THE MOSTLY MONTHLY NEWSLETTER OF THE

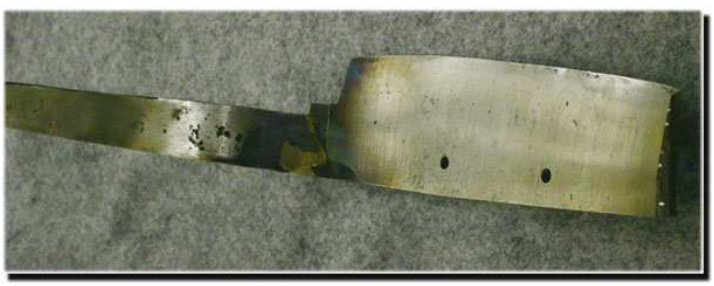
EUGENE 5160 CLUB ~ NOVEMBER 2013

NOVEMBER MEETING

The 5160 Club will meet at Woodcraft of Eugene (Delta Oaks – Beltline & Delta Hwy) November 7th at 6:00 pm. There'll be the usual show/tell/& pass-arounds, and I'll report on the Oakland Axe-n-Sax-in. Here's some selected snap-shots I put up: http://elementalforge.com/blog/?post=10

OCTOBER MEETING

WAYNE GODDARD opened the meeting with a discussion of distal taper's affect on the bending strength of the blade. As he has said before, a consistent taper helps spread the bending stress along the length of the blade. Any sudden changes in thickness create a weakness. He brought in the student's test blade that he like to use as an example of what-not-to-do.



The knife re-tapers right at the tang – which failed the bend test. After it broke at the tang, Wayne brazed it back together to see what the rest of the blade was made of. On breaking the tip, you can see course grain structure – like beach sand. Not acceptable.

Wayne then shared a photo from his Master Smith test with Bill Moran. He said "I passed the test, but you guys tell me what's wrong with that knife":

… the answer Wayne was looking for was "it's bend is

all at the tip – not distributed over the blade" and "it's too soft on the back and didn't bounce back any."

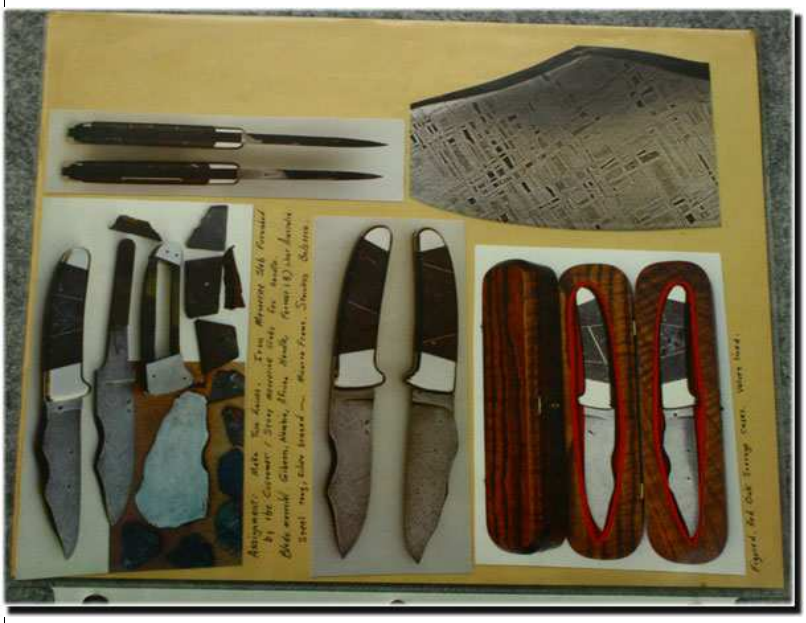
Here's a classic Goddard mustard-finished camp knife that was passed around:

