Official Newsletter of the Fort Vancouver Trades Guild

THE forge & plane

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F&P Interview

A Visit with Guild Member Hugh Eddy

THE DECISION TO INTERVIEW Hugh Eddy was an easy one. Hugh, who lives in Caldwell, Idaho, is probably the Guild member at greatest distance from the Fort. Our summer vacation routed us right through Caldwell, so why not see if Hugh was available for an *F&P* interview? Hugh and Karen, his wife, liked the idea and invited us to stop by on our way.

Hugh's interest in blacksmithing began at the age thirteen. Reading and imagination kindled the spark—there weren't any smiths among family and friends. He bought a forge, and an uncle gave him an anvil made from an old piece of railroad rail. He tinkered around a bit, and by age fourteen, managed to land a small job making iron railings in a fabricating shop. After high school, Hugh served in the U.S. Marines for three years, then entered Oregon State University, where he graduated with a degree in forestry. He worked for a time with the Bureau of Land Management in Coos Bay, Oregon, but eventually decided to pursue a career in medicine.

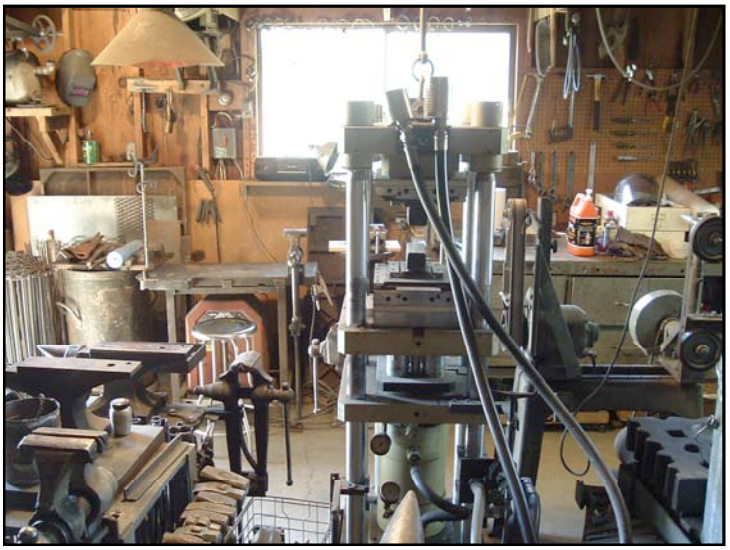
He was licensed as a physician in 1970, served a residency in internal medicine in Seattle, and moved to Caldwell in the early 1970s. Having finished with formal medical education, Hugh again found time to indulge in the fascination of working hot iron. He retired from his Caldwell medical practice last January, but even after thirty years of fire and steel, he shows no signs of retiring from the forge.

Above: Hugh Eddy in his studio *(M/S Gawecki)*

Hugh has belonged to the Fort Vancouver Trades Guild and NWBA since the early 1970s, so he is a familiar face to many of us. I first met him at a Jay Close workshop, at the Meridian Forge, in Eatonville. *Focused* simply doesn't do justice to Hugh's approach to a task: *welded* might be a more appropriate term. He and the project are one. His intense concentration,

immediate grasp of methods, and "no nonsense" approach to his work made me afraid that I might have just stumbled into the deep end of the pool.

Hugh has high respect for the Peter Ross philosophy of smithing, as something that goes way beyond "get it hot and hit it hard." His advice for newly minted smiths is to make simple things with simple tools until objects are perfected and to strive for authenticity. Only when you are skilled to this level should you consider making the down payment on a power hammer and hydraulic press.



Hugh's shop with anvils and hydraulic press
(Photos: M/S Gawecki)

Damascus steel spurs by Hugh Eddy

Hugh's work covers the whole nine yards and a little more. It includes, among other things, hardware, tools, knives, and tomahawks. Currently he is mentoring a young local smith on making knives and is happy with his student's progress. He has a special interest in Damascus steel and has expanded the technique to include more than knives.

