A POTTER'S OIL-SPOT MARX

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By

Frank R. Vickery

Director:
Richard Tichich
Director of School of Art and Design

Committee members:
Patrick Taylor, PhD
Emeritus Professor of Art, Kennesaw State University
Seth McCormick, PhD
Art History Assistant Professor School of Art and Design

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ABSTRACT

A POTTER'S OIL-SPOT MARX

Frank R. Vickery, M.F.A

Western Carolina University (Spring 2012)

Director: Richard Tichich

This thesis will represent a body of work that consists of ten, six-pound bowls thrown on the wheel and glazed using a cone 6 oil-spot base glaze, cover glaze one, and cover glaze two. Oil-spot glaze decoration originated in Northern China during the Song Dynasty. The name "oil-spot" refers to the high iron content of a glaze or clay slips that when fired in oxidation, produces large and small spots of iron on the surface. My goal is to produce a variety of size spots, specific colors surrounding the spot, and designs produced using glaze application techniques such as layering and waxing. This thesis will be successful based on the ability to reproduce these goals and designs from firing to firing.

Most of the research and literature available today on oil-spot glazing represents the relationship between iron and an oxidation firing atmosphere at stoneware temperatures. Those temperatures range from 2,300° to 2,400° (F) using wood as the heat source (or more recently gas). My aesthetic intention is to develop a body of knowledge about cone 6 oil-spot glazes using midrange firing temperatures (2232° F) in an electric kiln.

CHAPTER ONE: THE CONTEMPORARY CERAMIC OBJECT

The contemporary ceramic object is a result of geological research and glaze chemistry calculation, industrial size firing machines called kilns, and millennia of trial and error, success, and failure. Ceramic objects of the past fulfilled a role of utilitarian survival and also man's natural tendency to create and decorate. Today, functional ceramic objects take on more limited roles, but still represent man's continuance to combine form and function with aesthetic appeal. Pots have become more than just a playground for intuition, creativity, and design. Pots can be considered icons of innovation when technical considerations of form and glaze applications are applied to create a coherent body of work.

Functional potters deal with similar issues as painters and sculptors. Form, color, and composition are all crucial decisions in the production of ceramic objects. However, that little phenomenon called function is one thing that separates clay from other disciplines. Functional art is considered a low form of art by art critics when comparing high and low art. Ceramics will be forever linked to the functional aspect of clay. It is the foundation upon which clay became the versatile material it is today. Functional potters embrace the utilitarian aspect of clay while still fulfilling the technical aspects of fine art objects. This is not to say that all ceramic functional objects are fine art. However, the skill involved in making functional pots and all of the critical decisions are an art form unto itself. The process is demanding and hard work. It is not an easy task into which someone falls one day and achieves success.

Potters use geological elements such as eroded igneous rock, better known as clay, to create three-dimensional objects with their hands. A potter uses chemistry and groups of elements from the periodic table such as the alkali metals, alkaline earth metals, and transition elements to create clay bodies and glazes. Finally, he or she must load the glaze covered vessel in a kiln and allow the wrath of fire and heat take its toll to make a unified work of art. This process is used by all potters and by varying the steps and glaze recipes constitute individuality in the clay world.

For the functional potter, one way to survive as an artist is through utilitarian objects. Another is through high art objects desired by the bourgeoisie. Either way, the process used to create these objects is repetitive and must be followed in order to produce the wares. The hard work and labor intensive nature of repetition, working the material over and over with their hands and backs, and firing the wares in homemade kilns to extremely hot temperatures, places the potter by default as part of the proletariat in a capitalist society. A Marxist view of a capitalist society is a material and money driven economic engine whose primary affect on individual life is alienation from the self because the individual workers are detached from the products they produce. The functional potter, however, is not alienated from his or her craft. In fact, the very nature of creativity and production involved in making ceramic objects lies in stark contrast to Marx's social theory regarding the alienation of labor. So if the functional potter creates work in similar production methods as an alienated proletariat, does that make him or her alien to themselves? If not, can that object represent more than just a functional object in the fine art world?

CHAPTER TWO: THE PHILOSOPHY OF THE POTTER

The aesthetic of a functional ceramic object is inseparable from formal analysis and is a vital part of our understanding of the artist's intent. In this light, technique and skill are linked to intention and the idea of self as origin. "Potters believe that the crafted object was an extension of the self, and with skills developed over a long period of time, potters had the potential to create products/objects which were non-alienating" (Clark 118). The potter is able to see the product from start to finish and feels a sense of pride and accomplishment at its appearance and functional attributes. Making pots is a very personal act that affects everyone who encounters them. Traditionally, this is the way pottery has been perceived.

Pottery communities began in the 18th and 19th centuries and some continue to flourish today and make wares using traditional methods. Technological advances in equipment have changed, but production and creativity have not. In the 19th century, the Industrial Revolution created a break and altered the production lines of functional pots, forcing potters to make a choice. The choice was industry and mass production methods of creation or traditional methods of production and risk not making enough money to feed their family. When industry began to change how people lived and worked handmade pottery was in danger of losing the personal connection between maker and object.

Thomas Wedgewood was a ceramic artist entrepreneur who best represented the industry side of ceramic wares production. He used machines such as steam powered engines and lathes and paid other artisans to complete parts of works for sale. These breaks from tradition greatly increased his production and capital. Wedgewood pottery was produced for the bourgeois in large number series throughout the world, thus completing the circle of industrial capitalism. In his work, every detail is the same and there is little room for experimentation when the primary goal is to make financial gains. A different artisan does each step in the creation of the work. This assembly line of workers produces art objects from which the worker only participates in a small portion of the overall process. Even though the pots are beautiful, the connection between the workers and finished product is lost because the finished product is not their own.

Pre-industrial potters epitomized the important relationship between object and maker. They made useful pots that were aesthetically pleasing. Across North Carolina, many potteries supplied the local communities with various wares. Despite the invention of machines to make wares faster, potteries continued to make ceramic objects as they always had. Clay was dug from the hills and the wares were fired in kilns they built themselves. The personal creative quality in their work attracted apprentices, customers, and promoted traditional aesthetic values. The apprentices came to learn a tradition and to create functional and aesthetically pleasing wares. They, in turn, would take on an apprentice and pass on the skills creating a cyclical journey of knowledge/skill transmission from one generation to the next.

The potters fulfilled a need to the local communities. Butter churns, jugs, tableware, bowls, and many other items were functional objects made by potters using local materials, hard family work, and support from the local community. “Never an industry or a factory activity, it is instead a personal history built on the foundation of strong families and very hard work, plus the development of skills for the entire process, from digging the clay to dramatic effects from the kiln"(Perry 3). Potters work from start to finish; they make all of the decisions concerning the type of clay to use, what to make, and how to fire them. When the pots were fired and came out of the kiln, they took pride in their creation and achievement knowing that product could be sold to enrich someone's life. There is no division of labor in the making of the object; therefore, the potter completed a cycle of economic sustainment and artistic creativity in their home communities and surrounding areas.

The factories of industry exponentially increased production methods and, during this time in history, machines took the place of the worker. The machine and the factory style of compartmentalizing workers' production were transforming people's perception of their lives and needs. "The handmade utilitarian objects in a pre-industrial era were rapidly being supplanted by inexpensive mass produced alternatives" (Clark 116). The functional potter found himself either reinventing or adapting his craft to find a foothold in the fast-changing, economical society.

