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THE FORGE FIRE

The Newsletter of the Indiana Blacksmithing Association, Inc.

An Affiliate Of The Artists-Blacksmiths' Association of North America, Inc.

IBA is a Not For Profit Indiana Corporation recognized by the IRS under section 501(c)(3)

9:30 AM is the regular meeting time for IBA Hammer-Ins with beginner training available at 9:00 AM. PLEASE MAKE SURE TO ASK FOR HELP!

If you would like an IBA membership application form, please contact Farrel Wells, Membership Secretary (765) 768-6235.

BULK LOTS ARE AVAILABLE TO DEMONSTRATORS, SHOPS, SHOWS AND OTHERS WILLING TO MAKE THEM AVAILABLE. WE APPRECIATE YOUR HELP.

The Indiana Blacksmithing Association, Inc., its staff, officers, directors, members, and hosts and the *Forge Fire*, specifically disclaim any responsibility or liability for damages or injuries as a result of any construction, design, use, manufacture or other activity undertaken as a result of the use, or application of, information contained in any articles in the Forge Fire. The Indiana Blacksmithing Association, Inc. And the *Forge Fire* assumes no responsibility or liability for the accuracy, fitness, proper design, safety, or safe use of any information contained in the *Forge Fire*.

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More nearby resources and organizations for blacksmiths:

Rural Smiths of Mid-America:

Meetings are on the first Saturday of each month
Call Ron Gill
317-374-8323 for details

IBA MEETING SCHEDULE

Check the latest *Forge Fire* for monthly **IBA** revisions.

July 16 2016	MAUMEE VALLEY BLACKSMITHS
Aug 20 2016	TBD
Sept 17 2016	TBD
Oct 15 2016	TBD



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Dates to Remember

July 16 IBA Hammer In Maumee Valley

Aug 5-21 Indiana State Fair

Sept 23-25 Quad State SOFA

Editors Message

The Maumee Valley Blacksmiths will be hosting this month's hammer in. Directions and details are on the back cover. Charlie Helton is expected to be our featured demonstrator. Hope to see you there!



Master Blacksmith Jim Morre has recently passed away. He will be missed by his loving family and the many blacksmiths who had the pleasure of working with him at the blacksmith shops in Fort Ouiatenon in West Lafayette and at the Prophetstown State Park in Battle Ground, Indiana. His joy of blacksmithing was contagious. His patience with neophyte blacksmiths was quite appreciated by the many people he helped to teach. Jim was instrumental is setting up the blacksmith shop at Fort and also at Prophetstown. For many vears he taught a beginners class in blacksmithing at the Fort. His influence on the blacksmith community in the West Lafayette area will live on for many years to come. He will be missed as a colleague and as a friend.

His obituary can be found at the Journal and Courier (http://www.legacy.com/obituaries/jconline/obituary.aspx?n=d-

james-morre&pid=180366989&fhid=14336).

Summer festival and fair season is upon us. Education is a fundamental part of the IBA charter, so public demonstrations are a key part of our organization. Please let me know if you have an upcoming event that would interest our members. The Rocky Forge group is looking for blacksmith help during their Illiana Steam and Power Show, July 15-17. Contact Ted Stout at 765-491-2194 if you are interested in helping out.

If you are interested in hosting a hammer in, please contact Gary Phillips at: (260) 251-4670.