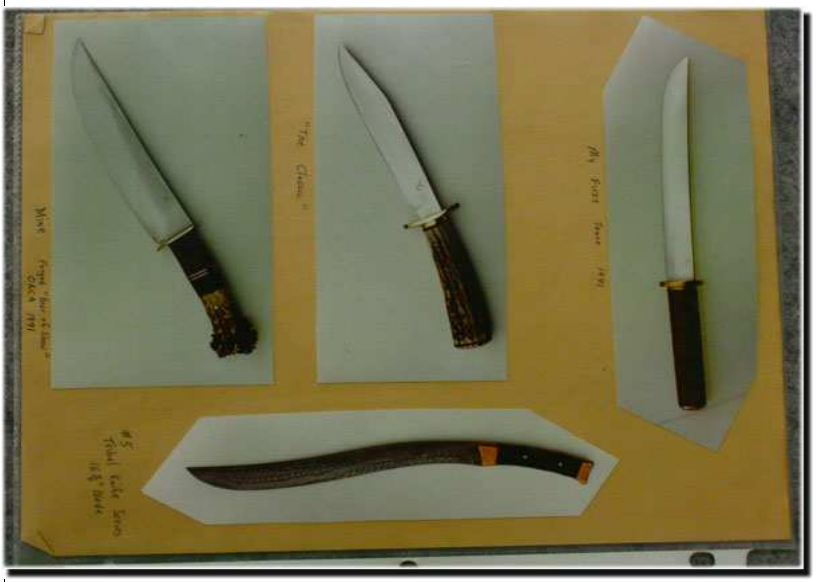
And a Bowie that Wayne made with $50 Knife Shop equipment back in the 1960's:

Wayne told stories of knife making and teaching classes. One issue he had at the ABS school was that there were mild steel bars mixed into the supply of "5160" bars.

Scribe's note: I had the same experience when I took the ABS class a few years back – Greg Neely tested the end of each and every bar and if memory serves, about a third of the shipment of 5160 from Admiral would not harden. Lesson: test each bar!

Wayne passed around pages of photos from his gallery of knives he's made over the years and told their stories. I'll just post some of the pages – if I posted all of 'em there'd be no mystery left!





LYNN MOORE got up next to share the results of experiments with grain refinement that he and Wayne have done. They took square blocks of annealed 5160 straight from the steel mill, hardened it, and broke it in the press to see what the grain structure looked like. The grains were pretty large. Lynn was surprised that stock from the mill had such large grain.

This just reinforced what Lynn had gotten from a blacksmithing class – that whenever you finish forging a piece of steel you do two or three normalizing passes on it to refine the grain size, remove internal stresses, etc. Lynn noted that to do normalizing you bring the steel up to just above where a magnet stops sticking to it and let it cool back to black in still air. If you harden and break the steel after normalizing, the grain you want to see is silky smooth, not course and grainy.

Lynn relayed that you wind up with large grain when you forge because you are up around 1900-2000°F or up toward 2400°F when forge welding – and at those temperatures the crystalline grains in the steel get pretty large.

As Lynn noted – all other factors being equal – a knife with large grain will be more brittle that one with refined grain size.

Lynn does the two or three normalizing passes just before heat treating. Each time the grain gets reduced a little – and smaller grains Austenize at a lower temperature than larger grains – so the recommended practice is to do each successive normalizing at a slightly lower temperature.

His standard heat treat routine is to first turn on his tempering oven so it will be ready when it's needed. Then the normalizing cycles, then the hardening quench and straight into the preheated tempering oven.

He generally tempers at 350-400°F for an hour or so – lets it come back to room temperature and repeats the

tempering at least one more time.

Lynn told a story on himself: he'd put a couple of blades in for the final tempering and then just shut off the oven and left them in and went to bed. When he went back to work on them some time later he could not figure out where they had gotten to. "I spent, I bet it must have been three months trying to find those things – I went through every drawer, all my boxes. I had the handles that I'd started to work on but I could not find those blades anywhere! … finally I open up the tempering oven and there they sit."

He said "I don't know if everybody knows the difference between normalizing and annealing. Normalizing is when you are trying to refine the grain... It also relieves tension in the steel from the forging process. Annealing is when you want to soften the steel." For annealing you bring it up to non-magnetic... Lynn often sandwiches the blade between a couple of plates of mild steel … bring it up to temperature and quickly shove it into a barrel of vermiculite. This lets the steel cool *very* slowly to create fine Pearlite – which makes it easier to grind and drill. Vermiculite acts as an insulator.

