the Newsletter

of the Blacksmiths' Guild of the Potomac

Vol. XXV No. 1

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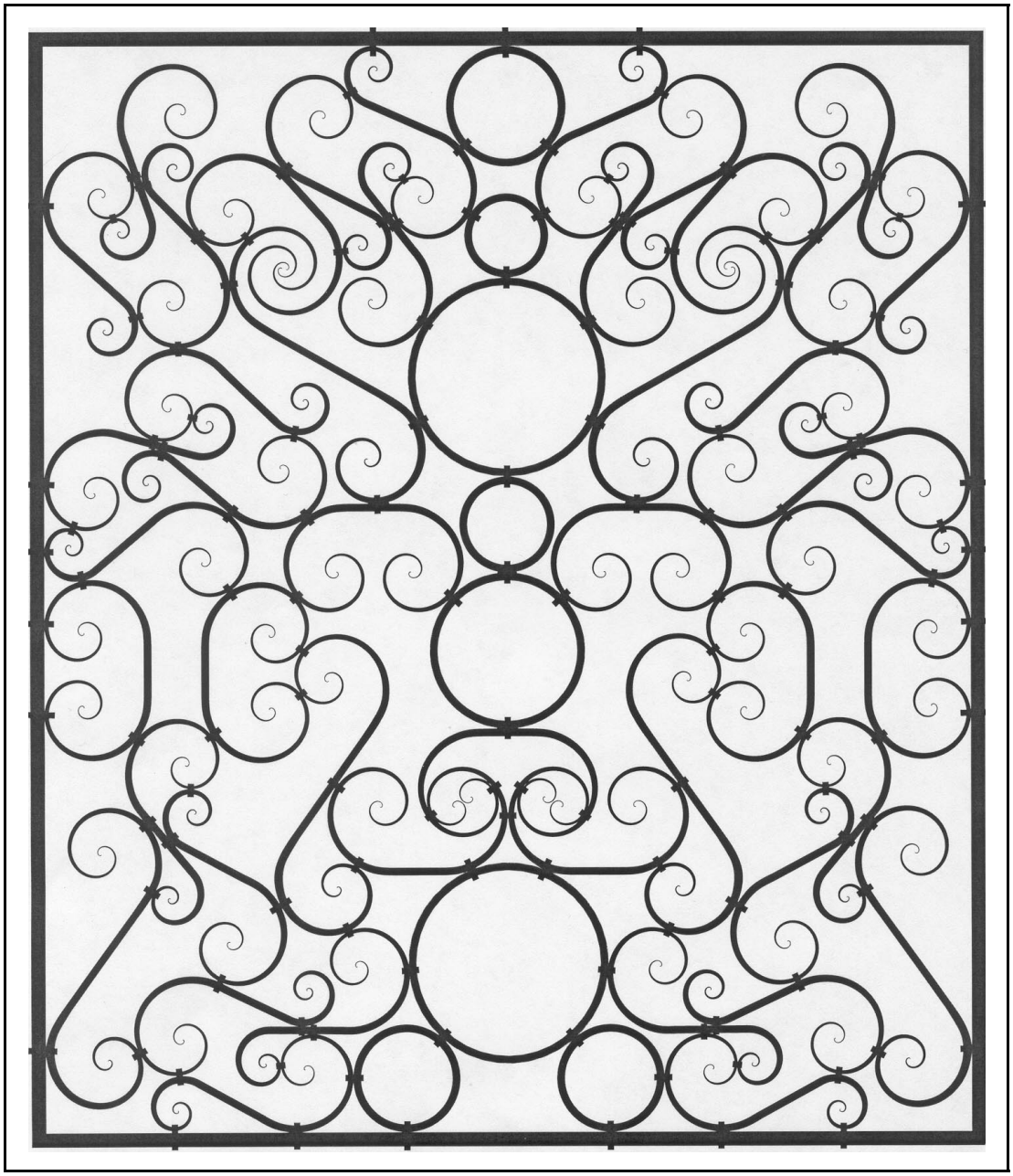
an affiliate of ABANA: Artist Blacksmiths' Association of North America



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The Blacksmiths' Guild of the Potomac, Inc.

2003 Board of Directors

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Luray VA 22835

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3407 Aberdeen St
Suitland MD 20746-3104
301-423-4938

Call the HOTLINE at 703-527-0409 for the latest news about Guild events.

*Member of the Executive Committee

BGOP MEETINGS

Guild meetings are held on the first and third Fridays of each month at 7:30 P.M. at the Gulf Branch Nature Center, 3608 North Military Road, Arlington VA 22207. Meetings are usually held in the Guild's shop which is located about 50 yards past the Nature Center building on the wooded path. Occasional Friday meetings with a speaker or video are held in the Nature Center auditorium. Call the HOTLINE for updates on meetings and event.

Scholarship Applications

Please send scholarship applications to Tug Tuggle
519 Morning Calm Lane, Harpers Ferry, WV 25425.

Committee Chairmen

Building	Ross Sullivan	540-775-2067
Claude Moore Park	Pat McGuire	703-437-9034
Corporation	Fay LeCompte	540-743-1812
Demonstrations	Jan Kochansky	301-937-6538
Meeting Raffle	Tom Coker	301-942-8573
Hospitality	Ed Jackson	410-549-2829
Hotline	Tug Tuggle	304-876-0909
Library	Steve Crist	703-754-9678
Membership	Ken Zastrow	301-622-0897
Newsletter	George McConnell	703-620-6454
Scholarships	Tug Tuggle	304-876-0909

Shop Rules And Etiquette

The Guild shop is available for use by members whenever the Nature Center park is open. Shop is locked, so call Shopmaster or a Board member for access. Follow all safety rules. Record number of visitors on log sheet near door.

Please observe the following rules and etiquette:

- Bring safety glasses and wear them. Work in a safe manner at all times.
- Clean the shop **before** you start to work.
- Empty firepots and dump ash gate after each use to minimize corrosion.
- Dump ashes in the ash dump outside, at the side of the shop.
- Place tools back in their proper places.
- Dress bar ends which you have cut, to be ready for the next user.
- Clean the shop before you leave, and carry out trash which you create.
- Always turn out the lights and lock up when leaving.
- Bring your own material for personal projects. Shop stock is for learning and practice.
- No alcoholic beverages on park property.

The Newsletter is mailed to members six times a year. Initial membership is $30 or three years for $60. Renewals are $20 or three years for $55. Life memberships are $300. Membership applications and renewals may be sent to the treasurer/ membership chairman, Ken Zastrow, check payable to BGOP.

Beginners Class

The next beginners class will start on January 16th. Cost is $150 and guild membership is required. The next intermediate class will start in January 13th depending on interest. Cost is $150 and requires a previous beginners class.
If you are interested in a particular subject like tool making as soon as we can get a group together we will set up a class. Fees and time negotiable.
Contact George Anderton 703-321-9737 or e-mail piton@erols.com

George Anderton

Blacksmithing & Safety

from the Appalachian Area Chapter Newsletter

by Dave Smucker

Last issue we talked about one aspect of hand safety wearing rings. This issue I would like to spend some time talking about gloves. Gloves can be a real aid in hand safety, preventing both burns and cuts, but they also can be a major risk around rotating machinery such as a drill press. So first let's start with the high-risk behavior of wearing gloves while using a drill press, lathe or other rotating machinery. Never ever use this equipment while wearing gloves don't do it, not even for just one item. The risk of getting the glove caught in the chuck, drill, work piece or other parts is just too great - and the result is the loss of a finger, or extreme damage to a hand and/or wrist. Don't take the chance; take the gloves off.

While visiting some manufacturing operations, I have been appalled to see rotating equipment operators wearing gloves. The reason they had gloves on was to prevent cuts, often minor, from sharp edges of metal that they were working with, but the risk of a loss of a finger or extreme hand/wrist damage is much greater. The problem originated from the fact that the inexperienced management was under great pressure to prevent cuts and other limited hand injures but had no idea of the possible damage if a worker got the glove caught in the chuck, drill or work piece. When I asked them about it, I was told that the workers were not to get their hand near the chuck, drill or work piece while the equipment was running. Give me a break. People do dumb things, especially when tired or in a hurry.

My advice, drummed into me by some older, experienced machinists when I was a young engineer, is !lever, ever wear gloves when you turn the machine on. If needed, wear them to load the work piece, drill, etc., but for your hand's sake, take them off before you hit that on switch.