During this time, Karl Marx began to express his ideas about industry and the alienating effects of the machine and capitalism. In 1848, he developed his social theory and subsequent writings on the worldwide effect of industrial capitalism in his *Communist Manifesto*. "The idea that Marx finds missing in all previous philosophical work is that human beings have individual and collective needs, and it is need, not individual contemplation or thought that provides human beings with their primary form of interaction with the world" (Wolff 28). Human beings are possessed with an innate ability and need to create. Factory style production under an industrial capitalist model detaches us from that need. The proletariat is "reduced to performing undifferentiated work on humanly indistinguishable objects among people deprived of their human variety and compassion" (Ollman 134). The laborers are not involved in productive activity or purposeful work for their own fulfillment in life. The laborer completes one kind of work and relies on others to do other jobs necessary for their survival. Labor in this sense does not belong to a man or a woman. It belongs to capitalists and under this system; people deny themselves of making material objects with high use to value ratios. Ollman quotes Marx saying "the external character of labor for the worker appears in the fact that it is not his own, but someone else's, that it does not belong to him, that in it he belongs, not to himself, but to another" (139). When the creative nature of our existence is missing or negated, we become alienated from our products. Marx's theory of alienation is the intellectual construct in which the devastating effect of capitalist productions on human beings is displayed on their physical and mental states and the social processes of which they are a part" (131). When a man or woman is separated from the products they create, Marx labels this alienation of labor in a capitalist society. Alienation from our product, under capitalism, prevents us from expressing our true nature of creativity.

There is no alienation in the contemporary studio or artist/potter model that I embrace. A functional potter spends hours in the studio, perfecting his or her craft, making objects that are an extension of the self. The functional potter's craft then has the potential to be non-alienating. Functional potters also work in methods of construction similar to those found in a factory's assembly line. For example, a production potter works in a sequence of rarely changing steps from start to finish. They use creativity and a variety of construction techniques, firing schedules, and glaze applications aimed at producing both a utilitarian and decorative object.

We are now in a post-industrial or post-modern age and the studio potter has new opportunities for exploration and creativity. The post-modern age of art makes available and allows artists to synthesize and re or de-construct styles and ideas from the past. My form and glaze experimentations are in this spirit. The current digital information creates a fast pace of technological advance, which opens the door for a national digital apprentice system of sorts. Compared to the past, the studio production potter no longer has to work in isolation and in narrow traditions. He or she has an overwhelming amount of information available through digital and printed media, workshops, and educational programs. The potter can incorporate a lot of information and techniques into their work.

Today, the major concern for a functional potter is how to deal with the combination of aesthetics, function, and intention. The functional potter also has a new market with which to contend. Few people buy pottery for purposes of cooking and/or storing food. Functional ceramics is not as necessary as it was 150 years ago. Today, pots are admired and valued primarily for aesthetic reasons and secondarily for functionality.

Functional pottery can be beautiful as history, and, more specifically, North Carolina potters have shown. It is a demanding process that requires all of the artistry and skill that can be acquired to solve problems of design and creation. "Making good functional pottery is not making art for art's sake; it is making art for people's sake" (Hopper 106). It requires a high degree of discipline and good visual perception to balance the functional and aesthetic considerations of any object.

Potters possess a certain freedom in their work and are exposed to various streams of inspiration, however, contemporary potters have two modes of creating; one is traditional functional pots and the other is art pots. A master tries to incorporate both in the work and this can only be done after years of research or when family secrets are passed down through the generations. Either way, there is a rich history of tradition and technique available when it comes to creating form and applying glaze. There is a plethora of inspiration circulating today and it is up to the individual to decide which form and surface will best fit the glaze and glazing, various clay bodies, glaze formulas, kilns, firing temperatures, oxidation or reduction atmospheres, and re-firing schedules that can determine the look and feel of the finished product. He or she must also explore glaze combinations which give the various surfaces of the vessel character. This can be done in many ways using many different techniques, but all potters start with the same raw material, clay.

CHAPTER THREE: PERSONAL INFLUENCES OF THE BOWL

Making bowls on the wheel is a very therapeutic and amazing spectacle which I enjoy. The bowl shape is rewarding when thrown properly because it has many shapes and multiple potential functional uses. I find the balance between functionality and aesthetics most appealing. There is a general saying in ceramics that "form follows function", so the bowls presented in this thesis follow these guidelines. A good bowl has a belly that is curvaceous and full and the rim must be stretched to its outer most reaches, like someone stretching their arms while leaning back in a chair. The foot of the bowl is no less than an inch high in order to provide a duality of support and pedestal.

Several distinct circumstances and people have influenced my decision to use the bowl shape for my research. These include my undergraduate professor Jim Connell, exploring the Utah desert and finding an ancient bowl artifact in 2008, and the Empty Bowl Project where potters or community members donate ceramic bowls to help raise money to support local food pantries and fight world hunger.

When our ancestors combined mud and fire, the result propelled them to harness the skin of the earth and the wrath of fire to create a survival tool. In 2008, this became especially evident to me. I was hiking through the canyons of Utah with a friend and found an ancient artifact. Hidden away in a small alcove away from the wind and weather, was a ceramic bowl, untouched since the last Native American hand put it there. We found it in a location near a rare spring in the desert located 100 yards below in the canyon bottom. The elements had not damaged the bowl and we were privileged to experience this object without the confines of a museum coordinator or gallery attendant. I was able to hold it and turn it over in my hands. I could see and admire the craftsmanship of the form and the black lines that decorated the interior space. The patterns were created by a flowing line design which followed the curvy shape of the bowl. It was in pristine condition. We took pictures, documented where we found it, and returned it to its rightful place (Figure 1). After research and discussions with park rangers from the area, we determined it to be from the Dead Man Phase, around 750 AD. This discovery was personally significant for several reasons. It was an example of good artisanship and was something that even after 1300 years, it could be held, appreciated, and respected. Because it was approximated to be from 750 AD, this demonstrated man was using the earth to form clay into vessels for drinking water, eating, and storing food. The Native Americans were also decorating and embellishing those vessels with patterns. This used to be a survival tool, but I viewed it as a work of art that combined clay, slip, and fire.

Figure 1- This ceramic bowl was found in Utah in 2008 by Frank Vickery and Creigh Godson. Bowl was not removed from location.

My undergraduate professor Jim Connell is another influence. Jim teaches ceramics at Winthrop University in Rock Hill, South Carolina. He introduced me to the technical side of throwing good pots. He is a master at using proportional ratios to make great forms. The shapes, weight, and proportions of his forms perfectly complement one another. The bowl is one of his more pleasing forms. His bowls have a narrow foot and a large rim span that is indented at four symmetrical points on the rim. The shape resembles that of a flower with long extending petals. The flower resembles the shape of classically shaped bowls. For example, in Greek history around 450 BC, this type of shape was referred to as a Kylix. The Greek Kylix is a footed, two-handled drinking vessel. The Kylix had a large belly and a rim that was stretched wider than the base. It had handles and was perched on a foot or pedestal. The bowls made for this body of work imitate the classical shape found in a Kylix and, closer to home, Jim Connell's thrown bowls. In watching him make bowls, I began to imitate his technique and shape. Imitation is one form of flattery; it is the best way to learn. Therefore, I had early exposure to classical influence and proportions.

