Catching Fire

Ian Robert Winsemius

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CATCHING FIRE

by

IAN ROBERT WINSEMIUS

(Under the Direction of Jane Pleak)

ABSTRACT

This support paper is intended to give both a technical and theoretical background for my thesis show. The primary exploration is wood firing and its ability to capture the flames movement in the kiln. This work is inspired by transient natural phenomena. I draw the comparison between the movement of the flame and as through the kiln, their ability to modify the surface of the vessels in the kiln, and the natural forces that shape geographic features in nature. The transient nature of flames can be captured and frozen on the surface of the works that I stack in the kiln. These natural media simply allow us to see currents and otherwise unseen fluid patterns that are constantly permeating our surroundings. Outlined as well is the construction of the Georgia Southern University Anagama (Dorothy) and the troubleshooting and modifications that it underwent during the course of developing my thesis work.

INDEX WORDS: Transience, Anagama, Fluidity, Ceramics, Porcelain, Stoneware, Catenary, Bisque, Glaze, Natural phenomena, Flames, Kiln, Wood firing, Currents, Geography
CATCHING FIRE

by

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BA, Art, University of Vermont, 2008

MFA, Three Dimensional Studies, Georgia Southern University, 2011

A Thesis Submitted to the Graduate Faculty of Georgia Southern University in
Partial
Fulfillment of the Requirements for the Degree

MASTER OF FINE ARTS

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CATCHING FIRE

by

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Looking up at a cloud formation in the afternoon sky, we are seeing nothing more than water being pushed around by air currents. Deceptively complex, these patterns emerge, giving us a glimpse into the beautiful fluid movements that perpetually permeate the natural world. My work captures this transience of vapor as the flame and ash stream through the wood kiln. My vessels are stacked meticulously, allowing them to respond to the flame’s movement. This controls the surface by creating a geography around which the turbulence of the flame can flow. The pieces, coming out of the kiln, reflect these inevitable forces in the same way the mountains reflect the natural occurrences that have shaped them.
CHAPTER 2
AESTHETIC DEVELOPMENT

The forms I create take advantage of the process and versatility of wood firing. The naturally occurring interaction of surface and form leads to a more organic and formally developed surface. While I am creating my pieces I pay close attention to the visual elements and surface the flame and ash will leave on the form. In the same way that the flame forms natural and organic paths through the kiln, I create organic and subtly curved vessels to respond to its movement. I strive to picture the outcome of the effect on the surface of my vessels. The level of dedication to process that occurs with wood firing creates an unbreakable connection between me and my work. This is especially true during the firing, having to follow the status of the interior of the kiln gives me a visceral connection to my work.

The surfaces achieved in an anagama are reflective of the fire, and its movement through the kiln and around each piece. Firing in a crossdraft atmospheric kiln (like an anagama) allows the movement of flame to surface each work in a unique way, depositing ash heavily on the windward sides of pieces, and flashing the leeward sides. This creates brilliant contrasts in color and surface, tied directly to the forms themselves.

Wood firing creates "an inexorable synthesis of pot and process and person." (Dick Lehman, forward to Wood Firing: Journeys and Techniques). I have been drawn to the physical nature of wood firing for years. I was compelled to seek out the unique surfaces that wood kilns produce. The same unyielding connection was echoed in the wood fired work I had been researching. The major influence in my work at the time was Tamba Ware. I had been drawn to
the contrast between the naturally glazed areas, and the raw clay. I knew that the ceramics department had a wood kiln, but I knew very little about it. As it turned out, it was an "Olsen fast fire" style down draft kiln. Firing the fast fire wood kiln was fairly simple, but it was excruciating work and didn’t yield the results I was researching. The enriched colors in the clay were a step in the right direction, but the kiln cooled quickly, in oxidation, and didn’t accumulate much in the way of ash deposits. Essentially what I wanted from the firing was a rich surface of ash deposits and the clean surface from the fast fire left me wanting more. Since I lacked the type of kiln that I required to create my work, I designed and constructed one under the instruction of Jane Pleak. The construction and firing of the anagama at Georgia Southern University has been one of the best learning experience that I ever could have had.