Now that I have that off my chest, let's talk about gloves as a great aid to the blacksmith and welder. I include the many forms of welding here, since many of us do that and it plays a large part in our overall shop safety. Some smiths like gloves while doing forge work; others do not, but I find them very useful when dealing with hot stock and the high temperature of the forge. Some smiths like to wear just one glove on their tong or stock hands, while others like gloves on both hands. Some like to wear a glove only when forge welding or if the piece they are working with (and not using tongs) is too hot to handle. Some smiths almost never wear gloves at the forge.

For arc welding - stick, mig or tig - gloves are really required because of the heat and ultra violet radiation from the arc. Most welders doing gas welding and/or cutting also want a glove on the filler rod hand because of the heat. The old standard for arc welding is leather gloves. They come in forms ranging from very heavy gloves with large wrist gauntlets to very thin, tight fitting gloves for tig and gas welding. I have used them all, but have now come to like something better KEVLAR®.

In my blacksmithing I had tried leather and cotton. I found the cotton gloves better since they provide better insulation from heat from both the work piece and the forge itself. While they are cheap, the problems with cotton were that they didn't last long and were a real pain if you got them wet from the slack tub. A few years back I purchased a pair of heavy Kevlar gloves and was very impressed with how well they insulated - but found them too heavy for the hammer hand and even too awkward for the tong hand for many things. Still they certainly handled the heat well. I then found some thin knit Kevlar gloves. I really like these and now wear them for both forge work and arc welding. I have found that I even like them on both hands most of the time. The one thing that is missing is that they don't have wrist gauntlets that would help when arc welding.

What is Kevlar anyway? It is an aramid fiber invented by two Dupont scientists, Stephanie Kwolek and Herbert Blades, back in 1965. It has a very high tensile strength to weight ratio, low electrical and thermal conductivity, high chemical resistance, high cut resistance and is flame resistant and self-extinguishing. Dupont's web page on Kevlar gives some data that explains why it works much better than leather for dealing with heat. In contact with a hot item at 415°F for 25 seconds the leather will rise in temperature by 120°F while the Kevlar will increase by only 17°F. The problem I always had with leather while welding is that it stays hot. Kevlar doesn't.

The gloves I like so well are really intended for cut protection and not hot work, but I find them very effective for both. I got mine from MSC for about $5 a pair, but many industrial supply houses now have them. I have also found they make great general work gloves, and I use them for many things. They are washable, and I have yet to destroy a pair. Just remember: take them off around the drill press and other rotating equipment.

The above thoughts are the opinions of the author and not the position of the Appalachian Area Chapter or ABANA.

DUES ARE DUE

for those whose membership expires at the end of 2002.

EVENTS and Meetings	
January 31	Board meeting
February 7	Forge weld a picket (Phil Heath)
February 21	Heat treating for tools
February 22	Dan Boone pasture party
March 7	Open Forge
March 21	Treadle Hammers at the nature center
March 29,30	Furnace Town Joint Meeting
April 4	Finishes for Iron
April 18	Spring Fling preparation
April 26,27	Spring Fling

Correction—Nov / Dec 2002 newletter

The publication of the letter from Sergiy should be attributed to Nancy Zastrow. Thanks again Nancy

New Email Addresses

Melissa Sulivan	Forgelady@earthlink.net
Ross Sullivan	Cherryhillforge@earthlink.net

Changes & Corrections

Don Plummer	H 610-495-5058
Lance Davis	E-mail: lance@bentoaks.org
Steve Murdock	Fiddle Head Forge

New Life member

#552 John Stapko

New members

#641 Ben Bovee' '03
4433 Village Dr
Fairfax VA 22030
H 703-277-3330
W 703-476-4200

#642 Mike Rodrigue '03
Virginia Architectural Metals
204 Thompson Ave Suite 133
Fredericksburg VA 22405
H 540-371-7740
W 540-899-0642

#643 Victor Ferrante '03
4108 25th St N
Arlington VA 22207-3939
H 703-525-6660
W 202-708-6423

#644 James Leenhouts '03
10305 Nantucket Ct
Fairfax VA 22032
H 703-323-0701

#645 Jonathan Sheldon '05
4111 N Old Glebe Rd
Arlington VA 22207
attyjon@comcast.net

#646 Steve Friend '03
141 Blackbird Ct
Whitacre VA 22625
H 540-888-3190
W 304-725-2553

Thanks for renewals

		PAID THRU
#361	James Roberts	'02
#453	Les & Becky Lorenz	'03
#343	William Clague	'05
#475	Pat Fulcher	'06
#454	Roy Ysla	'03
#605	Joe Boland	'05
#617	Kathryn Barnhardt	'03
#611	Chip Chenery	'05
#42	John J Austen	'05
#556	Connie Badowski	'03
#41	Edward S Jackson	'04
#239	Tuve Tuvesson	'03
#210	Gary Doub	'03
#305	Roger Amidon	'05
#614	Mary Beth Rynders	'03
#634	David Bluett	'03
#504	John Aakesson	'03
#608	Jay M. Peters	'03
#577	Michael Briskin	'05
#360	Keith Kuck	'05
#248	William Heston	'04
#629	David & Jeremiah Murphy	'03
#392	Pat McGuire	'03
#290	Lance Davis	'03
#249	John Wintermoyer	'05

Dan Boone's Blacksmithing Pasture Party

It's time again for Dan Boone's Blacksmithing Pasture Party. The date is February 22, 2003. Be sure to bring something for Iron In The Hat, and be prepared to participate. This pays for your lunch and the great demonstrators you get to enjoy. There will be tailgate sales and who knows what all! Deadline for reservations is Feb. 15 or 200 attendees, whichever comes first. Call Judy at 540-967-3267 for reservations.

Directions: From the north:

- Go SOUTH on I-95 to Exit 118 (Thornburg, Rt. 606) follow signs for Lake Anna, turn RIGHT at end of ramp.
- Follow 606 for approx. 5 miles, at Stop sign at Snell, Route number changes to 208.
- Continue on 208 for approx. 25 miles to Stop sign at Rt. 522.
- Turn LEFT onto 522, go toward Mineral, come to Stop sign at Firehouse.
- Turn RIGHT, go 1 block to Stop sign, turn LEFT still following 522 go through town of Mineral at end of town is Texaco station, go approx. 1/2 mi. past this station.
- Turn RIGHT onto Rt. 605, go approx. 7 miles.
- Turn RIGHT onto WEST Old Mountain Road (Rt. 640)
- Go approx. 2-1/2 miles, turn LEFT onto Parrish Road
- We are second driveway on RIGHT - look for IRON OAKS sign

Joint meeting at Furnace Town

The last weekend in March, 29 & 30. Fred Crist will be the demonstrator. Cost is not yet finalized. Similar arrangements to last year - demo on Sat, lunch provided, Iron in the Hat. Supper will be extra cost, approx $16. Workshop on Sun with each participating group given 2 slots in the workshop.

SPRING FLING 2003

Due to a conflict with Easter this year, Spring Fling will be held a week later than usual -- April 26th and 27th. Registration info will be mailed out in early February.

Demonstrators will be:

- Corrina Mensoff - Forging steel as well as sheet forming and fold forming copper and brass.
- Maegan Crowley - (not confirmed yet)
- Joe Leisch - Casting brass on Saturday.
- Colonial Williamsburg Blacksmith and Gunsmith
- Tailgaiting will be bigger and better than ever.
- See you in April

Boy Scout Metalwork (Blacksmithing) Merit Badge Project 2/22/03

The Merit Badge Jamboree for Boy Scouts in the Colonial Council in the Alexandria, Virginia area is coming up on February 22, 2003. The location this year will be at Mark Twain Middle School, 4700 Franconia Road, Alexandria, Virginia (off of the old exit 2 of the beltway, Telegraph Rd. exit). The usual setup is to provide a ground-level room with outside access for the forge(s), while cold work can be done inside.

I have been serving as counselor at this event for the Metalwork merit badge for the last four years, with occasional help from a number of volunteer parents, as well as Doug Ayen and Jock Dempsey (the Guru from Anvilfire). Last year was a transition from the old requirements to the new 2001 book. (There was only one, new, 2001 merit badge book available in the Council, and I received it the day of the jamboree.) The new book has a strong blacksmithing section as one of the four chief options (along with sheet metal, foundry and silversmithing).

This is one of the popular courses at the Merit Badge Jamboree, and we expect to have from 10 to 12 Scouts attending. The objective of the day's exercise is to give them a sound introduction to metalwork and to qualify them for the merit badge at the end of the day.