Hugh is still involved in medicine, but he limits himself to being a volunteer driver for those who need transportation for care, and to being a respite care giver, relieving primary care givers for Alzheimer's patients. For the past several years he has also been involved in historic demonstrations during Outpost Day, in Murphy, Idaho.

Now that this article has "introduced" Hugh, guild members who may recognize his face but have never spoken with him should step up and make the acquaintance of a compassionate man and an exceptionally skilled craftsman, who is generous about sharing his considerable knowledge. ♦

Shelton Browder Demonstration

Fort Vancouver National Historic Site

Sponsored by the Fort Vancouver Trades Guild

Friday through Sunday
November 10–12, 2006
9:00 AM – 4:00 PM
Fort Vancouver Blacksmiths' Shop
Registration on site
Cost: Members $20/day
Nonmembers $20/day plus $10 signup fee

For information, please contact any board member listed on the last page or F&P editor Susan Gawecki 360-666-3398
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Ralph Douglass
1960 – 2006

The cannon crew bidding farewell to one of their own

A Sendoff for Ralph

THE GUILD IS VERY SORRY to announce the death of Ralph Douglass, who left our company on July 1. Ralph started as a volunteer at Fort Vancouver NHS in 1994. He participated in constructing our side draft forge and was active in the shop. Ralph was on the cannon crew from 1996, serving alternately as back left, back right, front left, and front right gunner, and power monkey. Ralph was 46 years old: it seems way too soon to be saying goodbye.

The Guild honored Ralph with a short memorial service and cannon shoot at the Fort on July 31. Members of Ralph's family and friends attended, including his wife, Dawn, and their children, Nathan and Shannon. Bill DeBerry presented Dawn with Ralph's old shop hat, and John Prutsman gave her a memorial plaque with the last stanza of Longfellow's "Village Blacksmith." The ceremony was unexpectedly heightened by a flyover from the Oregon National Guard, perhaps in response to the cannon shot. Ralph would have loved it. He will be missed by all of us. ♦

2006 Guild Officers Elected

JUNE 11, THE GUILD met for annual election of officers. The slate was somewhat limited, and several officers are continuing in their offices throughout 2006. Elected to serve for 2006–2007 were
Officers: President, Ike Bay; Vice President, David Stearns; Secretary, Jeff Cawley; Treasurer, Ted Anderson
Board Members: Harry Newton; Larry Coffield; Gary Lewis, Off Site Coordinator; Bill DeBarry, NPS Representative; and Susan Gawecki, Newsletter Editor

Treasurer Ted Anderson reported that the Guild had a positive year, finishing $531 in the black. Our major expense continues to be the Fall Workshop. The board voted to request authorization from the membership to increase dues from $5 to $10 per year. We would be very grateful if members voluntarily increased their dues to $10 until we can obtain your official permission to increase the dues. Please consider this article your notification of the anticipated increase, and expect that the increase will come up for a membership vote at the next general meeting, to be held in the fall. ♦

Fall Guild workshop features Sheldon Browder

THE FORT VANCOUVER Trades Guild is proud to be sponsoring Shelton Browder for an educational demonstration November 10 –12. The Guild supports blacksmithing and other trades at Fort Vancouver NHS. We are happy to sponsor Shel, a thirteen-year veteran of the Anderson Forge, in Colonial Williamsburg. Shel has been a professional smith since 1985, when he left the family hardware business to fire up a forge full time. Prior to employment at Williamsburg, Shel was a blacksmith at the Tryon Palace, an 18th century historic site in Newbern, North Carolina. The Guild continues to support historical blacksmithing circa 1845 by sponsoring this demonstration. To quote Donald Streeter, we all persevere in the effort "to make common things uncommonly well." ♦

Notes from the President

THE STATE OF THE GUILD — Our little informal group is facing some challenges and we need to clarify our direction. Currently our dues structure dues not cover basic operating costs (insurance and annual state corporate filing fee). We need to raise annual dues from $5.00 to $10.00 and to do this we need to amend the bylaws. We will present a motion to accomplish this at a fall meeting.

