There is process and then there is application. Contemporary and traditional forgework both spring from the same basics of blacksmithing. To draw-out or punch, to incise or upset is to affect metal in a generic manner until style and design are introduced.

Learning the basics well enough to practice is a reasonably short trip. Learning what to do with those basics can fill as much of your life as you allow.

After the "basics" but before mastery is achieved there lies what is probably the widest gulf found in any art/craft. To work through the vocabulary of traditional motifs and processes or to apply those processes anew to contemporary design ideas is a long journey. That is where the term came from, journeyman.
ABANA / Internet

The Address is:
http://wuarchive.wustl.edu/edu/arts/blacksmithing/ABANA/

ABANA now has an Internet site. This graphically rich, informationally current site can be reached through CompuServe, America Online, E-World, Prodigy, or a local Internet access company. There are gallery's of photographs of members work (taken from past Anvil's Ring Issues) as well as historic work including a section of Samuel Yellin photographs.

There are areas of current events, descriptions of our publications as well as information about our Chapters. The Chapter section has a map of the USA and Canada that directs the viewer to the region where their nearest Chapter is located and includes Chapter addresses. Chapter newsletters are starting to be housed there as well. BAM and UMBA currently post their newsletter through the ABANA site.

While our two publications allow us to share what we do with one another, the ABANA Internet site shows the world who we are and what we do as well as how to join both ABANA and its Chapters.

ABANA / E-Mail Round Table

To Join the 'TheForge', ABANA's E-Mail Round Table:
Send an E-Mail message to listproc@wugate.wustl.edu In the body (text) part of the E-Mail write Subscribe theforge Your Name that's all. You will receive a return E-Mail message telling you how to post a question to the group or offer an idea. Everyone in the group will get all the messages, questions or comments and all may respond or offer a new topic. A sharing of information kind of thing! Good ideas may wind up in The Hammer's Blow "Shop Tips" section.

Hammer's Blow Coffee Mugs!

You can get one free if your Shop Tip is selected as Best Beginner or Best Intermediate/Advanced Tip. OR........you can buy one from the ABANA office. (Free is definitely better!) They are light gray with the new HB logo on one side and our anvil toting assistant on the other. What a deal!

Next Deadline:
Dec. 30
Out: Feb. 22

Address all material for publication to:
E-Mail: CompuServe: 73444,316
AOL: METALSMITH
Internet: GDixon@mailbox.ioa.com

The journal of the Artist-Blacksmiths' Association of North America (ABANA, a non-profit corporation) is published and mailed to members on a quarterly basis by ABANA, P.O. Box 206, Washington, MO 63090. Membership is available to anyone interested in the art of blacksmithing at the regular membership rate of $35 per year. Matters related only to membership, magazine or journal subscription should be addressed to Janelle Gilbert, ABANA Office, P.O. Box 206, Washington, Missouri, 63090. POSTMASTER: Send address changes to ABANA, P.O. Box 206, Washington, MO 63090. © 1995, Artist-Blacksmiths' Association of North America. The contents of this publication may not be reproduced either in whole or in part without the permission of the editor or the individual contributors. Contributors retain all copyright privileges; the material is copyrighted solely for their protection.

Disclaimer Notice: The Artist-Blacksmiths' Association of North America (ABANA) its staff, directors, officer, editors and members specifically disclaim any responsibility or liability for damages or injuries as a result of any construction, design use or application of information contained in this newsletter. The use of any information is solely at the users risk.
Professional Smithing is back. A run has been printed and is now available. This well written and photographically detailed book deals with many aspects of production forging. Although the topics of production are interior colonial style items, the approach and techniques can be applied to any style of work.

There are a variety of jigs and fixtures shown that are geared towards producing hinges and thumb latch parts. Some of these are used with a press while others are entirely hand powered. Tooling ideas range from tongs modified to facilitate a specific step of production to a shop-made rivet cutter and vise tools for holding work pieces.

The heart of the book is the projects that take you in steps from stock to finished piece. These include a one piece kitchen ladle that shows what you can do when you really want to spread metal. There are pipe tongs (smokers pipes that is) hinges and pintles, hasps and a ring latch to list a few. Each project has a detailed description of the work coupled with photographs of the tools and progressions involved. Whether you are a professional smith or an avid hobbyist, Professional Smithing offers something for a Blacksmith's Bookshelf.