The following sheet outlines the program for this year. We usually break the boys into two- or three-Scout teams and lead them through the steps of the requirement. Note that there are a number of pre-requirements for things like tin can craft , riveting, soldering and such that the Scouts are expected to bring with them. I do not expect all of the Scouts to have all of these requirements nailed, so we will have workstations set up to wrap up these requirements. (At least the new requirements don't include acid etching... messy, I assure you.) The more expediently we wrap up these requirements, the more time the Scouts (and we) can have fun at the forge.

I will be bringing a small farriers anvil, portable (tripod) post vise, a coal and/or gas forge and a shipload of other equipment for the various workstation. I would be most grateful for any assistance in this endeavor, and anyone who can supply additional or better equipment for the forging or the workstations would be very welcome. It is fun to do, and the excitement of the Scouts as they transform the metal is worth the whole bother.

Please feel free to contact me at: {H} 301-769-2627 (8:00-10:00 pm) {W} 202-354-1939 (7:30-4:00) [asylum@earthlink.net or bruce_blackistone@nps.gov] for additional information. As stated above, this is among the most popular sessions at the jamboree, and they have always had to turn some Scouts away each year. I hope to see some of you there.

Bruce Blackistone, Oakley Forge

Dear Scouts and Parents:

Welcome to the Metalwork Merit Badge project, part of the Merit Badge Jamboree, scheduled for February, 2003. We will be specializing in the Blacksmithing option.

The Metalwork Merit Badge requirements have been revised, providing a more flexible, thorough and complex learning experience. There will, therefore, be a number of requirements that you will need to fulfill before the Jamboree so that we can concentrate on some of the more interesting and less common projects and operations.

First, Scouts should obtain a copy of the latest Metalwork Merit Badge booklet. This has a picture of a scout bending metal over a large anvil on the cover. DO NOT use earlier editions (showing a Scout with a shallow metal bowl), since the requirements have been changed. READ the book, paying special attention to the safety and blacksmithing sections. The tinsmithing, silversmithing and founding (metal casting) sections also contain useful information, and may be read at your convenience.

COMMENTS on REQUIREMENTS

1. Please pay special attention to the safety section, especially the part dealing with hot metal.

2. Learn the terminology of the tools and skills. There will be an oral quiz on the subject. (a-h)

3. If possible, please experiment with yield points, work hardening and annealing copper, brass, or 12 gage or thicker solid copper wire. (a-c).

Experiment with solid and pop rivets (d).

Experiment with flatlock seams and soldering (e).

Make two tasteful object out of tin cans (see page 30-31 for possible projects) (g). Please be very careful with cut tin cans and be sure to fold or round all seams. These edges can cut. If you have not met this requirement before hand, bring two soup cans and a number 10 tin can or large coffee can to make the ever popular “hobo cup” and candelarium.

We will be running temper colors and making punches at the jamboree. (f)

Please bring examples of all completed requirements with you (annealed brass, tin can wares, soldered or riveted metal, etc.) for evaluation. We will have some materials on site to complete these demonstrations, but the more requirements done ahead of time, the more time we will have at the forge.

4. Scouts and their parents are welcome to visit my shop in Southern Maryland between now and the Jamboree. We can also possibly arrange visits to other shops or the forge used by the Blacksmith’s Guild of the Potomac in Arlington. Please contact me at asylum@earthlink.net or 202-354-1939 for further information (a).

Or, if you have internet access, compile a notebook of interesting blacksmithing and metalworking sites on the internet, starting with www.abana.org and www.anvilfire.com . Observe how the shops are laid out and projects that you might want to try as you become more skillful (b).

Since my specialty is blacksmithing, we will be completing projects under Option 4-Blacksmith. Bring two dimensioned sketches of proposed projects. Some projects are shown in the back of the merit

badge book and some, designed to meet Scouting merit badge requirements, are in the iForge section of the Anvilfire web site http://www.anvilfire.com/iForge/. Projects 110, 132, 135 and 136 are designed to be within the capability of Scouts and to meet requirements for the merit badge. Depending upon the age and strength of the scout we can also forge tent pegs, pot hooks, scribers and other useful items. Councilor, Scout and/or parent will agree on appropriate projects within the scope of abilities, tools, materials and time.

EQUIPMENT for SCOUTS

Safety glasses and leather or leather and canvas work gloves are required.

Work or shop apron, canvas or leather preferred.

Clothing should be cotton or wool if possible. Avoid synthetics (which will melt into the skin upon ignition).

Leather boots or high topped shoes. Pants legs should be left out to keep hot metal from falling down boot or shoe tops. Tennis shoes and synthetics melt!

Advanced reading:

- The Complete Metalsmith by Tim McCreight; 1991, Davis Publications, Inc., Worcester, Massachusetts; LoC 81-66573, ISBN 0-87192-240-1\
- New Edge of the Anvil by Jack Andrews; 1994, Skipjack Press, Inc., Drexil Hill, Pennsylvania; LoC 94-92314, ISBN 1-879535-09-2
- The Art of Blacksmithing by Alex W. Bealer; (Third Edition) 1984, Harper and Row, New York; LoC 83-48320, ISBN 0-06-015225-7

Bruce Blackistone, Oakley Forge

(H) 301-769-2627 (8:00-10:00 p.m.)

(W) 202-354-1939 (National Park Service, 7:45-4:15)

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BOOK REVIEW

By John Austen

Colonial Craftsmen And the Beginnings of American Industry by Edwin Tunis. Johns Hopkins University Press (2715 N. Charles Street, Baltimore MD21218-4319), 1999. 159 pp. $19.95.

Johns Hopkins University Press is reprinting several of the Edwin Tunis books, which are of great interest to historians of technology including blacksmiths. The volume on Colonial Craftsmen covers forty-eight crafts in the era leading up to the industrial revolution. Several of these are iron-working crafts (blacksmith, locksmith, cutler, gunsmith, etc.) and many others involve iron tools and fittings. Although Tunis admits in the preface that he "is not an expert in any of the trades described" and "has certainly missed some things entirely and failed, in spite of his best efforts, to understand others" his work is a useful overview of tools and processes in the hand-craft era and beginning of the industrial revolution. His few errors and omissions can be forgiven.

The book begins with a Preface and Acknowledgements that serve to review the sources consulted. Tunis undertook extensive research in museums and libraries as well as corresponding with other historians. He mentions the problems of researching the seventeenth century, noting that this book is thus primarily concerned with the eighteenth century. He consulted Diderot's Encyclopedie but used other sources in preference to it, since American practices were generally based on English, Scottish or German methods. Tunis often shows a single method, chosen from among many ways of accomplishing a task. He describes one of the ways axes were made, and one of the ways gun barrels were made; but we should remember that other methods were used as well. Bearing that in mind, the book serves as an interesting sampling of colonial craft practices.

The body of the book is divided into six sections, each containing several sub-headings. The first section (New World, New Ways) discusses general matters, including trade restrictions, apprentices, prices, and such. The other sections each address several particular crafts, as well as including a page or so of commentary and introduction. The section on Country Work includes the blacksmith. The section on Town Shops includes the cutler. The section on Bespoke Work (i.e. made-to-order) includes the town blacksmith, the locksmith and the gunsmith among others. There are also sections on Group Work and on Manufactories (including Ironmasters). The book is a well-balanced blend of text and drawings. Each page generally has several hundred words as well as several sketches related to the text. A full-page drawing on the front end paper depicts a tilt hammer in use at a finery forge.

This Johns Hopkins volume is a reprint of the work

originally issued in hardcover in 1965 by The World Publishing Company. It was reprinted in paperback several years later by Crowell, as an oversized tome of 8-3/4" x 11-7/8", just slightly too big to fit conveniently on most bookshelves. The present Johns Hopkins release is a more convenient size at 8-1/2" x 11", fitting the shelf very nicely without losing any clarity. Most of the Tunis books are available in school libraries for use by upper elementary students (and popular as well with teachers preparing lesson plans, according to one librarian I met). With their well-balanced blend of text and drawings they provide an interesting sampling of colonial craft practices, as well as a delightful "flavor of the times". We should become familiar with this widely read book, which has served as the introduction to colonial crafts for many of the spectators attending our blacksmith demonstrations.

Teaching Blacksmithing

Hey!

Are you an outstanding blacksmith, with an ability to teach?

Yes, good!

I was told by the head of the Metals program at the Worcester Center for Crafts that there is a plan to expand the Blacksmithing classes & they may expand into a program for foundry work. It is a paid position & they want
resumes of experience & training. A degree is not required, skill at teaching is.