Researching wood fired works, prior to understanding the process, I found it difficult to make qualitative distinctions. They all became lumped into the classification of wood fired ceramics. The time spent firing, researching stacking methods and conversing with other potters regarding their techniques has led me to begin to understand this quote by Ch'ing Yuan:

Before I had studied Zen for thirty Years, I saw mountains as mountains and waters as waters. When I arrived at a more intimate knowledge, I came to the point where I saw that mountains are not mountains, and waters are not waters. But now I have got the very substance I am at rest. For it is just that I see mountains once again as mountains, and waters once again as waters.

Where I saw a piece that had been wood fired as simply interesting for its variegated surface, and deemed that as something I wanted in my work, I did not have the body of knowledge necessary to comprehend the works. Eventually I began to understand how to control
various effects in the kiln and became much more discerning about what I liked and disliked. After more exposure to the medium, as well as research and discussion I became aware of the aesthetic merits of different styles, and was able to see them for their own intentions and worth.

The enlivened mischief of the fire is something that is inescapable in my work. Its path dances and spins on the skin of the pots, leaving trails of fly ash where it sees fit. This creates inherently abstract constructions on the surface of my vessels. My forms contain a vestige of function, to me they contain more of a connection to the invisible beauties of the natural world. These phenomena are brought to our attention when we notice dust devils in a parking lot, or a beautiful swirl of smoke coming off a lit stick of incense. These spectacles occur constantly in the wood kiln, but they are obscured from our view. The surfaces I create directly capture and display the elegant fluid movement that occurs inside the anagama. These sentiments are echoed in Chris Gustin's work, as well as his artist statement.

*Though most of my work only alludes to function, I use the pot context because of its immense possibilities for abstraction. The skin of the clay holds the invisible interior of the vessel.*

My forms are constructed with function in mind. They serve the formal function of containing space, while their actual usefulness remains somewhat ambiguous. While they are all different, the variations in surface are directly related to the form of the pot they are suspended on, a creation of the kiln itself. The fact that I'm only able to control this envelopment of form remotely allows the surface to act as a repository for the flame moving through the kiln.
CHAPTER 3
INFLUENCES

Historical

There are numerous types of surfaces that are possible when firing with wood. The length, temperature and speed of temperature rise during a firing, combined with the type of clay, can change the results drastically. The primary developers of the style of firing that I respond to are Japanese, or Japanese derivatives. Sueki wares (see image left), produced during the Asuka Period (5th century B.C.E) were fired to approximately 2100 degrees F (around cone 5), and were not held at temperature. They were reduced heavily at the end of the firing, causing an ashen grey surface. During Japan's Kamakura period (1185-1333 CE), with the development of the "Six Old Kiln Sites" (Shigaraki, Tamba, Bizen, Tokoname, Echizen, and Seto) there begins to be an evolution in surface. The higher temperatures that were reached caused a development of a natural ash glaze. During these developments in kiln technology and the aesthetics of the tea ceremony, the surface effects that I respond to begin to emerge. This is the frozen movement of
glaze on the surface of wood fire work I respond to. It seems to have a surface history of the flame and ash processes in the kiln. The works that were produced at the “Six Old Kiln Sites” are some of the most moving pieces of ceramics I have seen. These traditions are carried on in the same cities today.

These works exhibit a subtle freedom, which is impressive, especially since they are contained in such traditional forms. The surfaces on these works evidences the effects of the flame in a very direct way. Using natural clays, gives a sense of place to the work, since they often dictated the location of studios and kilns. So many of these forms were, and continue to be directed by necessity and traditional aesthetic of imperfections. Embracing the effects of the process of wood firing creates a direct honest connection to the process as well as the artist.
The effects that I strive for in my work were at one time considered to be defects. Up until the industrial revolution, kilns were fired with rather dirty fuels. Work which required clean surfaces had to be fired in saggars (protective containers designed with the intention of keeping any wood ash from accumulating, blemishing the pieces). The Chinese used these containers to fire Ming pottery, prohibiting the ash from attacking the pristine blue and white surfaces. In contrast to these technologically impressive kilns, the groundhog kilns of the south were made from house brick, and fired quickly. These kilns were built with low ceilings, so they could be stacked entirely without shelves. Firing these kilns was essentially an act of vitrifying the clay and melting the alkaline ash glazes (made simply from crushed bottles, local clay, and wood ash from previous firings). These stout pots evoke a sense of necessity whereas I wanted to create something more contemplative.

