

 **EUGENE 5160 CLUB ~ MAY 2016** 

<https://www.facebook.com/5160Club>

newsletter archive: <http://www.elementalforge.com/5160Club/>



August 18th to 21st at Government Camp (Mt. Hood) see <http://www.cascadiaart.org/> for Government Camp activities.

North West Knife Collectors and Washington Arms Collectors will have a joint **show in Puyallup, WA** August 6-7 2016 <http://www.nwkc.org/show-information.html>



MAY MEETING

May 5th – 6:00pm at David Thompson's shop. If you didn't get the directions in the meeting notice, email me for them: michael@elementalforge.com.

Bring your share-and-tell!

Note from the Thompsons:
“Please **drive very slowly** down our lane. The maintenance is all ours. Thanks.”



NOTES AND REMINDERS

Northwest Blacksmith Association events: **Blacksmith Conference** will be at the Cowlitz Expo Center – Longview, WA: May 13th to 15th – see <http://blacksmith.org/events/> for details and for other classes and events. **The Blacksmith Week** will be

The NJ Steel Baron is hawking a vanadium alloyed steel 80CRV2 described as a “tough as nails work horse of a steel. Excellent for forging and grinding alike, it is our hope that makers will choose this grade over 5160 for many of their projects. Having a very similar heat treat to 5160, it shouldn't be too much trouble to substitute this steel for many projects.”

If you try some, let us know how it works for you!
<http://newjerseysteelbaron.com/shop/80crv2/>

Email Spam! I had a couple of folks let me know that they received a spam email with my name in the From: address. I've changed all my email-oriented passwords and have added an extra level of security to the MailChimp account where I send out these newsletters.

If you got a spam email with my name on it, please forward it to me at michael@elementalforge.com to help me hunt for where the breach occurred.

I'm on the email list myself and if the whole list was hit I should have gotten the spam too – but I didn't see it – possibly because I have my spam filters set on “deep fat fry.”



My sincere apologies for any inconvenience this breach caused you.

The photo at the top of the newsletter is from the OKCA Show – my notes from the show (and from the metallurgy seminar) follow the meeting notes. We skipped our April meeting as it would have fallen on the eve of the show. Everyone had a great time and made some sales... well, OK... I spent more than I took in but I had a fantastic time and learned some valuable tidbits.



MARCH MEETING NOTES

MICHAEL KEMP (that would be me) opened the meeting with some odds and ends. Firstly, I shared my “issue” with my home made forge burner. I've been using a forced air burner that I cobbled up out of black iron pipe. Instead of a stainless bell on the business end I stuck on a black pipe coupler and called it good. At forge welding temps this burns up fairly quickly.



There were many suggestions – both useful and fanciful. The one I'm going with is to fashion a ceramic “bell” in the forge itself that the black pipe feeds into. FWIW I'm gathering parts and supplies to build a larger ribbon burner forge – I'll bring it in to a meeting when it's done – maybe June, more likely July. I'll post design ideas and progress notes (or links to 'em) to my Facebook knifemaking page if

you're interested in commenting or following along: <https://www.facebook.com/elementalforge/>

Then I passed around the stub end of a Damascus billet and a work-in-process chef knife from a it. It's the 2nd knife from that billet and there was enough left for one more (slightly larger) chef knife:



And here's a couple of photos of how it looked finished up about a week after the meeting. I'm a sucker for high layer count random Damascus.



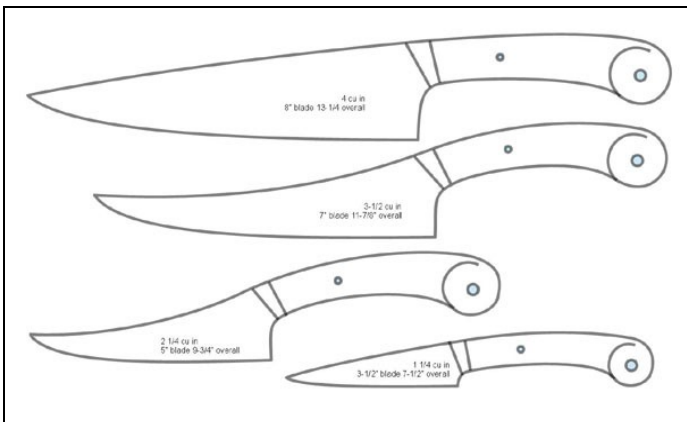
Lynn Moore asked how many layers were in the billet. “Theoretically 700-some-odd [of 1095 and 15N20]” I replied “but I know I burned off and ground off a lot of those – so call it 600. And in the blade – maybe call it 400.”

