

DESIGNING FUNCTIONAL CERAMICS FOR SERVICE AND WELLNESS

by

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Abstract

Service nurtures wellness. Through glaze palate, form, and function, *Wellness* illustrates this truth. Complete wellness requires self-care and engagement with community. By serving self, one nurtures decompression and rejuvenation. By serving others, one feels connected to a greater purpose. *Wellness* explores this complex reality through one line of functional ware fired in an electric kiln to Cone 6 with controlled cooling cycles.

Thesis Statement

The combination of form, function, and complex glaze palate and surface will influence the users' emotions, and display the dynamic and interconnected relationship between personal self-care and engagement with community as a means to wellness.

Outline

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C. *Wellness*

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Chapter 1: Introduction

Stress and distress are parts of the human condition. As America attempts to move toward a more egalitarian society, there is increased attention paid to the concept of emotional and physical wellness. Political and scientific advances have increased economic and physical security. This space has allowed a cultural norm to develop – human beings deserve relief from inevitable stress and distress. How this sense of wellness is achieved varies from community to community and from person to person.

Sometimes the path to wellness is described as service to one's self. Individuals are empowered to find activities that provide respite, rest, and rejuvenation for them. Often these are pursuits specific to the individual's unique interests, personality, and history. One person may care for herself by spending time with friends or family, another may spend an evening alone reading a novel. One person may engage in creative expression, another may seek out natural beauty. One person may engage in physical exercise, and another may pursue a hobby. The goal is for individuals to remain grounded and connected to their genuine self as an antidote to the natural stresses of life.

Another common conception is that through service to others, an individual can become whole. Humans are a communal species. We have achieved incredible advancements by building civilizations and complex social systems. Isolation can be a direct line to depression and distress. Conversely, working to serve others can foster joy, wholeness, purpose, and connection. In totality, personal wellness is not a singular pursuit, but a combination of both internal and external efforts, both personal self-care and engagement with community.

Design matters, and well-crafted objects can contribute to or detract from individual and community wellness. This cannot be an exclusive pursuit. Some designers or aesthetes may have negative opinions about work crafted for the masses, but this is counter to the thesis.

Objects that aim to foster wellness must be attractive and discoverable to a wide audience. As Don Norman notes in his seminal work *Emotional Design*, when too many people like something, it can lose cache, but “We should stop to consider just why it is popular. People find value in it. It satisfies some basic need. Those who deride kitsch are looking at the wrong aspects.”¹

This does not mean the design should be dumb-downed or the process simplified. Rather, creating objects for a mass audience that contribute to individual and community wellness presents a particular design challenge. Throughout the production of this thesis, the premise of bridging was behind many decisions. The artist chose techniques, forms, colors, and processes that bridged between the exclusive world of fine art and the inclusive world of the broader populous.

The result is a line of work that is cohesive, approachable, functional, pleasing, and whole. The initial visceral reaction is positive due to the attractive color palate and gentle curves. The use of the objects is satisfactory due to the attention to details, specifically at transition points, and the overlapping functions of the collection. The final, reflective experience is one of personal satisfaction, connection, positive self-image, and lasting, pleasing memories.²

¹ Norman, *Emotional Design*, 46

² This conclusion aligns with Don Norman’s conception of three levels of visceral, behavioral, and reflective cognition.

Chapter 2: Artist's History and Background

Expression through art has always been a part of the artist's foundation. She was born in 1979 in the South Bronx to very young parents who grew up in poverty. They wanted to break free from that cycle, but had very few emotional or intellectual tools to do so easily. The home was a difficult place for the artist, and art became her escape. Clay became her primary medium during high school.

In the more than two decades since, she has been studying, teaching, and working with clay. The rhythm and process allows her to escape life's pressures and slip into a place of freedom and expression.

2002; Bachelors of Fine Arts

In 2002, she received a BFA in Studio Art and a Minor in Education from Alfred University in Alfred, New York. Under Professor Linda Sikora, the artist learned of the creative and technical rigor that was required to be a master potter. Professor Sikora spoke of the importance of history, and the tradition of passing knowledge from one generation of masters to the next generation of students. The apprenticeship models of previous eras and cultures struck the artist by how brutal the process could be. Apprentices would watch and clean for years before working with clay, then were pressured to create a multitude of pieces, only to see many destroyed by the master as sub-par work.

While the tactics at Alfred were less vicious, the expectations were just as high. The culture of critique was a sharp break from high school ceramics, where the artist's innate technical skill was unconditionally praised by laypeople. A conflict arose within the artist, who sometimes felt excluded for not knowing the expected language of academic art discussion. She continued to enjoy the process of creation, but struggled to connect how her relationship with a piece would affect other's relationship with the piece. She approached being a potter as a

mechanical endeavor, not one that created objects that could influence the user's life. She approached her work as a designer attempting to create beautiful compositions, but struggled to transform her two-dimensional designs into three-dimensional experiences. Innately she understood this required pushing the boundaries of technical skill, she just did not know what that meant. This conflict led to the essential question, what does it mean to be a ceramic artist?

These challenges did not dampen her love for the medium. The artist did improve her technical skills, continuously striving for better artisanship and new techniques. She learned to make her own clays, and became proficient in soda, salt, wood, and reduction firings, gravitating to salt firing and developing a soft spot for shino glazes. She understood the answer to the essential question lay in understanding how all the individual choices of which clay body, glaze recipe, construction technique, and countless other steps add up to create a unified work of art. She understood that the creative value of her art would be in the perceptual and sensory, tactile and visual experience of the user. While she did not find the answers at Alfred, she knew these were the right questions, and simply understanding them solidified her identity as a potter and set her on a course for further growth and discovery as an artist.

2002-Present; Public School Teacher

After graduation, the artist became a middle and high school studio art teacher for New York City Public Schools. In 2005, a goal was achieved when the artist became the ceramics instructor at Albemarle High School in central Virginia, where she continued to teach through the 2019 school year.