The anagama is ill suited to mass production. The large temperature disparities coupled with the lack of scalability make it an inefficient design for firing large quantities of work that need to have homogenized results. The development of the noborigama (a climbing kiln developed in 17th century Japan) allowed for more efficient firing, as well as a lower accumulation of fly ash. They also had the benefit of being designed to be fired in sections. Each portion of a noborigama is essentially fired separately. This allows them to be fired almost continuously, since the lower chambers cool while the upper ones are being fired.

Though ceramics have been fired with wood in America since the early 1600's, the use of wood was purely for its caloric content. There has been a recent resurgence of wood firing, popularized in large part by Peter Voulkos. He was introduced to wood firing through Peter
Callas, who fired a large quantity of his work from then on. Voulkos' intensity showed through in his work, and wood firing gave another direct connection to process and the materiality of clay. His powerful forms became something much more intriguing coming out of the wood kiln. They possessed another powerful layer of content which spoke to the history of the media he was working in.

There are many ceramic artists continuing to fire with wood today. Jack troy is one of the preeminent american wood fire ceramic artists and kiln designers. He and Dick Lehman seem to have a preternatural ability to control the flow of fire, and the collection of ash. They are able to creat rich luscious surfaces with a wide array of colors, throughout the kiln.

Shiho Kanzaki's forms are masterfully crafted and fired. I am in awe of his ability to create vessels that speak so boldly of the process of their creation. They carry with them the tradition of function. The works he creates are not simply replicas of the works of ancient Shigaraki, though they may have it as a groundwork. He has also demonstrated an ability to experiment within his traditional background, developing textures never before controlled in wood fired kilns.

Artistic Concepts

I've dreamt of being in a wood kiln while its at temperature; Seeing the flames come weaving slowly up from the firebox to greet me in swirling ribbons. We only ever get glimpses,
and only through little holes, for short periods of time. This elemental peep show, though tantalizing, is pale in comparison to what it must be like wrapped in the flames. My pieces get to undertake that trip in its entirety. Their mutation in the kiln is evidence of the caress of the flame. Four days, in the most hostile environment imaginable, spent accumulating ash just to let me know what it was like.

My pieces are left as bare as possible in the kiln. This allows the flame to maintain a direct connection to the glazing of the work. I use the context of the vessel as a canvas for the flame. The result is an object which is too large to be an intimate precious object, but not too large to be intimidating. The scale of the form allows for a personal connection to take place. I want the viewer to be able to have a conversation with my work without being confronted. They are visually massive enough to be approachable, while remaining elegant in their design. I want the viewer to succumb to the experience of the work in the same way that I walked out of a show of Chris Gustin's feeling enlightened, like I was walking on air.

The animus for my work is not simply results. I feel an obligation to understand the process from start to finish, keeping myself intimately evolved in each step. I'm considering the finished product at every juncture in my work. I am entirely enamored with the technical aspects of the wood kiln. From mixing the clay to stacking the kiln, I am aware of the consequences of my actions (as much as one can be), “Although idea and form are ultimately paramount in my work, so too are chance, accident, and rawness.” -Martin Puryear. My goal, similar to Puryear's, is to allow the kiln to do more than heat the work, letting the fire share in the outcome of the work.
CHAPTER 4
TECHNICAL
Previous Explorations

Coming to Georgia Southern, I had never fired a wood kiln. I had become enamored with the idea of wood kilns. The world of wood firing is a realm unto itself. I have spent a great deal of time and energy investigating many different types of kilns and the surface effects they produce. Previously I had fired my work primarily in a high fire reduction atmosphere, but I had also explored raku and pit firing briefly. I found myself captured by the direct interaction between process and form that can be achieved in pit firing. The allure of the unpredictable surface, and the austere physicality of the process. Having seen the possibilities, I knew this technique could create a dramatic interplay between surface and form and work very well with my pieces. Designing and constructing the anagama at Georgia Southern University was a wonderful opportunity. This exercise taught me a great deal about firing, the necessary practices of kiln building and kiln design.

