Ah, So You Do It for the Ash: A Woodfiring Odyssey

Richard Selfridge

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Tatsuzo Shimaoka and Ken Matsuzaki in front of our two chamber gas and woodfired kiln

Rolled rope and stamped mishima vase made by Mr. Shimaoka, woodfired in our kiln

In the summer of 1982, after firing the second chamber of our kiln with wood a few times, we had the honor of hosting Mr. Tatsuzo Shimaoka and his deshi Ken Matsuzaki at our studio for lunch when they visited Edmonton and gave a workshop and exhibition. I asked him if he had any comments or suggestions about our kiln and our work as he and Ken looked into the kiln. He replied with a question that I am still trying to answer, "Why do you fire with wood?" to which I blithely replied, "Well, partly just to reach temperature, but mostly for the ash". "Ah", he said with a smile, "you do it for the ash". I had heard that sometimes he put ash on some of his studio pots and then fired them with LPG, so I thought at the time he might be saying "If all you want is ash, just put it on them".

Now, sixteen years later, I would say I fire with wood for the vapours and for the deposited ash, for markings that can't be achieved any other way. I did think the effects I wanted only came with multi-day firings but now know that a 24-hour firing can give all the ash and vapour you could want if it is in the right kiln.

This past summer I spent nearly a month in August working at Utah State University in Logan doing wood firing in a workshop organized and taught by John Neely and Owen Rye, learning more about why I do it. Carol and I have made woodfired pots since 1980 when we built our two-chamber kiln on our city lot in Edmonton. After a trip to New Zealand, seeing many woodfired pots and a few kilns, we thought firing our

second chamber by side stoking with wood was a way to make "country pots" in the city. Not too much smoke is produced as stoking starts when the second chamber reaches bisque temperature from the first chamber's waste heat. Except for firing the wood kiln as summer residents at the Archie Bray in 1988, and looking at the results from the two-chamber kiln at the Banff Centre, all of our prior experience had been with our kiln.

Kurt Weiser watching Carol stoke the Wood kiln at the Bray

Over the years, we have produced some good results, a few of which have been in national and international juried shows, but when I saw historic Japanese ware from Iga, Bizen and Shigaraki, I always knew that something was missing. In August of 1996 I spent three days at the Tozan in Nanaimo, one day helping with the stoking, one watching Yukio Yamamoto throw and trim teabowls, and a final day unloading the results of a six day firing. Some very good pots (I bought one of Yukio's tea bowls) but most of them from the firebox and first chamber. Although most of the pots had good vapour and flame blushes they still didn't have that crusty look that I'd always admired in the Iga and Bizen pots. They were more dusted with ash than encrusted with it. I knew that I wanted to try some pots in the Tozan the next summer, up front near the fire if possible. As it turned out the summer and fall of 1997 was a woodfiring marathon with pots in seven firings in Logan, one firing in the Tozan and two firings in our Edmonton kiln.

When I told people that I was going to Utah to do a woodfiring course in August, they were surprised when I said I was taking it, rather than teaching it. The short answer was that John Neely had been the juror for the Shades of Shino show we were in back in 1989 and I had seen his work in magazines and admired it and the work of his students shown in Las Vegas at NCECA. I was especially interested in the effects of reduction cooling. He told me he's a fan of Raymond Carver, my favorite short story writer when I briefly chatted with him at NCECA. When I saw the announcement for the course with Owen Rye (he fires with Chester Nealie a potter from New Zealand whose work I have admired since we first saw it there in 1980), I realized that USU was a place I ought to look into.

After making all the registration and housing details, I set to work in late June; to make some wood fired work to fire there and in the Tozan. David Lloyd, the kiln master in Nanaimo took my pots in Vancouver and saw to their firing in the Tozan in late July. I took a few of his to Logan and we were able to exchange them by Thanksgiving.

While visiting in Seattle in July I saw some fine wood fired pots at the Seattle Art Museum (Oribe teapots and plates), Honeychurch antiques (great shigariki storage jars), and a show with Loren Lukens, who fires a kiln on Whidby Island. Loren and I traded pots and I took a bisqued basket of his to Logan as well.