As an aside I noted that in one of his books Jim Hrisoulas (a massively accomplished swordsmith and expert maker of Damascus) commented that random Damascus was for folks who weren't skilled enough to make straight lines! Probably true in my case – I've only made a handful of Damascus billets... but I love the watery look of high layer random and I've been working with drawing techniques to enhance the pattern without forcing it into a strict structure.

Frank Bobbio buttonholed me whether I remembered any specific tips in Jim's books for grinding sword bevels (*I looked into it and found brief notes in **The Complete Bladesmith** pages 122-123*).

Frank noted that Jim now offers classes at his shop in Henderson, Nevada – both formal workshops and the offer to set up mentoring sessions with Jim in 2 hour blocks (\$50 per 2 hour block). If you are interested, check out Salamander Armoury at: <http://www.atar.com/joomla/> and click the “Bladesmithing Classes” link.

My final pass-around was my wood mock-ups of this series of kitchen knife designs. Martin Brandt and others had recommended making quick wood models of your designs before committing time and steel to the real thing. After making a few prototypes I worked up drawings of the profiles of the knives:



And after making a couple more knives and adjusting the drawings I belatedly whipped out some wooden models. As a result of having the 3-D model in hand I altered one knife profile slightly.

Making the mock-ups also allowed me to experiment with some grinding techniques and sculpting options on the handle shape.



Next up, I put a couple of new guys on the spot to introduce themselves – one was **DAN BROCK** of Plowshare Forge in Eugene, Oregon <http://plowshareforgeknives.blogspot.com/>



The other was **DONKEY** of Donkey Style Custom Knives <http://donkeystyle01.blogspot.com/> who has been learning from Dan. He's working on a backyard propane forge with whatever items are at hand, doing work to order. He brought in a tomahawk forged from a ball peen hammer, a 1918 upgrade knife, a kitchen veggie chopper, a Bowie knife from a leaf spring, a small knife made from the adjuster off the back of a vicegrip, and a cast guard. The 1918 and chopper handles and the guard were cast using greensand molds – and made from aluminum or aluminum/magnesium/copper – pot metal.





He'd built a kitchen chopper for his dad – and liked it enough to build a slightly smaller version that he passed around. The blade was made from 1/16” 1095 – made with a single bevel. The handle is birdseye maple and Peruvian walnut.



“I made two and gave the better one to a friend.”



Someone asked if he heat treated in a forge. “I do – I have a really simple forge – I copied a guy on Instructables [<http://www.instructables.com/>] - I took a piece of 8” stovepipe – built a cap on the end – built some legs. I bought a pile of firebricks from those Industrial Source guys [<http://www.industrialsource.com/>] and some Kaowool – it takes a while to heat up... and for right now I'm just heat treating, I'm not forging at all.”

His next pass-arounds were a couple of O1 blades fresh out of heat treat, and a left handed 1095 kiridashi for a left handed friend. “I was looking at that and I thought – Man, that needs a bottle opener!”

I got a photo of the kiridashi but somehow missed the two other knives.



His final pass-around was a hunting knife which he had a challenge with that he wanted suggestions on. Done in the Nessmuk style, this is for a friend who is an avid elk and deer hunter – with a garage littered with antlers. “And I said – Dude find a piece of antler you want for a handle and I'll make you a knife!”