Necessity – Design & construction of the Georgia Southern Anagama

The design I created for my anagama was informed by a variety of sources. I began by researching a multitude of kiln designs, construction techniques and firing methods. My
professor, Jane Pleak gave me several books about the general concepts and governing guidelines that apply to wood kilns. I had fired the fast fire wood kiln, which had given me some vague ideas of how wood kilns worked. This knowledge was applied when Jane informed me of a firing happening at Piedmont College, where I went to assist professor Chris Kelly with their anagama. The critical discussions I had with professors and artists about kiln design helped immensely. Before delving into my kiln design, I began by finding anagamas that had already been constructed in the area. Piedmont College has a kiln that Chris Kelly built in conjunction with Japanese national living treasure, Fujita Tomio. I went to explore the firing process, as well as the kiln’s design. During the first firing I spent at his kiln, I worked 12 hour shifts, making sure not to remain on the same schedule as any one person. This allowed me to question everyone at the firing, Chris included. He informed me that during his time spent firing kilns in Japan, he asked several ceramic artists what the ideal shape of an anagama was, and that each one pulled out a lighter or lit a match, and pointed to the flame.

I found this rather amusing and interesting, since it was such a simple concept. During a couple of lengthy discussions about kilns I worked on several preliminary designs. Following these talks I sat down for two or three hours and refined my design. I brought this to Chris, somewhat nervously, and asked him if he thought it would be efficient. To which he said, "What you really want is, the least
efficient kiln you can build that will reach temperature." Slightly perplexed, I just said back "what?" He explained something that seemed like it should have been obvious in retrospect. What you want on your work, if you are looking for a natural ash glaze, is just that, ash. The more wood you have to "waste," to get to temperature, the more completely your work will be glazed. These critical discussions led to the development of a working plan for the anagama.

There were several features that I wanted to be sure to include in the kiln. The first was an oversized firebox: approximately four times larger than necessary. (This was constructed to allow the placement of large flat pieces against the walls of the kiln.) The firebox area in the kiln is the most varied, creating more radical differences in texture than any other part of the kiln. Many of Peter Voulkos' plates were fired in Peter Callas' firebox. The rest of the kiln was designed around several governing principals and proportions. I used the flame shape, an elongated teardrop, as a guide. Since this was the first kiln I had constructed on this scale, I decided to use the strongest self supporting shape I knew of, the catenary arch. This has the benefit of being the simplest shape to construct for centering (the form that goes up to support the bricks before they can support themselves). I also used my own body, since I assumed that I would be the person moving in and out of the kiln more than anyone else. The height of the center of the ceiling, I set at fifty
two inches, and the height of the center of the firebox was set at sixty inches. These measurements were conceived to give me easy access to the kiln, while carrying larger vessels. The arc of the roof (from front to back, not side to side) was directly derived from the increasing radius curve of the nautilus. As an outline for the base of the walls, I had decided to mimic the flame shape once again. This presented a level of complexity in construction. The horizontal curves of the floor had to be combined with the vertical curve of the ceiling, this section then had to be linked to the straight walled firebox (Appendix A). This proved to be a feat of masonry that would prove very challenging. I became very well practiced on the studio brick saw. Honor student Jeanne Henry helped during the majority of the construction of the kiln, and was a tremendous help with its construction.

The flue run is essentially a horizontal brick pathway attached to the back of the kiln, allowing the kiln to connect to the chimney without rendering the back of the kiln vulnerable to large temperature fluctuations. My flue design, which has undergone some modification since the first firing, is entirely passive. By this I mean that the damping effect, aside from the checker-boarding of the flue, is governed by a sort of "valve" which I can open to decrease the suction of the chimney on the kiln. The chimney was constructed with helical stack. This spiral creates a

Figure 8. Passive Damper
swirling of exhaust gasses and allows for a reduction in the particulate carbon emissions from the kiln (Studio Potter V37 N2 2009 p.7) This effect is generated by the vortex created by the spiral chimney, which allows for added flow, while decreasing the back pressure of the exhaust. The added flow allows for the heat to stay concentrated in the center of the chimney, which aids in the combustion of the particulate carbon.