Worcester Center for Crafts, School for Professional Crafts Web site

25 Sagamore Road, Worcester, MA 01605
Attn: Sarah Nelson, Metals Dept. Head
Pax,
Olaf/Jim Revells
SPC student

http://mailman.qth.net/mailman/listinfo/theforge
theforge mail list group photo site is
http://www.photoaccess.com
Login: blacksmithblacksmith@hotmail.com
password: anvil

Brad Silberberg's Rust Finish for Steel

by Brad Silberberg, Bradley Metal Design, Inc.

This finish will be a polished rust having the look of a old, well-used tool. It is an interior finish only, and if placed outside will continue to rust.

Surface preparation: First, sand blast the piece to be rusted to bare metal. Then, smooth the surface with a motorized wire brush wheel until shiny silver. (Brushing alone will not remove all of the black oxide from a forging.) Make sure that the wire brush wheel is not full of oil or grease from a previous work piece or it may get on the piece to be rusted and keep rust from forming. (New wire wheels are oiled at the factory.) Wear gloves to keep the oil from your hands off the piece as well.

Rusting solution: Mix up a solution of Ammonium Chloride (common name: Sal Ammoniac) and water, mixing about one teaspoon in one US gallon of water or a pinch in a coffee cup of water. This will form a dilute, buffered hydrochloric acid solution. While this solution is fairly weak, you should wear rubber gloves and eye protection and work in a well ventilated area.

Application: This is messy, so work on small objects in a deep sink, or set up a wood frame with a plastic tarp to make a containment for liquid run-off for large objects. Apply the solution by brush, sponge, or spray bottle to wet the entire surface of the object to be rusted. (For large objects, mix up this solution in a 2 gal. orchard sprayer.) The steel will start to turn yellow in minutes. Try to keep the liquid from pooling in recesses or on flat horizontal areas. Use a dry brush or a gentle blast of compressed air to remove the excess. (The pooled areas will sometimes not rust at all or turn black if the excess is not removed.) Wet the piece frequently with the sal ammoniac solution, rinsing with plain water once in a while between applications. You may need to turn the work over, on its side, or upside down from time to time to get all areas to rust evenly.

If large areas start to turn black, your solution may

be too strong. (Experiment with how often to wet with water vs. chemical solution as well.) Edges and high spots sometimes turn black or don't seem to want to rust at all. Rub these areas lightly with a piece of Scotchbrite soaked in the chemical solution. They will usually end up looking like the rest of the piece.

The rate of rust growth is affected by temperature. If your shop is very cold in the winter, the rust will grow very slowly. The repeated evaporation of the rusting solution encourages rust formation and keeping the air around the work piece moving with a breeze from a fan will help. You can really speed up the rusting process by heating the steel before applying the chemical solution. Use a heat gun to get the piece "hot-potato" hot and mist with a hand sprayer. Shoot the mist above or across the object to be rusted and let it settle onto it. The solution will evaporate very quickly and needs to be repeatedly applied. (Take safety precautions from the fumes.) If the piece starts turning black it is reacting too vigorously and should be rinsed immediately.

Forging a rusty piece of steel makes the piece really hard to rust later. Even when it comes out of the forge oxidized black and has been sand blasted and brushed, some areas won't want to rust at all, so clean rusty metal before forging. The alloy content of the steel will affect the rust rate and the color of the rust as well, with two identical looking pieces of different alloys turning very different colors. In general, if things aren't turning out the way you want them to, start over by brushing on Muriatic acid (used to clean mortar from masonry work) to etch off the rust. This stuff is much more corrosive and protective wear and ventilation are imperative!)

Rust for one day for an orange rust with yellow in the low places, two days for more brown with orange tones. Don't rub the piece too much early on, as this newly formed rust is not very tightly held to the work. It will become more tenacious with time. You need to keep an eye on the rust as it grows. Walking away for long periods of time can result in odd streaks or unrusted areas. You can rust the work too much. It will become fuzzy and lose that polished look if you rust it more than two days, so take care to get it started evenly.

You can experiment with different chemical solutions to achieve different rust colors. Using a solution of ferric chloride (available from Radio Shack as printed circuit board etchant) in water will give a different look. You can also try laundry bleach straight from the bottle or add between six drops to a dropper full of muriatic acid to a pint of 3 % hydrogen peroxide from the drugstore. Substituting hot salt water after initiating rust with one of the chemical solutions will cause the rust to be more chocolate brown.

Neutralize: This will help keep your piece from becoming re-activated and rusting again later if located in a humid room. Neutralize the rust by rinsing the work a few times with baking soda or washing soda solution, about 3 teaspoons to a gallon of water. Then rinse several times with very hot water. Allow the piece to dry thoroughly and wipe off the loose rust dust with a soft dry cloth.

Using sal ammoniac solution will turn any attached copper or brass greenish blue. You can leave this color or carefully buff it bright again with a wire wheel or Scotchbrite after rusting and neutralizing. Left colored or cleaned up, these metals contrast beautifully with the rusted steel. Adding gold leaf is also a very striking accent, but apply it before proceeding to finishing.

Finishing: Oiling with linseed oil-beeswax mix will produce an all-over mahogany brown. Lightly rubbing the high spots only, using a rag with partly dried-out oil/wax mix will leave orange and yellow in the low places, providing contrast. Waxing the piece with paste floor wax alone will yield a lighter orange-brown than the oil. Apply wax with the palms of your hands to keep it only on the high places or the lighter colors in the recesses will go dark too. When the wax is buffed up, the rust finish will look almost like polished wood.

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The Business of Blacksmithing Part 2 Record Keeping

My own experience in business is as follows. In the 1980's I operated a business which provided technical support to the performing arts. I built stages and scenery, erected large tents, set up sound and lighting systems, provided stage crews and so forth for a variety of events. I had a year round shop and had employees, yellow pages ads, clients who came to me year after year and clients who I only ever saw once. In my last year of business I was on the road almost constantly and doing virtually none of the work that had originally attracted me to the business. At that time I decided to sell my business and go to blacksmith school. As it happened the only blacksmith school I could find was a farrier's school, so that is how I started out. I never did work as a farrier but I did end up working with horses for a number of years. The fact that I could do an "antique" trade and work with horses landed me in the museum business, specifically in that branch called "living history". During my time in the museum profession I joined the Ontario Artist Blacksmith Association and began to develop my skill as a blacksmith. Eventually I came to the realization that the museum business was going to be a dead end for me and at that time I became a full time blacksmith.

While I would not want to survive solely on what I make as a blacksmith the "business" does pay for itself and does make a contribution to the household. Fortunately in my case that contribution is enough.

It would appear that starting a series on the business aspects of blacksmithing has struck a chord, not only is it a popular topic at meetings, but it has garnered a response from readers, something articles in the Trillium rarely do. Keep those letters and phone calls coming.

A clarification on one point in last month's column. Only with incorporation does the government guarantee you exclusive rights to your business name, your business registration fee does not ensure that someone else may use your business name. When I first registered a business name over twenty years ago as a sole proprietor the fee was ten dollars, now it is sixty. Is this an example of less for more?

Now that the new year is here I am going to write about all the record keeping that you should have been doing last year and that you should start to do this year.

The single most important document is a day book that you can keep track of what you do during the year. Even with the briefest of notations this will be most helpful. I find it is better to keep it at home in a safe place, perhaps by the telephone, where it will be noticed and noted it regularly. Carrying it with you constantly can be useful as well but has the risk of getting lost, losing much valuable information. If you want to carry an appointment book do so but keep your recording day book somewhere where it won't get lost, stolen or misplaced. The day book is a good place to note your hours worked, the hours of any employees or contractors you have working for you, mosey spent on materials, supplies and other costs and notes of when money is paid to you. As well you should note in this book whenever you use your personal vehicle for business purposes, the kilometers driven and any expenses incurred. Now the information in the day book is placed there in no particular order, and you don't do anything with it. It is just an informal record of when things happened during the year, but it can be very useful when it comes time to put your books in order.