She focused most of her efforts in the first decade on building the school's ceramic program and increasing her pedagogical skills. This included creating and sustaining a system for attracting, enrolling, retaining, and supporting students engaged in the ceramic arts program,

resulting in tripled enrollment. To meet the needs of the increased population, she developed a studio with ten pottery wheels, two electric kilns, and a glaze-formulating table. This required implementing an expanded glaze palate, which she accompanied with a special topics unit on properties of glaze, involving the upper level students in choosing, mixing, and evaluating glaze results. Due to space, safety, time, efficiency, and public school budget, the student's work was fired exclusively in electric kilns.

Her teaching philosophy embraces the uniqueness of each student and calls on pedagogical fluidity and individual instruction. Everything is in service of helping students become educated and technically skilled artists. This starts by encouraging them to bring and explore their own ideas and creativity. The artist helps the student shape and give form to those ideas through the elements and principles of design, the foundation of the creative process in her classroom. The personal expression is then funneled through technical education. Students learn to control the clay, develop glazes, manipulate firings, and use tools effectively.

During these early years of teaching, the artist's own work continued to be exploration of functional forms, and investigating the possibilities of electric kilns. The artist appreciated the value and accessibility of electric kilns, and believed that the depth in glazes found in atmospheric work would need to be reconfigured. As the artist became more comfortable in her pedagogical expertise, she found her own artistic development had slowed. To model the value of lifelong learning, and to break free of limitations imposed by repetition, the artist explored creative and professional development outside of her classroom.

2008-Present; Continuing Ceramic Development

That question of what it takes for a potter to push the technical boundaries of her craft came up again in 2008 when the artist attended a workshop on altering thrown forms by Nick

Joerling at Piedmont Virginia Community College. The concept of altered forms was not new to the artist, but she had only seen brief, single technique demonstrations. Mr. Joerling took expertly thrown forms, and through a wide range of alteration techniques created a comprehensive, holistic line of work. Most striking was how the alterations created movement.

In 2012, she took a weeklong workshop on glaze formulation with John Britt. Mr. Britt's course was not just a refresher on things she had learned at Alfred; it helped her understand how controlling and manipulating glaze composition and materials could create a unique palate and surface texture in service of her vision and style. This workshop started a decade of study, practice, and testing of glaze recipes for electric and atmospheric firings. She sought a proprietary glaze that would be buttery to the touch, have a matte finish, and have a complex visual texture.

Despite several other quality workshops and conferences, there were still loose ends. The essential questions of what it means to be a potter, of how the individual choices and techniques come together to create an impactful experience for the user, remained unanswered. To take the next step on her journey to answer these questions, the artist enrolled in the Masters of Fine Arts in Ceramics program at Hood College in the summer of 2016.

2018; Storytelling in Transit

Opening in May of 2018 in the Hodson Gallery at Hood College, Storytelling in Transit was the culmination of a two-year journey exploring beyond the artist's strengths of functional, wheel thrown, electric kiln fired work. The show was a series of six wall-hung installations comprised of over 400 gas fired sculptural forms. The show was about emotions; about how one's history, choices, and feelings shape who they are.

The central installation, “Generations,” explored the connection and interaction of the fundamental emotions of despair, hope, and love (fig. 1). No one is immune from despair. It



Figure 1. "Generations," 2018.

festers and destroys through self-doubt, hunger, and pain. Hope and love are within. Hope fuels, grows, and fills. Love is what moves us. It is our matter, our physical selves. The artist describes how “Generations,” displayed these truths from her experience, “My childhood was filled with despair, much of which I inherited from my parents. In my adolescence, glimmers of opportunity, including finding my passion for creating, fostered seeds of hope. But love, both of others and of myself, was difficult. Now I am a mother, and while the poison of despair is still present, with each year its footprint is smaller and smaller. My hope for my children is a life filled with love.”

Complimenting “Generations” were instillations representing other emotional experiences titled “Tranquility,” “Impressionable,” “Longing,” “Nostalgic,” and “Exhilarated” (fig. 2, fig. 3, fig. 4, fig. 5, and fig. 6).



Figure 2. "Exhilarated," 2018.



Figure 3. "Longing," 2018.



Figure 4. "Nostalgic," 2018.



Figure 5. “Tranquility,” 2018.

To produce the scale necessary to display the power of emotions, the artist utilized slip casting, a technique outside of her typical repertoire. Two-part molds were made from wheel thrown pieces. Some forms were then altered to represent the various emotions (fig. 7).

The intricacy of color combinations was also essential. The artist was inspired by how colors found in nature can vary in color, tone, and texture, creating a rich palate (fig. 8). Base



Figure 6. "Impressionable," 2018

glaze recipes were tested, then altered to make the recipes required to fulfill the vision. This process and the exclusive use of atmospheric firing was also outside of the artist's typical work.

The result was an exhibit unlike anything created by the artist before, showcasing skill and abilities with the full range of possibilities in the ceramic arts. In preparation for this thesis, the artist decided that to display complete mastery, she would return to her

primary interests in wheel thrown, functional, electric fired pottery. Through these techniques she would push the boundaries of color and movement to develop work which displays her answers to the essential question asked at Alfred nearly twenty years before; how do the individual choices, techniques, moments, and materials come together to make unified art that creates a meaningful experience for the user?



Figure 7. Detail of altered forms used in "Storytelling in Transit" exhibition, 2018.



Figure 8. Surface texture and color variance detail on forms used in “Storytelling in Transit” exhibition, 2018.

Chapter 3: Glaze

Concept

Color and surface texture, possibly more than all other elements, shape the user's immediate reaction to an object. The artist believed the glaze palate was central to the thesis. Don Norman recognizes that affect and cognition are an essential duality integrated to form a person's information processing system. Emotional response assists in judgment. Humans' brain stems evolved to drive instantaneous processing regarding safety, pleasure, and biological needs. If one experiences fear, they pursue safety through instinctual responses like fight, flight, or freeze. In this emotional state, focus is heightened, and creativity is closed off. When one experiences positive emotions, cognition expands and the individual is open to new ideas and experiences, and is able to relax and engage in rewarding experiences.³

Don Norman notes that we are, "exquisitely tuned to receive powerful emotional signals from the environment that get interpreted automatically at the visceral level. Think peacocks, flowers, fruits."⁴ He catalogues things that our primitive brain stem pattern matches to identify as pleasing and positive. This list includes bright, saturated hues along with comfortably lit places, sweet tastes and smells, and smiling faces.⁵

These ideas are, to a degree, in contrast with classic pottery. Clay is terrestrial. Atmospheric firings tend to create natural, earthy tones that match and compliment the clay. The colors available to atmospheric firings are not traditionally attractive to a broader consumer audience. The artist's goal was to develop glazes that would bridge between the old and new worlds. She wanted some crystal growth in homage to atmospheric firing and the historical sense of ceramic work while bringing brighter colors to reference modern aesthetics. She sought colors that would engage and please a novice collector. However, while bright colors attract visceral attention, they must be centered and grounded to create a sense of safety and wellness.