The second challenge is our ongoing educational program. Guild membership is small, and member participation in these programs is limited, so we need nonmembers to be part of the paid gate for our bigger educational offerings, those led by top-level people from across the country. If there is not enough Guild support, maybe we should be cutting back. Do you want us to continue to bring top-level historical smiths to teach at the Fort? Will you support that training by attending? Would you like to cut workshops down to just two days?

One thing we *must* do is fix a date and an instructor early in the year and promote the workshop aggressively to our own members and to NWBA members.

Our cash reserves are such that we can suffer modest losses each year and still stay healthy for many years, but I doubt that is the best long-term course to take. Please support the dues increase bylaw amendment and the Sheldon Browder workshop. Shel will make some interesting objects and through them educate us way beyond the object itself. Welded holdfast, socketed and tang chisels, and modest shovel are just a few of the items under consideration. We welcome your requests for objects and techniques you want to see. ♦ — Ike

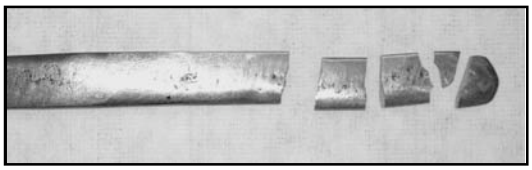
Ike Bay, Guild President

Improving Your Heat-Treating: Rediscovering the Break Test

Dave Smucker

What *is* a break test?

THE "BREAK TEST" HAS BEEN around a long, long time. The first reference I find is in discussions of the manufacture of "blister steel" in the 15th century. Blister steel was made by taking the best grades of wrought iron, in the form of bars, and packing them in finely ground charcoal in a large clay box. This was then heated for 6 to 8 days at about 2000° F so that the wrought iron absorbed the carbon from the charcoal and became "steel". (Real wrought iron had almost no carbon, being almost pure iron with several percent of silicon oxide slag.) The clay boxes were about the size of a coffin and had a small door or opening through which a sample could be removed for testing. This is kind of like testing to see if the cake is done. The sample, which was well above the critical temperature, was removed and quenched in water. It was then broken — hence the name "break test". Pure wrought iron would not break in a similar test, but would instead bend.



I have always assumed that this was just a simple test, with no tempering of the sample, just a quench followed by breaking the sample with a hammer. I also assumed that experience and judgment were then used to guess at the carbon content by looking the fracture. Carbon content could also be judged by testing the sample with a spark test on a grinding wheel. (While they didn't have modern testing methods in those days, they did have natural stone grinding wheels.) Today, I think I was wrong in assuming the test was quite this simple. Instead, I think a progressive temper was made to the sample and it was then tested by repeated breaking of the sample from least temper to most temper. This would add very little time to the testing process but give a much more meaningful test.

Mark Hopper teaches the break test at Madison

AT THE SOUTHERN Blacksmith Association conference this past May, Mark Hopper was one of the featured demonstrators. Mark grew up in England and actually started blacksmith when he was thirteen. He learned blacksmith in a formal British training program and then worked with a number of experienced smiths. He spent four years in Kenya, in East Africa, where he taught tool making.

For me, one of the outstanding things that Mark demonstrated is how he was taught to perform and use the break test so that you could use the proper heat-treating procedure on almost any steel useful for tools. This test is very, very useful for an"NTS" (not-too-sure-what-it-is) steel, but it is also very useful to just learn about the best way to heat treat and temper a known steel. It is especially useful to gain experience and confidence in heat-treating and to solve problems you might run into. Mark taught this test in his four years in Kenya, where almost a hundred percent of the steel used for making tools is material salvaged from junked autos or other industrial scrap.