Visit the IBA website at: www.indianablacksmithing.org

IBA Satellite Groups and News

1) Sutton-Terock Memorial Blacksmith Shop

Meet: 2nd Saturday at 9 AM Contacts: Fred Oden (574) 223-3508 Dennis Todd (574) 542-4886

3) Wabash Valley Blacksmith Shop

Meet: 2nd Saturday at 9 AM Contacts: Doug Moreland (217) 284-3457 Max Hoopengarner (812) 249-8303

5) Maumee Valley Blacksmiths

Meet: 2nd and 4th Saturday Contact: Clint Casey (260) 627-6270 Bruce Teegarden (260) 226-1722

7) Rocky Forge Blacksmith Guild

Meet: 2nd Saturday at 9 AM Contacts: Ted Stout (765) 572-2467

9) Whitewater Valley Blacksmiths

Meet: 2nd Saturday

Contact: Keith Hicks (765) 914-6584

11) Bunkum Valley Metalsmiths

Meet: 1st Saturday Contacts: Jim Malone (812) 725-3311 Terry Byers (812) 275-7150 Kathy Malone (812) 725-3310

13) Satellite 13

Meet: 4th Saturday

Contact: Bill Newman (317) 690-2455

2) Jennings County Historical Society Blacksmith Shop

Meet: 2nd Saturday at 9 AM Contact: Ray Sease (812) 522-7722

4) Fall Creek Blacksmith Shop

Meet: 4th Saturday at 9 AM Contacts: Gary Phillips (260) 251-4670 Dave Kline (765) 620-9351

6) St. Joe Valley Forgers

Meet: 4th Saturday at 9 AM Contacts: Bill Convers (574) 277-8729 John Latowski (574) 344-1730

8) The Southern Indiana Meteorite Mashers

Contacts: Mike Mills (812) 633-4273 Steve King (812) 797-0059 Jeff Reinhardt 812-949-7163

10) One-Armed Blacksmith Shop

Meet: 1st Saturday Contact: Tim Metz (812) 447-2606

12) "Doc" Ramseyer Blacksmith Shop

Location: 6032W 550N, Sharpsville, IN 46060

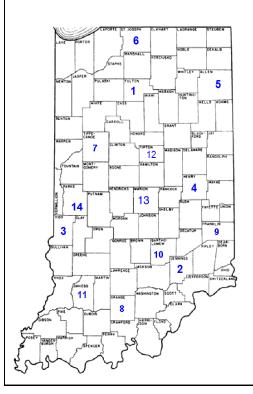
Meet: 3rd Sunday at 2 PM

Contacts: Charles Gruell (765) 513-5390

14) Covered Bridge Blacksmith Guild

Meet: 1st Saturday

Contacts: John Bennett (812) 877-7274



The Southern Indiana Meteorite Mashers

The meteorite Mashers met this month at Beck's Mill near Salem. The good folks at Becks Mill built a blacksmith shop for our use and have invited us to have as many meeting there as we can. In fact we have chosen to hold the July and August meetings there as well. The weather was hot and humid, but there was serious forging going on. Pete Riddle was working on chandelier parts for his house. Isaiah Jenkins made a steak flipper and bottle opener. Joseph Gehl was also forging and a great time was had by all. No iron in the hat, too hot, and lunch was pizza. The next meeting will have a second forge set up as Jeff Reinhardt will bring his forge demo trailer.

IBA Satellite Groups and News (continued)

One-Armed Blacksmith Shop

The One-Armed Blacksmith Shop held its normal first-Saturday meeting on July 2nd at its smithy located on

the grounds of the Bartholomew County Historical Society's Henry Breeding farm. Present were Paul Bray, Ken Dettmer, Jim Jessee, John McDaniel, Ray Sease, and Charles Shaw.

Recent group activities included support of the Bartholomew County Historical Society's annual "Spring on the Farm".

Mentored by members Jessee and McDaniel, Hauser Junior High students Emily Harker and John Bragg did a remarkable job demonstrating



basic blacksmithing skills to almost 700 young people during the two day event. Emily and John assumed the roles of mid-1800's blacksmith apprentices.

Falling on the 4th of July weekend, this month's meeting was declared an informal open-forge session. Mixed with much friendly banter was work on a sturdy trivet for top-of-woodstove use.

Upcoming OABS events include support of Bartholomew County Historical Society's Reeves pancake breakfast on July 23rd, demonstrations at the Bartholomew County Fair in mid-July, and work at the Indiana State Fair Pioneer Village in August.





