

 **EUGENE 5160 CLUB ~ FEBRUARY 2016** 

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## FEBRUARY MEETING

February 4<sup>th</sup> – 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](mailto:michael@elementalforge.com).

Bring your share-and-tell!

I've got my work cut out for me this issue – there were lots of folks at the January meeting and lots of work was shared – see below!!!

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



## NOTES AND REMINDERS

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**Radical Blade Forging** at Studio 4 in Seattle – taught by ABS Master Bladesmiths Adam and Haley DesRosiers. February 20 9am-4pm or February 21 9am-4pm. This is a one day, intensive workshop for knife makers looking to improve their blade forging skills. We will cover precision blade forging with emphasis on set up for economic grinding and finishing. We will discuss and practice hammer work, pre-forming, and accuracy in forged-to-shape blade making. The advanced and beginner alike, will benefit from this class, so sign up now! Cost \$200. [studio4@davidlisch.com](mailto:studio4@davidlisch.com)

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**Steve Goddard** has to clear out a lot of Wayne's old stock – and a few pieces of equipment. Expect a garage sale next Saturday – the 6<sup>th</sup> – details to follow.

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**Tong forging** class March 5<sup>th</sup> and 6<sup>th</sup> in Oakland, CA – among other classes: James Austin was the host of an outstanding gathering I attended a couple of years back. [http://forgedaxes.com/?page\\_id=148](http://forgedaxes.com/?page_id=148)

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**Northwest Blacksmith Association's** Blacksmith Conference will be at the Cowlitz Expo Center – Longview, WA: May 13<sup>th</sup> to 15<sup>th</sup> – see <http://blacksmith.org/events/> for details and for other classes and events. The Blacksmith Week will be August 18<sup>th</sup> to 21<sup>st</sup> at Government Camp (Mt. Hood) see <http://www.cascadiaart.org/> for Gvt Camp activities.

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It's never too early to plan for the **OKCA April show!** It's the big annual knife event around here – and a place for “anything that goes cut” as Oregon Knife Collectors Association likes to say. Custom made; factory made; fixed; folder; swords; tools; supplies; books; collectibles; and a good time for all! See the OKCA website for details: <http://www.oregonknifeclub.org/>  
April 8<sup>th</sup> (OKCA members only) 9<sup>th</sup>-10<sup>th</sup> (public)

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**North West Knife Collectors** and Washington Arms Collectors will have a joint **show in Puyallup, WA** August 6-7 2016 (previously scheduled for March).

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Lynn Moore reports that the American Bladesmith Society has awarded Wayne Goddard a lifetime Master Smith ranking & membership award.



## JANUARY MEETING NOTES



**MICHAEL KEMP** (that would be me) opened the meeting, noting that we again have a couple of tables at the OKCA show in April. Erik Land and Frank Bobbio will be joining me at the tables. That means we can take turns roaming the show and buying stuff! If somebody else wants to join us, let me know. It seems like somebody else expressed interest.

Lynn Moore had to divest himself of a fair amount of handle material wood before he moved – and I'd picked up quite a bit of his leavings. I brought a box of Purple Heart blocks to the club meeting and set them out for anybody to help themselves to – and still went home with a good number for myself.

Here's a couple of my kitchen knives in AEB-L stainless that I'd brought to the last meeting as work



in progress – here they are finished:  
My pass-around was a work-in-process billet of

layered Damascus – very rough looking because my rebar handle had broken off while using my (rather aggressive) drawing die – so it was rough surfaced and covered with scale. The billet was at 75 layers.

I responded to some queries: it is composed of 1095 and 15N20. Blair asked if I cut the billet for re-stacking or cut notches and Z folded it to get three layers for the next round. I tried the Z method on a previous billet (using a cutoff hardy) and (1) I was not accurate in eyeballing my measurements plus (2) that meant possibly trapping some scale in the folds. So what I do now is (once I've gotten the billet drawn out) let the billet cool, mark it and cut it in thirds with a chop saw, grind the surfaces flat, then tack weld the three pieces back together for the next weld.

There were more questions about my process that are answered in the article I've submitted for the next OKCA newsletter:

<http://elementalforge.com/Articles/RandomDamascus.pdf>

Here's the billet completed at approx 500 layers and lightly etched:



One thing I don't mention in the article is that this billet is totally dry welded. I did not use borax flux, kerosene, or anything else in making the welds. On my last random layer billet I wound up using some borax when I had one weld that did not want to “take” - so I'm not a purist.