My final influence is the Empty Bowl Project. The Empty Bowl Project is a fundraiser that invites local artists from the community to come together to make bowls (Figure 2). Potters make and donate glazed one-and two- pound bowls that are sold containing a soup meal and the customer keeps the ceramic bowl. Sometimes there is also a silent auction where larger or perhaps more fine art bowls can be sold to help raise money. My experience with this event happened in 2011 at The Bascom in Highlands, North Carolina. Over the course of about three months, members of The Bascom and the community made 700 ceramic bowls. The bowls were donated to The Presbyterian Church in Highlands and the Zachary Tolbert House in Cashiers, North Carolina. On October 23, 2011, volunteers from two facilities provided the soup meal and, unsurprisingly, all of the bowls were sold. As soon as the event ended, plans were being made for the 2012 Empty Bowls Project. The ancestral and survivalist purpose of the ceramic bowl lives on through the mission of the Empty Bowl Project.

Figure 2- These bowls have been thrown for the Empty Bowl Project. The bowls are drying so they can be trimmed and fired.

The bowl is more than just a pleasing shape to make on the potter's wheel. It is a symbol of where we have come from as a society and how we interact and take care of one another today. For these reasons and others to be discussed in later chapters, the bowl is an important and special functional object. That is why I have chosen it as the vehicle for exploring beautiful form and oil-spot glazing.

CHAPTER FOUR: OIL-SPOT BACKGROUND RESEARCH

The oil-spot glaze is considered by many a happy accident of the kiln where the kiln gods look favorably upon the potter. Throughout my research I have come to the conclusion that it is not an accident. It is something that can be reproducible as long as a few necessary ingredients are present and the correct steps are taken. Many articles and dissertations have been published that analyze and describe the oil spot glazing phenomenon at cone 10, 2,350° (F).

Donald Park wrote a thesis in 1957 to fulfill requirements for a Bachelor of Science in Ceramic Engineering. *The Study of Oil Spot Formation in a Slip Clay*, which was presented to the Alfred University Ceramics Department. In the paper, the formation of oil-spot in slip clay can be seen when Albany slip is the main ingredient. Albany slip was mined in Albany, New York. Albany slip was unique, although it was a variable material both chemically and physically, it can be fired to become glaze at cone 9. It has all the components needed to make a glaze. Those components are alumina, silica, and flux. Alumina is present in clay, silica is the glass-former, and flux is the melter which is used to create a eutectic in order for everything to melt at lower temperatures. The goal of his research was to provide insight into the illusive oil-spot glaze and to make it reliable and easier to understand. Park experimented with different clays and additives such as iron and colemanite to produce the spots. He concluded that in order to create the oil-spot effect, the glaze needs to be high in iron and needs to bubble during the firing to bring the iron to the surface. The glaze layers need to be thick because a thin layer produces little to no effect. There is also a need for small amounts of a calcium rich ingredient such as whiting or colemanite to help decompose the iron and produce the bubbles before the silica layer of the glaze melts and seals over. The tests conducted were fired between cone 9 and cone 11 in a gas kiln.

Another thesis presented by Donald Warnock to the Art Department of San Jose State in 1967 discussed oil-spot variations. His thesis, *Some Variations in Glazes of the Oil Spot Type*, concluded that a high alumina to silica ratio along with certain oxides produced the desirable oil-spot. Warnock also concluded that feldspar, which through erosion breaks down into clay, can also be used in the recipe to aid in glaze adhesion and fluxing. The problem was trying to solve was how to melt a glaze high in both alumina and silica. The feldspar created the necessary bubbling of the glaze; however, the next problem was how to heal the glaze once it bubbled. This can be settled with an alteration of the glaze composition through the cooling cycle of the firing, or as Warnock concluded, a cover glaze that produced less glaze tension. This is the most important part of his research and helped me to achieve a variety of colors.

One of the best scientific explanations was written by Brother Anthony and subsequently published in the October 1980 edition of *Ceramics Monthly*. Anthony concluded in his paper, The *Chemistry and Physics of Oil Spot Glazes,* that oil-spot glazes are created by the decomposition of iron into magnetite and deposited on the surface of the glaze by the bubbling action of the glaze. The bubbling is caused by red iron oxide turning into magnetite and releasing oxygen, which rises through the melting silica and deposits the magnetite on the surface. This is called thermal reduction. This happens spontaneously and vigorously around 2,250° (F) in oxidation. If the red iron is reduced early in a firing due to atmospheric reduction then there will be no thermal reduction of red iron and thus no oil spots. The base glaze must contain enough iron oxide to dissolve in the glaze and the remainder decomposes to release oxygen. Therefore, the base glaze does not need to dissolve all of the iron content and actually the iron oxide acts as a refractory in oxidation, helping the glaze to be stiff. A high alumina and silica ratio, with high alkali and low calcium are the correct ingredients for achieving oil-spots at cone 10. Since calcium is a flux for iron, only a small amount is necessary because firing to cone 10 temperatures is 2,350° (F) and iron fluxes at 2,232° (F). He also states in order to get the glaze to melt and smooth over at stoneware temperatures, which is 2,300° (F) or there about, a little calcium and magnesium oxide need to be present. Natural feldspar has all of these requirements. The most important part of this for my research is the high alumina and high silica ratio to calcium and magnesium because I want to achieve oil-spots 100° (F) lower than cone 10, 2,350° (F). The base recipe will need to have a higher percentage of calcium to flux the iron. The magnesium content will be tested to figure out the effect of magnesium on cone 6 oil-spot.

Ian Currie wrote *Stoneware Glazes: A Systematic Approach* in which he discusses two generally accepted theories. One is Brother Anthony’s one glaze approach and the other is Frank Hamer’s base glaze with a cover glaze approach. Hamer, author of *The Potter’s Dictionary of Materials and Techniques* suggests that both the base and cover glaze need to be high in iron, but the base needs to be overloaded with as much as 30% iron. The cover glaze must melt first so the decomposing iron in the base glaze can bubble through a layer of molten glass. This is essential because without the molten glass layer of a different color, the iron spot may be unnoticed. Also, according to Currie, oil-spot recipes contain at least 50% feldspar and a wide range of high iron glazes will give the oil-spot effect. Currie lists several recipes and all of them contain high feldspar at 50% or more, high silica at 20% or higher, and iron at 8% or higher. There are also small quantities of magnesium and calcium oxide between 5 to 10%. This is important to my research because I use a high feldspar, high silica, and high iron base. There is no iron in my cover glaze.

John Britt has written several articles about cone 10 oil-spot including *Oil-Spot Glazes*. In the article, John points out oil-spot glazes are either feldspathic glaze or a clay slip with a cover glaze. The thickness of the base glaze matters in the size of the spot and the glaze needs to be one-eighth of an inch thick and can be as much as a quarter inch. Another way to control the size of the spot is to fire the kiln slowly between cone 6 and cone 10 so that the oxygen will have time to reach the surface of the glaze. The red iron oxide molecule will let go an oxygen atom at approximately 2250° (F). The red iron oxide can't maintain its complex structure and will release an oxygen atom to become magnetite. Firing fast leaves rough craters and the glaze is not smooth due to pinholes from the thermal reduction process. The most important aspect of oil-spot glazing is the oxidation atmosphere.

According to *The Complete Guide to High Fire Glaze: Glazing and Firing at Cone 10,* also written by John Britt, oil-spot glazes are high in alumina, silica, and potassium oxide and low in magnesium oxide. The desired effects are produced when fired in oxidation. The spots will be brown with 6 to 12% red iron oxide in the base glaze or black spots with 1 to 5% cobalt carbonate. Mix the oil-spot glazes to a thick specific gravity of 165 to 170. Due to the thick layers of glaze, the pot will become heavy, so throwing thinner will compensate for this. John recommends bisque firing to cone 05 and explains two ways of glaze firing. One firing option is an oxidation atmosphere, with the length of time between cone 7 and cone 10 lasting 4 to 5 hours. Another way is to fire in oxidation until cone 9 and switch over to reduction from cone 9 to cone 11. The iron in reduction will begin to flux and melt the glaze causing some smoothing over. John also mentions that in order to smooth over the craters on the surface, hold at peak temperature and slow the firing down between cone 7 and cone 10. The other way is to re-fire in reduction to turn the remaining iron black and cause it to flux.