Jennings County Historical Society Blacksmith Shop

There is an assortment of shop tools and various hand tools for sale from the estate of Ed Putoff. Anyone wanting additional information should contact Ray Sease at: home ph.# 812-522-7722 or cell ph.# 812-521-2035.

SAFETY FIRST! SMASHED FINGERS

Safety articles re-printed from "The Voice" newsletter of The Blacksmith Organization of Arkansas

Hitting your fingers with a hammer is a painful and memorable event. Unfortunately, for blacksmiths, it is also somewhat inevitable. But once the damage is done, there are a few steps you can take to make the lesson a little less painful and permanent.

- 1. Ice it. Use an ice pack to reduce pain and swelling. Keep the ice on it for 15 minutes a couple of times an hour for the first few hours after smashing it. Don't keep ice on too long or you can develop frostbite.
- 2. Elevate it. Letting your hand dangle at your side after smashing your finger will simply increase swelling and that uncomfortable throbbing. Hold it up to reduce the pressure in there.
- 3. Use it. It won't be fully functional, but keep it moving. If you can't move your finger or if you can't feel it (in a few minutes that is--you've got to give the throbbing time to go away) then you should visit the doctor.
- 4. Take a pill. Over the counter painkillers can help relieve the constant reminder that you didn't move quick enough.

Don't wrap a smashed finger! We already struggle to get blood flowing to the tips of our fingers and toes on a good day. Wrapping injured fingers and toes can lead to more damage when vital oxygen and nutrients can't get to the tips.

Likewise, don't splint a finger without consulting a doctor. If the bones or joints are damaged, the splint could cause the finger to set incorrectly, affecting its use for the remainder of your life.

If there is blood under the fingernail, do not attempt to drain it. If it appears to be building up and becoming increasingly more painful, see a doctor.

Finally, if the skin is split open deeply, or if the nail is split down to below the cuticle, seek medical attention.

SAFETY FIRST! HAMMER SAFETY

Hammers are a necessary part of blacksmithing. You can weld, grind, cast, bend and drill, but if you never actually hit hot metal with a hand-held hammer, you are arguably not really a blacksmith.

There are several safety concerns with hammers. The first is that the head is secure. There is a great debate regarding whether the heads on top set tools should be wedged or left friction-tight, but for any hammer that is swung, the handle should definitely be wedged into the head, and the fit should be checked before each use. If you have a hammer that you are continually having to tighten up, you should stop and fix it. A thrown hammer head can cause a great deal of damage in your shop, and could easily hit you, or send hot metal or coals flying. It could hit a gas cylinder valve. It could hit your dog. Don't hit your dog—fix your hammer properly.

Another concern for hammers is the weight. There are many different schools of though regarding the ideal hammer: Some prefer a heavy hammer on a short, thick handle. Others swear by a lighter weight hammer on a longer, thinner handle. I actually have plans for a whole issue dedicated to this debate next February. But regardless of your hammer preference, you should not use a hammer that is too heavy for you to swing. The strain of swinging a heavy hammer can cause joint injuries and problems with torn or inflamed muscles and tendons. If your arm is so tired that you have to stop hammering before your metal cools below forging temperature, you should have already switched to a lighter hammer. Heavy hammers can move metal quickly, but you need to switch to a lighter weight once the rough shape is reached. Even if it weren't a safety issue, the lighter hammer gives you more control, and hence more accuracy. Keep a good selection of assorted hammer weights.

Finally, you should be careful of your grip on the hammer handle. The handle should not be slick, and you should not wear a glove on your hammer hand. Either will cause you to grip the hammer too tightly, which will not only tire you more quickly, but will transfer more shock from the hammer into your hand, wrist, and arm. Don't hammer with your thumb held extended along the handle, pushing it into the work—this can cause serious injury and is a very bad habit to get into.

So keep those hammers swinging, and stay safe.