His plan – based on Wayne's notes in **\$50 Knife Shop** – is to use an all thread rod soldered or silver braised to a cutout in the stub tang to run through the antler handle to a threaded butt cap. One challenge is that he cut the slot a little large. Another is that what he has on hand is stainless all thread. It was

Next up was a newbie at the Club who's name I did not catch “I've been interested in this for some time.” He'd read **\$50 Knife Shop** years ago thinking “someday I want to do this.” When he saw TV's **Forged In Fire** last Summer he re-read Wayne Goddard's book and thought “Ya know, I can do this!”



He shared a drop point hunting knife made to Wayne's recommended dimensions, using stock removal on O1 and wood scales from Woodcraft.



suggested that he go to Eugene Fastener for some black all thread.



As for attaching the all thread to the tang there was a lot of discussion between soldering and silver braising. For the propane torch he has at home, soft solder is the option (the melting point is often around 400°f) – but with the Oxy/Acetylene torch that he might have access to, silver solder (brazing) becomes an option.

Silver solder or brazing creates a stronger connection (silver solder comes in varieties from extra-easy to extra-hard with corresponding melting points from around 1200°f to 1490°f). Frank Bobbio noted that round silver solder wire is usually hammered flat and cut into tiny squares. Use of solder and heat direction was covered (solder flows towards heat). Keeping the solder and joint free of any fingerprint oils was mentioned. Appropriate flux was also discussed.

There was discussion of how to protect the temper of the blade from the brazing process. You can't really do soldering/brazing before heat treat due to austenitizing temps. *I mentioned that I've stuck a blade into wet sand to do brazing in this sort of situation, but that did not get a warm reception with the crowd. Frank suggested of using a damp cloth clamped onto the blade.* Cool Gel, Cold Shield paste, Heat Stop paste, and similar products were mentioned for protecting the blade.

Discussion turned to having a friend TIG weld the all thread in place – and how to normalize the area afterward to correct the grain growth that welding would cause. *This could be done before heat treat as it would not be compromised by austenitizing temps.*

If the guard is going to be soldered then he'll need to plan the guard soldering versus the all thread soldering-or-brazing so that one doesn't undo the other - - - as well as the issues between soldering/brazing/welding and heat treat.

“I'm going to throw out something sacrilegious” I said “what about using JB Weld for the all thread?” Nobody gave me the raspberries out loud but let's just say that my idea did not get a warm reception.

It was also relayed that another design is to use a longer tang, then have a pivot joint for the all thread so that there can be a bend in the tang/all thread to match the curve normally found in antler handles.

JIM JORDAN stepped up next with a hatchet head that he'd cleaned up.



“I decided I needed to add a little flash to it” so he did some engraving on both sides.



“On one side I started engraving some ribbons and I got too close to the edge where it was heat treated.

I wound up grinding off my scratches where the chisel started breaking.”



FRANK BOBBIO started by offering a free multimeter still in the packaging. Several folks were interested so he raffled it off. He shared his latest belt buckle design – then passed around a cable knife in the style he's developed from Ariel Elias Salaverria's work (see the September 2015 newsletter).



“Normally I'll solder a brass plate at the transition point – up against the wire bundle” but as he's noted before, he has issues with the cable oozing tar and oil out when he goes to solder. This strikes everyone as bizarre since the cable has been taken to forge welding temps, then hardening temps. But you have to go with what happens, not what you think should happen.

Frank researched deeper into Ariel's notes and found that he uses stabilized leather for the transition – which can conform to the wires at the end of the welded cable. Frank used a sharpened 1” conduit and a punch to create leather washers. He soaked them in Super Glue for stabilizing. Then he JB Welded the spacers onto the tang and after finishing them added more Super Glue for a final touch. “Probably saves me a good hour over the solder joint...”

The handle on this knife is leather spacers and Osage Orange. The leather is somewhat translucent from the Super Glue. *I'm wondering if Frank used “thin” Super Glue for more penetration.*

His next pass-around was a dagger done in the same style. Forged guard. Osage Orange handle. Frank textured the pommel like he does his belt buckles, and threaded it to attach to the tang. In response to a question Frank said that he forge welds on a hydraulic press and then uses a power hammer to set the bevels.