Therefore, the artist needed to honor and exemplify the qualities of the clay through surface texture of earthy, stone qualities. She wanted surfaces that were multi-dimensional, with varied shades and tones. She also wanted texture through crystallization.

It was of great importance to build a bridge between techniques. Atmospheric firings require significant space, strength, time, help, and financial resources. The lifestyle of atmospheric firings is not representative of life of a working mother, like the artist. Instead, she endeavored to achieve the desired aesthetic through the cost- and time-effective tool of an electric kiln. She believed this commitment to premise in all aspects of the work would begin to address the central question; and create a complete emotional experience for the user.

The artist recalled conversations during her undergraduate studies about atmospheric firing creating a rich glaze palate in part because of how long cooling occurred, allowing crystals time to develop and deepen the qualities of the glaze surface. Originally, electric kilns had analog controls only allowing for low, medium, or high heat, limiting the user's control. The advent of digital control boards in the mid-1990s opened the door for more control with electric firings. At that time, the artist believed her life as a teacher in New York City would likely mean extensive use of electric kilns, and she set an ultimate goal of testing control cycles and developing glazes with more crystal development.

Also, Mason Stains were not commonly used in higher end ceramic art until more recently. Initially these stains were mostly used in lower firings and made flat boring colors. Consequently, they were ignored in the artist's undergraduate studies. She believes using them in this thesis is a way of engaging in change and development, of pushing forward and not remaining stagnant, all central tenants to wellness.

To create unique glazes that met the conceptual goals of bridging old and new world pottery aesthetics and techniques, while pushing her craft forward, and developing work which is viscerally engaging to a wide audience, the artist conducted research. Base recipes were explored to identify materials most likely to create crystal formation and interesting surface texture. Cooling cycles were robustly tested to test the hypotheses and identify the most impactful cycle. Specific recipes were tried with and without general colorants to identify a final selection. Finally, colorants were tested in a range of ways to find the hues and colors desired. This was all in service of creating textured, satiny, pastel in color glaze surfaces, with depth, development, and complexity.

Research

Cone 6 Oxidation: Glaze Materials Preliminary Tests

Base materials upon which to build final glazes were to be identified. A quadraxial blend

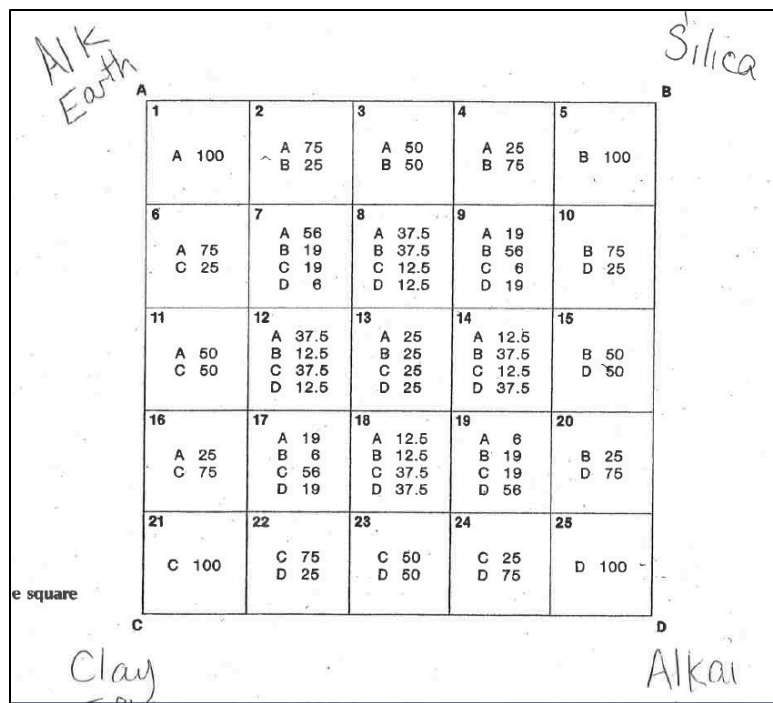


Figure 9. Quadraxial blend diagram, common use.

diagram was used to learn more about how glaze materials react with one another to find a suitable formula for a basic glaze recipe (fig. 9). Twenty-five samples representing the percentages in the diagram were developed.

After reviewing initial results by colleagues conducting similar research, it was clear to the artist that recipes from the outer

ring of the diagram would not be usable. This left only nine possible selection. Additional review of others' results suggested a potential positive outcome with Dolomite, Ferro Frit 3134, Silica, and Tile 6, the four materials initially considered by the artist. She was interested in crystal formations and a satiny finish, with the goal of finding a finish that could pass as a “skin” for an organic sculpture.