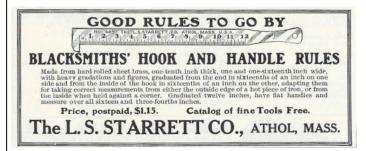
Blacksmith's Rules and the Line of Chords

Russell Bartling - June, 2016

Many blacksmith projects do not require precision measurements. In fact, sometimes the best measurement is no measurement at all but rather just to transfer. However, there are occasions where there is no substitute for reasonably precise measurements, especially when angles are involved.

A 12" steel or brass rule can be a very convenient measurement tool for blacksmithing projects. The steel or brass is light enough to be easily handled and carried in a pocket (many overalls and work pants have a pocket tailor made for these) but they are not generally affected by the heat of metal being forged. A tape measure, by comparison, is vulnerable to having the paint burnt off fairly quickly which renders it basically useless.

There are many versions of these rules that are either still available as vintage items or that are still being produced today. Starrett used to offer a blacksmith's hook rule which has a hook on the end for fast and convenient positioning.



Gerald Fanklin has a quick project article on how to make a simplified version of a hook rule in the July 2015 Saltfork Newsletter. The newsletter can be accessed online at:

http://www.saltforkcraftsmen.org/Newsletters/2015 July.pdf



There are also many variations of folding rules that have two 12" sections hinged on one end. These usu-

ally have various graduations on each side for more convenient use depending on the level of precision required. For example, one side might be graduated in 1/8th of an inch increments and the other side in 1/16th inch increments.

Some of these rules are listed as "Blacksmiths" rules and have a few additional features that are sometimes useful. Lufkin and Starrett still manufacturer these today in the steel and vintage versions in both steel and brass can be found.

One of the additional features sometimes included on the "Blacksmiths" rules is a direct circumference measurement. You can sometimes find these online by searching for "Blacksmiths Rule" or "Circumference Rule."

Say you want to calculate the length of stock for a collar to wrap a given size of round stock. It is fairly easy to find the circumference for for a given diameter by multiplying by Pi using 3.14 in your head (some smiths just use 3). But on larger diameters, this can lead to a larger error. For a 4" diameter circle, for example, the difference between 3 and 3.14 would be over 1/2" which might mean the difference between a collar that works and one that adds to the scrap pile. On fractional diameters, the math can be less than convenient without taking time to grab a calculator or paper and pencil.

Enter the Circumference feature of the Blacksmiths rule. This is a graduated section that allows for direct reading by laying the scale across the diameter of anything that can be accessed from the end. (The end of a round bar or pipe for example.)



A direct reading circumference scale on a Blacksmith's rule.

This article reprinted from Saltfork Craftsmen Artist-Blacksmith Association newsletter, July 2016 edition



This black circle is 3-13/16" in diameter. Not the easiest circumference calculation to do in your head. The direct reading from the circumference scale shows just slightly under 12" and can be read in an instant. The calculated circumference using 3.14 would be 11.98".

Granted, it is also easy to round up some fractional dimensions to help offset using 3 instead of 3.14 for Pi and this method sometimes gets good results. But using the circumference rule, if you have one available, is more consistently dependable and often more convenient.

Another convenience feature built into some of these rules is called the "Line of Chords." This feature may be less well known but can be equally useful. This scale is a bit more rare.

The Line of Chords scale allows for very accurate (in blacksmith terms) angle measurements using only the rule and a set of dividers. These are two tools commonly used and available in most any blacksmith tool box.



The Line of Chords scale. This particular rule is made by Rabone Chesterman and is made in England. Older rules may be marked Rabone and Sons.

Using the Line of Chords is easy and will take much longer to explain the method than it actually takes to use. There may be easier ways to measure an angle, like a protractor, no tool is universal. In some instances, the Line of Chords method will be easier to use.