The two-day drive from Vancouver to Logan was a good time to think of what I hoped to explore in the workshop. I thought I wanted to see if I could fire some of our constructed illusionistic "flattened" pots in about the two-foot range. I also needed to build the "deco" into them instead of relying on painting it on as we have done with our majolica work. While on holiday on Bowen Island, I had obsessively cut out rubber stencils (animals, birds, pots, fashion stuff, floral). These would give a different value once they were pressed into the clay surface, slipped and removed to give a depression in the clay.

"Toasted Snow Raven Teabowl"

"Slingback Shoe Shape Teabowl"

This is a technique Kurt Weiser showed me, one that David Shaner has used. I also wanted to do some "tumble stacking" and had collected lots of shells on our beach to separate and wad the pots. With a supply of my feldspathic stones for the clay body, some of my usual Helmer woodfired body and all the tools I thought I would use, I was ready for adventure.

After getting acquainted and looking around the well-appointed studio (some really fine work done by former students and visiting artists in the display cases,) I got ready for "class" on Monday morning. We worked as a group, about 16 people who ranged in experience from enthusiastic undergraduates, through seasoned grad students to a few full time potters like myself. The group included people from Florida, North Carolina, New York, Iowa, Colorado, British Columbia and Alberta, as well as a contingent of Utah residents. Although not all had woodfired before, everyone was a potter, some were teachers

as well and both knowledge and enthusiasm levels were high. Many of the participants had extensive exhibition experience and there was a real sense of collegiality.

Marty Kendall, recent Alfred grad, Lynn Johnson, Vancouver Island, British Columbia and John Neely, firing the "Cat" kiln.

Gas fired, reduction cooled, ash glazed shaker by Utah State ceramic head John Neely

We talked as a group about all the possible woodfiring variables for a couple of hours. John was leading and Neil Estrick the technician for our course and Will Shynkaruk the studio manager and John's right hand man were adding insights they had gained from firing the Logan kilns with a variety of woods and firing schedules. This took place the first day but was augmented by John's e-mail updates from Owen who was coming for the third week of the workshop and to open a show of his work at the gallery.

Just some of the variables included:

Materials (clay, slips glazes)

Fuels (species of wood and chemical analysis, condition (aged, dried etc.), cut size)

Stacking and flame path (tumbled, shelves, mixed, density, configuration of pieces)

Length of firing and cycles of oxidation and reduction

Cooling (oxidation or reduction)

Isolating variables with anything like a "scientific critical test" seemed about impossible. But what emerged was a rough plan to fire tests, choose some combinations and then vary the cooling conditions as well as the type of wood used. It was decided that we would make up and test seven

different clay bodies and about the same number of "flashing slip" recipes. After making up this "fresh"(somewhat "short") clay we set to work making lots of small pots. We made mostly teabowls and sake sets, beakers and bottles. We then stamped them with the code numbers of the clay and the slip that was applied at the leather hard stage. By the end of the first week, we had bisque, glazed, loaded and fired a kiln full of these tests in the "cat" or catenary arch kiln, (about 35 or 40 cubic feet loading space). We paired up for three-hour shifts with most firings taking between 18 and 24 hours. As well we made frequent trips as a group to the wood lot. We used mostly fir, hemlock and spruce "boards", that is dimensional lumber construction scraps hauled back to the university and stacked on wheeled carts about two feet wide by eight feet long by five to six feet high. We also fired with logs, usually willow, and elm that had to be split with the hydraulic splitter after being cut to length with chain saws. If we could we did this in the morning or early evening, as the 90 F midday Utah sun is somewhat unrelenting.

With our kiln in Edmonton we have only used "boards", spruce and fir off cuts from the laminated beam factory here. They are cheap, kiln dried and easy to split, but fairly labor intensive because they need to be finely split and constantly side stoked. The kilns in Logan have large Bourry type fire boxes which allows longer stoking cycles and a much more relaxed pace while consuming much more wood, (up to five carts in a 24-hour firing). It was easy to put large charges of wood through the sliding door of the firebox. The outer part of the tree and bark provide much more ash and volatiles as we soon discovered when comparing the results between firings with only "boards" or the heart wood and ones with "logs" and bark.