The break test is for known as well as unknown steels

THE BREAK TEST is very useful to you even if you know what steel you are using because it lets you do a test heat-treat. Just as you might make a test piece when working out a design, the break test is useful for testing a steel even if you know for sure what it is. If you don't know the steel, except by viewing grinder sparks or the kind of thing it came from, then the break test is really useful. It is also a great tool for teaching you how various steels react to heat-treating. It will help you understand if they will be brittle or tough, if you will have trouble with cracking, etc.

OK – Enough history and introduction. Just how do you *do* a break test, anyway?

STEP 1: Forge the stock down to a good working size for the test. I find that you want a flat bar about ⅛ inch thick by about ½ to ⅝ inch wide. (A larger cross-section may be too hard to break, especially in high-strength steels.) You will need a working length of about 5 to 6 inches — plus enough additional material to hold for heat-treating, quenching and tempering. Extra material on the "handle" end doesn't hurt but isn't necessary. At left is an example of some typical test pieces after rough forging.

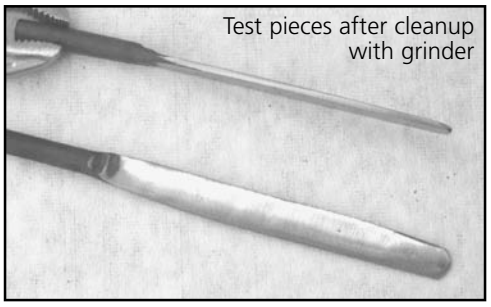

Test pieces after rough forging

STEP 2: Normalize your test piece. What do you mean "normalize"? Heat your material to above the critical point — for many steels this is just a little hotter than the point at which it becomes nonmagnetic — then set it aside on the coal on the edge of your forge and let it slowly air cool. (If using a gas forge, just set it on a firebrick.) This step helps relieve stress in the steel and can give you a smaller grain size.

By the way, you can do a little test here and see how hard your sample is. Check it with a file — if shows hardness, you very likely will have a good "tool" material. (This in itself is not a test for "air hardening steel" because many alloy steels will show quite a bit of hardness when cooled this way if they are of a small enough cross-section. This is because they cool quite fast, even in still air.) If it is a water-hardening steel, you will still cut it without too much trouble with a new sharp file. If it is an alloy steel with mid-range carbon content it will be so hard that while it will still cut with a file, it will not be easy. If it is an air-hardening steel, it will be so hard at this point that a file can't touch it.

STEP 3: Clean up your test piece so that you have a good surface finish. I use a 4½ inch angle grinder for this. Mark Hopper did such a fine job of forging his test piece that he had an almost polished piece coming off the anvil. I have to grind mine.

SHOP TIP: An easy way to hold the test pieces for cleanup is to put a welding magnetic holder in your vise jaws. You can then lay the flat surface of the test piece on the magnet for grinding. Then flip and do the other side.


Test pieces after cleanup with grinder

STEP 4: Slowly heat the cleaned-up test piece. You don't need a very hot, high-draft fire for this. Take it easy. (I think this is one of the major places folks have trouble with cracking in their heat-treating — they heat too fast. This is especially true for W1 or O1 steel. I have been able to reproduce longitudinal cracking in W1 drill rod with very rapid heating.) Heat your test piece to a little above the critical temperature. As noted above, for most steels this just above the point at which the steel becomes nonmagnetic. If you know that you have a high-alloy tool steel such as S7 or H13, then you will need to go to higher temperature for it to be above the critical temperature.

STEP 5: Quench 6 inches of the test piece in water. Keep it moving all the time; draw a figure eight in the water; give it some up and down motion too. Mark Hopper only quench-

A quick review of heat-treating steel

When we heat-treat a steel that contains enough carbon, we are able to change its hardness, strength and toughness. Alloying elements may also help us in this process. It is always some form of a compromise to get the things we desire in the finished product. For example, we can make it very hard, but it will be quite brittle and lack toughness. These and other factors are controlled by carbon content, alloy content, manufacturing history and how we heat treat the item.

