Rocky Forge News

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Next Rocky Meeting: 4/9/16

Spring sure is taking its time getting here; the windy days in the 40's make for some cold outside work. I am hoping next Saturday, April 9th, will be a nice sunny, windless day in the 50's or higher. We are planning an open forge day so you can grab a piece of metal and make whatever has been on your mind. I hope some of you can make items for the toolbox to be raffled, along with Jim Bolen's bench, during the summer and fall events. We need hinges and a latch made for the box. Hopefully, we can make some money to apply toward our shop at Rainsville. Bring your bucket of tools, coal and whatever else you need for a day of forging.

The Illiana club would like to put the blacksmiths on the buttons for the July 2016 Bicentennial show. Please look at your blacksmithing pictures and see if you have any that would make a good showing on the buttons. Hundreds of these buttons are given out at the show. The picture should be one that showcases blacksmithing, not necessarily of any individual or group, it needs good clarity and not to busy. That is why it is hard to find just the right photo.

For lunch I will fire up the automatic hot dog cooker and Carol said she would make a pan of scalloped potatoes. The rest of you need to bring some dishes to pass. If you don't bring food we won't let you in the door. Any ideas for something healthy would be good.

We have had some really good turnouts at our meetings and I trust that will continue. New people continue to call saying they will come and we have some new additions to the membership that will make our group even stronger. The new television programs on blacksmithing may be contributing to the renewed interest. Welcome to all of you and if you have a guest interested in what we do bring them along.

As usual doughnuts and coffee should be ready by 8:30. Not much on the meeting agenda so we should be able to start pounding metal pretty early. Hope to see Melvin Lyyton in the crowd.

See you on Saturday. Ted Stout

Two Indiana Artisans Featured

This year's Indiana Artisan Marketplace, April 9 and 10 at the Indiana State Fairgrounds Exposition Hall, features nearly 150 artists (including blacksmiths John Bennett and Dominick Andrisani) and foodists recognized by the State as an "Indiana Artisan" for their extraordinary work in painting, pottery, wine, wood, paper, chocolate, fiber, sauces, glass, popcorn, metalwork, and more. This annual showcase of Indiana's best in art, fine craft, food, and drink is Saturday, April 9: 10-6 and **Sunday, April 10: 10-5. $10 at the door, 14 and younger admitted free**

Contacts

Forgemaster: Ted Stout (stout8525@tds.net, 765-572-2467 home).
Newsletter Editor: Dominick Andrisani (andrisan@purdue.edu, 765-463-4975

Dates to Remember

June 3-5, 2016: IBA Conference, Tipton, IN.
July 13-16, 2016: ABANA 2016 Conference, Salt Lake City, Utah
July 15-17, 2016: Illiana Antique Power

Japanese Tempering

By Roger Davis (redavis@mintel.net)

Western smiths have historically depended on oxide colors to judge tempering temperatures in tool making. All through the 19th century, it was a mark of quality for an edge tool to be delivered showing its "straw" tempering color; a premium price was charged for this finish. This was true for both laminated blades and for later ones of solid "cast" steel. The straw color corresponds to a temperature of about 420F, and leaves the edge at a hardness of about 60-62Rc, depending on alloy and carbon content. Note that a light straw is the first oxide color to appear, so that 420F is the lowest tempering temperature you can judge this way.

Many Japanese edge tools are still made with laminated blades. The bodies may be mild steel or wrought iron, the latter reclaimed from things like old anchor chains. Cutting edges are typically quite a bit harder than Western tools, often in the 64-65Rc range. These traditional tools are still made in fairly traditional smithies, a smith and his striker working by hand in a dimly lit shop. The best edges are made from various grades of relatively simple alloys of high carbon steel, with perhaps a little more carbon than is typical in the West. The softer back is claimed to offset the brittleness of the edge steel.

A question that had never occurred to me was how Japanese smiths judged the low tempering temperatures necessary to keep the hardness in the desired range. Today, you can use an oven or an oil bath to temper in the range below the start of the oxide colors, but these guys were doing this job masterfully long before scientific temperature measurement was available. I think the video below provides an answer:

https://www.youtube.com/watch?v=TO5LwkJEXos&list=PLIJTPH_LaFrsMmiiZwNg5pm-0aMm9G57W&index=3

At about 1:16 in the video, you can see the smith and his striker laminating the blade by forge welding, continuing up to about 2:06. Beginning at about 2:50, the smith hardens the blade with a water quench. I was following along with the process and fine with it up to about this point. The smith then shoves the hardened blade back into the coals for a bit, and pulls it out and starts throwing water on it. My immediate response was "What the #$%@ is this guy doing???" He shoves the blade back into the coals, tosses a little more water on it, and then sets it aside, apparently satisfied.

Now the amount of water was way too small to stop the tempering process, and was applied quite deliberately, not like a quench. I started pondering this action, and was suddenly struck by a bit of kitchen wisdom from my Mom. She judged the temperature of a griddle or pan by tossing a little water in as it heated, and you were good to go when the water beaded up and danced around a good bit before evaporating. I was pretty sure that I had heard on some cooking show that this corresponded to about 400F. So we might have here a way to judge a temperature below 400F. As a bonus, you don't need bright light as when judging tempering colors. The behavior of the water drops would be quite visible by the light of the forge.

A quick Internet search turned up reference to the Leidenfrost effect (see Wikipedia). At a temperature of about 379F (but apparently dependent on surface finish and other factors), film boiling starts, and the water drop is insulated from the surface by a thin layer of steam. Steam is a lousy conductor, so the drop can last a very long time before evaporating, dancing around under the influence of random forces. I looked at the video again to see if the smith was going to the Leidenfrost temperature, but he appears to stop the heating before he reaches it.

In the video below, a pan is heated while being tested with water:

https://www.youtube.com/watch?v=CB-SCA1reqE

Note that the character of the boiling changes as the Leidenfrost temperature is approached. It would have been instructive to have a temperature display, but this video is still suggestive. I think that any guy who could learn to harden without a magnet test could learn to temper by watching the boiling. He ends up with a very hard edge tempered to some temperature below 379F, and can do the whole process in the dim light of the smithy. That is a great combination of repeatability and economy of motion.

Please direct comments to Roger Davis.