The results of the first firing ranged from dismal to spectacular. The dismal being the one clay body which dunted as we unloaded the kiln with sharp shards and nearly explosive cracking sounds, sometimes punctuating a quiet time in the studio over the next week. In the spectacular I would put the Helmer based bodies with the Tony's Blaze flashing slip.

418 Helmer Body
(John Neely)
Helmer Kaolin 60
Old mine #4 ball clay 10
Flint 5
Custer Feldspar 20
Sand 70 mesh 10
Epsom Salt 0.25
Tony's Blaze slip
(Tony Nankervis)
Nepheline Syenite 41
Alumina Calcined

'High Heel Shoe Shape Teabowl"
Richard Selfridge

Teabowl, Judith Duff,
Brevard, North Carolina

41
EPK Kaolin 12.5
Bentonite 5.5

In this first test firing in the Cat we got a small to moderate amount of ash (medium firing length, mostly boards). The schedule of the firing was to go fairly quickly to body reduction at about 850C, then hold the kiln in alternating cycles of oxidation and reduction and once in the 1250C region to build up ash but not fire too hot too fast. As Owen says:
The concept of oxidation and reduction is understood easily by wood fire because it happens naturally in the wood kiln. You stoke, it reduces. You let the wood burn down, it oxidizes. ... I have now eliminated the oxidation and work in cycles of light reduction if I want temperature rise and heavy reduction to create ash deposit. I suspect that much of the flashing occurs at the end of the firing during the reduced cooling process that I follow.

That is, we were not trying to melt the accumulated ash to run off the pots, but building up layers of ash to be fused and starting to melt in the cone 10 to cone 11 range at the end (slightly in excess of 1300C). All of the firings would have a generous stoke at the end and then be clammed up tightly. Usually this resulted in a slight rise in the temperature at the end and then a soak on this long burning last stoke. I have quoted from two excellent articles about this process found in Ceramics TECHNICAL No.2 and No.3, 1996. "Stacking the Wood Kiln for Flashed Colour and Surface Marking" and "Woodfiring Techniques" by Chester Nealie and Owen Rye respectively.

This first firing was an oxidation cooled one to see which test bodies and flashing slips we wanted to use during the last two weeks. While we waited for the results from this first experiment we all made pots with a red firing stoneware body Coot. It had been made specially to do a reduction cool firing in the "Train" or coffin kiln.

Coot (Wil Shynkaruk)

AP Green Fireclay 60
Laterite 15
Old Hickory 54-s 15
Custer Feldspar 10
Red Grog 10

"Summer and Winter, Bizen Style Teabowls " Richard Selfridge

Marty Kendall

The pots for this firing were mostly unglazed except for insides and usually no flashing slip on the outside. The first part of the firing of this kiln was the same as the oxidation cooled "Cat" except that the train was "tumbled" in the setting and back stoked (about three feet from the chimney). This back stoking is a way to put more wood, ash and heat throughout the rest of the kiln beyond the firebox. It is like the side stoking of an anagama.

The "Train"

Owen Rye loading the "Train"

To get an idea about the configuration of the train you imagine it as a square built anagama with a giant elevated Bourry firebox or engine on one end. This has a sliding door and a stepped grate that moves the embers and ash downhill into the throat arch and onto the pots. Now envision a giant chimney on the other end. In between is the "coffin" with a hinged lid. This allows climb-in access to this large setting space. You just start at the throat arch end with wads and shells on the floor and start stacking up pots like cordwood. It could all be stacked without shelves but usually we used some, especially one or two back from the checkered exit flue, leaving a space to burn the wood on top of the pots set under the back stoking hole. It is indeed a powerful machine for burning wood, really a firebox with thirty feet of chimney (some of it horizontal).