In simple terms, we heat treat by:

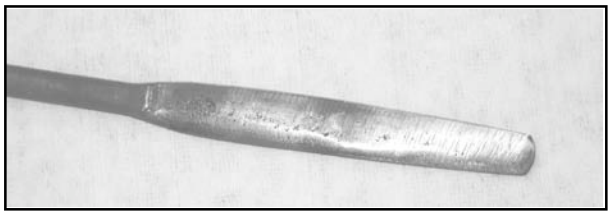
- Heating the steel to above its transformation or critical temperature
- Quenching the steel, making it very hard but very brittle
- Tempering the steel by reheating it to a lower temperature, reducing some hardness, but making it less brittle and much tougher.

es the test end and then uses the retained heat in the rest of his sample to provide heat for tempering. You can do this too if you know how, but I suggest that for your first attempts at the break test you completely cool your test piece and use a torch for tempering. (See Step 7 below.)

STEP 6: Now repolish-regrind the surface of the 6 inches quenched. Be careful not to let your piece become too hot from the grinding (warm to the touch is OK). If you get your piece hot, you will be tempering it and messing it up for the progressive temper we are going to add in the next step. Keep fingerprints off the surface too — not a big deal, but oil on the surface will affect the temper colors in the next step.

STEP 7: Now gently reheat your test piece from the "handle" end. I like to do this with a propane touch with the handle held in the vise. You can do this with any torch but use a small tip. Or you can do this in the forge, holding the tip of the test end in vise grips, etc. The idea is to produce a progressive temper, with the temper colors covering the maximum length of the test section possible. Using the torch, I apply most of the heat back by the handle end, on the bottom side, and watch the colors run towards the tip. I will give the process a little help by quickly playing the torch along the length of the test piece from time to time, but put most of the heat in back towards the handle end. When you have a nice spread of colors from light blue to very pale yellow, re-quench your test piece. This stops the tempering process.

Mark does all Steps 5, 6, and 7 in one connected operation. He takes his test piece from the quench with the "handle" end still hot, makes a quick polish of the quenched surface with emery cloth and then watches the colors run from heat still in the handle. If necessary, he may add a little more heat from the forge or a torch. He then stops the process by quenching.



OK, close your eyes and imagine the picture above in color. On the center left, you would see steel grey, then light blue. In the center would be dark blue, then purples, then browns, and then, as we move to the right, dark yellow follow by straw all the way to pale yellow. Isn't imaginary color great?

STEP 8: OK, now we get to use a hammer!! We have a test piece that has been the heated above critical, quenched, and has a progressive temper. By progressive temper, I mean one that is almost full hard (untempered) at the end to one that has been nearly completely drawn at the other end. In other words, the one end is very hard and brittle the other end softer and tougher. The test piece also has a full range of temper colors.

What are temper colors? Why do they form on steel?

When we heat steel that has a machined, ground or polished surface to temperatures between 400 degrees F and 650 degrees F the surface will take on various colors from a very pale yellow to purple to even a dark blue. These colors are caused by a thin layer of transparent oxide forming on the surface of the steel. Because of the nature of reflected light, we see this as different colors, based on the thickness of the oxide layer. This turns out to be very useful to blacksmiths for judging tempering temperatures. It does take some experience to judge the color but it is a very useful skill. Below are the colors and temperatures as listed in Machinery's Handbook.