---

Shop Tips

Layout

When you have a bar to layout for a railing (or anything) that requires punching or drilling in evenly spaced increments take the time to do a progression sheet. If, for example, the space from center to center of the holes to be drilled for tenons is 5 1/2" and there are 8 holes you would work out the math for the layout as follows:

5 1/2" 11" 16 1/2" 22" 27 1/2" 33" 38 1/2" 44"

Having checked the math you then start at one end of the bar and measure down its length, marking at each stage of the progression. This system avoids the error potential of starting at 5 1/2", marking, and then measuring 5 1/2" more and marking again. The chance of incremental error is eliminated with a progression sheet.

Layout

Layout is king, all else follows the marks you make on a piece of metal prior to process. Layout fluid (available through industrial suppliers) is a thin dye that dries rapidly and leaves a dark color spot where you apply it. This background allows a scribe or silver pencil mark to be very apparent.

Process benefits greatly from layout. A chisel line that follows a precise layout, which includes cold marking with the tool that will subsequently be used hot, will have the richness of hand work with the precision of control.
Echo's of the 'Ring'

These hinge drawings came from the Summer 1984 issue of *The Anvil's Ring* (Volume 12, Issue # 2). They were part of a series of reprints from *Pencil Points*, originally seen in July of 1934.

Methods of applying nails & studs.

Welded

Bevelled before rolling

Forged from solid, bushed, & welded to strap

Some methods of making hinge sockets

Buckhorn Hinge

H-Hinge

L-Hinge

Pin rivetted in

Washer

Pin dropped in

Three good pivoting devices
Apprentices' Notebook

Drifts:

Drifts are tools that are used to shape and refine the inside diameter of slits, punchings and rolled forms in a variety of situations. Drifts can be made in almost any shape a design requires. The most common are round and square in cross section.

The diameter of the body of the drift is the precise forming aspect of the tool. (Fig. 1) The body of a drift works well when it is as long as the piece to be drifted is thick.

The leading end of the drift is tapered enough (Fig. 2) to fit into the undersized slit or punched hole. Sometimes the leading end is forged to match the slit hole with a transition into the body (round or square) of the drift. In either case the leading end has smooth taper to allow the tool to ease into the hole.

The trailing end (Fig. 3) of the drift is also tapered but not as much as the leading end. In fact, the trailing end needs to be just under the diameter of the body of the drift to function. The trailing end is a heavier taper because it must carry the force of the hammer blows that drive the drift through the undersized hole. The length of the trailing end is critical. It must be somewhat longer than the thickness of the stock being drifted to allow the full size body of the drift to move through the stock, refining the hole, before the end of the drift is flush with the stock surface. If it is not longer than the body of the drift there will be nothing to drive with the hammer and the drifts body will hang-up in the hole. If the trailing end is longer than the stock is thick, the body will pass through the stock while enough of the trailing end protrudes to hammer on. Make the last few hammer blows light ones or the drift will shoot out of the piece as the body passes through. It will be hot and moving fast if you are not careful.

There are other types of drifts beyond the basic form described here. In the project section there are two different types of 'drifts'.
Rolling a single knuckle hinge eye: Style 1
In this example the hinge will have a 1/2" ID knuckle or barrel, and will be made from stock 1 1/2" wide.

Make the drift pin out of 31/32" drill rod. Forge a thick taper at least 1 3/4" long on the rod, measure another 1 3/4" up from the taper and cut the drift off (Fig. 1). Bevel the cut end.

Bevel the end of the hinge stock. If the stock is 3/16" thick then bevel back 3/16". Forge any slight spreading of material back into the hinge stock (Fig. 2).

Extend the beveled end over the edge of the anvil and begin to curve the stock with moderate hammer blows (Fig. 3). It is important that the curve begin at the end of the piece so that there is no straight stock involved in rolling the eye.

Roll the beveled end of the hinge stock until its curve will hold the drift pin. Insert the body of the drift into the curve and continue to close the curve on the drift, rolling the barrel as you go.

Set-up a swage with low sides. Some that are made or modified for this purpose have one side lower than the other. Striking the tapered end of the drift, knock it out and take a heat on the barrel. Reinsert the drift and set the barrel in the trough of the swage. Lightly hammer the barrel, hot, onto the drift as you rock it in the swage (Fig. 4). This tightens the barrel down snugly onto the drift. When it looks even, knock out the drift. Do not quench the barrel.