The artist believed alkaline earth metals had great potential, and wanted to see what would happen if she went beyond only four ingredients. A new mixing chart was required to explore the interactions of six materials. Based on publicly available six variable diagrams the artist developed figure 10. This approach would bring new information and provide more

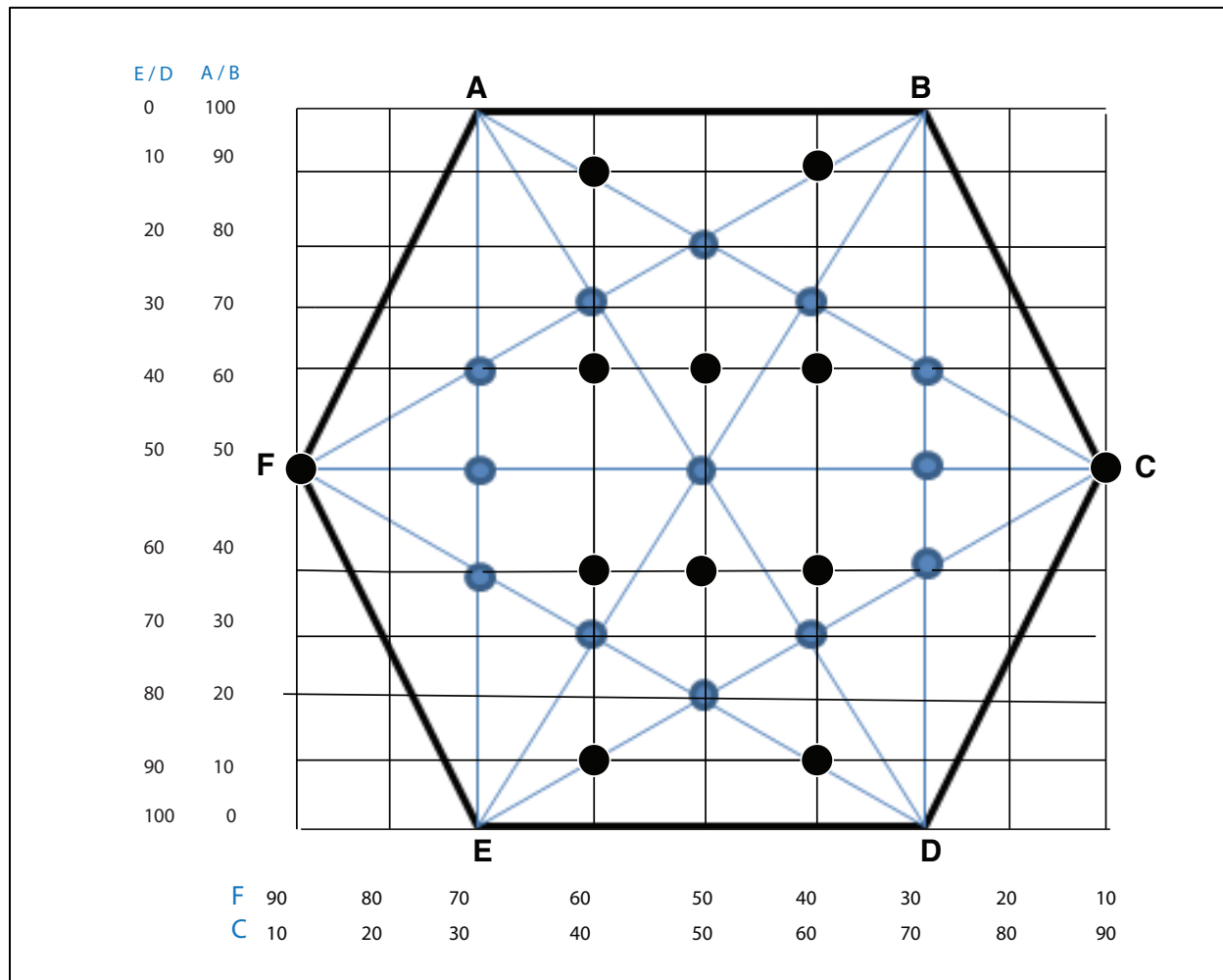


Figure 10. Six variable diagram for blending six material glazes, developed by the artist.

choices when deciding which of the twenty-five samples would be the base for the final glaze formula. The artist chose Dolomite, Silica 325, Strontium Carbonate, Frit 3134, EPK, and Barium Carbonate.

Figure 11 shows the percentages per sample, with each letter corresponding to a different ingredient. Figure 12 and figure 13 display the layout of sample glazes before and after being applied to test cups.

	A = 90 D = 10 B = 90 E = 10 C = 40 F = 60		A = 90 D = 10 B = 90 E = 10 C = 60 F = 40	
		A = 80 D = 20 B = 80 E = 20 C = 50 F = 50		
	A = 70 D = 30 B = 70 E = 30 C = 40 F = 60		A = 70 D = 30 B = 70 E = 30 C = 60 F = 40	
A = 60 D = 40 B = 60 E = 40 C = 30 F = 70	A = 60 D = 40 B = 60 E = 40 C = 40 F = 60	A = 60 D = 40 B = 60 E = 40 C = 50 F = 50	A = 60 D = 40 B = 60 E = 40 C = 60 F = 40	A = 60 D = 40 B = 60 E = 40 C = 70 F = 30
A = 50 D = 50 B = 50 E = 50 C = 10 F = 90	A = 50 D = 50 B = 50 E = 50 C = 30 F = 70	A = 50 D = 50 B = 50 E = 50 C = 50 F = 50	A = 50 D = 50 B = 50 E = 50 C = 70 F = 30	A = 50 D = 50 B = 50 E = 50 C = 90 F = 10
A = 40 D = 60 B = 40 E = 60 C = 30 F = 70	A = 40 D = 60 B = 40 E = 60 C = 40 F = 60	A = 40 D = 60 B = 40 E = 60 C = 50 F = 50	A = 40 D = 60 B = 40 E = 60 C = 60 F = 40	A = 40 D = 60 B = 40 E = 60 C = 70 F = 30
	A = 30 D = 70 B = 30 E = 70 C = 40 F = 60		A = 30 D = 70 B = 30 E = 70 C = 60 F = 40	
		A = 20 D = 80 B = 20 E = 80 C = 50 F = 50		
	A = 10 D = 90 B = 10 E = 90 C = 40 F = 60		A = 10 D = 90 B = 10 E = 90 C = 60 F = 40	

Figure 11. Six variable blend chart with percentages, developed by the artist.



Figure 12. Layout of glazes.



Figure 13. Layout of glazes.

After studying the test samples, the artist narrowed the twenty-five samples down to four. Sample one was chosen for its crackling properties (fig. 14). The frosted look was also attractive. Sample twelve was chosen because of how the glaze pooled at the bottom of the dish, reminiscent of scar tissue from a heavy burn, which may enhance and provide depth and interest to a curvaceous form (fig. 15). Sample twenty-two was chosen because of similar frosting and scarring found in one and twelve (fig. 16). Sample twenty-four was chosen because of the



Figure 14.



Figure 15.