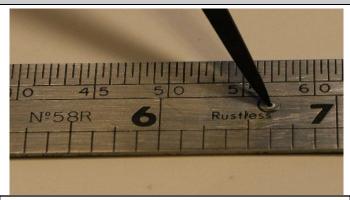
Say you need to measure an angle of a given piece. If you can open up the folding rule to match the angle, then it can be accurately measured. The Rule of Chords scale on the rule I have is graduated to ½ degree increments and is marked from 0 to 120 degrees. Once the angle is set, a pair of dividers is used to take a reading across a fixed mark on each leaf of the rule. This measurement is transferred to the Line of Chords scale to directly read the angle. In practical terms, it is difficult to measure angles less than 5 degrees as the fixed marks need at least that much angle and larger angles require larger dividers to make the span.

Using the rule for layout work is also possible by the same procedure applied in reverse. Set the dividers to the required angle measure on the Line of Chords scale, then open up the rule so that the fixed measure points match the dividers. Then the angle can be marked.

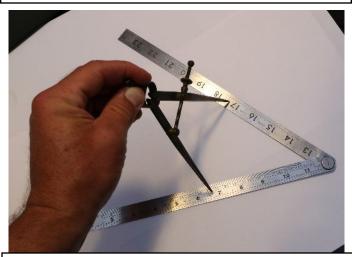
This procedure is easier to follow with photos than text so the following sequence will probably be more clear:



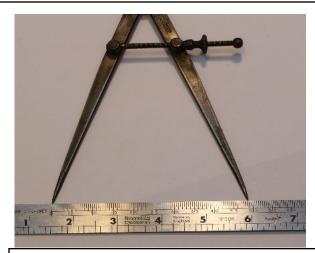
To measure an angle using the Line of Chords, first set the leaves of the rule to match the angle to be measured. In this case, a steel plate.



Each leaf of the rule has a fixed mark for measuring angles using dividers and the Line of Chords scale.



After the angle is set, each point of the dividers is set to each fixed point on the leaves of the rule.



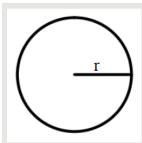
The divider setting is transferred to the Line of Chords scale to directly measure the angle. In this case, 49 degrees.

This may not be a tool that you will use very often. But when you need it, it can be just the solution you need for the job at hand.

Editor

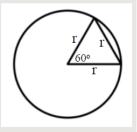
How it works:

You don't need to know how the Line of Chords works to use it. (Unless you have a genetic disorder like me that requires you to find out.) But it would not be difficult to make your own rule when you know what makes this work. The scale graduations are arbitrary and only the relative measures are important.



Take any given circle and draw a radius.

Next, draw another radius 60 degrees from the first and connect the ends that touch the circle with another line of the same length. This creates and equilateral triangle with the outer side being a chord of the circle.



There are 360 degrees in a circle and a full circle of chords makes a hexagon. This relationship is what makes it work. If you arbitrarily use any unit of measure on your scale to mark off 60 graduations. then place a fixed mark the same 60 units from the vertex of your folding scale, then you have created a Line of Chords rule that can measure in 1 degree increments. 60 units of length equals 60 degrees.



You don't have to make a scale that measures in single de-

grees if you want to use fewer graduations. It is only important that the length of scale you use to represent 0 to 60 degrees is the same as the distance you place the fixed marks from the vertex of your rule. Sixty units of length must equal 60 degrees.

You could make one of these rules any size you like. Just remember that a larger rule requires larger dividers to measure the bigger angles.

If you don't want to make one, at least maybe you can impress someone with another real world application for high school geometry!

This article re-printed from "The Voice" newsletter of The Blacksmith Organization of Arkansas



METALLURGY— THERMAL PROCESSING

All too often we all use the term heat treating to refer to hardening of the steel. The term is open to a variety of processes that alter the mechanical properties of the steel. The discussion this month will focus defining the numerous heat treatments that are out there. Some will be familiar, where others will not. Each of these heat treatment method vary in the cooling rate to achieve a certain structure of the steel, much of what we have been discussing in the recent months.