When the hinge knuckle or barrel has cooled you need to ream it. The pin to be used will be 1/2" cold rolled (for a precise fit and constant dimension) but the barrel is 1/32" undersize due to using the 31/32" drill rod for the drift. Take a 1/2" reamer and put it into a hand chuck. (A hand chuck is a drill chuck mounted on a handle, it has many uses (Fig. 5)) Since the barrel is 1/32" undersize in diameter you have only to remove 1/64" from each side of the inner barrel wall for a very close fit with the 1/2" hinge pin. The 1/64" is easy to manually turn out with the hand reamer coated with a film of cutting oil. There is no need to power ream, it's quicker by hand because there is no setup. The result is a very close fit. I usually break the edges on a 3/16" thick bearing bronze washer, polish it and fit it between the knuckles of the hinge. This adds a bit of color as well as a smooth action (Fig. 6).
Project

Rolling a single knuckle hinge eye: Style 2
Style 2 comes from Steve Kayne of Candler, NC.

Scarf the end of the hinge stock. If the stock is 3/16" thick then scarf back 3/16" (Fig. 1). There will be a slight spreading of the end of the hinge stock, leave it. File or grind this off in the fitting process.

(Fig. 1)

Extend the scarfed end over the edge of the anvil and begin to curve the stock with moderate hammer blows. It is important that the curve begin at the end of the piece so that there is no straight stock involved in rolling the eye (Fig. 2).

(Fig. 2)

Continue to roll the scarfed end of the hinge stock until its curve will hold a drift pin. In this example the drift is only slightly longer than the width of the stock and is the diameter of the intended ID of the barrel (Fig. 3). Place the drift into the curve and continue to roll the barrel or knuckle of the hinge. Pull the loose barrel against the edge of the anvil as you strike the outside of the curve. This tightens the barrel as it continues to roll. If your initial curve of the scarfed end of the hinge stock was well done, the piece will roll cleanly into the cylinder shape that comprises the barrel or knuckle (Fig. 4). Keeping the drift inside the barrel and pulling the barrel back against the anvil (Fig. 5) refine the outside with moderate hammer strokes.

(Fig. 3)

(Fig. 4)

(Fig. 5)

When your satisfied with the forging, turn the barrel on edge and rap it against the anvil allowing the pin to fall out. Do not quench the barrel. When cold, drive a pin back in and hammer around the barrel until the pin drops out. Later, if necessary, pass a drill bit through to true the inside to your pin size.
Fundamentals of Blacksmithing

The need for a series on the fundamentals of our craft has been apparent for some time. Coming issues will deal the basic processes of Drawing Out, Spreading, Upsetting, Rolling and Scrolling, Punching, Twisting and Forge Welding. The fundamentals of tool, jig and fixture making will also be included.

The Fire

The common feature of a gas or coal forge is control of the heat source. In either case improper control can lead to oxidation, or excessive scaling of your metal. In both cases the proper mixture of fuel and air will raise the quantity of heat as well as the absolute temperature with a minimum of scaling.

Gas forges have come a long way. Small commercial units are reasonably priced and have more or less dealt with the fuel - air mixture issue. Home made is a whole different issue and will not be dealt with here other than to reiterate that the mixture of fuel to air must be adjusted as blower volume is increased to maintain a semi-neutral, less oxidizing fire.

Coal forges are more demanding of the user than gas forges. The coal forge, used skillfully, will heat stock as quickly and have less oxidation than most gas forges. (There are also some textural effects that will covered in a later issue that can only be achieved in a coal forge). The key here is "used skillfully". A coal forge is more than a heat source, it is a tool that requires competency just like any other tool. You are the fuel pump and regulation of fuel and draft is a constant requirement in the heating cycle.

The most common error made in using coal is maintaining too small a fire. To work well a coal fire should be relatively large and deep. A large fire, even for fairly small work, gives a fast recovery when heating your material. A large fire allows for a distinct vertical separation of the levels found in a forge fire. These are the Oxidizing, Neutral and Carburizing levels (Fig. 1). When the fire is deep the neutral band is broad and as long as you feed the fire properly that band can be maintained. By keeping your work piece in that band you will minimize oxidation. While 'too many irons in the fire' is an old adage, you can maintain multiple pieces in a coal fire with a little experience.

![Figure 1](image)

Coke is formed from the coal around the fire in the forge. As the burning coke is reduced to ash you must feed the freshly forming coke into the fire from all sides as you move fresh coal in to take its place. A fire that is properly burning the coke it is generating will be almost smoke free, very hot and clean. The right coal matters. While any coal will burn, metallurgical grades of coal are best. Most coal dealers will know what you are referring to when you ask for a metallurgical grade of blacksmiths coal...they may not have it so keep looking.