In Joseph Grebanier's *Chinese Stoneware Glazes,* he discusses glazing and firing procedures of the oil-spot glaze. Grebanier cautions against mixing the glaze with high amounts of water because saturating the clay body with water from the glaze will cause layers not to adhere to one another which then promotes crawling. However, a thick coat is necessary for large spots so a high specific gravity is helpful. A watery mix of glaze and thick layered application can produce hair line cracks in the glaze and later those will peel in the firing. He says "Ironically, the parts that do peel, in such instances, fold over onto other glaze portions and produce large spots. The only problem is they directly adjoin ugly bald spots" (86). Grebanier agrees with everyone discussed so far about the oxidizing atmosphere in the firing of the kiln. A soak of the kiln at peak temperature is necessary in order to allow the glaze to heal and produce the oil-spot glossy, deep black effect. This is important for my research because of the many layers of glaze that are applied to the bowl, a high specific gravity base glaze is essential for large iron spots.

CHAPTER FIVE: CONE 6 OIL-SPOT RESEARCH AND FORMULA

One way to decorate a ceramic object is to use a glaze or combination of glazes. Glazes are made from various naturally occurring elements. A potter must choose glaze recipes based on a scientific understanding of how the periodic elements react when exposed to extreme heat and firing atmospheres in the kiln. Based on the properties of the elements (melting point, surface tension, etc) and the eutectic point created when melted, I plan to use available recipes for cone 6 oil-spot glazes and modify them to unmask the mysteries behind the alchemy of refractory, flux, and glass former in cone 6 oil-spot glaze. In order to get visual results of oil-spot at mid-range temperatures, alkali elements in the base recipe need to react with acids or anti-fluxes to melt glass, or silica at 2,232° (F) or cone 6. A cover glaze is used for the iron to bubble through so the spots are visible and to help heal the glaze.

The clay body used for this project is stoneware clay, Zella Stone, which can be purchased from Highwater Clays in Asheville, North Carolina. The bowls are bisque fired to cone 06, normal for stoneware clays, which also provides a strong and durable, but porous surface to absorb glaze. When the first layer of glaze is applied, it dries evenly within a couple seconds. Zella Stone becomes vitrified between cone 7 and cone 10.

I chose to use this clay body for several reasons. The primary reason is the versatile nature of stoneware clay when thrown on the wheel. Stoneware clay has grog, which helps to give stability to the object. Since the bowls are fanned out to the extreme and have a narrow foot, a clay body is needed that can handle that kind of stretching. The clay also has small amounts of iron. It is traditional to use a high iron body for oil-spot and then reduction cool to turn aid in turning the spots black. However, firing a kiln electrically does not permit reduction. Potters, who use an electric kiln, sometimes re-fire the wares in a reduction gas kiln after the oxidation process. This helps turn the iron in the clay body and in the glaze black. This was not done for this project because the iron spots produced with the cone 6 base recipe were black after one firing.

The glazes used for this thesis are a base glaze, cover glaze one, and cover glaze two. The base glaze is the chemical result of potassium oxide, calcium oxide, aluminum oxide, silicon dioxide, and iron oxide under an oxidized atmosphere fired to 2,232° (F). Potassium oxide is a strong flux and works well with iron glazes. It is found in feldspars and the feldspar used in this base recipe is G-200 HP. High feldspar content helps to stiffen the glaze and not be so fluid. Calcium oxide fuses with the potassium oxide to strengthen the glaze and it is also a flux for iron decomposition. It is introduced in this recipe as whiting. Aluminum oxide is the clay content, otherwise known as refractory or anti-flux, and is used to decrease the viscosity of the glaze. It brings stability to the glaze. Most of the aluminum oxide comes from Edgar Plastic Kaolin or EPK in the base recipe. Silicon dioxide is the glass component of the base recipe and is introduced in this recipe as silica. Silica is the glass former in glaze and when the ratio between alumina and silica is controlled, the maturing temperature of the glaze is controlled. Iron oxide is a strong flux and is very sensitive to oxidation and reduction firing atmospheres. In reduction it acts as a flux, but in oxidation it acts as refractory. Iron oxide is responsible for the spotting in the glaze and only shows when the kiln is fired in oxidation.

Cover glazes are used to achieve different colors around the spots and to heal the cratered surface of the glaze from the bubbling action of the decomposing iron. I used two cover glazes to achieve a variety of colors surrounding the spots. When the iron decomposes into black iron around 2,232° (F), oxygen is released and pulls a small amount of iron to the surface of the cover glaze and deposits the iron in the shape of a circular spot. The cover glaze is pushed to the side of the circular spot when the bubbling action begins and is deposited as a colorful halo around the black spot. Because the iron bubbling is random, the spots appear all over the surface.

Cover glaze one is also comprised of alkali elements and refractory, but there is no iron. It is high in potassium oxide, silicon dioxide, and a strong flux called boron oxide. The high boron oxide content is introduced as gerstley borate. Gerstley borate is sodium, calcium borate. Sodium allows for color response and strong fluxing action. Cover glaze one has low aluminum oxide and is also introduced in this recipe as Edgar Plastic Kaolin or EPK. Zirconium oxide is added through zircopax and it helps make the glaze stronger and glossy and because it is extremely refractory helps the glaze not run.

Cover glaze two is responsible for mixing the base and cover glaze one to create a beautiful eutectic of runny blues and greens (Figure 4). The iron will also bubble through cover glaze two and leave small spots on the surface (Figures 3 and 4). These spots are only noticeable where there is base, cover glaze one, and cover glaze two. This allows for vibrant colors and a wider range of color halos around the spot. Cover glaze two helps smooth over the craters and produces a very glossy surface. Cover glaze two has a high percentage of frit, silica, and refractory. Wollastonite has calcium and silica components. Frit 3134 is used for fluxing. Edgar plastic kaolin is the refractory. A small amount of nepheline syenite introduces sodium along with the gerstley borate from cover glaze one. The sodium component from cover glaze one and cover glaze two becomes evident in the discoloration of the foot. This is commonly called a sodium halo (Figure 3).

Figure 3- The sodium halo can be seen on the foot ring of this bowl. This is the foot for Figure 9. Notice the large spots around the foot and even underneath the bowl.

The colorants in cover glaze two are rutile and copper carbonate. Rutile is natural titanium oxide and iron oxide. When combined with copper oxide, it produces yellow-greens. When cover glaze two is added, the result of the combination of all three glazes is a range of blues and greens (Figures 4 and 5). I use stains such as blue, red, green, and yellow in the amount of 10% in addition to the 100-grams of base in cover glaze one. I did not change cover glaze two. Figure 5 is an example of the red stain used in cover glaze one.

Figure 4- The combination of all three glazes with wax designs. The waxed designs move toward the center of the bowl when fired twice.

Figure 5- An example of the red stain at 10%.