You can get vermiculite at garden supply stores. Folks sometimes use wood ash and other insulators. I find vermiculite easier to keep dry in Western Oregon!

If you want more detail on heat treating, Wayne's books both have sections on it, or follow the links in the "References" section at the end of this newsletter. For a technical in-depth look, check out Verhoeven's PDF or book. For the Readers Digest version, Kevin Cashen has notes on heat treat, along with specific temperatures for some common knife steels here: *http://www.cashenblades.com/heattreatment.html*
You can also usually find specific heat treat info for a steel on the manufacturer's web site.

MARTIN BRANDT came up next – to share his findings on Photinia.

This common hedge can get overgrown and provide a resourceful person with some trunk pieces large enough for handle-making.

Martin passed around a couple of dried pieces that rang like any good hardwood.

Then Martin shared a file-knife he's been working on:

[Very nicely done!] … *and from his description of the process it sounds like I'm not the only one who has lots of "fun" fitting the guard! As I often do, he'd filed a little too much an needed to close the hole a little.*

Martin related how you soften a non-ferrous metal. It's a lot like how you harden steel: heat it to dull red and plunk it into water.

He used a 6 pound hammer to smack it tight against the blade – then he drove it off the blade and had to re-face it from the hammer blow. Result: nice tight fit.

Scribe's note: It seems like a light hammer works more on the surface of metals – where a heavy hammer transfers the power of the blow deeper into the piece.

Apparently I'm also not the only one who's used a flex-shaft bur in the direction of rotation rather than against it. Martin told the story on himself of working too late, too tired – and having the bur catch and run on ahead where you never wanted it to go... and being so tired that he went right ahead and did it again. *I have to admit – I can relate!*

Martin went into his process of drawing back the Rockwell on the files. He'd temper on in the oven, Rc test it, then up the temp and do it again. From 63Rc

after the first cycle he headed for 59-60Rc, he got to 60Rc at about 425-450°F. The coloring was a brown-purple hue. It's right at the point where a dull three corner file will just barely cut the steel.

He noted that this is an inexpensive way to get into stock removal knife making. A good file will have a fine grain structure and (obviously) be plenty hard. It's too brittle until you temper it like he did – but then you've got an excellent steel to grind into a knife – if you are set up (or patient enough) to grind hard steel.

Martin discussed file guides (for getting the top/bottom of the transition from blade or ricasso to the tang even – so you get a nice fit on the bolster or guard. There was general praise for Uncle Al's carbide face file guides (Riverside Machine): http://w.ivenue.com/riversidemachine/ecommerce/carbide-file-grind-guide.html
There was mention that Bruce Bump sells both mild steel and stainless with carbide top – but I could not verify that they are still available. Here's Bruce's site: http://www.brucebumpknives.com/

Another method I've got to try is to clamp the blade in a drill press vice and mount a flat grinding disk in the drill press chuck. Set the depth where you want it and grind both shoulders.

In response to a question about gluing up so many spacers in the handle, Martin shared his trick

- Build a little metal tray just larger than the spacers need to be.
- Put cling-wrap in it.
- Sandwich up the spacers and glue.
- Fold the cling-wrap over the top.
- Put a top plate on the top spacer.
- Clamp it and wait for the glue to set!

Martin finished by noting that one of the things he enjoys about knifemaking is the challenge of figuring out how to fix your mistakes. We all seemed to agree that you are going to make a mistake or two with every knife – the challenge is devising a fix!

There was discussion about where to find West Systems G-Flex epoxy. I've ordered some online from: http://www.westmarine.com/webapp/wcs/stores/servlet *… search for "g-flex". Others noted that marine supply stores usually carry it.*

Wayne extolled the virtues of his new variable speed grinder – such as using it at slow speed on things like leather spacers that you just can't do with a high speed grinder. Several of us chimed in with variations of "I didn't know what I was missing until I got the VFD!"