Wet coal cokes better than dry coal. If you are burning "fines", or small pieces of coal, it will pack better wet than dry.
Fundamentals of Blacksmithing

Starting The Fire

On top of the air hole (tuyere) of a cleaned out firepot place either a tightly wadded ball of newspaper or a pile of dry wood shavings or pieces. Around and over this pile a solid layer of coked coal. If you don't have any then use dry uncoked (green) coal, you will just get a smoky start this time. Light the paper or shavings and, with the blower on, open the air gate slightly. As the blast pushes the fire add wet coal around the coke until you have a sizeable mound. Keep an outlet passage poked through the top of the mound to allow the hot blast an exit. This will burn off most of the smoke generated and keep the fire from spreading laterally.

A small, flat shovel about the size of your hand will allow you to "feel" the edge of the firepot as you force it down into the coal and wedge over and slightly lift the coke thus feeding the fire. Pack fresh, wet coal into the voids you form as you move the coke inward to feed the burn.

A poker, straight seems to be fine, allows you to break open the mound to allow gases to escape the top or open a port on the side to place stock into the fire. Again, "mound" is the operant term. A reasonably large pile of packed coal works best.

A can with a series of small holes in one side about 3/4 of the way up from the bottom, fixed on a handle, makes a great sprinkler to control the fire and keep the coal wet.

Heating In The Fire

If your fire is deep, as shown in Fig. 1, the optimum place for you stock is the mid-level of the fire (Fig. 2). A coal forge raises temperatures that are above the burning point of carbon steels. Since this is almost assuredly what you are forging (bar, rod and sheet or plate are all carbon steels) you need to pay close attention to how your forge heats the material. Because the amount of blast or air flow greatly influences temperature you need to get used to controlling your fire at the air gate.

As you forge your stock you change its cross section. What started as a thick bar becomes a piece of varied thicknesses, all of which respond to the heat at different speeds. The time it took to get your first heats on the thick stock is more than enough time to burn off the thinner result of you hammer work as you thin the bar. The key is to induce the heat more slowly. With some experience and somewhat more control you can bring a piece with widely different cross sections to a forging or welding heat in your forge. I guarantee that a little inattention will turn your effort into a sparkler.

(Fig. 2)

 Quitting The Fire

When your forging day is done make sure that you have a good reserve of coke to start your next fire. I prefer to pack the fire one last time and let the fading heat do a little more coking. Shut the blower, check around the forge with "safety" on your mind and remember to rap your anvil three times on the way out the door.
Forging A Tenon
(also called Tenant in the 1888 Glossary of Architecture because it 'occupies' a mortise)

Example stock: 5/8" x 5/8" square stock.
Tools: Butcher, hammer and a monkey tool.

A tenon is a protrusion forged at the end of a piece of stock that is intended to be inserted into a hole (mortise) made to receive it. A good tenon has a distinct shoulder, a slight radius at its base and is true in dimension. It can be square, round or rectangular. (Fig. 1)

Layout: Use a scribe or a silver pencil and a square to draw a line around the bar approximately 3/4" from one end (Fig 2).

Using the butcher with the vertical face towards the intended shoulder, incise the layout line around the bar. Take a heat and drive the butcher with a hand hammer or a treadle hammer. This establishes the shoulder and moves the stock that will become the tenon away from that shoulder so it is easier to forge (Fig. 3). Work progressively around the bar, develop the butcher cut and you won't distort the tenon base. Be careful not to butcher quite as deeply as the intended base of the tenon to avoid leaving a nick that may develop into a crack.

Take a heat. Place the tenon-to-be on the anvil with the shoulder tight against the anvils edge (Fig. 4). Hold down hard to keep the stock from bouncing and marring the shoulder. Forge the tenon area as you rotate the bar a quarter turn at a time until the four faces are forged down. Take a heat and set the bar in the same orientation but on the diamond and repeat the forging process. Take your time and develop the necessary hammer control, it will always serve you well.

As the square bar end facets into a rough round, the tenon, start to roll the piece on the anvil while hammering. Keep the shoulder tight against the anvil's side.

The monkey tool is used to clean up and slightly upset the shoulder (Fig. 5). It should have a chamfered rim around the hole which leaves a transitional fillet at the base of the tenon. This helps resist cracking under stress. The mortise (hole) should have a corresponding countersink to receive this fillet. Take a heat and quickly put the bar in a vise.