For the tang Frank used a 3/8” rod that is set 1/2” into the forge welded cable and welded in place.

Frank made a hand die to texture the pommel. Aligning the pommel to the shape of the handle turned out to be “interesting.”



JOVE LACHMAN-CURL

brought in a “sibling” of a knife he shared at an earlier meeting. “I've been trying to wet grind” he said “spraying water on my belt. But I got little pieces of crud sticking to my platen and as I'm dragging my piece across I dig a deep line in.” The blade is 3/32” 1095.



Kool Mist was mentioned as a commercial system for setting up wet grinding or milling operations.

<http://www.koolmist.com/>

“I've been coming here for 2 or 3 years and have made good friends with Jim and Lynn. I've been thinking about this for awhile – I made them each a knife.” And with that Jove presented them their new knives! “They are **very** sharp. And as a bonus the wood is some I got from Wayne's shop.”



Now aren't those a couple of pretty knives. Good job Jove!

The top knife's bolster was brazed in with bronze brazing rod before heat treat. The texture was peened in with a tool Jove made from a ceramic ball bearing hammered into the end of a bolt that he'd tapered down for the purpose.

ERIK LAND stepped up, saying “I’ve got 8 or 10 folders on the bench right now at various stages... and I got a wild hair a while back – I wanted to start doing some inlays.” He passed around a set of carbon fiber scales – with the Oregon State University letters inlaid in (pretty much) the OSU colors:



Next he passed around a set of scales that he made with a combination of curly koa and phenolic resin (Micarta) joined in a keyhole pattern. The Micarta was leftover from the OKCA Micarta handle challenge.



Erik expected to set up his CNC to cut these and “I thought I’ll cut this out and this is just going to fall together... it takes a lot of programming, and you cut it and then it doesn’t really fit just perfect, and you have to kiss it with sandpaper to get it to snap in.”

This was followed by a discussion of the continuous learning process that is CNC work.

LYNN MOORE gave us a sharpening demo as a practice session for his sharpening seminar at the upcoming OKCA show.



Lynn uses “Wayne Stones” from Norton – one side is crystolon and the other is fine India. “This is one of the few stones that will cut the new steels” as opposed to softer stones like Arkansas. Lynn asked for a knife from the crowd to sharpen. Somebody threw him a curve – literally – a recurve blade – which added to the challenge.

Lynn uses Simple Green (instead of water or oil) to lubricate and clean the stone. “I look for when the edge starts to pick up the Simple Green to tell when I’m on that cutting edge.” Keeping the same angle and applying firm pressure. Lynn generally likes about a 15 degree angle.

“I try to use the whole stone” so that he doesn’t wear a big dip in the middle of the stone.

Lynn moved from the medium crystolon/fine India sharpening stone to finer grit on a triangle stone to 600 grit sandpaper on a board to leather with rouge glued to a board.

There was discussion about using belt grinders, paper wheels versus stones, and mass market sharpening systems. Nobody seemed to be a fan of the retail store sharpening tools – and among the other choices it boiled down to a trade-off between time spent and how picky you are about the results. And of course some sharpening mediums/tools work better with some steels and others with others.



OKCA APRIL SHOW

Great times! Everybody at the 5160 Club table sold something – I came in last, selling a few 1oz tins of my wood wax. Lots of folks picked up the 5160 Club info cards and there've been a number of new sign-up for the newsletter.

Before the show even opened several dozen of us gathered for the free open-to-the-public metallurgy seminar presented by Bob Skibitski (senior process metallurgist at Crucible Industries) and Frank Cox (Niagara Specialty Metals). Bob had the major presentation and it was thick with info and micrographs pertaining to Crucible's CPM (particle metallurgy) steels. You had to be there – if you missed it, just hope that you can catch it next year.

CPM steels are created by spraying tiny droplets of molten steel into a liquid nitrogen bath. The small size of the droplets and the quick quench creates ultra fine grain and carbide structures as compared to other production methods. The hardened grains are then put into huge sacrificial cans – heated, pressed, and rolled to form solid bars. The resulting carbides are 1 to 3 microns in size.