Next up was **ERIK LAND** with "a couple of firsts": one ~ he's made himself a dedicated knife shop area; two ~ he's started working with Damascus and broke down to put washers in because he couldn't stand the thought of half-moon circles on the etched Damascus.

He'd been reluctant to add washers before because he didn't want to compromise a tight fit. He bought some 0.002" hardened shim stock and punched out his own spacers. The result was better than he'd expected and "I should have just done it" on earlier slipjoints as well.

Erik passed around the slipjoint in question. The crowd seemed to share his satisfaction with the results!

There was some discussion about switchblade versus assisted opener versus slipjoint. Craig Morgan shared his Ron Lake assisted opener.

There followed general discussion about licensing out production of knife designs and the price of knives at places like Bi-Mart or Lowe's.

“How to destroy your knife” stories followed – a favorite method being to cut through a live electric wire. Big bang – nice hole melted through the blade. Guy holding the knife has a brand-new hairdo.

Wayne recalled having a 12” grinding wheel come apart – with a shard landing in his apron pocket and a piece 6-8” long going past his head and punching a hole in the plywood wall 20 yards behind him!

There was general discussion of shop safety issues, handle woods, experience with micarta. Then we discussed the wood-fired forge I'd seen in operation at the NW Blacksmith Conference.
http://www.youtube.com/watch?v=mWw3bRO_ADI

Lynn relayed how a smith from South Africa that he'd met at the Conference a couple of years ago said he used a forge that you'd start up with propane, but feed with a used-cooking-oil drip until it got up to heat and you could shut off the propane and just run on used cooking oil.

And from there the meeting broke up...

… so bring your show-and-tell to the meeting this Thursday if you can make it!

Your Scribe ~ ~ ~ Michael Kemp

Build-Your-Own “Tire Hammer” Workshop

When I emailed Larry Langdon earlier this week there were still some openings in the workshop. I'm signed up. It's a chunk of change (and it's not the Nazel hammer they were using at the Axe-n-Sax-in) but it's such a deal, and the right size for my work-shed. If you are interested you'd better sign up sooner rather than later! Details are in the October newsletter.
http://www.elementalforge.com/5160Club/201310Newsletter.pdf

Website Links

Send me a note if you have a favorite site to add or have comments about a site I've posted.

5160 Club

5160 Club members and presenters, past and present: Send me a note if you'd like to list your knife sales website in future newsletters. If you want to be listed w/out a web site I can post your email &/or phone number. A sentence or two on your specialty or what you offer would be good as well.

5160 Club Newsletters are archived at:
http://www.elementalforge.com/5160Club/

Hint: to Google the archive for a specific knife style or presenter name, use a search like this:
sami site:http://www.elementalforge.com/5160Club
or this:
ron lake site:http://www.elementalforge.com/5160Club

Forums

Knifedog Forum
http://knifedogs.com/forum.php

Bladesmith's Forum aka Don Fogg Forum
This URL Changed in August
http://www.bladesmithsforum.com/

American Bladesmith Society
http://www.americanbladesmith.com/ipboard/

Usual Suspects Network
http://www.usualsuspect.net/forums/forum.php

Blade Forums
http://www.bladeforums.com/forums/forum.php

References

Many of the sites linked under “Knife Maker General” have book & video sections. Our own Wayne Goddard's books are available at Amazon: http://www.amazon.com/Wayne-Goddard/e/B001JS9M10 And you can email Wayne directly for his DVD at wgoddard44@comcast.net

Here's a few other useful references:

Verhoeven's Metallurgy For Bladesmiths PDF
http://www.feine-klingen.de/PDFs/verhoeven.pdf

Verhoeven's updated book:
http://www.amazon.com/Steel-Metallurgy-Non-Metallurgist-J-Verhoeven/dp/0871708582

ZKnives – Knife steel composition/comparison/etc.
http://zknives.com/knives/steels