My oil-spot recipe for the base, cover glaze one, and cover glaze two are below. However, there are endless recipe options for cone 6 oil-spot bases and cover glazes that can be applied using a balance of the oxides described. Obtaining the correct ingredients and proportions involves knowing the properties of the elements and how they react with each other under heat. Testing the ingredients using a tri-axial line blend, regular line blend, and/or a progression blend are three ways to understand the ingredients and their relationship with each other. A tri-axial blend was not necessary because I only tested the effects of one ingredient, which helps in slowing the viscosity of the glaze. I chose to use a line blend to add magnesium carbonate and dolomite to the base recipe in order to reduce runny glaze. The results of the three different line blends are below (Figures 6, 7, and 8).

FORMULAS USED IN RESEARCH

Vics Oil-Spot Iron Base	% of 100-Grams	Oil-Spot Cover Glaze one	% of 100-Grams	Oil-Spot Cover Glaze two	% of 100-Grams
G-200 HP Feldspar	47 g	Custer Feldspar	30 g	Nepheline Syenite	4
Silica	21 g	Silica	15 g	Silica	17
Whiting	18 g	Gerstley Borate	30 g	Wollastonite	28
Edgar Plastic Kaolin (EPK)	11 g	Edgar Plastic Kaolin (EPK)	5 g	Edgar Plastic Kaolin (EPK)	28
Dolomite	3 g	Zircopax	10 g	Frit 3134	23
Red Iron Oxide (RIO)	10 g	Any Stain	10 g	Copper Carbonate	4
Bentonite	2 g	Bentonite	2 g	Rutile	6
				Bentonite	2

Tables 1- These are the recipes for Vics oil-spot iron base, cover glaze one, and cover glaze two.

As shown in Figures 4 and 5, the vibrant colors are produced by layering glaze. When certain oxides are combined, this can create a lower melting point resulting in runny glazes, shivering, and/or crawling. I use layering at each step of the glazing process. The colors and large spots can only be produced by applying these specific glazes and by layering them. Because there are several layers of the base glaze applied and then subsequently one layer of cover glaze one and one layer of cover glaze two, the potential for a runny mess is prevalent. From the beginning, the problem was runny glaze. I used a line blend test to adjust the levels of whiting, dolomite, and magnesium carbonate in an effort to control the viscous nature of layering glazes. There was no magnesium in any form in the recipe before the tests were conducted.

The following line blend tests were used to understand and visually recognize the effects of magnesium additions to the base recipe. Magnesium was added to the base recipe in different percentages in the form of dolomite and magnesium carbonate. Magnesium is used to stiffen glaze and even though it is a flux, its fluxing action doesn't begin until 2,138° (F). In cone 10 recipes, magnesium can be found in magnesium carbonate, dolomite, or talc in between 6 and 20% of the base recipe.

Each test began by mixing 500-grams of the base recipe with water and adding it equally to five solo cups. Then 1% of an ingredient was added to cup one and 2% added to cup two and so on to 5%. Each tile was dipped twice to produce two thick layers of base glaze. A cover glaze was added for color on top of the base glaze to reveal the spots after firing.

The first test consisted of adding up to 5% dolomite in increments of 1% to the base recipe. This revealed the correlation that as dolomite increased, the glaze stiffened and the hanging glaze effect became more apparent. The pooling glaze visually recognizable at the bottom of the glaze line resembles delicate folds in clothing (Figure 6, center test tile). The glaze moves and builds up as if about to run completely down the tile, but does not. The droopiness of the glaze was more substantial at 5% dolomite and the spots became less visible and were irregular. The center tile with 3% was the best because of the hanging glaze was the most even. The glaze breaks beautifully on the corners of the tile and was very smooth. The addition of dolomite decreased the viscosity of the glaze. Calcium is also in dolomite and although it is a strong flux, it does not begin fluxing until 2,012° (F). It also accented the characteristic hanging glaze effect and added a yellowish green halo on the breaks of the test tile. The glaze was smooth and the spots were large and completely matured (Figure 6, center test tile).

Figure 6- From left to right, one percent of dolomite was added. Notice the hanging glaze on the middle tile. The glaze is also smooth after one firing. The breaking of the glaze on the corners is very nice.

The second test, Figure 7, consisted of removing 5% whiting and adding dolomite up to 5% to the base recipe. The glaze was cratered on the test tile with only 1% dolomite and 13% whiting. There was no visible hanging glaze and the spots were not completely formed. With 5% dolomite and 13% whiting, the glaze is getting close to mature spots, but the yellow halo on the breaks of the test tile and the rim were not noticeable. This test indicates that whiting is essential to the recipe and removing it inhibits the iron spotting and healing of the glaze. In Figure 7, all of the tiles have craters and the glaze is not mature.

Figure 7- Five percent whiting was removed from the base. From left to right, one percent dolomite was added. Notice the pits and craters in the glaze. The hanging glaze is not even and not smooth.

The third test, Figure 8, consists of adding 5% magnesium carbonate to the base recipe in increments of 1% up to 5%. This test showed that 5% magnesium carbonate added to the base recipe changed the iron spot to a yellow or gold color. This could be similar to the effects magnesium has on cone 10 Tea Dust Tenmoku's. "Tea Dust is a Tenmoku like glaze with green or yellow-green crystals scattered throughout" (Currie 168). They are fired in oxidation or neutral atmospheres in the kiln producing a blackish brown glaze with yellow crystal growth on the surface. Also at 5%, the pooling of the glaze near the foot of the test tile revealed that small amounts of magnesium decrease the viscous nature of the glaze (see Figure 8).

Figure 8- From left to right, one percent magnesium carbonate was added. Notice the yellow color of the far right tile. Five percent magnesium carbonate changes the color of the spot. The hanging glaze is not as noticeable.

Because dolomite was added to the recipe and the ingredients now totaled over 100-grams, the recipe needed to be re-totaled. For example, I added 3-grams of dolomite to the base recipe so the new total is 103-grams. Divide 3-grams of dolomite by the new total of 103-grams and the result is .029. Multiply that number by 100 and the new total of dolomite in a 100-gram batch is 2.9 grams. I rounded up and made it even at 3-grams.

All of the ingredients were re-totaled, except for red iron oxide and bentonite. Red iron oxide is a colorant and bentonite is used to suspend the ingredients in the glaze. Each of these ingredients is outside of the 100-gram base glaze, therefore they stay the same.

CHAPTER SIX: THE BOWL IS THE PERFECT FORM FOR OIL- SPOT

The bowl is a functional object used to enrich our everyday lives and when thrown properly, it offers the most beautiful form for glaze application. I use the wheel to make bowls because of the inherent nature the wheel provides. It is circular and spins around and around as soon as I push the pedal down. My goal is to create a perfectly shaped bowl using classical aesthetics with accurate one-thirds/two-thirds proportional ratios. This ratio constitutes beautiful form, which is the proportional relationship between all of the different parts. This can be challenging to achieve.

Throughout the research, I have constructed several forms to apply glaze to, but none of them are as appealing as the bowl. I enjoy the half circle shape, the wide surface area that can be exposed to glaze application, and the multiple uses a bowl provides for people; therefore, it is the best form for me to work with given my intentions. In general, bowls can be short or tall, have a wide rim or a closed rim, or any combination of the two. The bowl is a dynamic shape because it provides a visible interior and exterior space, which promotes great opportunities for glaze calculation and experimentation. The bowl represents a complete integration of beautiful form, function, and surface area.