Bob warned that if overheated during heat treat these carbides will aggregate and balloon in size – and while normalizing can reduce grain structure of the matrix it will NOT reduce the size of enlarged carbides. The only “fix” would be to melt it down and run it through the CPM process again.

Bob had many micrographs demonstrating the effect of various heating/cooling cycles on CPM structure. Bob also emphasized that the steel needs to be extremely clean before heat treat. He recommended cleaning with acetone, then soap and water, saying that any oils on the surface will create hot spots at austenitizing temps and remelt and enlarge the carbides in that area.

Bob fielded several questions that we've batted around 5160 Club meetings centered on “when normalizing and air cooling, how cool do you need to let the steel get to accomplish normalization of the

grain structure?”

You'd think that this would be something you could look up – like Ms and Mf temps for various steels – but several of us have spent many hours flipping through books and searching the web and found nothing beyond “cool in air.”

Some bladesmiths cool until black (~ 900°f) while others cool to room temp. Bob's answer was “until you can hold it in your hand.”

... then it was ON TO THE SHOW! I had a great weekend, visiting with new folks and old friends. And buying belts and wood blocks that I simply could not live without. A couple of tidbits I gleaned regarding the online world:

- Folks I know who are selling a lot of knives online are having great success with Instagram.
- A professional search engine optimization (SEO) specialist shared with me that Google indexes the names of your online pictures – so if you let your photo post with the camera-assigned name (like IMG_60694.jpg) Google won't index it – but if you rename it with key words separated by dots or dashes – like Kukri.Knife.jpg – then Google will pick it up for searches with those keywords: in this case “kukri” and/or “knife”.

I stopped a couple of medieval warfare reenactors who were wandering the show floor. I'd spotted their rondel daggers and I'd always been puzzled about how such a ridiculous looking handle achieved such wide use. They were more than pleased to demonstrate how the round disks fore and aft were indeed very useful if one was wearing armored gloves. The disks are used to lock the dagger in place in either an underhand or overhand grip.

... and now all I have to do is make some knives for those wood blocks I bought.

Have fun all – and be safe!

~ ~ ~ Michael Kemp



FREE DE-CLASSIFIEDS

Email me a brief description of what you are selling/buying/looking for with your preferred contact (phone/email/...). Unless you let me know you want a shorter run, I'll run the note for 3 months and then send you an email to see if it's still valid. It's free – email me at Michael@ElementalForge.com

no submissions this month...



WEBSITE LINKS

5160 CLUB

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>

OREGON KNIFE COLLECTORS ASSOCIATION (OKCA)

The OKCA hosts monthly dinner meetings where you are guaranteed to see treasures from the wide world of “things that go cut!” OKCA also puts on the big knife show in April – if you haven't seen it you've been missing something special!

<http://www.oregonknifeclub.org/index.html>

Go to the “Knewslettter” link and scan a recent newsletter for a membership form and contact info.

FORUMS

Bladesmith's Forum aka Don Fogg Forum
<http://www.bladesmithsforum.com/>

Knifedogs Forum (USA Knifemaker)
<http://knifedogs.com/forum.php>

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>

Julious Griffith groups on Facebook:

- Custom Knives For Sale by Maker - Available now
- Knifemaking - Works in Progress (w.i.p.'s)
- Knifemaking Equipment Buy, Sell, or Trade (used only)
- Knifemaking - Masters to paying Students connection
- Knife shop photos
- Knife Calendar - Events, shows, hammer-ins, schools, misc.

These are all closed groups – to keep them focused – so if you want to join one of the groups, click the “+ Join Group” button and also message Julious and give him some info on yourself so he knows you have real interest in the group.