Slide the monkey tool (sized for the tenon) onto the tenon and drive the end with a hammer. Rotate the monkey tool a partial turn with each blow and keep it parallel with the bar.

Stages of forming a tenon.

Monkey Tool (Fig. 5)
Conferences & Events

From England

Announcing an invitational forging event:
The reconstruction of the Elizabethan Globe Theatre, where many of Shakespeare's works were first performed, is about to be graced with gates forged by British blacksmith Brian Russell for Richard Quinnell Ltd. An invitation is being extended to the blacksmiths of the world to contribute the decorative motifs arrayed throughout the design. These motifs take the form of animals, plants and birds mentioned in Shakespeare's plays. On Shakespeare's birthday weekend, (April 20th - 23rd, 1996) the selected motifs will incorporate in the gates at a public forge-in held by the British Artist-Blacksmiths Association, BABA. There will be no payment offered for any motif. These are donations of a labor of love by the metalsmiths involved. Should more motifs arrive than room allows, the overflow will be worked into fixtures throughout the Globe Theatre. All contributors will have their names recorded on a plaque which will be permanently displayed in the theatre. To avoid duplication please contact Richard Quinnell for a list of unclaimed motifs. There will be restrictions on size and motifs should be of metal and suitable for zinc metallizing and painting or they should be of stainless steel. Contact: Richard Quinnell, Oxshot Rd., Leatherhead, Surrey, KT22OEN, England. Telephone 01372 375148 or Fax 01372 386516.

June 26-30, 1996
The 1996 ABANA Conference will be held at Alfred State College in Alfred, NY. Don't miss Tom Joyce, Tom Latane, Peter Ross, Francis Whitaker, Toby Hickman, Clifton Ralph, the Colonial Williamsburg Smiths and many others.

Remember to help ABANA by donating items to the Auction and Iron in the Hat! For information call (716) 268-7383 or fax (716) 268-5152.

March 22-24, 1996
Power Hammer Rebuilding Seminar instructed by Fred Caylor. A Hands-On event! Cost $85.00 420 4th Corso, Nebraska City, NE 68410 (402) 873-6603

For Sale

Trip Air 50lb Air Hammer. Excellent condition. Must sell for health reasons. Originally $3400.00 will sell for $2400.00 plus shipping. Call or write: Art Oakes at 3 Norris Circle, Cottondale, AL 35453 (205) 556-3222

Peddinghaus Tongs, Hammers and Anvils
At Discount, we ship and accept Visa / Mastercard Kayne and Son Custom Forged Hardware Candler, NC 28715 (704) 667-8868 0r 665-1989 Fax (704) 665-8303

Supplier Information

Little Giant / Automotive Inc.
Little Giant Power Hammers, parts and rebuilding. They bought out the Little Giant company and are a source for keeping the 'old dependables' pounding away. 420 4th Corso, Nebraska City, NE 68410 (402) 873-6603
ABANA
MEMBERSHIP APPLICATION

NAME _________________________ PHONE( ) _________________________

ADDRESS(Street) _________________________ (POBox) _________________________

CITY _________________________ STATE ________ ZIP ________

Indicate type of membership applying for:

☐ REGULAR MEMBERSHIP $35.00  ☐ NEW MEMBER?  ☐ RENEWAL MEMBER?
☐ SENIOR CITIZEN (65+) $30.00  ☐ FULLTIME STUDENT $30.00
☐ OVERSEAS AIRMAIL $70.00  ☐ CONTRIBUTORY MEMBER $100.00
☐ OVERSEAS SURFACE MAIL $50.00  ☐ PUBLIC LIBRARY $25.00

I _________________________ hereby apply for membership in the Artist-Blacksmiths’ Association of North America and enclose $ ________ as my annual membership dues for one year (subscription included).

☐ CHECK OR MONEY ORDER ENCLOSED (WRITTEN ON U.S. BANKS ONLY)
☐ VISA  ☐ MASTERCARD

Exp. Date Required

Send to: ABANA PO Box 206, Washington MO 63090  ☑ Or phone with Visa/MasterCard (314) 390-2133

ABANA
Artist-Blacksmiths’ Association of North America
P.O. Box 206 Washington, MO 63090 USA

NON-PROFIT
BULK RATE
U.S. POSTAGE
PAID
Asheville, NC
Permit # 137