Although the first part of alternating reduced stoking and oxidation burn down was the same as in the Cat, after the top temperature was reached we filled the firebox with wood and closed the dampers and clammed it up tight. Then we continued to stoke it with a couple of small sticks every 15 minutes to keep it smoking and in reduction for about 6 hours until the temperature fell to about 750C. This is essentially the procedure that Owen describes for his anagama firings. By leaving tiny air gaps around the firebox, some little oxidation occurs locally:
I suspect this final oxidation has something to do with the development of flashing colours under wads near the front of the kiln.

The discussion of tumble or bundle stacking in Chester's article is lucid and his whole approach is an ode to the wonders of this thoughtful decorative method:
"Bundle Stacking Pots In The Wood Firing Kiln is the best way, I believe, to achieve the subtle flashings that occur where the flame bounces between pots, walls and wadding materials. ... Indefinable qualities occur to the clay under changes in oxidation and reduction and the stack of pots directly affects these qualities.

Teapot Plate (detail)

Thrown flower vase, fired upright
Judith Duff

Perhaps more important than the changes caused by the flame and vapour impingement on the pots (especially if you hope to live from the production of this beautiful work) is the pyro plastic deformation or effect of heat and weight on the ware. I learned the lessons of what I call the "Sumo wrestler effect" when my thinly potted ware went to the garbage leaving a shard of deco behind on some of its more thickly walled neighbors. Because they were on the bottom of a two-foot stack, many of the ones with the best flashing went to the blue bin. Any idea of tumble stacking our large constructed trompe l'oeil pieces was soon abandoned, and even firing them upright meant they had to be fired edge to the flame because the side to the fire gets hotter, is fluxed more and deforms, tipping toward the fire.
The strength of the clay body that you are using and the pot shape need to be considered. The pots have to be made with more weight to them if they are going to support a meter of other pots balanced on top. Rims must be stronger and cylinders can't be too wide or they will squash and end up as flattened forms. If pots are going to be lying on each other, the marks of placement are going to be part of their decorative elements.

"Bizen style Water Jar"

Reduction Cool in the "Train"

"Bizen Style Pouring Bowl"

"For the Shogun Bizen Style Flower Vase"

"Bidero Bizen Style Tea Bowl"

Judith Duff

Unloading the first train was quite a surprise--Black pots and reddish flashed black pots, with lots of scars and marks and dark drips of ash. Bizen in Utah, what a cross cultural rush. I had put feldspathic stones in the clay body and was quite pleased with the black pots with white stars. The black ash patinas and the rusted iron look of flashing were things we don't usually associate with cone 11 stoneware. Another promising effect was on the Helmer clay pots that we had glazed with Owen's feldspathic glaze, which went well over the Tony's Blaze slip. It is a really simple glaze applied super thick.

Owen's Frosty Glaze
Potash
Feldspar 80
Whiting 10
Silica 10

"Frosty Pear Teabowl"

"Frosty Canada Geese Flower Vase"

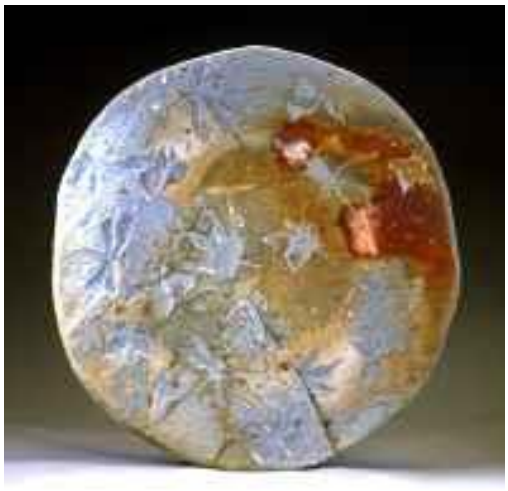
This gave a grayed "frosty glaze" in the reduction cool. It is refractory enough that it doesn't seem to run but it really grabs ash and allows the buildup of crusty surfaces. Re-glazing and firing again--sometimes as many as three or four times for 100 hours each time is the basis for Owen's incredible surfaces. We had the treat of looking at and handling most of the pots for his exhibition at the gallery one afternoon near the end of the second week. I bought two of them and I am still learning from them.