REFERENCES

Our own Wayne Goddard's books are available at Amazon:
<http://www.amazon.com/Wayne-Goddard/e/B001JS9M10>
And you can email the Goddards directly for his DVD at wgoddard44@comcast.net

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

From the Heat Treating Society of the ASM – the Heat Treater's Guide Companion for Android devices. Look up heat treating details on hundreds of steels in the palm of your hand.
<https://play.google.com/store/apps/details?id=com.pfiks.mobile.heattreaters&hl=en>

My “Knife Info” has some knife musings and cheat sheet charts – plus Oregon and Eugene knife laws:
http://elementalforge.com/tips_notes/

CLASSES FOR KNIFE MAKING, ETC.

Gene Martin offers personal instruction at his shop south of Grants Pass for a daily rate.
<http://www.customknife.com/>

Michael and Gabriel Bell of Dragonfly Forge offer an ongoing series of small group classes in Japanese style sword forging and fittings. Located on the southern Oregon Coast.
<http://dragonflyforge.com/>

Murray Carter offers small group classes in a variety of subjects, primarily focused on traditional Japanese cutlery. Located in Hillsboro, Oregon.
<http://www.cartercutlery.com/bladesmithing-courses/>

David Lisch is an ABS Master Smith who teaches classes in Seattle. I've heard rave reviews from his students. Lisch is very skilled at blacksmithing in general and bladesmithing in particular.
<http://www.davidlisch.com/Learn.html>

Jim Hrisoulas now offers both formal classes and mentoring sessions in 2 hour blocks at his shop in Henderson, Nevada:
<http://www.atar.com/joomla/> and click the “Bladesmithing Classes” link.

The ABS (American Bladesmith Society) offers classes in Washington, Arkansas and elsewhere – if you are up for traveling across the country to take classes, check out their “Schools” link:
<http://www.americanbladesmith.com/>

James Austin offers forging classes in Oakland, CA – axes, tongs, viking anvil, etc.:
http://forgedaxes.com/?page_id=148

Blacksmithing and some bladesmithing workshops are hosted regularly by the Northwest Blacksmith Association: <http://blacksmith.org/>

USA Knifemaker has a lot of fun & informative videos on their YouTube channel:
<https://www.youtube.com/user/USAKnifemaker/videos>
... and hey - “free” is a hard price to beat!

Nick Wheeler also has a good YouTube channel with a lot of how-to videos:
<https://www.youtube.com/user/NickWheeler33/videos>

GENERAL TOOLS & SUPPLIES

Woodcraft of Eugene – thanks to Joe & the crew for six years of hosting 5160 Club meetings – we've had to move on, but the hospitality was appreciated.
<http://www.woodcraft.com/stores/store.aspx?id=515>

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

McMaster-Carr
<http://www.mcmaster.com>

Grainger
<http://www.grainger.com>

Surplus Center

<http://www.surpluscenter.com/>

Victor Machinery Exchange

<http://www.victornet.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/>

True Grit

<http://www.trugrit.com>

KNIFE STEEL SOURCES

New Jersey Steel Baron

<http://newjerseysteelbaron.com/>

Kelly Cupples (High Temp Tools) – Alabama

<http://www.hightemptools.com/steel.html>

Niagara Specialty Metals – New York

<http://www.nsm-ny.com> (click Products/Knife Steels)

SB Specialty Metals – New York & Texas

<http://shop.sbsm.com/>

Bohler Uddeholm – numerous U.S. locations

<http://www.bucorp.com/knives.htm>

Sandvic – stainless steels – Texas & Pennsylvania

<http://www.smt.sandvik.com/en/products/strip-steel/strip-products/knife-steel/sandvik-knife-steels/>

Pacific Machinery & Tool Steel – Portland, Oregon

<http://www.pmtsco.com/tool-die-steel.php>

EQUIPMENT

Beaumont (KMG) [Ohio] – the industry's benchmark 2x72 belt grinder

<http://www.beaumontmetalworks.com/shop/>

Travis Wuertz [Arizona] – premium versatile grinder

http://www.twuertz.com/Home_Page.php

Pheer [Gresham, Oregon] – affordable grinder made in Oregon

<http://www.2x72beltgrinder.com>

AMK [Ohio] – affordable grinder, quick-change between platen & contact wheel

<http://amktactical.com/>

Coote [Port Ludlow, Washington] – affordable, simple grinder – you supply the motor

<http://www.cootebeltgrinder.com>

Marinus Kuyl [Hillsboro, Oregon] – another affordable grinder made in Oregon – and parts – you provide the motor.