The slowest cooling rate is used to produce the softest steel. This is accomplished by austenitizing the steel in a furnace then slowly decreasing the temperature or turning the furnace off. The carbon is allowed to migrate to the proper locations. We call this annealing. One problem with this process is that is ties up the furnace until the part is cooled enough to take it out, causing a

bottleneck for productivity. This is done on steels that need to be softer than normalized to work in into the proper shape.

With the need to speed up processing, steel was taken out and allowed to cool in air. The steel has a bit faster cooling rate than a furnace cooled anneal but can be worked. This process greatly sped up the production of steel and became termed normalized and is designed as a continuous process. The vast majority of raw steel is supplied in a normalized condition. Steel is supplied in a workable condition before a final heat treatment process is performed to control the mechanical properties required in the final products.

The next set of thermal processes have faster cooling rates and are designed to strengthen the steel parts for their intended use. Here is the one that everyone knows and calls heat treated: quenching (tempering will be mentioned later). The steel is cooled very fast using a variety of quenchants; water and oil are the most common. Less common quenchants are polymers, salt baths. After quenching, the steel will be at its strongest mechanical properties but also brittle from the carbon being locked into unnatural position.

Tempering now is very important to relax the material and allow the carbon to migrate a small amount. This reduces the mechanical properties, but the steel gains back some ductility. Mechanical properties are controlled by the time and temperature to which the steel is reheated. This is the second step of the quench and temper process. Rarely is steel used in the as-quenched condition.

Now to finish, here are a few off—the-wall thermal processing routes. Carburizing: carbon is driven into the surface of the part to form a hard layer over a soft core. Nitriding is performed in a controlled atmosphere furnace; nitrogen is driven into the steel part to harden the surface but at lower temperature. Austempering: this one is interesting, the part is quenched but before the austenite starts to turn to martensite, the Ms (martensite start) temperature, the quench is stopped and the part is allowed to transform at a set temperature (big word here: isothermally).

Heat treating has a variety of processes all to alter and control the final properties of the steel. This is one of the major factors in my decision to become a metallurgist. So in the future be aware that heat treating is a process with many types and not just quench and temper. Next month we will dive into the specifics of what is happening in the steel during a quench and temper.

Ron Wilkinson, BOA Metallurgist



Position at Conner Prairie

Thought I'd let you know about a blacksmithing/woodworking position I currently have open. Could you send this out to IBA members? Might have some that would be interested.

http://www.connerprairie.org/About-Conner-Prairie/Join-Our-Team

NATHAN ALLEN Manager of Historic Trades

13400 Allisonville Rd. Fishers, IN 46038 317.776.6000 ext. 276 fax: 317.776.6014



Blacksmiths Needed July 15-17

The Rocky Forge Blacksmith Guild is in need of blacksmiths to help man its blacksmith shop at the Illiana Antique Power Association Annual Show to be held on July 15-17, 2016. The show is held at the Illiana Show Grounds in Rainsville, Indiana. For various reasons Rocky Forge is running a little low on available blacksmiths and could use some help.

Please contact Ted Stout (765-491-2194) if you would like to volunteer.



The State Fair is August 5 - 21

Aug 5,6,7	Rural Smiths
8,9	Rocky Forge Blacksmith Guild / Keith Hicks
10,11,12	Vernon Group
13,14	Bunkum Valley Metalsmiths
15,16	John Bennett / Fred Ripberger / Wayne Ripberger
18,19	Jim Jesse
20,21,22	Fall Creek / Satellite 13

If you have any questions call or e-mail Bill Newman

Ph: 317 690-2455 email: ruralsmiths1@yahoo.com



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July 16 Hammer In Maumee Valley Blacksmiths

Maumee Valley Antique Steam & Gas Association 1720 South Webster Road, New Haven, IN Bring a dish to share