By the time Owen arrived on Friday of the second week we were nearly done making more pots for oxidation cooled firings in the Cat, four in the three weeks, and another oxidation cool in the Train, which holds roughly three times as much as the Cat. Some pots were re-fired but there was just not enough

room for everything in the two firings we had planned for the last week. I decided to fire the Train at the start of the fourth week when the class was over. I got some help from participants still around, (many trips to the wood lot with Joe Flaherty) with Marty Kendall, Doty Layton and Kelly Sinner, spelling my exhausted self for about six hours of the 24-hour firing. Marty and I tumble stacked it, (really a two-person job), and unfortunately, he had some good work sacrificed to the extremity of the conditions in the throat arch.

Hindsight tells me that I shouldn't have put that fifth cart of wood through the kiln, as many of the pots in the first third of the kiln were irrevocably warped and fused together and to the floor of the kiln. In part this happens because, although the pots were bisque first, the shrinkage of the stack can make it unsteady and pots shift and fall and get stuck together where wads no longer separate them. Although the large plates that I fired eight across on edge didn't "taco" or fold up, (in part because I followed Owen's suggestion of wadding a brick under their sturdy foot rim before I stacked them on edge like dominos leaned against the side wall), they sure ended up wonky.

"Undersea Garden Plate"
52 x 46cm., thrown, rubber stenciled helmer stoneware,
woodfired fired on edge, feldspar stones,
flashing slip with blue celadon glaze



"Shinto Vision Plate"
52 x53cm.,thrown stencled helmer stoneware,
woodfired on edge,flashing slip,
feldspar stones, willow ash

"Teapot Extravaganza Plate"

"Four Clam Shell Stacked Bowl"

"Two Ravens Watch Canada Geese Plate"

like my experience twenty years ago with translucent porcelain, you have to dance close to the edge of disaster to get excitin
s. A lot of ash is a good thing; too much heat is a problem. Probably a good rule of thumb with heavy ash wood firing is to avoi
iring and if necessary re-fire the pots either in wood or cone 11 gas. Some of my best results, especially the fusing of the
athic stones has come from a second firing on the hot side of our gas fired first chamber.

s talk about deformed pots fused together suggest some questions about how to wad, what to wad with and how to get the w
With our kiln in Edmonton we usually used wads of 60% alumina hydrate, 30% tile 6 kaolin, 7% wheat flour and 3% bentonite
lways came apart well but I only put them on the bare clay or fairly refractory flashing slips--never on a glazed surface. The
ach of those who fire with LOTS of ash is to reject this mixture because, if combined with sufficient ash, it will form a glass tha
out most silicon carbide grinding tools and only can be removed with a diamond edged tool. We did have a problem with one
Cat that had some wads, which would not separate well; (a real problem if you stack nesting bowls together three or four high
as probably because of too much fire clay (not refractory enough), not enough coarse silica and not enough flour. The
mended method then is some variant of Chester's approach:
o use a wad mix made from a fireclay that is refractory and will break down easily. Mixing this with fine or coarse sand or saw
ave different effects so you can play all sorts of games.

awdust or in our case wheat flour just provides filler that burns out making the wads less dense and more "crumbly" when fire
ined with seashells these wads can be used even on glazed surfaces. It ends up being a kind of deco by scarification, where the
w of the abutting pot and the residue of the shell allow the background of the flashing slip to contrast with the more pastel Co
built up ash.
the firing, the calcium oxide of the calcined shell recombines with the air moisture to form a powder. Reluctant shell wads can
ned by soaking the pot in water, enabling the shells to swell and separate easily from the clay or glaze surface. Residual salt fro
ells tends to leave an orange halo around the perimeter of the shell. This is particularly effective on white and flashing bodies a
s to happen under both reducing and oxidizing conditions.
ows that a great deal of time and attention need be paid to carefully getting the tumble stacked pots apart and "cleaning up" t
All of this involves post firing aesthetic decisions, especially if you want the "functional" pots, which come from the kiln with a

what scratchy abrasive surface to be user friendly. The last week of the workshop was in part devoted to this sometimes noisy process in between glazing, loading and stoking shifts for the last two class firings.

the firings in the train give a first disappointment when you lift the lid, because the more interesting "flashy" effects are on the sides where the ash didn't get to them.