Figure 16.



Figure 17.

crystal formation that occurred on the wall where the glaze thickened (fig. 17). The artist ultimately made the glaze thicker than the test in order to get the reaction throughout.

Four additive tests were conducted with each of the four base recipes. Test one was with 2.5 grams of Vanadium Stain 6404 and 0.5 grams of Crimson, with the hope being melon. Test two was with 2.5 grams of Vanadium Stain 6404, 0.5 grams of Crimson, and 1.5 grams of Titanium Dioxide. The artist believed that if the orange in test one and was too harsh, the titanium dioxide would soften the color. Test three was with two grams of Spanish RIO, 2 grams of Praseodymium Stain 6450, 1.5 grams of Tin-1.5, and 3 grams of Titanium.⁶ Test four was with three grams of Cobalt Carbonate. The artist had seen a similar test confirming that cobalt could react with dolomite colorant to achieve a nice purple color. She was hoping for a similar result.

While the additive tests reacted similarly with all four base recipes, the original hypotheses were disproven. Test one generated a tan/pale yellow tone, not light orange. The titanium dioxide in test two shifted the color to a light green. Test three was inconclusive

because the tin oxide was not blended well enough. Test four gave the true blue color it is known for, without any glimpses of purples.

Ultimately, the artist was most satisfied with base recipe twenty-four. Through the colorant tests, she continued to get the surface quality desired (fig. 18). She especially enjoyed



Figure 18. Sample Twenty-Four with colorants on porcelainous stoneware and porcelain.

how colorant test one and test two looked when overlapped (fig. 19). The artist decided to move

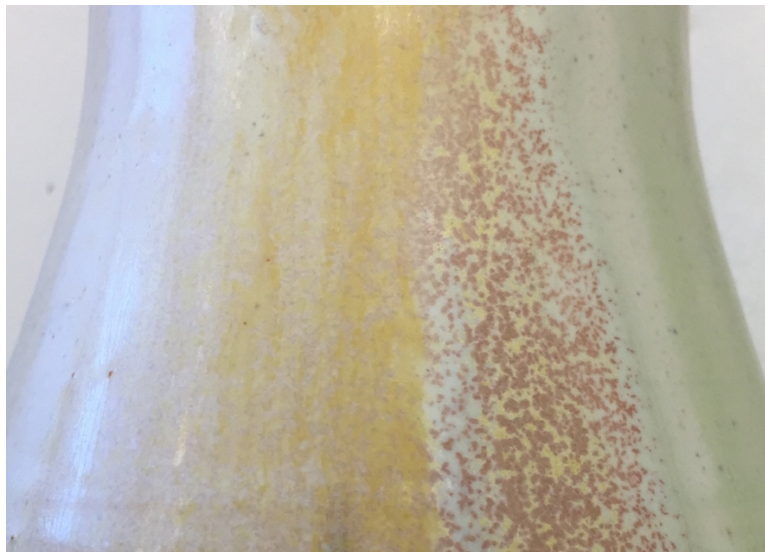


Figure 19. Detail of sample Twenty-Four with colorant overlap.

forward with this base recipe, which was 3.3% Dolomite, 3.3% Silica 325, 13.3%, Strontium, 30% Frit 3134, 30% EPK, and 20% Barium Carbonate. Figure 20 shows interior and exterior details of further tests revealing the possibilities of this base recipe.



Figure 20. Interior and exterior detail of sample Twenty-Four on final test piece.

Cone 6 Oxidation: Four Cooling Cycles Preliminary Tests

After identifying base glaze materials, the artist next explored the impacts of controlled cooling cycles. She reviewed the limited published research, which provided some inspiration and direction. As noted, the artist was seeking to develop a textured, satiny surface. Standard cooling of an electric firing cycle could inhibit this goal, but a slowly cooled cycle could allow time for crystals to form, creating a matte appearance.⁷

Marians explored how iron-rich glazes reacted with controlled cooling cycles and achieved fascinatingly diverse results. Her results with the same glaze recipe exposed to a range of cycles varied from, “a glossy black surface, a densely textured rough surface, a golden red/mud color, or anything in between.”⁸ The article provides a helpful metaphor of sugar in hot tea – the hotter the tea, the more sugar that dissolves. As the temperature cools, different

compounds, iron in her research, precipitate. However, by holding the temperature at various points:

The iron crystals cannot precipitate [completely] and sink to the bottom of the glaze, nor can they grow very large, as the iron ions do not congregate in the same location. Instead, as the glaze cools, the dissolved iron separates out, forming numerous small crystals suspended in the glaze. The number of particles, and their eventual size, is affected by the surface texture of the underlying clay body, the cooling speed of the melt, the thickness of the glaze application and several other factors. The competition between the number and size of particles as the glaze cools results in the variety of desirable effects.⁹

Marians illustrates how holding the cooling cycle at different temperatures can create different effects. Holding at a higher temperature may generate a matte surface, while holding at a lower temperature may create conditions for greater crystal growth and a more varied surface.¹⁰ In addition to holding temperature at times, slowing cooling to under 150 degrees Fahrenheit per hour can also influence crystal growth and surface variance.¹¹

Despite consistent documentation of the concept, the limited volume of research is a problem. Given all of the variables in any set of work, the artist was required to conduct extensive testing to find how her unique base recipe reacted with various clay bodies, colorants and final glaze recipes, and other unknown variables. Focusing on the two approaches tried by Marian, holding at set temperatures and slowing the rate of cooling,¹² the artist developed the firing cycles shown in figure 21.

Testing the cooling was only part of the equation required for developing the right glaze palate for the thesis. Building upon the findings noted above in preliminary testing of glaze materials and the original tests done to formulate her own glaze, the artist went through multiple sources and collected thirty base glaze recipes with materials that could contribute to crystal growth. These recipes are listed in the appendix at the end of this chapter. Finally, the artist wanted to investigate how different colorants would react with the glaze recipes and cooling

cycles. To do this, she made three versions of each recipe; a base sample, a base sample with 2% Copper Carbonate added, and a base sample with 5% Rutile and 4% RIO added.