While wood firing may seem detrimental to the environment at first glance, it is actually a carbon neutral fuel. Carbon neutrality implies that you aren’t putting any more carbon into the carbon cycle than would naturally be there. Firing a kiln with natural gas releases "carbon that has been sequestered for millions of years [and] In a sense... has been forgotten and is no longer part of the natural exchange." (Studio Potter V37 N2 Change in the Air) Trees consume carbon dioxide, and subsequently release oxygen. The Carbon released during a firing is simply the reversal of that process. This would happen naturally if the tree were left to rot in the woods. The fact that I fire entirely with waste wood and fallen trees is something that I am rather proud of. Not only are we not burning a benign fuel, we are reducing the effect of the university on landfills in the area.
The inefficiency of the firings is something that I initially thought to be wasteful. Firing for four days consumes over six cords of wood on average (enough to heat an average northern home for a winter). However, the fact that the wares I create in this environment are a visually tantalizing snapshot of fluid motion makes it all worth while.

After having completed the construction of the kiln, the centering (supports holding up the bricks during construction) needed to be removed, and I decided to remove it in a simple and traditional manner, setting it on fire. Once it got started it went up like a tinder box. The kiln remained entirely intact, and there were no discernible shifts in the brickwork. The final steps before being able to load the kiln were rather simple. Since I had planned on a sand floor for the kiln, approximately 100 lbs of sand had to be spread on the floor to create a mild insulating barrier between the fire and the dirt, as well as allowing a more malleable refractory substrate for stacking shelves. As a precautionary measure, I decided to scour the interior of the kiln with water and a wire brush, simply to make sure that any of the mortar and the bricks that might have chipped, wouldn't fall into the kiln and onto work during the firing. The stackable space in the kiln ended up being 110 cubic feet, not including the firebox.

Results – Charting & Modifications

The first firing of this kiln did not go entirely as planned. This was due to my lack of understanding of wood firing at the time. I made the decision to see what the kiln would do without side stoking it. A decision partially based in curiosity, but more influenced by a
perceived lack of space in the kiln. Since I had not stacked the kiln before, I was trying to gauge how much work would fit in it. I underestimated the volume of the kiln. We ended up with ample space to fit the work, and would have had plenty of space to leave a region open for side stoking. The firing started out much the same as any other firing, with a small fire in the firebox to get the draw going. Our firing developed several conditions that were undesirable after we reached around cone 6 (2200 deg. F) in the front. The first of which was the almost indiscernible temperature in the back of the kiln. The barely visible level of heat in the back told me that we had really only reached around 1200 degrees (F). A thousand degree gap in the kiln from front to back is much larger than usual and is one that would cause the work at the back of the kiln to hardly reach bisque temperature. We were barely getting to the melting point of wood ash, and only at the first couple of feet of the kiln. I spent a number of hours playing with essentially all of the variables that are available to alter on the kiln. These include the air inlets, the amount and type of wood that is introduced to the kiln, and the variable draw on the kiln in the form of the passive dampers. These modifications are essentially the equivalent of tuning a carburetor. The passive damper being the throttle, air inlet being the choke, and the amount of wood being the main fuel jet.

The only solution that I could come up with at the end of the firing was to take the front of the kiln to an unreasonable temperature, which I have estimated at around 2550 degrees F (around cone 14), through the color, and the state of the remains of cone 12 at in the front of the kiln. This was the one redeeming outcome of the first firing. The kiln had the capability of reaching temperature in at least one region. The temperature at the floor of the kiln hardly
reached bisque temperature, observed through the lack of melt of the ash, and the lack of shrinkage and tone change in the vessels. The temperature at the rear of the kiln, near the flue, was barely high enough to soften cone 5, and only enough to allow it to blow sideways to some extent. The fact that the flow through the kiln was fast enough to blow over a soft cone was somewhat helpful. It informed me that the speed of the gasses through the kiln was entirely too high. What was happening was that the flame was moving unimpeded, up and over the work, and out the chimney, without being forced down to the floor of the kiln. There were modifications to the kiln that needed to be made, though at the time I did not know what they necessarily were.