Top side of "Pewter Willow Ash Flower Vessel"

"Pewter Willow Ash Flower Vessel", Tumble stacked in Coffin kiln,

"Raven Tea Bowl for Owen"
Helmer stoneware, crackle slip, willow ash feldspathic stones, cone 11, 9cm x13cm

Windward side of "Raven Teabowl"

"Luscious Drip Vase"

"Sharpei Hanging Flower Vase"

In fact, the oxidation cooled final kiln I fired in the train had mostly "snotty" green surfaces when viewed from above, but the undersides were spectacular. This is in part because the ash eats and bleaches the orange flashing slip, which I had covered most of the pots with. I had used mostly blue and celadon green glazes on inside surfaces going for that "across the Colour wheel" contrast that had been punchy in work from our kiln in Edmonton. Also the inlay rubber stencil work which relied on the Colour contrast was often a "barely there" process memory, but after getting used to these new results (much like the guy who didn't know for sure about his new electric guitar) I like the subtlety quite a bit. Some of them clearly had more ash than I wanted. This may be the price you pay for the ones that are just right.

"Sunken Vessel" Vessel

"Large Woodfired Mallet Vessel"

"Shigariki Style Pouring Bowl"

"From the Bottom of the Sea"

"Ceder Ash and Athabasca Clay glazed Teabowl"

"Flattened, Splashed, Greenbergian Amphora"
willow ash with flashing slip, 55cm

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After unloading the kiln and trading pots with a few of my new colleagues, I loaded up a van full of pots. I headed North after four weeks of Utah, a place where some think coffee may be a banned substance, (not so), and a waitress rolled her eyes at me when I asked for three in non-smoking and said " The whole state is non-smoking". When I got home after the two-day drive I was exhausted. Without my "normal" family life and my usual more-sane collaborative partner Carol, I had spent a month working 18-hour days. She too was excited about these new woodfired works, so after a week off we started to make pots in our studio, making changes to the kiln to get more ash effects and to deal with cool spots that had been a problem.

The things I did to our kiln were first to lower the setting floor and bag wall five inches, as well as putting shorter pots on the bag wall. We blocked up the exit flue with splits and soaps to get more heat from the flame before it exited from the chimney. Both the train and the cat had a checkered flue exit that made the temperature even with a more dispersed pattern of flame. We put a back stoking hole in the door about 18 in. above the floor and 5 inches from the back (flue) wall. This allowed us to better reduce the bottom of the kiln and to stoke directly on pots that we tumble stacked under shelves that were 20 in. off the kiln floor.

"Let's You and Him Fight" Chun Chicken Casserole

"Hagi Pate Dish"

We got some great pots from this new configuration in the two firings we did in September and October. When spring comes we will do it again. Unfortunately, we haven't yet laid in a supply of slab wood edgings with bark which could give us quite a bit more ash and volatiles.

"Jumping Bunny Amphora"

"Running Bunny Shino Teabowl"

"Chicken Mating Dance Teapot"

"Tea Party" and "Chicken" Pate Dishes"

"Square Slip Trailed Iris Jar"

"Running Bunny Jug"

"Tea Party Teapot"

Observing Ravens view of Chicken scrap

Even with the right wood however, we still can't get the kind of pots that the magic Logan train produces. It's a powerful tool with a powerful wood burning engine, which gets gravity to help put the ash on the pots. I might have to build one because in the end I think I do it for the ash.

Other Potters Woodfired Work

Yukio Yamamoto, Tozan teabowl
Our collection

Yukio Yamamoto, Tozan teabowl,
square cut foot

Yukio's freshly square footed teabowl
Tozan Kiln, 1996

Yukio trimming a Teabowl
Tozan Kiln, 1996