The ninety samples went through five test firings, a control with the kiln's automatic program, and four different controlled cooling cycles. Due to the scale of the testing, the artist

Firing Cycles-2018 MFA Research

Cycle A	
Slow Glaze	Cone 6

Cycle B	
Segment 1	100°/hr.→200°F
Segment 2	375°/hr.→1950°F
Segment 3	100°/hr.→2232°F
Segment 4	150°/hr.→1700°F

Cycle C		
Segment 1	100°/hr.→200°F	Hold 1hr. if glazed the same day
Segment 2	375°/hr.→1950°F	
Segment 3	150°/hr.→2232°F	Hold 15 minutes
Segment 4	9999°/hr.→1900°F	
Segment 5	150°/hr.→1500°F	

Cycle D		
Segment 1	100°/hr.→200°F	
Segment 2	375°/hr.→1950°F	
Segment 3	100°/hr.→2232°F	
Segment 4	9999°/hr.→1750°F	
Segment 5	50°/hr.→1600°F	Hold 1 hour
Segment 6	50°/hr.→1500°F	

Cycle E		
Segment 1	100°/hr.→200°F	
Segment 2	375°/hr.→1950°F	
Segment 3	100°/hr.→2232°F	
Segment 4	50°/hr.→2100°F	
Segment 5	9999°/hr.→1700°F	Hold 1 hour
Segment 6	25°/hr.→1600°F	

Figure 21. Firing cycle chart with control and four cooling cycle variations, developed by the artist.

recruited help with the process of mixing the glazes, then dipping and labeling test tiles. To facilitate this, she created two handouts (fig. 22, fig. 23 and fig. 24).

Handout 1		
Name _____ Glaze Name and # Assigned _____		
<u>Day 1</u>		
Need for Mixing:		
<ul style="list-style-type: none"> • 30 test tiles: 15 white tiles and 15 pink tiles (wipe down with wet sponge) • Squeeze bottle with under glaze (to label tiles) (Or Iron red oxide wash in small cup and paint brush if out of squeeze bottles) • Masks • Gloves • Aprons • Bucket with lid. • Marker • 4 solo cups • Electric scales • Hand blender • 1 yellow bucket and small sponge per table (fill half way with water) 		
<hr/> <ol style="list-style-type: none"> 1. Wipe down 30 test tiles with a wet sponge 2. Each individual will receive a glaze number. This glaze number will go in place of # below. 3. Label white tiles (15 total) with the squeeze bottle as follows: 		
A#	A#x	A#y
B#	B#x	B#y
C#	C#x	C#y
D#	D#x	D#y
E#	E#x	E#y
<p>For our purposes when labeling tiles:</p> <p>A, B, C, D, or E = Type of Firing Cycle</p> <p>#1-#30 = Glaze Recipe</p> <p>x, y = Colorants added</p>		

Figure 22. Page one of Handout One for glazing and labeling test tiles for glaze recipe, colorant, and cooling cycle testing, developed by the artist.

Handout 1, Continued		
1.	Label pink tiles (15 total) following the same chart above.	
2.	Label 3 cups with a marker as follows:	
	#	#x #y
3.	Add 900 grams of clean water to the bucket of glaze materials (About 2 solo cups worth).	
4.	Mix with blender for 1-minute minimum. Make sure all clumps are out.	
 <u>Day 2</u>		
5.	Hand mix bucket. Dip finger in glaze. If the glaze looks like skim milk, call me over to add Epsom Salt solution. If it is way too thick call me over to thin it out.	
6.	Divide into three equal parts into 3 solo cups.	
7.	Weigh out glaze, make sure to tare out the weight of the cup and that the measurements are only off by about 0.5g	
8.	How much does each cup weigh? _____	
9.	Pour and weigh out 100mL of the glaze in a graduated cylinder.	
10.	How much does 100mL weigh? _____	
11.	Cup # is finished, put aside.	
12.	Cup #x needs 6.6 grams of copper carbonate. (2%)	
13.	Cup #y needs <u>16.6g of rutile</u> (5%) and <u>13.3g of red iron oxide</u> (4%).	

Figure 23. Page two of Handout One for glazing and labeling test tiles for glaze recipe, colorant, and cooling cycle testing, developed by the artist.

About nine hundred tiles were glazed and labeled. The first step was to evaluate the impact of the various cooling cycles. Cycle A was used as the control and ran on the kiln's generic Slow Glaze Δ6 program. It has been argued that the most action in glaze development happens between 1900 and 1500 degrees Fahrenheit.¹³ Cycle B reached 2232°F and immediately began cooling slowly allowing the temperature to drop at 150°F per hour until the kiln hit 1700°F and then shut off. While differences were seen when comparing tiles from Cycle A and B,

Handout 2

Mixing Glazes

Need for Mixing:

- 2 individuals
- 30 test tiles: 15 white tiles and 15 pink tiles (wipe down with wet sponge)
- Squeeze bottle with under glaze (to label tiles)
- Gloves
- Bucket with lid
- 3 solo cups (Matching number on your bucket)
- 3 plastic forks for stirring
- 1 yellow bucket and 2 small sponge per table (fill half way with water)

1. Wipe down test tiles with a wet sponge
2. Each group will receive a glaze number. This glaze number will go in place of “#” below.
3. Label white or pink tiles (15 total) as follows:

A#	A#x	A#y
B#	B#x	B#y
C#	C#x	C#y
D#	D#x	D#y
E#	E#x	E#y

For our purposes when labeling tiles:

A, B, C, D, or E = Type of Firing Cycle

#1-#30 = Glaze Recipe

x, y = Colorants added

4. Pair up tiles with their designated cup.
5. Each tile will be dipped 3 different times. Follow drawing on board.
6. Your group should have 10 tiles to dip in each cup.
7. After all tiles are finished, place in kiln room for firing.
8. Combine the 3 cups of glaze into the bucket, cover with lid and place on long table.
9. Throw away cups and forks.
10. Hand in paperwork if I asked you to take any notes down for my records.
11. Clean Up.

Figure 24. Handout Two for glazing and labeling test tiles for glaze recipe, colorant, and cooling cycle testing, developed by the artist.