That one effect, the windswept look of the rear cones, informed me that the movement through the kiln was entirely too fast, even with the passive dampers open. I discovered that I needed to alter the flue of the kiln, that it was entirely too open, and not long enough. I was presented with two options. The first was to tear down the chimney, and take the flue off and lengthen it by around two feet. The second was a design called a "checker-board" flue. "Checker-boarding" the flue is the imposition of obstacles in the path of the flame at the rear of the kiln, in this case a number of soft bricks placed in symmetric and regular intervals through the relatively short 20 inch flue channel. This "checker-boarding" effectively lengthens the flue channel. The path that the flame has to take to exit the kiln forces it around and between and over many different obstacles, allowing for more heat reflection, and better combustion. This turbulence drives the heat in the rear of the kiln downwards in search of oxygen, towards the floor, which helps to rectify the temperature at both the bottom and rear of the kiln. The second large
The alteration made to the kiln was to brick up the side stoke ports, since they had been built too large.

Now, prior to loading, two or more of the ports can be bricked up completely, depending on which zone will be used for side stoking. This allows us to increase the insulation potential of the kiln. I had also decided that more insulation was needed over the ware chamber of the kiln. The nine inch layer of hard brick that was used to construct the arch by itself had proven to be more conductive than I had anticipated. As a solution, a layer of house bricks and a layer of insulating castable were applied. House brick is not terribly refractory. However, outside of two layers of hard brick, the temperatures that would be reached were low enough that it would not degrade, and was very cost effective. Insulating fire brick would have cost more than four times the amount. The castable was used essentially to seal the house brick, and allow the cavities in the brick to serve as insulation instead of ventilation. These three modifications were implemented quickly, and worked exactly in the way I had hoped. This led to the development of a general firing schedule that works well for the GSU anagama. The schedules for greenware and bisqueware are as follows:
Figure 10. Greenware Schedule

Figure 11. Bisqueware Schedule
The difference in visual effects will be minimal, since at this low temperature, there is not a lot of ash accumulating on the pieces. To increase the effects of fallen ash on the work, you could lengthen any of the time frames prior to 2200 degrees (when wood ash begins to form a eutectic with clay bodies, forming the early stages of the natural ash glaze). After you reach cone 10 (or at the very least cone 6) you can begin side stoking the kiln. The intervals for side stoking are largely intuitive, and based largely on preference. Side stoking often has the effect of cooling the front of the kiln, since it increases the pressure of the kiln. This reduces the air intake, and the combustion occurring in the firebox. Once the formation of a coal bed has been achieved in the rear, maintaining it is the goal. This maintenance might be several stokes per hour, which is a very slow rate in comparison to the stoking of the main firebox. Since the coals in the firebox consume oxygen, there is a very low availability of free oxygen in rear of the kiln. This lack of oxygen allows for the very slow combustion of the coals at the rear of the kiln. These coals aid in the maintenance of the rear temperature in the event that the front of the kiln is allowed to burn down and begins to oxidize.

Since the basis of my work is to suspend the fluid aspects of the actions in the kiln, I prefer the highly directional aspects of the ash blowing through the kiln and temperatures well above the melting point of wood ash. This is what led me to develop the firing schedule seen above.
Clay Bodies

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<td>This Stoneware can take very high temperatures, and is not particularly pyroplastic. It develops glossy oranges and subtle matte greens and yellows in areas of heavy ash.</td>
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<td>Hawthorn Bond Fire Clay</td>
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<td>KY OM4 Ball Clay</td>
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<td>15</td>
<td>Kona F-4 Feldspar</td>
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<td>25</td>
<td>Sand</td>
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## Table 1

*Image List*

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REFERENCES


*Ceramic Art of Japan; One Hundred Masterpieces from Japanese Collections*. Seattle, WA: Seattle Art Museum, 1972.