Kevin Cashen's Bladesmithing Info
http://www.cashenblades.com/info.html

Tempil Basic Guide to Ferrous Metallurgy
http://www.tempil.com/wp-content/plugins/download-monitor/download.php?id=Basic_Guide_to_Ferrous_2010.pdf

General Tools & Supplies

Woodcraft Eugene – special thanks to Joe & the crew! 1052 Green Acres Rd Eugene, OR 97408 (Delta Oaks Shopping Center) 541 685-0677
http://www.woodcraft.com/stores/store.aspx?id=515

MSC Direct
http://www.mscdirect.com/

Grainger
http://www.grainger.com

Surplus Center
http://www.surpluscenter.com/

Knife Maker General

Knife kits, steel, tools, machines, supplies such as handle material, fasteners, belts, glues, finishes, etc.

Jantz Supply
http://www.knifemaking.com

Texas Knifemaker's Supply
http://www.texasknife.com

USA Knife Maker's Supply
http://www.usaknifemaker.com/

Knife and Gun (K&G)
http://www.knifeandgun.com/

Alpha Knife Supply
http://www.alphaknifesupply.com/

Knife Steel Sources

New Jersey Steel Baron
http://newjerseysteelbaron.com/

Niagara Specialty Metals
http://www.nsm-ny.com (click Products/Knife Steels)

SB Specialty Metals
http://sb-specialty-metals.com/products/knifesteels

Bohler Uddeholm
http://www.bucorp.com/knives.htm

Pacific Machinery & Tool Steel – Portland, Oregon
http://www.pmtsco.com/tool-die-steel.php

2x72 Belt Grinders

Beaumont (KMG) – the industry standard
http://www.beaumontmetalworks.com/shop/

Travis Wuertz – premium brand
http://www.twuertz.com/Home_Page.php

Pheer – affordable, satisfied customers on the forums
http://www.2x72beltgrinder.com

Coote – affordable, reliable – you supply the motor
http://www.cootebeltgrinder.com

Grinder-In-A-Box – low cost – assembly required
http://www.polarbearforge.com/grinder_kit.html

Wayne Coe – grinders, motors, VFDs, etc.
http://www.waynecoeartistblacksmith.com

Contact Rubber Corp – wheels etc.
http://contactrubber.com/contact-wheels.asp

Sunray – drive wheels
http://www.sunray-inc.com/drive-wheels/

True Grit – grinder belts
http://www.trugrit.com

Forge & Refractory

Chile Forge
http://www.chileforge.com/

High Temp Tools (scroll down the page for the category buttons)
http://www.hightemptools.com/supplies-mainpage.html

Omega – thermocouples & measuring equipment
http://www.omega.com/

Auber – more thermocouples and controllers, etc.
http://www.auberins.com

Hybridburners – home of the venturi T-Rex
http://www.hybridburners.com/

Zoeller Forge – low cost venturi & parts: Z Burners
http://zoellerforge.com/

Blacksmith

Blacksmith Depot
http://www.blacksmithsdepot.com

Pieh Tool
http://www.piehtoolco.com

Centaur Forge
http://www.centaurforge.com

Logo/Etching

Ernie Grospitch – Blue Lightening Stencil
http://www.erniesknives.com/

IMG International Marking Group
http://img-electromark.com/

Other Goodies

Sally Martin Mosaic Pins – So. Oregon
http://customknife.com/index.php?cPath=13

Burl Source – handle blocks/scales – So. Oregon
http://www.burlsales.com/

Gilmer Wood – N.W. Portland
https://www.gilmerwood.com/

Oregon Leather – 810 Conger Eugene and 110 N.W. 2ND Portland
http://www.oregonleatherco.com/

Coyote Steel – misc., scrap, copper, brass, bronze – Garfield & Cross St. Eugene
http://www.coyotesteel.com

Cherry City Metals – Salem, Oregon – metal recycling and useful objects
http://www.cherrycitymetals.com/

Amtek – tool steel & cutting tools
http://websales.amtektool.com

Rio Grande – jewelry tools/supplies
http://www.riogrande.com

Otto Frei – jewelry tools/supplies
http://www.ottofrei.com