Cycle B tests were inconclusive because the kiln errored out while the artist was out of the

building leaving questions as to what temperature the kiln actually failed at. Cycle C took a similar approach to Cycle B. In this cycle, the kiln was programmed to crash cool until it hit 1900°F and then cooled at a controlled 150°F per hour until reaching 1500°F. This approach was the most successful. It is important to note, however, that the overall effect was more muted than anticipated. Further testing is likely to produce outcomes that are even more provocative.

Next, the artist looked more closely at the test tiles from Cycle C in order to choose a few recipes for further testing. She chose Mackersie's Copper, VC Pam Fredericks, and Frosty White. Mackersie's Copper was chosen for its matte finish and variation in final look based on the thickness of glaze (fig. 25). It also showed great promise for crystal growth in a cooling cycle. VC Pam Fredericks was nice to the touch and rich in color, showing warm earthy tones

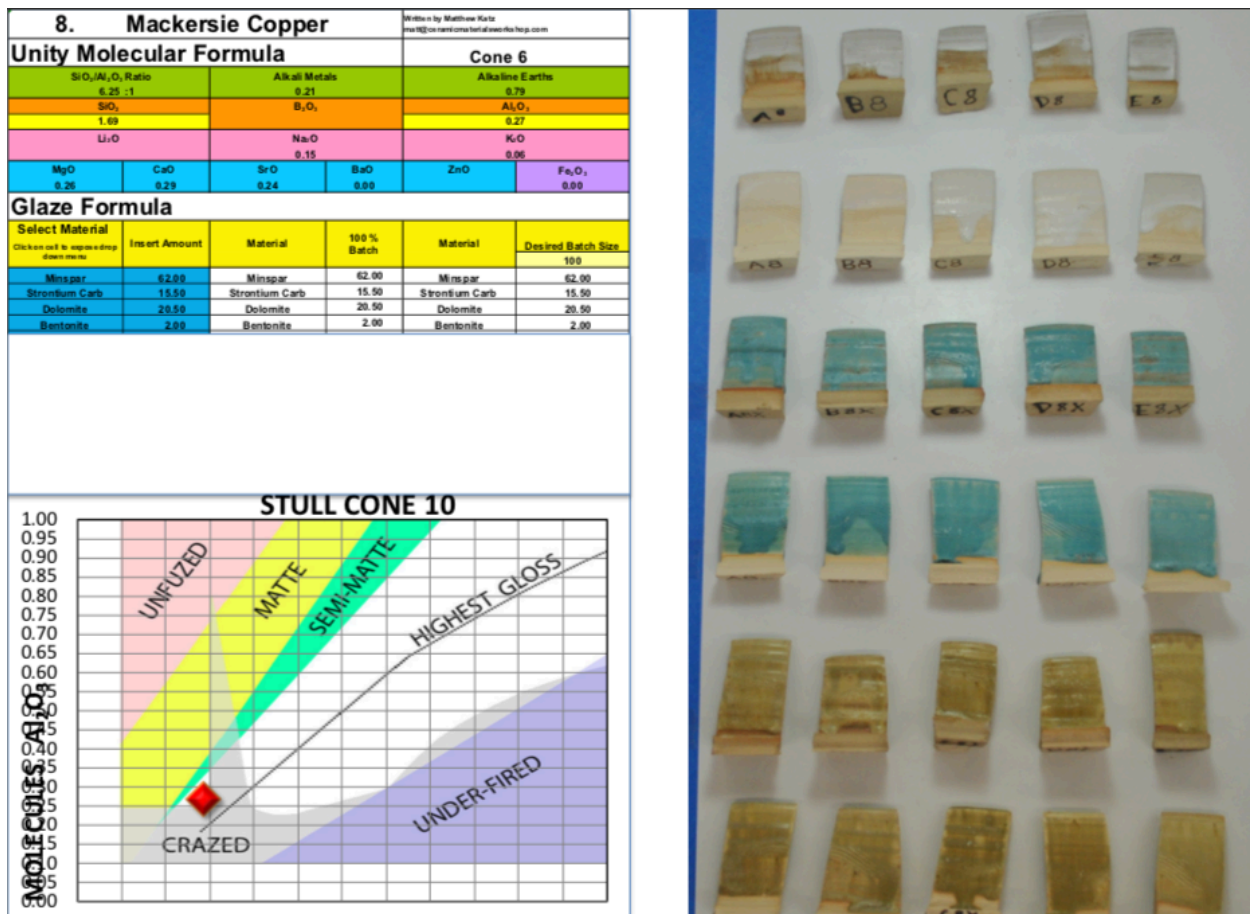


Figure 25. Glaze and Unity Molecular formulas and tile details of Mackersie Copper test. Formulas developed by Matt Katz and used with permission.