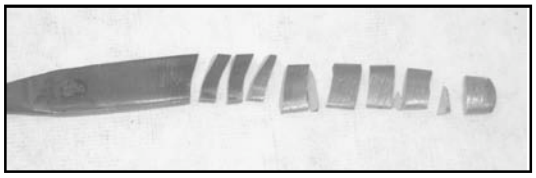
Pale yellow	420F
Light yellow	440F
Pale straw yellow	450F
Straw yellow	460F
Deep straw-yellow	470F
Dark Yellow	480F
Yellow Brown	490F
Brown Yellow	500F
Spotted red-brown	510F
Brown-purple	520F
Light purple	530F
Full purple	540
Dark purple	550F
Full blue	560F
Dark blue	570F
Light blue	640F

We can now start breaking off small pieces from the very hard end over the edge of the anvil with a hammer. As we progress toward the tougher end, we may reach a point of "bending" rather than "breaking." Don't use your good forging hammer for this test. Use a hammer that you don't care about marking up the face. We can now use the colors from the tempering to judge the performance of the steel we are testing. Where does it break, where does it bend? We can also judge the amount of force required to make a break. I start with a lighter blow and then re-strike with a harder blow if it doesn't break.

Mark Hopper uses this test to pick the tempering temperature he wants for a finished tool. In other words, the tempering color he wants. For edged tools, he likes to go back "one break" and use that as his target tempering temperature. He knows it is not the toughest temper, but one that will still hold a good edge and is quite tough.

Results: What I have learned from using the break test

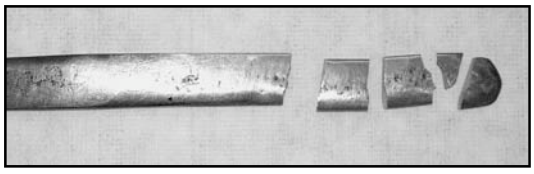
I HAVE DONE QUITE A BIT of heat-treating and still have learned a lot from the break test. Especially for me it gives me a way to test one steel against another. It also provides firsthand knowledge of how various steels that I have data on perform in my shop using my equipment. It also give me a great way to test the performance of unknown steels like springs, railroad rail, truck axles and things I might pick up at the scrap yard.



Test of W1 (1095) Here is a test piece of W1 (1095) after breaking over the anvil, with all of the little bits. There was not much difference in temper color towards the hard end (right side in the photo), so I was not surprised that I could keep breaking it off. It didn't take a lot of force to make these breaks. The steel was quite brittle.

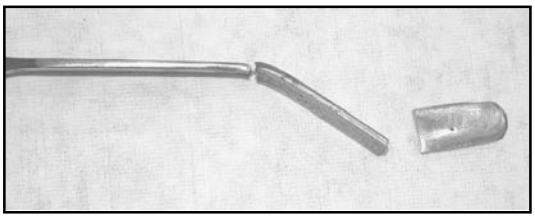
As I got farther to the left it took more force (at least it seemed like it) but still a rather brittle break, sometimes requiring more than one strike. When I got to the full purple, I did get another break but I didn't try breaking in the vise with a really big hammer.

What this test doesn't show for W1 is the effect of a "very hard case" and a tough core. Since my test piece is only about ⅛ inch thick and W1 hardens to a depth of about 1/16 inch, my test piece is through-hardened. If I am making tool from W1, a wood chisel for example, one of the advantages with a tool that is about ¼ inch thick is that I can have a very hard cutting edge and a tool that still has a softer, but much tougher center. I need to repeat this test with a test piece made with a long taper to test out this effect. I repeated this with another piece of W1 and got very similar results.



Test of 4340 Here is one of the break tests I ran on a piece of 4340. It was quenched in water, even though I knew that 4340 is considered an oil-quench engineering steel. It took a lot of force to break the 4340 sample, but it still broke with a brittle fracture until I got to the range of 460° F temper. At a higher temper temperature, I was not able to break

this sample over the anvil. I didn't try breaking it in the vise.



Oil Quenching 4340 Because I knew that 4340 was intended as oil-hardening steel, I ran another break test, but this time I quenched in oil rather than water. Result? I could not break this test piece over the anvil. I got a small bend, but no break. So, I put the test between the jaws of my vise and hit with a six-pound striker's hammer. I made the break on the right, seen above.