The functionality is universal, has been for millennia, and is directly related to the proportion of the foot and the diameter of the rim. For example, a good ratio between the foot and the outer stretches of the rim is one-thirds to two-thirds. This proportional ratio called fie was first noticed by Euclid, the father of modern geometry in 300 BC. “This proportional relationship is found in many places in nature such as the human body and a chambered nautilus shell" (Hopper 157). Also, Leonardo Pisa, known as Fibonacci, devised a series of numbers where each succeeding number is the sum of the two that came before it. The connection between fie and the Golden Mean comes when the bigger number is divided by the proceeding one. The sum is 1.619, which is very close to Euclid's 1.618. This one-thirds/two-thirds instinctive proportion is as natural as the materials of the earth and a functional potter uses both to create and decorate form.

When I create and throw bowls on the wheel, I do not get a ruler and measure the relationship of the parts of the whole. I do visually check, hold, and test the functional attributes of each bowl when they come out of the kiln. I make adjustments based on the visual relationship of the foot, rim, and the belly. The visual proportions turn into a tactile formula which I carefully try to repeat each time. After the form has been made, it is ready for glaze decoration.

Because of the rigorous demands and the beautiful effects of this glaze and glazing process, I chose to put it on the largest bowls that would fit into the electric kiln. It is important for the inside and outside of the piece to be visible and a small vessel does not have enough surface area. Vertical pots do not work well either because the glaze runs down the vertical surface and a runny glaze means torn up kiln shelves, broken pots, and poor craftsmanship. It is harder to see the inside of a tall pot so a vase or other similar shape is not optimal for my intentions. A large platter would have more surface area, but the exterior of the platter would be difficult to see. I want to maximize the surface area on the inside and out and a large bowl offers this possibility. The slope from the top of the rim to the foot is important. I have found that a sloped surface increases the flow of the glaze when it melts, but is also slows the viscosity when it reaches the belly of the bowl. Sometimes the glaze melts and runs down into a nipple shape hanging off the belly of the exterior surface of the bowl. As you can see in Figure 9, the glaze runs down the belly of the bowl and exhibits the characteristic oil-spot hanging glaze.

Figure 9- The hanging glaze is a characteristic of the oil-spot. Notice the large spots on the exterior of the rim.

The interior of a bowl is similar to a funnel that does not work. I pour layer upon layer of glaze into the interior space. This produces a myriad of colors and glaze melting. As you can see in Figure 10, the inside of the bowl provides a large interior space to apply layers of glaze. This bowl has been re-fired so the spots elongate and move toward the center. The blue highlights also became more apparent after the second firing.

Figure 10- The interior space provides a large area to apply glaze. This is cover glaze one with yellow stain at 10%.

For this project, the thrown bowl forms are concerned with the technical considerations of size, weight, and proportion. A technical piece speaks to all of the standards associated with the specific categories of functional objects. The technical considerations for this project serve a dual purpose for form and glaze application. For example, the span from rim to rim is important for proportion, but also a large span means more space for glaze. The slope is important for aesthetic reasons, but also the slope of the belly towards the foot of the bowl helps to slow the viscosity of the glaze movement. The weight is important because the pieces are made to be functional, even though they aspire to a higher level of aesthetic appreciation. The weight of the bowl changes dramatically from bisque to completed glaze firing because of the multiple layers of glaze. The layers add a considerable amount of weight to the bowl. The last feature of the bowl that serves a dual purpose is the foot. All of the bowls have a very pronounced, carved foot. The foot helps to lift the bowl off the table surface as if presenting itself. The most important feature of the carved foot for this project is the ability to hold the bowl by the foot for glazing. As observed in Figure 11, the foot provides support, but also acts like a pedestal to raise the bowl off the surface of the table.

Figure 11- The foot of the bowl provides support and acts like a pedestal. Side view of Figure 10.

CHAPTER SEVEN: OIL-SPOT GLAZING PROCESS

There are many decisions a potter will face when creating beautiful form, but there are even more when it comes to applying glaze. There is a cognitive dimension surrounding the surface of a vessel that involves a finely tuned approach when applying glaze. Glazing is complicated with too many recipes, formulas, combinations, firing temperatures, and methods of applying. "Glazing ceramics is also an artistic expression which involves a unity between clay, form, and surface treatment which cannot be separated out, and it cannot be said that one is more important than the other" (Clark 144). Bowls are more than just beautiful forms. They have a surface that begs to be covered in glaze. Any potter can produce good form, but it is the great potter who can make beautiful forms and control the glaze. A potter's technique for glazing is mirrored in the way a painter approaches the canvas. A pot covered in glaze can represent a variety of paint application techniques. Techniques such as dipping, dunking, splattering, spraying, or brushing, among many others, are all methods of applying glaze. The right colors and method of application are all very important decisions. These are unique and specific to individual potters.

Elements from the periodic table are combined using scientific methods of research to create unique effects of color melting and iron spotting. Oil-spots or iron spots result from a certain way of firing iron. When fired in reduction and oxidation atmospheres, iron can produce browns, yellows, greens, blues, and metallic colors. Without the knowledge of what the elements do by themselves and in combination with each other in oxidation or reduction firing atmosphere, glazing may seem an elusive or mystical task. Oil-spot glaze has represented this myth of elusiveness because many do not understand the oxidation firing procedure. The most important factors in oil spot glazes are the high iron content and the correct amount of alumina and silica combined with the oxidation atmosphere in the kiln. The colors, designs, and effects shown in the work can only be created using a cone 6 oil-spot recipe and an oxidation firing schedule.

There are endless options for glazes, recipes, and combinations. It takes training, along with trial and error to match the right recipe and technique to the clay body and form. The decisions are also based on the potter's concept or technique. Each piece for this body of work incorporates dipping, pouring, brushing, and layering of glazes. The only things changed from bowl to bowl are the wax designs and the option of multiple firings. The most important consideration and factor during the glazing process is drying times between the layers. Patience is a virtue and for me this was tested considerably. Sometimes it takes two or three days to finish applying all of the layers of glaze. If the preceding layer is not dry when the next coat of glaze is applied, then the layers will slide off the bowl. This is commonly referred to as crawling. Crawling can produce large brown spots where the layers of glaze have moved away.