<http://oregonblademaker.com>

Grinder-In-A-Box – grinder kit, assembly required

http://www.polarbearforge.com/grinder_kit.html

Wayne Coe [Tennessee] – grinders, motors, VFDs...

<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/>

Renaissance Metal Art [Mulino, Oregon] – 80# ram air hammer

<http://www.rmetalart.com/tools.htm>

Anyang [Texas] – air hammers from 20# to 165#
<http://www.anyangusa.net/>

Meyer Machine Tool [Ohio] – treadle hammer
<http://www.meyermachinetool.com/Blacksmith-div-.html>

Spencer/Clontz tire hammer plans/workshops
http://www.alaforge.org/Trading_Post.html

Appalachian Power Hammer plans
<http://www.appaltnet.net/rusty/index.htm>

Helve Hammer and Quick-Change Dies Video –
from a BladesmithForum.com thread.
<https://www.youtube.com/watch?v=uzruqYkKGNM>

FORGE & REFRACTORY

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

Mankel Forge
<http://mankelforge.com/forges.html>

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

High Temp Inc. has also been recommended for
Kaowool etc.:
<http://hightempinc.net/>

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/>

Pine Ridge Burners – for ribbon burners and all
associated fittings, blowers, valves, etc.
<http://www.pineridgeburner.com>

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

Here's the original article on making a ribbon burners
that John Emmerling wrote back in 2005 for the
NWBA Newsletter:
<http://blacksmith.org/2005-1-hot-iron-news/>
You can download the PDF from that site. John's
article starts on page 11.

BLACKSMITH

Blacksmith Depot
<http://www.blacksmithsdepot.com>

Pieh Tool
<http://www.piehtoolco.com>

Centaur Forge
<http://www.centaurforge.com>

Quick and Dirty Tool Co.
<https://www.facebook.com/QDTool>

LOGO/ETCHING

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

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

Electro-Chem Etch
<http://www.ecemmi.com/products.html>

HEAT TREAT SERVICES

Here are some folks who provide heat treating services for blades. While all of these have been recommended by one reputable person or another I have not had experience with them. If you use one, let me know how it went!

Paul Bos Heat Treating at Buck Knives. Paul Bos has retired and handed the torch to Paul Farner. Highly reputable. Post Falls, Idaho:

<http://www.buckknives.com/about-knives/heat-treating/>

Peters Heat Treating is another highly reputable operation. Meadville, Pennsylvania:

<http://www.petersheatreat.com/cutlery.html>

Texas Knifemaker's Supply offers heat treat services. Houston, Texas:

<http://www.texasknife.com/vcom/privacy.php#services>

Tru-Grit provides heat treat services. Ontario,

California: https://trugrit.com/index.php?main_page=index&cPath=34

K&G also provides heat treat services but I can't find a reference on their web site – you'll have to contact them for details. Lakeside, Arizona:

<http://www.knifeandgun.com/default.asp>

Byington Blades heat treat service is in Santa Clara, California: <http://www.byingtonblades.com/>

It's my understanding that Chris Reeve Knives uses ACE Co in Boise Idaho – which is enough for me to add them to the list:

<http://www.aceco.com/heattreat/index.html>

WOOD SUPPLIERS

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

Shelton Pacific – stabilized wood – Shelton, WA
<http://stores.sheltonpacific.com/>

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

North Woods Figured Wood – Gaston, OR
<http://www.nwfiguredwoods.com/>

OTHER GOODIES

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

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>

M3 Composite – space age mokume & other

<http://www.m3composite.com/>

Minarik automation & control

<http://www.minarik.com/>

Valley Stainless (that does water-jet cutting) is one of Craig Morgan's customers. They told Craig “bring in a pattern” and they'd work with you on small batch cutting. They don't have a website yet. 29884 E Enid Rd, Eugene, Oregon 97402 (541) 686-4600.