Then I moved the test piece up in the vise and went at it again. With a series of heavy blows from the six-pound hammer, I was able to bend the test piece over to about a 45-degree bend. On the last blow, I broke it off. Oil-quenched (oil-hardened) it is one very tough steel. I was still in the 450° F to 480° F tempering temperature. Handbook values show 4340 oil-quenched and tempered at 500° F with a hardness of Rockwell C in the mid to low 50 range with a yield strength of 225,000 psi and a tensile strength of 265,000 psi. In my opinion, a rather good steel for lots of tools, especially if you cool it between uses.

One of the major lessons learned here is that it pays to oil quench 4340. Why? Well, I get a just as hard a surface (or nearly so) as the water quench and quite a bit tougher core. The tougher core comes from the type of steel structure that is formed by the somewhat slower quench in the oil. I have read all about this many times but doing it and then running side-by-side break tests really helps you understand the differences.

Other steels that I have taken a look at with the break test

I HAVE DONE SIMILAR TESTS on O1 tool steel, unknown coil spring steel and a chunk of junk — called rebar. I still haven't run the test on some run-of-the-mill A36, railroad rail or some of the high-alloy air hardening tool steels such as S7, A2 or H13.

O1 quenched in water looked a lot like W1. I need to run that again and try an oil quench like the one I did with the 4340. The coil spring material looked like it would make good tools based on the water-quenched break test. That, too, should be looked at with an oil quench. Now, about the rebar. First, I had cracking in the rebar just from forging it. It may have been from forging in a "cold shut" from the rebar surface but still, a crack is a crack. Then, when doing the break test while the steel is quite tough, it bent to a 90-degree angle before starting to break, but it just didn't have the hardness I saw with the 4340 or coil spring steel. Junk is junk.

What quench should I use? That is a good question on unknown steels. My starting point is to use water because it is easy and fast to do. If from the file test, (at Step 2, above) your steel looks quite hard then I would follow with repeating the test with an oil quench. If I have a known steel, that I know should be oil hardening, from what I have learned, do an oil quench. ♦

Summer Off-Sites

Draft Horse Plowing Exhibition at Portland Community College

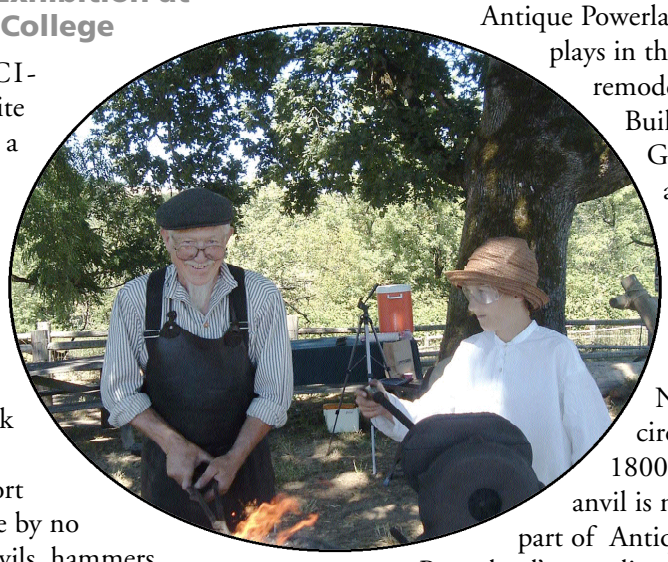
THE GUILD PARTICIPATED in several off-site events over the summer, and a few more are anticipated before summer ends. The season opened with our annual set-up at the Draft Horse Plowing Exhibition, sponsored by the Washington County Historical Society at the Rock Creek Campus of Portland Community College. The Fort Vancouver Trades Guild were by no means the only guys with anvils, hammers, and fire. The exhibition also had a wheelwright and a farrier. Participants included Ike Bay, Bob Conner, Gary Lewis, Denny Nelson and Mike Popa. Sales were good and food (for us) was free!