I just figure that if folks that do a lot of forge welding like JD Smith and Bob Kramer are touting the virtues of dry welding, I should give it a shot.

My first forge welding forays were done with a lot of borax. On the plus side, molten borax not only dissolves existing scale, but also seals the surfaces of the steel to discourage new scale from forming. On the minus side it can get trapped in the welds, creating inclusions – and it makes a real mess in the forge and will dissolve most forge insulation.

My setup is to have flat dies in the tire hammer and drawing dies in my “forging press” (a 20 ton wood splitter with attachments that convert it into a forging press). Being able to instantly go between drawing dies and flat dies (to square it back up) works great for me.

I touted my flip-up welder's lenses. I need reading glasses to see up close, so I get safety glasses with cheater lenses in the bottom – like bifocals. Add the flip-up welder lenses to that and I can stare into welding heat or with a quick flip of my gloved hand get the dark lenses out of my way. They cost about \$10 and I got mine at a local glass blower supply store (Winship Designs aka Glasscraft). These are shade 3 welder glasses.



The question was raised about Didymium glasses often used by glass blowers. These are pricey – usually over \$100 – and I'm under the impression that they don't block much infrared. They are great at blocking sodium flare for glass blowers. At the BRIGHT forge welding heat I prefer the shade 3 welders because they cut out enough light that I can actually see objects inside the forge.

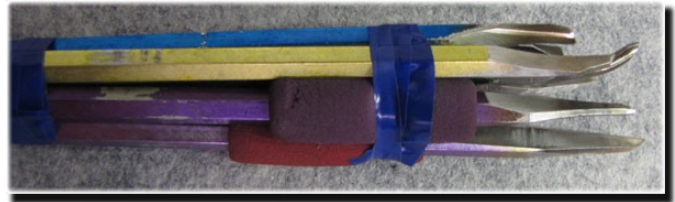


**JIM JORDAN** was up next. His first pass-around was a brass plate he's been using for engraving and inlay

practice – he's done quite a bit with it since the last time he brought it in:



Jim loves to make his own tools – so he's been making his own engraving chisels. “I've been using these screwdriver bits from Harbor Freight... I just grind them to shape, bring them up to temperature, quench 'em, draw 'em back a little bit – and they work on brass, copper, soft metal really well.” They come in two lengths – he brought in a batch he's customized:



... as well as a fresh pack of the short version of the screwdriver bits – noting that you could color code types of chisels if you so desired. Made of S2 tool steel.



Another project Jim has been working on is engraving into – well, let's just call them metal sandwich disks that are either a silver colored metal or a golden bronze on the outside with a copper interior. Once flattened out using a jeweler's rolling mill they present a two-tone sandwich to engrave into:



In response to a question Jim said he has tried making chisels from Allen wrenches - "They take a nice edge, for brass and aluminum."

### FRANK BOBBIO

said "I know this is a knife meeting and this ain't a knife but ... I forged it and you guys forge so I thought I'd bring it in. It's a free formed tree with a copper candy dish."



Frank started with a 1" round for the tree – tapered it down and split it into the top branches and welded the lower branches on. The base was intended to be more free-form but got flattened out using a texturing die in the press. "It's a Christmas present for my wife."

Asked how he textured the limbs Frank said he started with a hardy hole spring die – with 1/4" flat stock for the top & bottom dies (2"x2") which he ran lines down with a cutoff wheel – making the lines somewhat jagged – welded that onto the hardy hole spring and hammered the texture into the limbs.



His next pass-around was a short sword he finished a day or two before the December OKCA show. The blade is 5160. The handle is Pacific Yew. Guard & pommel are mild steel – darkened with plumb brown.

"I did it 7 or 8 times and kept sand blasting it off until I got the color right because I wanted just a medium shade." When he followed the instructions on the bottle it was

too dark and would streak. In the end he used a lightly bead blasted finish heated to about 150°F, then rubbed it down with the plumb bluing. At the recommended temp (where water sizzles) you can't avoid streaking when wiping on the bluing.