Keep your receipts! Keep every receipt you get, even those that have nothing to do with business. As a habit it is easier to keep them all and dispose of those you don't need at a later date then to try and sort them on the fly. No-one has yet developed a simple and easy way for filing receipts. This is because there is no standardized shape or size to them and you can easily acquire receipts that range in size from a 2" x 2" square cash register receipt to a 8 1/2" x 14" multi page invoice, with every physical size in between. Unfortunately you need everyone of these scraps of paper because they prove that you paid money out to someone in the pursuit of your business. Proof that is necessary if you wish to avoid paying taxes on at least that portion of the money that you mad but did not get to keep. To establish this proof an auditor must be able to follow a paper trail through several steps, and each step has to be able to be verified independently. Thus your claim that you paid a bill for a load of materials can be verified

twice, once by the check, where the bank stamp will verify that the money was paid out, and by the "paid" invoice which indicates the check was received. (in an extreme case the auditor may even visit your bank and supplier to confirm shipments and payments)

All your receipted payments (and un receipted ones) should be entered in a ledger. This is simply an appropriately ruled book or even accounting software on a computer. Done on a regular basis during the year this will keep you up to date on how well or poorly your business is doing and come tax time it will make the task of filling out the tax forms a lot less onerous. The ledger also breaks down the income and expenses into separate accounts so you can keep track of which parts of your business are making, or conversely costing you money.

In my circumstances I make income from both doing demonstrations and from the sale of my work, so I have two columns for income. This lets me track the two separately. In addition one of the items is subject to provincial sales tax the other is not, another reason to keep them separate.

This is also the point where you can break down your expenses into separate categories. There are many ways to do this and there is no one "correct" .way you just need to do it the way that best works for you. First remember that you need to list a number of categories of expenses on your income tax form, so your categories should allow you to easily extract these figures when you go to do your taxes each year. Beyond that it depends on what information. you want to know. If you are concerned about the amount spent on paints and abrasives in your shop you may want separate columns for these items, otherwise you may wish to simply place them together under "shop supplies" .

It is important that you maintain consistency through the year as to where you place an expense, something that is credited to shop supplies one month should not go to maintenance the next.

Usually one of the biggest expenses we have is our vehicle. If you are lucky enough to have two vehicles then it is a simple matter of determining that one of them is your business vehicle and all expenses related to that vehicle are deductible. To ensure that this is acceptable both the vehicles must be road worthy, insured and registered-but I have seen cases where the "non-business" vehicle was a classic vintage car that gotten driven to a special car show once a year--the "business" vehicle managed to do everything else, quite legally. If you have only one vehicle things become more complicated. Now you must keep track of the kilometers driven over the course of the year, at least those for business purposes.

At the end of the year you divide the number of business kilometers driven by the total kilometers driven. For example if you drove 10,000 kilometers on business and the total driven was 20,000 kilometers the answer would be .5. This number represents the fraction of ALL your vehicle expenses that you may claim as a business expense. Therefore it is important that you keep receipts for all expenses for you vehicle as the business expense portion is determined as a portion of the total. (so even if you use your business vehicle on a vacation trip the cost of the fuel used on that trip counts towards the total operation of the vehicle, although the mileage does not count as business mileage)

Once again I should warn you that this is from my own experience. The advice is given free and is worth every penny you pay for it.

Remember to check the Canada Customs and Revenue Agency forms and guides carefully each year. Not only can they change the rules, but they don't have to tell you that they have changed the rules.

Try to keep your bookkeeping simple. There are simple computer programs available and even simpler "all-in-one" ledger books for those who prefer to do it by hand. If you are not sure what to do hire a bookkeeper to help you set up a system that you can manage and keep up. You'll find that tax time becomes much less of a burden and you will probably be pleasantly surprised to see that not all of your money is just slipping through your fingers.

Reprinted from the Iron Trillium, Jan/Feb 2003, Ontario Artist Blacksmith Association

Cannot determine original author

COLONIAL DOOR HARDWARE
BY DOUG ROBERTS
Reprinted from "Forge" vol 14 Issue10
Vancouver Island Blacksmiths

Whether forged by a colonial smith or imported from an English factory the hardware of colonial America was hand wrought. The more isolated the community was the more likely the door hardware was to be locally made.
The earliest hinge in colonial times was the strap hinge, generally plain. Of necessity, due to the lack of readily available iron, they were often made of old wagon tires. Little ornamentation was found on these early hinges except for finials usually round or ovate, occasionally arrow head, heart, or fishtail and rarely tulip or fleur de lies, except where the Dutch or Germans settled. This may have been due to the harsh necessities of colonization in combination with the. religious views of the time, making the smith perform in a solely functional and less decorative manner.
Cockshead pattern hinges were found in places where people of Germanic decent settled, but in a less ornate from than found in Europe. Where English settled the Cockshead hinge is mostly of a standard size and pattern indicating that it was probably mass produced, though still hand made, and imported rather than being locally made. They are however uncommon in the English settled places.
Pennsylvania Dutch smiths seemed to, at an earlier time develop an artistic approach, the tulip being a popular hinge ornament. The heart was also popular along with Masonic symbolism. In the late 18th and early 19th the craft of making hinges in colonial America reached its zenith. The artisan took the greatest pride in the products of his labour creating an excellence of the product which is apparent in that the simplest things were done well." The excellence of the product rather than the monetary reward seems to have been the motivating factor in their workmanship." (Written like a true academic)
The most numerous hinges are the H and HL style and were used universally throughout the colonies. They were cheap hand forged in factories in standard sizes from door size down to delicate patterns for cabinets and cupboards. They varied in finish from' plain to beveled With foilate finials; and chasing. Legend has it that H and HL stand for Holy and Holy Lord, and were placed on doors as a protection from witchcraft. It was common in these times to put leather washers under the nails, usually of a bright. colour, this was probably ornamental, but may have served some purpose unknown to us.
Latches came in several types, Suffolk, Norfolk, Escutcheon-lift, and Knocker latches. The Suffolk latch is the basic door latch, with upper and usually lower cusps joined together by a handle. The thumb press passes through the upper cusp and is held in position by a split tongue or swivel pin. the thumb press lifts the bar inside the door, releasing it from the catch and allowing the door to be opened. There are some without lower cusps, there is instead a spike end which is passed through the door and clenched, though these are not as common as in Europe. The Norfolk latch works on the same principle as the Suffolk latch, but has a back plate or escutcheon plate instead of cusps. Over time these proved to be the most popular, however were eventually superceded by a patented cast iron latch.
The Escutcheon-lift latch has the same general principle as the Suffolk latch, only there is an escutcheon which is slotted to have the handle pass through. The escutcheon then slides up and down, the handle being made fast to the door. To it is a bar attached through welding or riveting which passes through the door. When the escutcheon is lifted up then this bar lifts the latch-bar, the escutcheon bar serving the same purpose as the thumb piece on a Suffolk or Norfolk latch. The Knocker latch is a combination knocker and latch the handle grasp serving as a knocker and mechanism by which the bar is lifted out of the catch. There are two designs commonly used. The New England style which has a square or rectangular hole in the end of the boar away from the catch. The handle is then tenoned to fit the hole in the bar and either riveted or more commonly clenched to fasten it to the bar, which in turn holds the bar to the door in conjunction with the staple. In the Dutch style the bar is lifted by the means of another piece of iron fastened to the knocker/ handle/grasp, the bar being lifted by means of this earn, this type is easier to operate than the New England style due to the leverage acquired through the use of a earn. the New England style was found in the Dutch colonies, but the reverse is not so. Door knockers were not used commonly in the colonies as they were in Europe, however there are some in existence which show good workmanship and probably gave-their owners pride.
As a security device prior to the development and common distribution of latch locks doors were fitted with bolts. These were quite simple in design, a bar, flat or round held to the door by two staples and sliding into another staple with no ornamentation to quite ornate. Some of the ornamentation included backplate which were cut to pleasing shapes, " dog ears" which were a punched spreading of the edges of the bolt to prevent it from sliding through the staples. Also there is. found beveling of edges, file marks in a decorative manner, fishtailing and curling of the ends, and is only limited by the imagination of the smith. Some had riveted grasps, and others had a turned up end to facilitate locking and unlocking the bolt. There does not seem to be the standardization found in hinges and latches in the colonies. Bolts are often found on shed and barn doors with a grasp passing through the door so the bolt can be on one side of the door and opened from either side.
The transition from latch to lock brought the Latch-Lock into the fore. This is achieved by the addition of a backplate on the latch side and a spring to close the latch bar. There is also in some cases a mechanism to prevent the bar from being lifted when it is activated. this may be achieved by a simple
bar that is swung down to prevent the latch from lifting the latch bar to a complex arrangement of cams and springs to do the same job. As the mechanism became more complex however they were encased behind a plate to prevent damage and eventually evolved into locks.