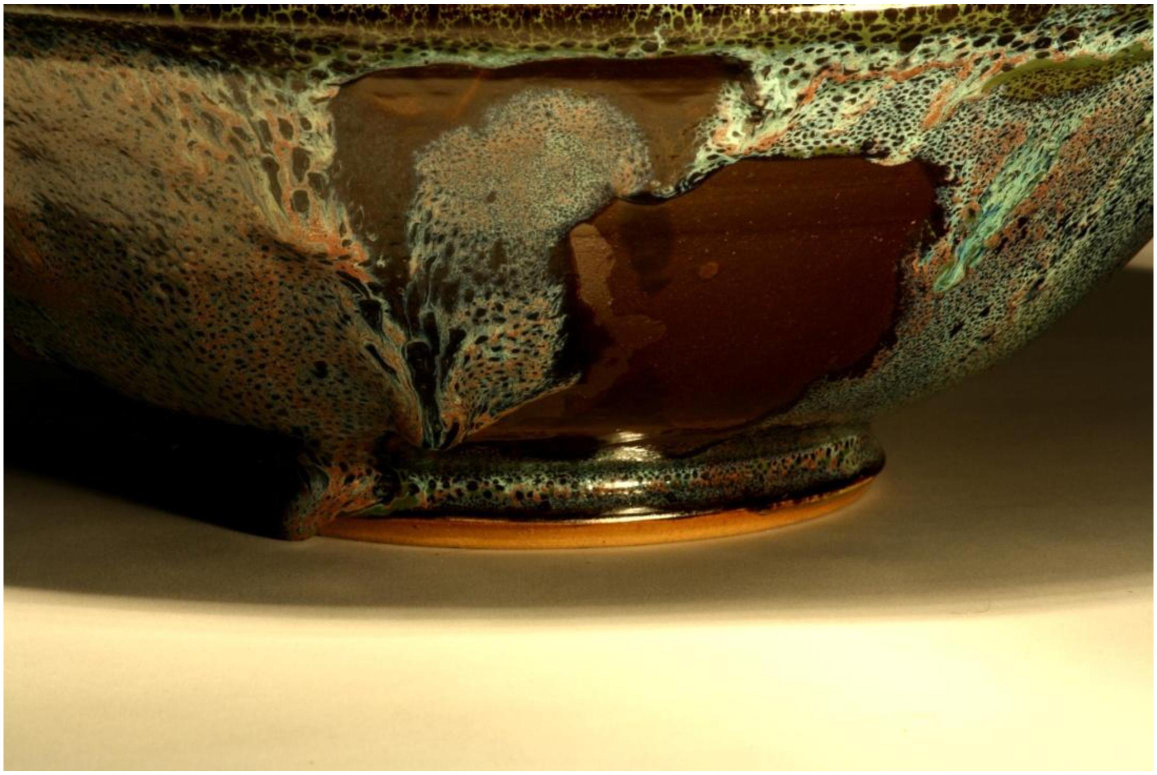

Figure 12- This is an example of crawling. Notice the hanging glaze next to the brown area. The glaze has crawled from the point of contact and collected to form a hanging drip.

Crawling occurs when glaze is applied to the surface of a pot and water evaporates from the dry glaze, causing it to shrink around the pot. It also occurs when the next layer of glaze is applied on top of a wet layer. This causes cracking or fissuring of the dry glaze and when fired, the glaze releases from the side of the pot and either folds onto itself, falls off the pot, or simply runs down the side towards the kiln shelf. There will be a large brown or black area where the glaze moved from (Figure 12).

One way to decrease the amount of glaze shrinkage on the surface of the bowl is to calcine half of the clay content of the recipe. Calcining (firing to red heat) drives off chemical water and thus changes the physical properties of the material. Calcined kaolin (clay) still has the chemical properties of clay but no longer has the property of shrinkage that natural clay has. I did not calcine half of the clay content for several reasons. The first reason is the consistency of the base glaze was mixed to the consistency of pudding or very thick milk. I also mix a separate 1, 000-gram batch of the base, with a specific gravity higher than 170, to the consistency of oil and brush it onto the areas where larger spots are desired. The main reason I did not calcine half of the clay content is that patience between the layers resulted in thick layers, large spots, and no crawling.

The base recipe is mixed in 10,000-gram batches and stored in a standard five-gallon bucket. The base glaze is applied several times using the pouring method with an average thickness of one-eighth of an inch. I hold the bowl by the carved foot in one hand and use a liquid measuring cup in the other to pour glaze onto the surface. I begin by pouring glaze onto half of the interior of the bowl over the top of the five-gallon bucket. I immediately pour the other half of the interior of the bowl and let it dry. After the first layer on the interior is dry, then I repeat step one. I will repeat step one on the back as well, remembering to let each preceding layer dry before applying the next layer. The base glaze is applied thickly and thick layers produce large spots. This includes the rim of the bowl, the center of the bowl, and under the waxed designs. In Figure 16, the dime size oil-spot is the result of layering the base glaze thicker in the middle of the bowl.

Cover glaze one is mixed to the consistency of skim milk. It is mixed in 2,000-gram batches and only poured once over the interior and the exterior of the bowl. I use the same method of pouring as I do for the base. Sometimes the thick layers of base glaze and the one layer of cover glaze one take a full day to dry. This layer of glaze is only about a millimeter thick or less.

Once cover glaze one has been poured over the entire surface and dried, I use liquid wax to paint designs onto the interior and exterior surfaces. I use Forbes wax, which is a water based wax and a deterrent wherever it is placed on top of cover glaze one. Where the wax is applied, the normal reaction between oil-spot base and cover glaze one combination can be seen (Figures 13 and 14). The wax designs are a product of the wheel (Figures 13, 14, 20, and 25) multiple firings (Figures 4, 5, 10, 15, 17, 18, 22, and 24), and the Anasazi bowl artifact (Figure 1). The straight lines inside the Anasazi bowl are thin and black. They curve and mimic the interior shape and accent the full belly of the bowl. The bowls that represent my inspiration most directly from the Anasazi bowl are Figures 20 and 25.

The Anasazi bowl is only part of the motivation behind the wax patterns on the interior of the bowls. The finger swoosh in the bottom of the bowl is residue from the circular nature of the wheel. The swoosh design starts when the bowl is approaching mature form on the potter’s wheel. I use the metal rib to finish smoothing the interior surface down to the lowest point of the bowl. Most bowls are made with a continuous U-shape curve. The bowls for this project are made with a small flat bottom. The last and only finger mark left on the surface of the bowl is in this small, flat circular space. The thickness needs to be about one-inch because of the pressure I apply with my finger. As the wheel spins, I press in the middle of the circular flat space at the bottom of the bowl and drag my finger outwards. This produces a spinning spiral. The same spiral is used as the template for the designs painted on the interior of the bowl (Figures 13 and 14). The aesthetic appeal of the design is the repetition of the circle. The bowl is a circular shape and the designs are spirals that radiate out from the center just like the finger swoosh in the bottom of the bowl.

Figure 13- The spiral design is a product of the wheel and carried over when decorated on the banding wheel.

Figure 14- The spiral design applied with wax over cover glaze one and allowed to dry. Cover glaze two is then applied.

Once the wax has been applied and left to dry for about ten minutes, cover glaze two is applied using the same pouring method. Cover glaze two is mixed into 2,000-gram batches as well and has the consistency of skim milk to achieve blues, and whole milk to achieve purples. A thick coat of cover glaze two will result in a runny mess. Cover glaze two is poured over the entire interior and exterior surface using the same method as base glaze and cover glaze one. Once cover glaze one has been applied, it is left to dry before placing into the kiln.

The kiln used for the firing of the bowls is an electric kiln made by Bailey Pottery. It is a computer-controlled kiln with preset firing options. The pots are placed in the kiln, one bowl to a shelf and usually three or four bowls per firing. I use the fast glaze firing option and I put a hold on the kiln at peak temperature for thirty minutes. A hold at peak temperature means the kiln probably reaches cone 7, which is 2,262° (F). Because of the rate of temperature increase in the kiln is near 108° (F) per hour, cone 7 falls at a higher temperature than if the rate of increase is lower. This hold also allows for any remaining oxygen to bubble to the surface and the cover glaze to smooth over the craters. The kiln usually fires to completion in about six or seven hours. If the kiln is started before noon, it is usually cool enough to unload the next morning. I unload the kiln when it is between 200° and 300° (F).

After the bowls come out of the kiln for the first time, I examine to see if re-glazing or re-firing is my best option. I look for the size of the spots, the color variety, and smoothness of the glaze. During my tests for the oil spot project, I made several smaller bowls to apply glaze to in order to figure out the layering and the visual aesthetics. When approaching the final steps, I would catch the kiln on the way down around 300° (F) and remove it from the kiln. I immediately took the bowl, dipped it into cover glaze two again, and let it dry. The internal heat from the bowl fast dried the glaze and drove off the moisture. The bowl was placed back in the kiln and re-fired. This last glaze application and firing helped smooth over the surface, meld the colors more abstractly, and provided a glossy finish (Figure 15). The spots seem to fade away and are not as noticeable. Re-glazing after firing once was not the best option.