*Scribe's Note: I gave up wiping on bluing for the same reason. I've settled into immersing the piece in a tank of diluted Super Blue cold bluing for 20 minutes or more (this is a Wayne Goddard trick). If I'm etching Damascus I do repeated immersions in diluted ferric chloride with sandings at 2000 grit between dips – and finish up with a long dip in the diluted Super Blue and a final sanding to bring out the pattern.*

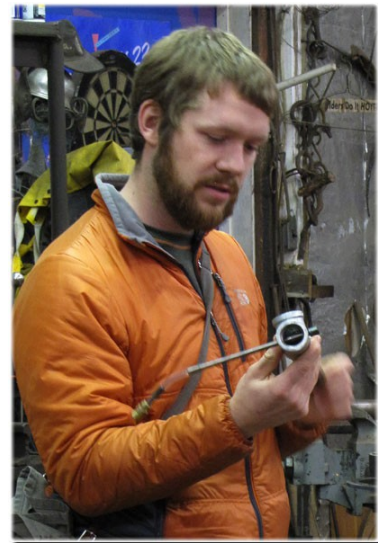
To get the round pommel with flat front & back, but radiused edge, Frank started with a 1-3/4" length of 1-1/4" round stock - trued up the ends on the lathe so that it stood perfectly straight. "I heated it up in the forge, then squished it in the press – when it was exactly 3/4" thick I pulled off on the power. That radius is just completely done by squeezing it."



### JOVE LACHMAN-CURL

took the floor – he's working on a new forge – to be 15" on the inside – "made from a portable air cylinder 1/8" thick, I've got 2" of Kaowool in it, a brick floor, and a door, and now I'm working on a burner."

The propane comes in through the small tube – which has a #57 hole centered in the larger 1" air tube.



*Another Scribe's Note: The #57 drill is 0.043". If you haven't invested in a full set of numbered and lettered drill bits, you should consider it. For one thing they make drilling for pins and assembling guards and handles a whole lot smoother.*

Jove asked for opinions on plumbing the propane. Some designs call for both a direct propane feed from a ball valve plus another side feed that routes through a ball valve and a needle valve. "So for a 2 burner forge you wind up with 3 or 4 ball valves and lots of T junctions."

"Just make sure your valves are propane or LP rated – and the regular is appropriate" noted Blair. Jove assured him that they are – and he said he'd picked them up at Home Depot. Blair also questioned the need for a needle valve.

Jove asked what folks are using on their forges. It sounded like most folks do not have a secondary idle circuit. Some folks just use the regulator to adjust their propane – others leave the regular set and adjust the flame with a needle valve. Some folks use a 1" main tube (*I've used as small as a 1/2" tube when operating at heat treating temperatures*) and others have used as large as a 2" main tube. It depends on the construction of your forge, the pressure you are running on the propane regulator, and for blown forges the CFM of your fan. A gate valve on the air side is handy for controlling the rich/lean mix on a blown forge.

## **ELIJAH AMEZCUA**

introduced himself to the group – he and his dad had dropped by the 5160 Club table at the December OKCA show. He's been getting into knife making.



"I am not forging yet – I am working on getting a forge" he said. He brought in a couple of knives that he's made via stock removal.

Elijah's first pass-around was a neck knife and Kydex sheath. The blade is 1018 mild steel. The handle is

purple heart.

On his second pass-around Elijah said "I call this blade the Alien Blade because it makes me think of Alien vs

Predator... it's also 1018... I put this blade to work chopping and cutting and it's held up." The handle is Micarta - "I wanted to use Purple Heart wood on it or make Micarta – so I went with [homemade] Micarta – It's purple and green card stock with yellow liner."



Responding to questions he said he used fiberglass resin for the homemade Micarta.

Frank strongly suggested that he invest in better steel "because you're already making really good knives" and for all the work involved it would be great to have steel that will take better heat treatment.

Elijah's dad Manuel (Manny) said that Coyote Steel and Ideal Steel both said they didn't have knife steel available.

*I'm a little surprised about Coyote – in the past they've carried things like 5160 and 1084 – but maybe not in good stock removal sizes.*

Before they left the meeting, Manny and Elijah had a couple of leads for getting high carbon steel for a decent price. Or to pick up some worn out files at BRING or some such used tools store. File-knives are a staple for forgers – and Martin noted that "for a

Simonds file, temper it at 425°F-475°F to knock the Rockwell hardness back to about 60Rc and then you can grind it. You don't even need to harden it after.”  
*[as long as you don't heat the steel up enough to color the edge while grinding]*

There was quite a bit of discussion with Elijah and Manny about sources for tools and knife steels. Elijah shared his learning experience with using an angle grinder for the bevels and got suggestions on how to make the bevels he's looking for with the tools he's got.