"Iron & Steel" by Hans Peot

BRIEF HISTORY:

Wrought iron dates back to the ancient Egyptian Empire. Very small blooms of iron were produced in forges using charcoal. In 500 BC the Etruscans were producing 10,000 pounds of iron a year on the western shore of Italy using short cupolas with bellows made of animal skins to produce the air source. Once the burn was complete, the short furnaces made of stone were disassembled and the resulting mass of iron and impurities were removed and further refined by heating and hammering. The charcoal making process deforested most of western Italy. The iron ore was brought to the furnaces on sailing ship. The extraction the Etruscans used was so poor that the tailings were mined during both world wars to produce steel. Wrought iron was produced throughout Europe in late BC to early AD. In the magnificent buildings of the Greeks and Romans the stones were held together with butterfly shaped pieces of iron coated with lead.

The first steel was produced by the Celtics in about 200 AD. They cut up wrought iron into small strips and stacked them in a wrought iron container with burnt bone and carbon and heated them in a charcoal fired furnace for 10 to 12 hours at a high heat. In the process. carbon was absorbed into the surface of the metal. They then forged welded the pieces together and produced blades. This was the forerunner of pattern welded blades as we know them and which we erroneously call Damascus. Damascus steel was developed in Pakistan at about the same time in the form of Wootz billets and sent to Syria to be made into Damascus blades. As near as we can tell, (since the exact process is unknown) pure iron ore and carbon were placed in a ceramic crucible and actually melted producing a carbon steel which contained about 1.5% carbon. It was very difficult to forge since it had to be worked at a red heat. Any hotter and it would shatter. The Celtic's steel process was copied by the Vikings and Germans to produce pattern welded steel blades through about 1050 AD. From that time until 1400 AD both countries produced steel blades by family protected secret processes.

During that time period they started making their furnaces taller and taller. At this point they were no longer producing wrought iron. The iron finally melted and as it ran down through the charcoal it dissolved some of the carbon into the iron. The resulting iron had 3 to 4 percent carbon, was not forgeable and was very brittle. It could only be used for cast items and was not useful for blades or wagon parts. Also during this time period most of the forests in Europe and England were disappearing because of building and charcoal making. The King of England finally ruled that the forests could no longer be cut for making charcoal. This forced the steel makers to come up with a process to make coke out coal by driving out the volatile oils.

To get wrought iron in quantity, the English developed a puddling process where they mixed molten cast iron with molten iron silicate and iron oxide. Iron silicate is a component of wrought iron. They called the coal fired furnace a finery. When a worker called a rabbler stirred this mixture, the iron oxide would combine with the carbon forming iron and carbon dioxide. The resulting iron had a much higher melting point and would float to the top of the puddle. The rabbler would move the pieces into larger lumps weighing about 200 to 300 pounds. Then another worker, using a pair of tongs with an overhead track would grab these pieces called blooms and place them in a press to squeeze out some of the iron silicate. The bloom would then be run through a rolling mill and turned into muck bars. The muck bars would then be cut into short pieces. wired together and placed in a coal fired soak pit and raised to a weld heat and run through the rolls again into a finished piece called a merchant bar. This process was not only used throughout Europe but in the Eastern United States also. During the 1500's and 1600's, much of the forest in the United States were cut to make charcoal. To make steel, thin rolled merchant bars were place in a coal fired soak pit, covered with carbon and burnt bone and held at a high heat temperature for several days. The carbon would be absorbed into the iron forming blister steel. The name blister comes from the appearance of the bars when they were removed form the pit. They were covered with blisters. These bars were then folded and re-welded together to be used as steel. None of he steel was of very good quality having a lot of iron silicate inclusions.

In England, there was a need for a good quality steel to make springs for timepieces so that they could navigate the oceans. One enterprising Englishman noticed that the glassmakers were able to get very high temperatures in the glass furnaces. He took pieces of blister steel and placed them in a ceramic crucible, set it in a glass furnace and when the steel melted, the iron silicate floated out but the carbon remained, resulting in a quality steel. Unfortunately for him, too many people observed his efforts and he was unable to keep it secret and profit from his process. This process was further developed and produced good quality steel called cast or crucible steel. It is still used to this day to produce small quantities of different steels. A lot of old tools in the United States are marked cast steel. Some people mistakenly think that these tools were cast as the name implies.

The making of steel didn't get the greatest boost until the Bessemer Process was developed. There is a great argument on whether it was developed in the United States or England. To remove the carbon from the cast iron, they simply put it in a

large ladle and blew air up through the molten cast iron burning out the carbon and some of the iron in the process.

Wrought iron was produced in quantity by Beyers Steel through 1950 and was used in large construction jobs like the Grand Coulee dam because it was impervious to rusting. It would only rust down to the iron silicate and then stop.

Mixing of other alloys with iron occurred in the early 1900's where they added manganese, chrome, nickel, etc. in gas fired open-hearth furnaces. The process of coming up with new alloys was very slow since it was a hit-or-miss experimental process. The real push for alloys occurred during World War II when greater strength alloys were required for the weapons of war. Since then, great strides have been made in developing different steels.

IRON AND STEEL

Wrought Iron: Wrought iron is pure iron mixed with iron silicate (glass). When rolled through the mills a couple of times its structure takes on the characteristics of wood, having a definite grain structure. It is forged at a yellow heat. Lower heats will result in the metal shattering like a wood board unless it has been refined several times. If it does split. it is easily welded back together again at a yellow heat. The iron silicate acts as a flux. Holes drilled through it will split out lengthwise under load. Therefore. the end where the hole is should be folded over across the grain and forge welded. Since there is no carbon in the iron it will not burn like carbon steel even at a yellow heat. Wrought iron is no longer produced. It can be found in old iron structures fabricated at the end of the 1800's and the beginning of the 1900' s. Old bridges in the area have been a source of wrought iron. Some of this wrought iron is available or sale.

Carbon Steels: Most carbon steels contain less than 1.5% carbon. Mild steel as we once knew it was labeled 10 18-1020 containing .18 to .2 percent carbon.

Today, this is only true for steels smaller than *1/4"* thick and over 4" in breadth. Most of the hot-rolled steels today is made from scrap and is categorized as A-36, having a guaranteed tensile strength of 65,000 psi. Since it contains numerous other alloys the car bon content can vary up to .29% at which level it is not very suitable forging metal since with that carbon content it develops black hardness which will result in cracking and breaking. It is also made in a continuous pour process directly. As a result, you can find inclusions in the metal when you are working with it which will cause it to split.

Sulfur or lead is added to the low carbon steel to improve machineability. This is mostly found in cold drawn mild steels and *is* no good for forging at all since it has a tendency to crumble at forging temperatures. It is usually designated I 1 18 or I 1 LI8.

The more carbon that is added to the iron the greater the tensile strength it has until it starts to become brittle. The optimum strength is achieved at .4 to .45 percent carbon. In order to achieve hardness, the steel has to be heated to a cherry red and quenched in warn salt brine and then tempered.

Carbon steels with a carbon content of between 0.6 and 1.4 percent are designated as W -I. W -2, etc. The W indicating that they can be hardened in water.

This is a little misleading in that only small pieces such as chisels and punches can be hardened safely in water. Since water boils, it causes steam bubbles, which results in uneven cooling and on larger pieces of carbon steel, cracking results. Most of the time, the coolant is warn salt brine. With the best quench the depth of the hardness goes in less than 1/4" leaving the core soft. The cherry red color is observed in a dark area with no outside light. The old black. smiths usually had a blackened bucket under the bench to find this red color.

For people who are color blind this temperature occurs when the steel is no longer magnetic. Once the steel is quenches it has to be tempered by adding heat. This is accomplished by cleaning the piece down to the bright metal and slowly heating it and watching the color change stopping at one of the colors below and then cooling in further in water.

Lathe tools, milling cutters	Straw Yellow
Chisels, punches	Bronze to Dark Purple
Woodworking tools – Blue Springs	Dark Blue

Alloy Steels: Since carbon steels can only be hardened to a depth of 1/4". large pieces of high strength steel was not available to the industry. The most important alloying metal turns out to be chrome. Chrome does two things to the steel. It allows deeper hardening and resistance to deforming at elevated temperatures. Other metals that improve strength and deep hardening are molybdenum, vanadium, nickel and tungsten. Since we now have deep hardening during quenching we no longer can use water or brine because cooling is too fast and high stresses occur in the metal that causing cracking or break-

age. They now must be hardened in quenching oil or air. Quenching oils are organic and specifically developed for quenching. Motor oil can be used but fumes off the oil are usually toxic and results are not predictable since quenching rates are unknown.