Champoeg State Park

BOB CONNER and Susan Gawecki participated in the Friends of Champoeg Blacksmithing demonstration. This event, unlike others the guild has participated in, focused on the participation of younger Friends of Champoeg, who eagerly lent a hand with nail making. They enthusiastically cranked bellows, headed nails and helped start a fire with a striker. The next Champoeg event in September highlights a range of pioneer crafts, from butter making through shelling corn.

Great Oregon Steam Up at Antique Powerland

The Great Oregon Steam Up was a little less steamy this year. The end of July and first of August can be sweltering, but this year's mild weather took some heat off blacksmiths. Spirits were high, and the event drew plenty of visitors. Participants from the Guild included Dean Moxley, Dennis Torresdal, Garron Guest, Gary Lewis, Jeff Botts, Jim Marson, Neil Pope, Bob Conner, and — the event wouldn't be complete without them — Merlyn Troska and Ralph Hinds. One of the new additions at Antique Powerland are displays in the recently remodeled Dezotell Building. The Guild donated an old anvil made by the Fisher and Norris Company of Trenton, New Jersey, circa late 1800s. The old anvil is now a proud part of Antique Powerland's standing exhibit of blacksmithing tools.♦



Photos, this page, top – Ike Bay at the PCC Draft Horse Exhibition; *bottom* – Bob Conner and a young Friend of Champoeg [*M/SGawecki*]

Photos, page 11, clockwise from left – Garron Guest and Roger Hancock riding the Russell at Antique Powerland [*B. Conner*]

Merlyn Troska and Mike Darrig at the Great Oregon Steam Up [*M/SGawecki*]

The Fisher Norris anvil on display [*M/SGawecki*]

LIFE IN THE SLOW LANE AT ANTIQUE POWERLAND

The tractor above is a 1915 Russell, rated at 30 - 90 horsepower. 30 HP at the drawbar, 90 HP at the flywheel. It weighs 25,000 pounds dry, meaning no water in the boiler or the two on-board water tanks, and no fuel. It burns wood. Original design steam pressure was 160 psi, but it is now set by safety valve at 100 psi. During the tractor pull we usually run between 50 and 80 psi. Two people are needed. The guy on the right above, Roger Hancock, controls the throttle, reverse gear, and monitors steam pressure, boiler water level, and the fire. He also checks for pedestrians and other obstacles on his side and in front. The guy on the left above (that would be me) steers, holds the clutch lever at full engagement, and monitors his *side and front for pedestrians and other obstacles. In the traditional tractor pull, we were the grand finale and largest, most powerful tractor in the event. We moved slowly along the track while the stone boat (sled) was being weighted down. When all the load that could be applied was on board, Roger opened the throttle and sped up, making the engine 'work' a little, resulting in the distinctive barking 'choo-choo' that steam engines make when they are working. We were rewarded by generous applause from the spectators, and responded with a couple toots from the tractor's two steamwhistles. It's always a lot of fun driving this 13 ton behemoth . . . 1913 state-of-the-art agricultural technology.* ♦ *— Garron Guest*

The Great Woodpile Cleanup!

ON JUNE 3, Scout Troop 479 and Guild members pooled their talent to begin organizing the wood supply outside the shop. The scouts ran the wood splitter, President Ike took the front loader for a spin, and other members carted the wood to piles. The woodpile remains a work in progress. We expect to hear from Bill again soon. ♦

At left. Harry Newton and John Christiansen with Troop 479 leader.[*M/SGawecki*]

FORT CALENDAR

Candlelight Tour
Friday & Saturday,
September 15 & September 16
7 PM to 9 PM
(Volunteers Needed!)

Kids Dig
Saturday, October 7

Tales of the Engagés
October 14 & October 21

For more information, please contact

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612 E. Reserve Street
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Visitor Center: 360-816-6230
www.nps.gov/fova/home.htm

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Official Newsletter of the Fort Vancouver Trades Guild

THE forge & plane

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