Manny talked about their setup – their process for molding the Kydex sheaths – and his own interest in getting into forging.

The group did our usual rundown on safety equipment and the deceptively dangerous buffer. Manny (a glass blower) is on top of it!

Responding to another question Elijah said he'd already sold one knife and has several orders.

In response to a question he said that the grease had soaked in 3/16” and with the bolt holes in the material plus the saw kerf “It's kind of deceiving how little good material there is in there.”

“So then I couldn't stop with just one – and as you guys know I make folders so here's a folder I made with some.”



And another with Lignum Vitae:



### ERIC LAND

reminded us of the Micarta Challenge that Dennis Ellingsen gave at the last meeting: *make a knife with a piece of the Micarta that Dennis salvaged from sawmills and enter a contest at the April show.*

Erik brought in his entry! He said that he had to grind off quite a bit of oily exterior. “Then I slabbed mine up against the grain rather than with the grain.” As with all his knives these are O1 steel.



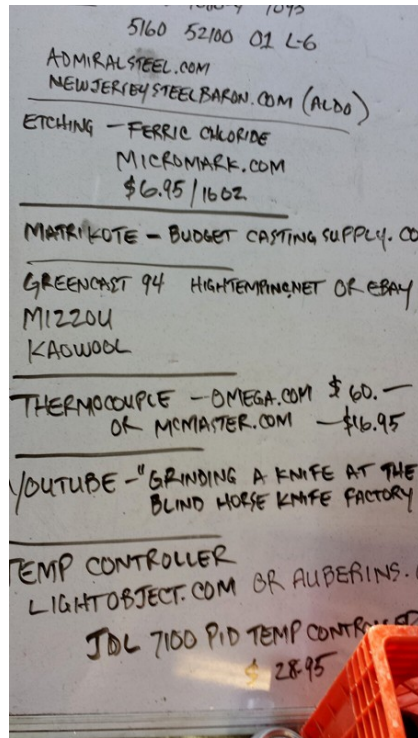
Erik was asked how he gets the very oily Lignum Vitae to take glue. “I wipe the heck out of it with acetone then glue it up – and all my handles are pinned I'd never rely on just epoxy.”

**MARTIN BRANDT** was up next. “I talked with Steve [Goddard] at the last knife show and got some of Wayne's books and DVDs...” and he was offering them for what he'd payed. Marty recommended the books to Manny and Elijah saying “there's so much information. Wayne was the son of a poor preacher and learned how to scrounge and make do with nothin'. He makes a lot of his own equipment – adapting vice grips with pads to do things – a 2”x72” grinder made out of wood and spare parts so he can use the good belts – and it works.”



Then Martin mentioned that he looked up the article on making a ribbon burner that John Emmerling wrote up years ago for the NWBA newsletter – Marty printed out extra copies of it that he gave away to a couple of folks who were already planning on making ribbon burners of their own in the near future. John ran into the ribbon burner design visiting a glass blower neighbor and has been a champion of them ever since.

Frank talked about seeing John's presentation of the ribbon burner and forge at a workshop a few years ago. Frank took photos of John's notes and shares them with us – noting components and supplies:



Frank sent a photo of the forge itself. The ribbon burner is on top. The big pipe goes to a blower – there is a gate valve on it to control airflow. The smaller side pipe for propane isn't hooked up in this photo (to a regulator & tank) – it's got a needle valve to control propane flow.



*Yet Another Scribe's Note: I too have worked up plans for a new forge that will use ribbon burners – to be built after the April show. Here's the link to John's 2005 article – you have to download the newsletter PDF, then John's article is on page 11. <http://blacksmith.org/2005-1-hot-iron-news/>*

Martin reminded the new folks that there was a box of wood blocks for handle material under the table that's free for the taking.

Martin shared a cheap and easy way to make a center line scribe. A center line scribe is used – especially for stock removal from bar stock or for rough ground knives with a ricasso – to mark where you want to grind the blade edge to from each side. You lay the profiled knife blank on a flat surface and scribe along the side that will become the knife edge. This gives you a line to grind to for equal angled main bevels.

You can buy a carbide scribe made specifically for the purpose – or, as Marty noted – you can take an old file and grind it to a point on the end. Lay that flat and use the point as the scribe. “Use a magic marker if you don't have layout dye” on the knife blank's edge before scribing. Flip the knife blank over and scribe from the other face – if the scribe point isn't exactly 1/2 the width of the knife blank you still wind up with 2 scribe lines that show you the grinding target for the knife edge.