Some of the steels that are useful to blacksmiths from junkyards are:

Car & truck springs - flat, round or coiled	Its referred to as 5160 which is a chrome steel with 0.5% carbon, 1 % manganese, 0.3% silicon and 0.6% chrome.
Large truck axles make good hammerheads	It is called 4140 having 0.4% carbon, 1 % manganese, 0.2% silicon, I % chrome and 0.2% molybdenum.

Steels that are available from First Street Recycling in Dayton, Ohio that are readily available in an annealed state, having the Quality Steel Company color coding are as follows:

0-1 Blue-oil hardening-only the outside will have a machined surface.	Don't confuse with cold drawn which is also painted blue on the ends.
0-2 White-high carbon alloy die steel air hardening.	Too brittle for blacksmith work.
A-2 Green-high carbon alloy steel that is air hardening.	Again, too hard and too brittle for blacksmith tools.
M-2 Orange-high carbon alloy steel used for making milling cutters, etc.	Air or oil hardening, much too brittle for blacksmith work.
H-13 Green and White-a hot work steel.	air hardening, makes excellent punches and chisels for the blacksmith and holds its temper at high heat.
S- 7 Orange and Black-a shock resistant air hardenable alloy steel.	An excellent steel for blacksmith tools. It retains its hardness and strength at very high temperatures. With a handled hot cut, the handle will burn out of the tool before you will lose its usable hardness and strength.
4140 Blue and Green-oil hardening.	0.4% carbon, 1 % manganese, 0.2% silicon, I % chrome and 0.2% molybdenum.
5160 Red and Green-oil hardening alloy.	a chrome steel with 0.5% carbon, 1 % manganese, 0.3% silicon and 0.6% chrome.

Many thanks to Hans for this article. He deals with First Street Recycling in Dayton a lot and knows what they have. I have been there a few times myself and am amazed at the selection of scrap tool steel they have at pennies on the dollar. Check them out sometime when you are in the Dayton area. Hans can give you directions.

Interesting Nail Facts

comments & photos by Bill Curry, Placerville, California articles by Robert Ruhloff, Ashland, Massachusetts Reprinted from "Forge" vol 15 Issue 9 Vancouver Island Blacksmiths

Many thanks to the California Blacksmith who originally published this fine article.

Some time ago I ordered copies of a couple of German books on descriptive drawing that had been translated and published by Robert Ruhloff. I discovered that not only could he translate German to English but that he was a retired engineer and an experienced blacksmith as well. He sent me two very interesting articles he had put together on the manufacturing and use of various types of nails and spikes used both for ship building and residential construction. Fifteen years ago Robert had taken on the job of making a large number of nails for the restoration of the copy of the original Mayflower, which had been brought to Plymouth from England He did considerable research on that project in order to determine just what the original fasteners_ looked like and exactly how they were installed He sent me one of the spikes he had forged for that job, which I photographed for inclusion in this rep Ort. The following write-up describes what he found out about some of the fasteners required to fabricate the reconstructed vessel. Mr. Ruhloff prepared both of the following articles and fabricated the nails.

Hand forged of wrought iron, they are not simple nails but much more sophisticated than might appear. The squared spikes were hammered out of round material. (Methods of rolling or drawing square or rectangular shapes were developed hundreds of years later.) The square beneath the head was tapered from two sides only, to bring the end to a chisel edge. A round hole was drilled through the plank, not into the beam. and counter-bored to sink the head of the spike below the surface. The spike was driven into the slightly under-sized hole, and the square comers would set firmly into the round hole. Most important, the chisel point was set across the grain of the deck beam; thus the danger of splitting was avoided. The fibers of the wood were cut, not split, and held firmly the entire length of the spikes as they were driven down. The counterbored hole above the head of the spike, perhaps a half-inch deep, was then filled with a wood plug. The side and bottom planking of a ship like the Mayflower was probably held to the ribs with runnels (tree nails), tapered plugs of a tough, stringy wood - like ash or hornbeam. The ribs were much heavier than the deck beams, and usually doubled, so the hole drilled through the plank and into the rib would not weaken the rib to any significant extent. The swelling of the wet plank and the plug would hold tightly. Wrought iron rusted far less readily than modern steel, and a fish oil dip facilitated driving the spike and also helped to preserve both wood and iron.

Hand Forged Nails

If you look across the village green in many of the hundreds of older towns in New England, you may see the town hall, the church and a number of colonial homes, some of them quite large.

Most of these structures are of wood, with cedar shingle or slate roofs. The exterior siding is usually narrow strips; each lapped over the strip below in the style called clapboard.

Take off a strip of clapboard, and you will see it has been nailed to the building frame. In similar fashion, each slate or shingle is nailed to wooden sheathing. In both instances, the nails are covered by the overlap.

Count the number of strips of clapboard - there may be a hundred on one side of a two-and-a-half story house. There are nails every eighteen inches - forty nails in a sixty-foot building!

Add two nails in each slate or shingle for the possibly five thousand slates in a large roof. To these impressive numbers, add nails to hold the sheathing to the frame, and a total of over twenty thousand nails might be needed for one building. Until well after 1800, when cut nails came into use, each of these nails was forged by hand. Nail making was an important trade, and many a nailer spent an entire lifetime forging nails. Nails for clapboard would be less than 1/8" square under a small, thin, flattened head, and no more than an inch to an inch-and-a-quarter long; nails for heavy construction and spikes for bridge and ship building could be ¾" or more square and as many as two feet long. While there were many variations, nails were usually made from round material. Roughly rounded rods of wrought iron were available; methods of rolling square or rectangular material were not developed until much later.

The usual steps in the process are as follows:

For example, for a nail 3 ½" long, with a large head, a rod about ⅜" in diameter was used. Rods were usually from 1-½ to two feet long.

1. Heat the end of the rod to a bright red.

2. Hammer a shoulder, from two sides, about 2" from the end of the rod, against the edge of the anvil. (The shoulder will locate and hold the head in the header

4. On the hardie (anvil chisel) make a cut almost. through the rod, about 1/2" above the shoulder.

5. Bend the rod at the cut to 90°

6. Heat at the bend, with the sharp point up out of the fire.

7. Push the nail through the heading tool.

8. Break off the rod at the cut, leaving the nail in the

tool, with the cut end projecting upward.

9. With a heavy hammer, form the nail head; the rest of the nail will be projecting downward into the hardie hole in the anvil.

10. Finish the head with four angled blows. The heading tool is simply a short length of iron or steel, with a tapered, square hole punched through at one end; the size of the square was made for the dimension of the nail below the head.

Thomas Jefferson had a nail factory at Monticello, and from his detailed records and existing examples, We know that his nailers followed a similar procedure.

In the collected papers of Thomas Jefferson (Princeton University Press), there are many references to nail rods, nails and nailers. In one note, Jefferson said, "Eight lads, employed as nailers, and fed, clothed and housed as apprentices, will produce twenty-five thousand nails per week." In the year 1810 the factory at Monticello produced six tons of nails.

In the mid to late 1800s the lure of more fertile lands to the west led to large scale abandonment of many farms in New England. Often, with no market for the remaining property, buildings were burned down, and the ashes raked for the nails. A bushel of hand forged nails salvaged from the fire would be a valuable asset for a new farm.

I am sure much of the above information is already known to many of our more experienced smiths, but for the newer members of the CBA, as well as myself, I found both of Mr. Ruhloffs articles to be good reading and informative. Apparently he is well into his eighties and has been very deeply involved with blacksmithing as a hobby for many years. Incidentally the two German books on descriptive drawing as it relates to metalwork that Mr. Ruhloff translated and published included a number of good hints for doing that kind of drawing, as well as several projects for practice. Their titles are Descriptive Drawing For Metalwork (45 *pages) and Workbook For Descriptive Drawing* (75 *pages). The two books together sell for $32.00 (US) plus* $2.25 *for priority mailing. His address is*

770 Watson Spruce Comer Road, Ashfleld, .MA 01330.

Cover Art

The design on this months cover is one of the results of evaluating the use of CAD for the Artist/Blacksmith. It was was created with Design CAD and a macro I wrote in BasicCad to draw spirals for the scrolls.

The spiral program has three parameters: beginning (small) radius, the large radius and the number of revolutions for the logarithmic spiral.

You draw two spirals to for a tapered scroll. After drawing the first spiral line you can start the next spiral at the same beginning radius and end it say at a 1/2" greater ending radius and you will get a perfectly tapered scroll that begins 1/2" wide and tapers to a point. If you want it to look more realistic taper it down to an 1/8" and put a rounded tip on the end.