Figure 15- This bowl has been fired twice. After the first firing, the bowl was removed from the kiln at 300° (F) and re-glazed using cover glaze two, and then re-fired. Notice the iron spotting is not as pronounced.

As you can see in Figure 16, the oil-spot is almost as large as a dime and has a rich black color and a smooth surface. However, there are several immature spots around the large spot that have an amber tint. These represent thin sections of glass where the surface has not completely smoother over. This can cause fracturing of the glaze and small shards could be set free with contact. For a functional and decorative piece, this is unacceptable. Re-firing or re-glazing at this point is the best option in order to smooth the glaze over.

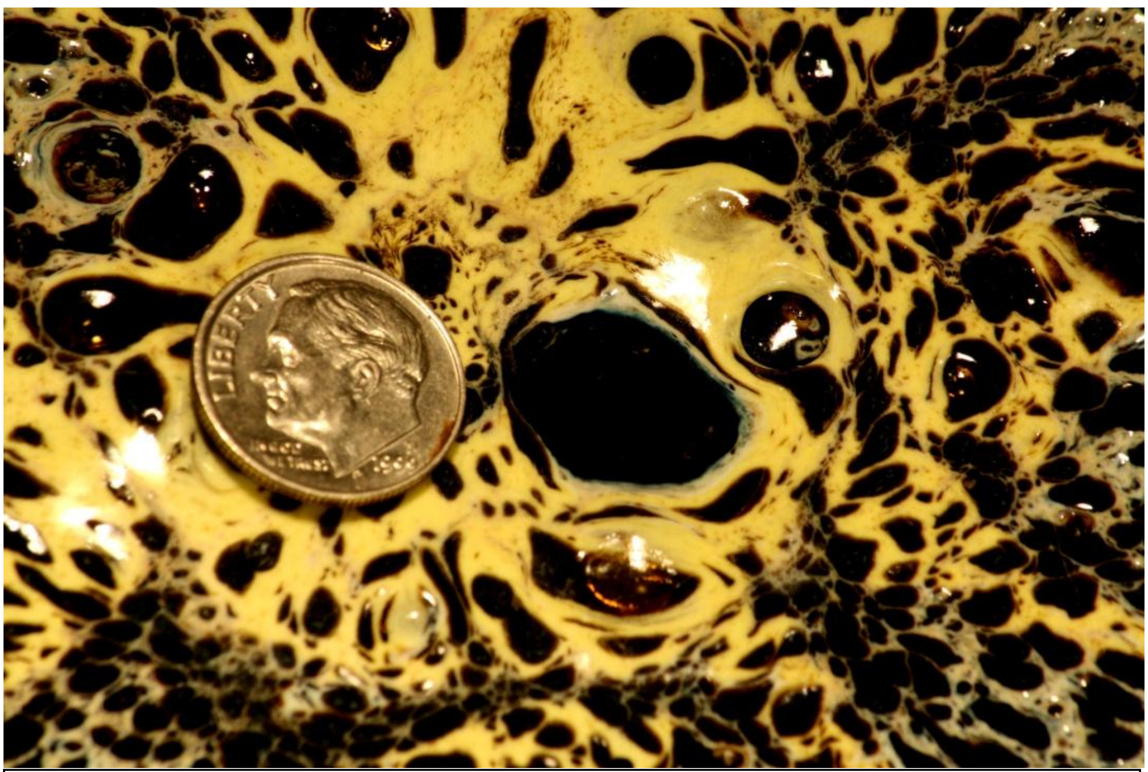

Figure 16- The dime size oil-spot is the result of layering. The amber colored and pitted oil-spots are also the result of layering. If the layers are too thick, uneven spot formation is the result.

Re-firing in oxidation permits the glaze to move, elongate, and stretch the iron spot and waxed iron spot design. The base glaze used for this research provides a black spot on the first firing. There was no need to re-fire in reduction because re-firing was only used to smooth over the surface. Most of the finished bowls completed for this project were multi-fired. When the waxed designs and colors were ideal for exhibiting the full range of the oil spot possibilities, I did not re-fire.

Figure 17- This bowl has been fired twice and shows the dragging of the iron spotting towards the center of the bowl.

CHAPTER EIGHT: CONCLUSION

This oil-spot glaze thesis project has not only fulfilled the requirements for a cohesive body of work for the Master of Fine Arts degree, but has also opened doors to future projects. As discussed in Chapter Four, the literature available today concerns stoneware temperature oil-spot. The intent of this thesis and body of work was to develop and expand on cone 6 oil-spot glazing and firing procedures. The oil-spot glaze and glazing method used in this research, along with the functional aesthetic of the bowl shape, represent all that is fine in fine art. There are several other conclusions have been made.

To get visual results of oil-spot at mid-range temperatures, alkali elements in the base recipe need to react with acids or anti-fluxes to melt glass or silica at cone 6, 2,232° (F). A highly saturated iron base glaze with additions of calcium helps to produce iron spotting at mid-range temperatures. Using wax in combination with layering cover color glazes produced beautiful and vibrant colors and a variety of oil-spot sizes. The bowl is the perfect form for oil-spot because of the visible interior and exterior space available for glaze application and because traditionally oil-spot glazes were used on tea bowls. Re-firing in oxidation brightens the colors, smoothes over the surface, and promotes stretching of the oil-spot. A glossier finish also emerges after the second firing.

Karl Marx’s ideology of the alienation of labor and a functional potter’s methods of creating are in direct contrast with one another. The biggest distinction between factory produced objects and factory-like produced objects is that the latter offers a connection to individuality and personal expression. Potters work hard and create works of art using natural materials that are unique, personal, and self-sustaining. They control the whole process from the object's conception, to the creation of form, to glaze application, and finally the firing method. Every potter uses the same material and has access to the same equipment along with the body of knowledge that is associated with modern ceramics. Traditional aesthetics and historical references are rich in subject matter and present challenges to both present and future potters to rethink and push forward ideas to make new and innovative work.

New projects for the future could consist of further testing the relationship between calcium, flux, and iron. If the ratio between flux, iron, and calcium is adjusted, oil-spotting may be achieved at lower temperatures than cone 6. Another idea is to combine cone 6 oil-spot glazing with other glazes that are high in frit, sodium, and colorants. For this, project I used two cover glazes, but the options are endless for cover glazes. Testing would be the only way to reveal these discoveries.

When I give a friend one of my pots, I am giving them a small piece of me. My time, effort, research, sweat, frustration, and joy went into creating that object. I made it because I enjoy using science and geology to produce works of art. There are surprises every time I walk into the studio, especially during this thesis project, but that is only a small part. Ceramics is repetitive, but not like a factory assembly line. Ceramics is a calculated risk that requires scientific knowledge and physical labor, along with critical analysis to produce functional art objects. I joke with friends and colleagues when they buy one of my cereal bowls. I say, “Looks like I am having cereal with you tomorrow morning”. The essence of that statement is true. That bowl represents me.

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APPENDIX A

PHOTOS OF CERAMIC OIL-SPOT BOWLS

Figure 18 - Side view of Figure 3

Figure 19- Side view of Figure 20.

Figure 20 - Full view of Figure 19.

Figure 21 - Side view of Figure 22.

Figure 22 - Full view of Figure 21.

Figure 23 - Side view of Figure 24.

Figure 24- Full view of Figure 23.

Figure 25- Full view of Figure 9.

Figure 26- Side view of Figure 5.