And if you have a triangle file that you don't mind grinding a point on, grind at slightly different depths on the 3 sides – giving you 3 different scribe heights.

Jove mentioned the round rod test that Wayne Goddard always championed for testing your hardened-and-tempered finished edge: “take a 1/4” rod – could be a screwdriver, drill bit, piece of brass rod – hold your blade at 30° or so – and you just push on it, 30 to 40 pounds – and you get light on the blade so you can see the edge bulge a little bit [where it crosses the rod] and you take the knife away and it will spring back...” If the edge does NOT spring back then it did not get hard enough – so you want to re-do the quench. If the edge chips out then it got too hard – so you want to grind out the chip and re-temper at 25°F hotter. This is a test you want to do before attaching hardware or handle material.

“And that brings up another thing” Erik noted “that none of us really do a proper amount of testing. Unfortunately, you put in a certain amount of work and it just kills you to put it in a vice and break it. But in all fairness you need to do that once in a while to make sure you're still in the zone with the steel you're using. Especially if you change steels you should be breaking knives right from the start. It hurts.” It's the only way to know if you have good heat treatment and control of grain growth (if you forge). Each steel responds to heat treating a little (or lot) differently so just because you've got it dialed in for, say, 5160 doesn't mean the same process will do what you want for 1095.

The ASM phone app was mentioned at this point – it's in the links at the end of the newsletter – heat treating specifics for hundreds of steels: <https://play.google.com/store/apps/details?id=com.pfiks.mobile.heattreaters&hl=en> and other such apps are available.

Frank then told us about some quench testing he'd done using “Super Quench” that impressed him. With low carbon steels – where you have a second or less to go from Austenite past the “nose” on a TTT diagram to get any Martensite to form (aka harden the steel) – Frank holds the piece right over the quench tank and heats it with a torch so that there is no delay physically moving the piece from a forge or oven into the quench.

*My understanding is that Super Quench is a homebrew with a recipe like:  
5 gallons water  
5 lbs salt  
28oz bottle of Dawn blue dish washing detergent  
8oz bottle of JetDry or other rinse aid  
You can substitute Simple Green for the JetDry. If one of you has a favorite Super Quench recipe, let me know and I'll put it in the next newsletter. This is a more aggressive quench than water – so I would expect it to cause simple high carbon steels to crack.*

“Always stir up your Super Quench” noted Marty “because it separates out.”

Martin's next pass-around was a work-in-process where he had done a burn-in for the through tang. He freehand drilled in from each end of the wood block.

The drill hole is just a pilot hole for the through-tang. Martin drilled a couple more holes (top & bottom) on the blade side to get the tang started. He wrapped a wet rag around the blade, heated the tang, and pressed it into the drill holes – burning the tang hole through the wood. The bottom blade (below) has an etch mask for salt water/electrical etching (see Wayne's books for details).



Martin's gotten used (sterilized) dental drill bits and sometimes chucks one of those up in a Dremel to drill a starter hole in the end of a wood block – so the standard drill bit won't wander when you go to drill your tang hole.

Here's some of Martin's tools – top to bottom: 3 saber saw blades superglued together and seated into an old screwdriver handle [for enlarging a tang hole]; an antique keyhole saw blade [same usage]; a file with the end sharpened [edge scribe]; and a round file with one side ground flat [tang hole adjuster – also great for refining the plunge cut for a ricasso].





Martin noted that you can remove older screwdriver handles by putting them in warm water, put the shaft in a vice, then pry-bar the handle off.

Talking about older handle material, Martin warned that if you have knives with celluloid handles you don't want those in your gun safe or near good tools because celluloid will release nitric acid as it decomposes! He went on to tell how once he'd left a little jar of muriatic acid (aka hydrochloric acid) open overnight in a shop where there were dozens of block planes and hand saws hung on the walls. In the morning all the metal in the shop had a nice brown patina – and the cutting irons would no longer cut wood. Much blade sharpening ensued.

The discussion veered off to various woods, dust, shop vent fans, and Craig Morgan mentioned this quick-release 3M respirator that lets you pop open the mask without removing the straps (and face mask, ear muffs, etc.) - at least I *think* it's this one: <http://www.amazon.com/3M-Comfort-Facepiece-Reusable-Respirator/dp/B00IF7RBS4> ... so you can quickly talk to someone and then snap back up again.