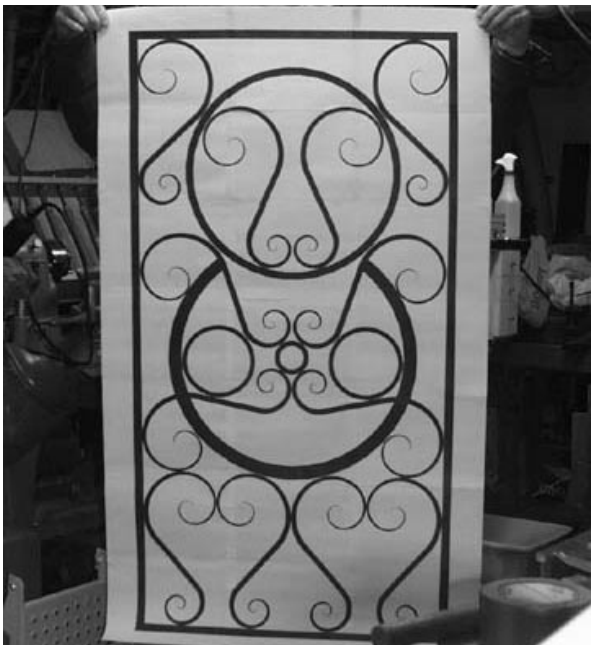
Once you have drawn a few scrolls you can manipulate them by copying, mirroring, rotating etc. to create a design.

The cover art is a design of a 61-7/8" X 71-15/16" frame 1" thick containing scrolls and circles made of 1/2" material. The scrolls taper from 1/2" to zero.

The ability to quickly manipulate the design elements while maintaining precise dimensional capability could make CAD useful for complex designs that have dimensional constraints. This can give one confidence about the overall design appearance and fit as well as provide a cost effective way to sell a concept to a client.

Another use is to scan in photographs or other artwork and convert them into CAD vector drawings. This can be a big plus for the "artistically challenged".

Using cad to help in the shop I think would be much more of a challenge. I have used this programs ability to print a full size 21 sheet design on multiple sheets of paper. I found the overlap feature useful when combined with the corner markers for accurately positioning the sheets. I also found the paper glue that works like a lipstick to be easier to use than tape. The cover design would require 56 8-1/2 X 11 sheets. George McConnell



For Sale

Little Giant 50 pound Power trip Hammer
Comes with its own platform.
Two sets of flat drawing dies.
Has new 3HP 220V motor
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Call: Dan Gillman 540-554-8407

"OIL" Finish

By Jeff Spoor

Reprinted from Northern Rockies Blacksmith Association News

Winter 2001

"Oil" as a finish really has to be broken down into 2 categories, drying and non-drying. The drying oils include Tung oil and Boiled Linseed oil. The drying is actually a polymerization in contact with oxygen. Other oils also polymerize, but very very slowly. Dryers are added to linseed oil to make it harden in one lifetime. It also is possible to actually boil linseed oil to create a drying oil, but temps are critical and not widely known (and risky). The metallic dryers that are added are toxic, so it isn't food safe should a bit flake off into the porridge.

Non-drying oils, like mineral oil and most vegetable oils, just remain slippery. The vegetable ones can go rancid, or slowly polymerize and get *messy.* Walnut oil will get *gummy* in a few weeks and be very ugly for instance. In several years it might harden though.... Mineral oil is refined petroleum and therefore will not go rancid. It isn't digestible either, which is why it'll cure constipation.

It is also possible to speed up the polymerization with heat. I have used olive oil on cast iron cookware to season it, but I take it to a higher temp than most (400+ F) past the smoke point, and it hardens to a nice dark brown-black finish (instant aging) that is quite hard - harder than the usual seasoning process. It withstands most washing at that point without rusting, but is not weatherproof by any means. This is heat without direct flame.

Also, a polymerized (dried) oil should not be flammable (when done drying). If the tools are to be used around oxygen or near flame, as in welding, do not use a non-drying oil. The oil will spontaneously combust (possible near concentrated oxygen) or otherwise bum in the flame. Very annoying while blacksmithing.

One last comment - drying oils will heat up while polymerizing. While there won't be enough to heat your object much, it can heat a soaked rag past its ignition temp. So, seal up the used rags in a reasonably airtight small metal can, or place in water, or spread out in the driveway to dry (the driveway will conduct enough heat away, especially in Fall). Hope this helps.

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ABANA Affiliate Liaison Letter

January 2003

Are you getting a little stressed out thinking of new ideas for your blacksmith club?
Then get a load of this!

Go to the ABANA website ***www.abana.org*** and click on "Affiliates," then look under "PDF Files." Then click on "Successful Affiliate Activities." Read what it says. Your Member Services Committee has been working hard to work out a system whereby it can be a clearing house for affiliates to share ideas. Do you have a good thing going for your club-*then share it with all of the other affiliates.*

Wouldn't you be tickled pink if you got all kinds of ideas on activities
that other affiliates found to be successful?
Ideas that you could use.
If So…
Talk with your affiliate officers-talk with your affiliate board members.
Encourage them to participate in this program

Remember when you were a wee tot in Miss. Larson's first grade class, and how excited you were when she said, "Now boys and girls, it is time for Show and Tell?" And now, your Member Services Committee says, "Now guys and gals, it is time for Show and Tell."

Have you been wondering how you might communicate a little bit more with ABANA?
Then get a load of this!

Go to the ABANA website and click on "Affiliates," then look under "PDF Files." Then click on "A Program To Enhance ABANA-Affiliate Communication." Read what it says. Your Member Services Committee has been working hard to set up a program to make it happen.

I'd be willing to bet the farm (well, if not the whole farm, maybe the back 10) that you would really like it if your ideas could go right to the ABANA Board members.

Talk to your officers and board members and ask them to participate by
sending an e-mail to Bob Jacoby

Bob Fredell, Chairman
Member Services Committee
(763) 389-5119
bobfredell@abana.org

BGOP Membership Application and Renewal

Name_____ Home Phone_____

Address_____ Work Phone_____

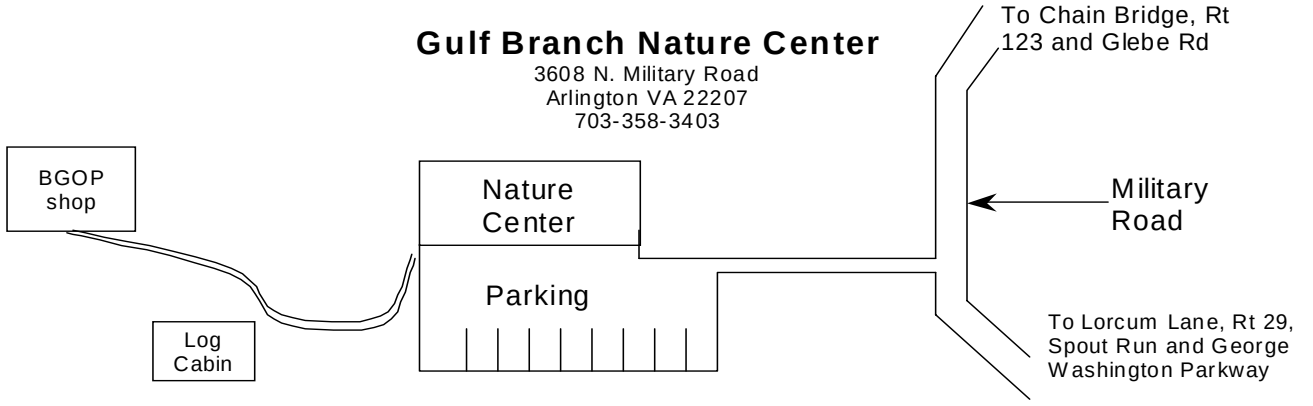
City_____ State_____ Zip_____

I am a member of ABANA, The Artist Blacksmiths Association of North America ☐ Yes ☐ No

☐ New Member—$30 or 3 yrs—$60 ☐ Renewal—$20 or 3 yrs—$55 ☐ Life—$300

Make check payable to: **BGOP**

Mail check and Member application to: Ken Zastrow, 12800 Hammonton Rd, Silver Spring MD 20904



ABANA

Name:

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Type of Membership

☐New Member ☐Renewal

☐ Regular—$45 ☐ Contributing—$100

☐ Student—$35 ☐ Library—$35

☐ Senior (65+) -$40 ☐ Overseas Air —$80

☐ Overseas surface -$60

ABANA Chaper Affiliation:_____

Application may also be made at the ABANA web site: www.abana.org

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www url:

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Submit check, money order (US banks only), or by credit card:

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