Martin finished off by sharing an article on Puukko “hat sheath” knives – and examples of traditional Puukko knife kits.



**STEVE GODDARD** gave us an update on Wayne's status. He's been fighting infections as well as the Parkinson's and has been in and out of the hospital.

And Steve told Manny and Elijah “Your steel issues are over!” Because he's having to clear out Wayne's shop – with accumulated tools and steel from 1969. As I said at the top of this newsletter, Steve will

probably have (another) garage sale Saturday February 6<sup>th</sup>. If you've been in Wayne's shop you know that Steve has his work cut out for him – and he'd love to see the stock go to a good home rather than being hauled off to recycling.

“There's a lot of L6 out there – L6 supported me through Middle School and High School.”

Steve passed around this knife he came across while clearing out the house marked 1971 “so I was 11 years old” - and a belt buckle:



Steve finished up by passing around a couple of knife “finds”. The first is a Steve Huey knife he found at a Goodwill for \$6.99 – the other is a Japanese made folder marked DG Russell.



“I'm usually at dad's house making the pile smaller Monday through Thursday... there's a lot of material

there to make machinery...”

“That was one of the most amazing things” chimed in Craig “I told Wayne I was looking for this specific sized chuck for a little bench top buffer I was making – ‘Well come on over’ says Wayne and when I got there he opens up this drawer – army surplus full extension ball bearing drawer – with maybe 400 drill chucks, every size you can imagine...”

Frank came forward again – saying that he'd had a heck of a time keeping the lines true on his short sword and asking how experienced makers deal with grinding this type of blade. The diamond cross section is a real challenge – both keeping all the angles right and keeping a crisp ridge line straight down the center of the blade.

Bill Harsey was recommended as a resource. Ben Tendick was another name put forth. Dragonfly Forge (Michael and Gabriel Bell) was also mentioned as a resource. Frank talked about visiting Jim Hrisoulas' shop some years ago.

YouTube videos were discussed. If you have not watched Niels Provos' series of videos making a migration era style “Serpent In The Sword” you owe it to yourself to watch the series:

<https://www.youtube.com/watch?v=vyUkYJeZtW4>

Frank noted that Niels and others he watched might use a contact wheel for the rough grind, but would go to draw filing (or using a sen scraper) for the final grind. Frank was hoping for other ideas.

This was a perfect opener for our next new face:



**SAM TAYLOR** put a notice in our declassifieds a few months back looking for a power hammer to rent time on. What was curious about it to me was the material he was using for a sword: Titanium.

“I've been working on trying to perfect titanium swords for about 4 years now. I've had really good success with Beta Titanium alloys which are heat treatable and hardenable, really hard... Rockwell 65 or more. So there's a lot of misconceptions about the titanium family of alloys.” Sam said.

The large sword he brought in for the meeting isn't Beta Titanium, but the more common titanium alloy (Ti-6Al-4V). Sam likes it for the lighter weight for a given size compared to normal steels. This common titanium alloy will get to 45Rc hardness through work hardening. The sword is in the German Zweihander (2 handed) style. Sam gave a brief description of Zweihander fighting styles.

This is a commission from a German sword enthusiast who wanted a lighter sword for practice. The customer has a steel Zweihander sword that Sam was hired to sharpen and had a chance to test out. Not only was it heavier, “it flopped more, it wiggled more, it was weak – this thing would just slice that thing in half I swear – he's really going to like this!”

The Beta Titanium is about 70% of steel whereas Alpha Titanium is 55%-60% of steel, Sam said.

“The alloy makes really good swords because it's so tough and really flexible... you can bend this well beyond 90° if you want to but it takes a lot of force to do it” Sam said as he tried to demonstrate bending the sword by setting the tang on the concrete and applying force with one hand on the blade.

He talked about having completed 35 to 40 knives and shorter swords (many in Beta Titanium) – and because of the lighter weight compared to steel, especially in swords with mass at the end of the blade like a Chinese Dao, titanium swords are faster and more accurate to use.

Asked how much more expensive the Beta Titanium is Sam responded that a lot of the Beta Titanium is leftovers from the aerospace industry – so it is hard to find... which can be cheap if you find it in a scrapyards. “You quench it in ice water – it's a lot like working in steel – but temper it at 800°F-900°F and it will become harder.” Sam confirmed that it is precipitation hardened and will get harder over time.

Since Alpha Titanium work hardens Sam was asked how he anneals it: "I don't!" he said "You have to hold it for 20 hours at 2300°F in a vacuum or something." He warned that in heating it for forging that if you go over 1600°F-1700°F then nitrogen and oxygen will attack the metal. And not to soak it at all – just heat it up and hammer on it "all the way down to black heat... it forges better at a low temperature."

He described the lattice structure of titanium which is very different from what we are used to with steel. And you don't want to use a coal forge. You want an oxidizing atmosphere, not a reducing atmosphere. The reducing atmosphere will create titanium hydride that embrittles the blade.

Asked how much stock he started out with for this sword Sam responded "1" round by 3' long – it was forged under a 100# trip hammer mostly." It cost him about \$180. Beta Titanium would have been \$1,200.

"The grinding is kind of a pain because it tends to gall – it's sticky, it kind of grabs. Ceramic belts work well at really slow speed..." Sam noted. He uses a grinder set up with a large contact wheel in front and a platen set almost horizontal above the wheel – with the belt running away from him (reverse from how most of our grinders run – more like a Japanese grinding wheel). He uses a combination of the contact wheel and the flat platen – running the blade lengthwise down the belt.

Titanium dust is flammable and explosive – like aluminum or magnesium – so there's a caution.

Sam discussed his finishing process for Beta Titanium. Basically finishing grinding at 200 grit then loading a Scotch-Brite belt with copper for the final finish.

"When I first started doing this I thought that people would be excited about the idea of titanium swords but what I found was that it was a whole bunch of complete dismissal because everybody had heard that titanium can't make a decent blade." Which Sam likened to saying that since mild steel can't make a decent blade, saying that no steel can make a decent blade. He has found titanium alloys and methods that make very tough, light, and sharp blades! Sam has tested a number of blades to destruction to make sure

he has proper control of the hardening process.

Sam feels that for knives, the smaller a blade is the less advantage titanium has over steel "but the bigger it gets the more titanium shines. It's not just the weight, it's the way that it impacts when it hits – it has so much strength."

And yes – we all had fun playing with the sword!



Sam's YouTube channel is "Mad Science Forge"  
<https://www.youtube.com/channel/UC1G3CoVLsG2sNfEGh7vZIOQ>

Last us was **ANDY** with a kiridashi style neck knife made from a file.

Black leather heart shaped pouch – stitching, lines, and bead like blood. "I'm calling the cracked heart."



"I like making neck knives. My resolution this year is to make chef knives and folders... I want to make knives that actually get used. I made a friend a 6" chef knife with

Purple Heart – right now I'm working on an 8" chef knife... the first knife I sold was a mini and I like those too... and I want to do folders too..."

Here's Andy's Facebook site:  
<https://www.facebook.com/Savage-Blades-1375934346045535>

**MIKE JOHNSTON** couldn't make the meeting, but sent a photo of a couple of recent knives with the note:

I got a desperate call on 12-20-15 for two knives to be delivered before Christmas. Sent them off on 12-23-15 in a flat rate box that they received 12-24-15. Both forged from Ford coil spring, brass bolster, one finger groove, three mosaic pins by Sally and maple burl handles.

The third "just before Christmas" order I already had made and was at the December show.



We missed seeing you Mike!

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](mailto:Michael@ElementalForge.com)

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Ken Olson is looking for someone who would be interested in building him a set of six woodcarving knives, steel only, 4" handle with a rectangular shaped opening in the handle with a 1/4" steel border, 2" blades of various shapes. Ken has specific dimensions. Contact Ken at 541 935-1182 or [olson@bossig.com](mailto:olson@bossig.com)

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## 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 has a number of Facebook groups designed to help knifemakers and collectors – search Facebook for:

- 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](mailto: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](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/](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.

<http://www.cartercutlery.com/bladesmithing-courses/>

David Lisch is a 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>

Speaking of the ABS (American Bladesmith Society) – 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](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](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](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/>

Quick and Dirty Tool Co. [Auburn, Washington] -  
will build Spencer/Clontz style tire hammers  
<https://www.facebook.com/QDTool>

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](http://www.alaforge.org/Trading_Post.html)

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

## 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>

## **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/>

There's a new set of epoxies made specifically for bladesmiths, created by a man with a decade of experience in making fishing rod adhesives.  
<http://www.bladebond.com/Products.html>  
If you try some of this stuff, I'd love to know which product you tried and how you liked it!

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.