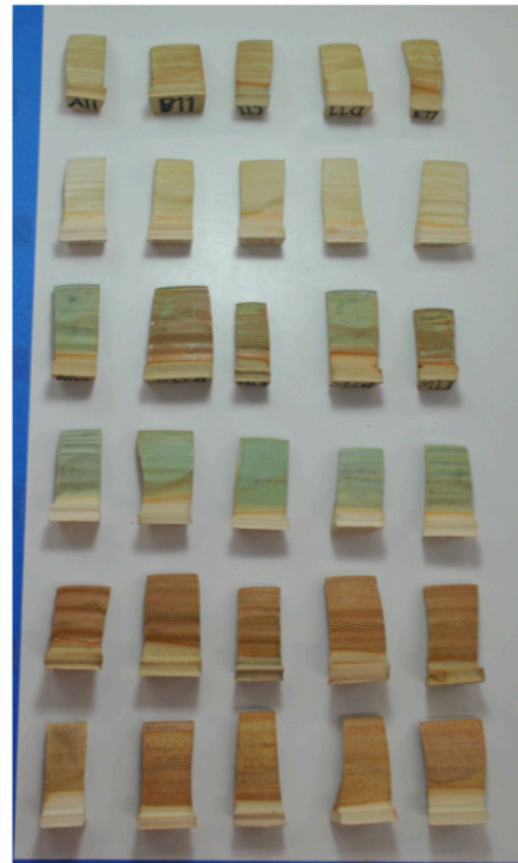
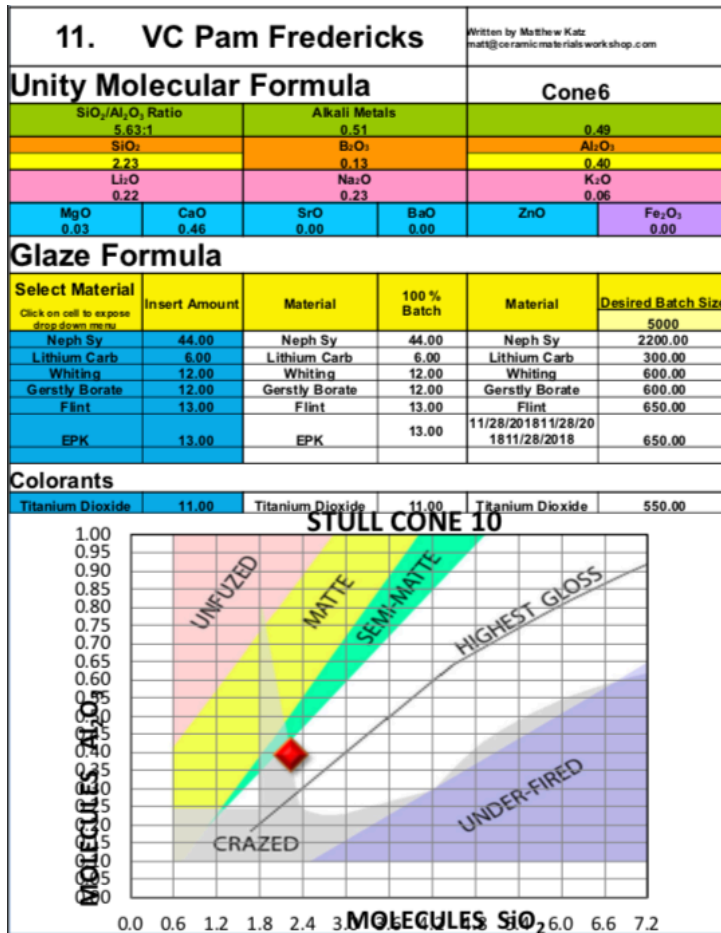


Figure 26. Glaze and Unity Molecular formulas and tile details of Pam Fredericks test. Formulas developed by Matt Katz and used with permission.

(fig. 26). It was dynamic, blending well when looked at from afar and showing a complex surface when observed closely. There was also slight variation in the glaze where it broke on the surface. Frosty White had a very nice satin finish, was very bright in color and showed a great variation of color and texture on the test tile surface (fig. 27).

Secondary Testing

Arresting colors and complex surface texture were the twin goals of the artist's glaze research. She focused all efforts up to this stage on developing the surface. Next, she turned her attention to color, wanting a colorful pastel palette with violets, pinks, blues, and greens. She chose to test Mason Stains in different percentages to get intense colors

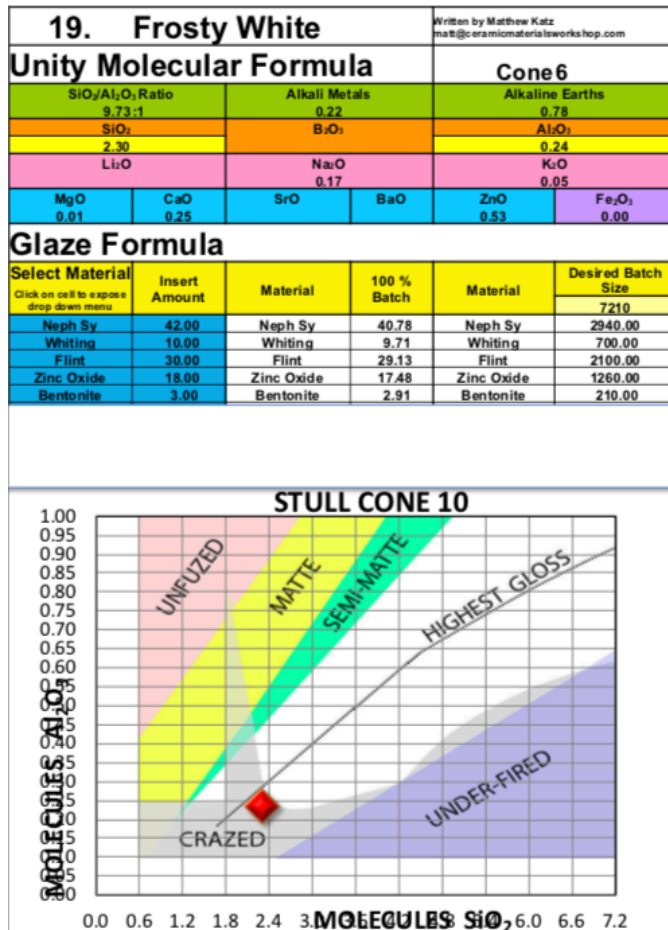


Figure 27. Glaze and Unity Molecular formulas and tile details of Frosty White test. Formulas developed by Matt Katz and used with permission.

while still keeping the surface characteristics developed during preliminary testing. For each of the three glazes chosen, tests using the line blend method explored various Mason Stain colorants at 1, 3, and 5%.¹⁴ Thirty-six variations were applied to both stoneware and porcelainous stoneware, resulting in seventy-two test tiles.

There was a lot of hope for VC Pam Fredericks to be successful. Unfortunately, the glaze completely rejected all Mason Stains and only gave different shades of brown. This round of testing was so unsuccessful the artist abandoned the recipe.

With Frosty White the Mason Stains showed through and stayed fairly consistent with the color they should be. The artist liked these results, but was sad to see that all the variation in

visual texture and color seen in the first test was due to quick mixing in original testing. In this round of testing glazes were mixed appropriately and put through 100 mesh screens before application. When taking this step, the glaze became very flat and had little visual complexity. While the satin finish and color results were positive, the recipe fell short of the project's ultimately objectives, and was dropped.

Ultimately, she chose Mackersie's Copper for its many wonderful qualities. It allowed Mason Stains to show off their color and vibrancy, crystal growth showed up during a regular firing and even more so when slow cooled. There is a large spectrum of complexity in visual texture based on the thickness of the glaze (fig 28).

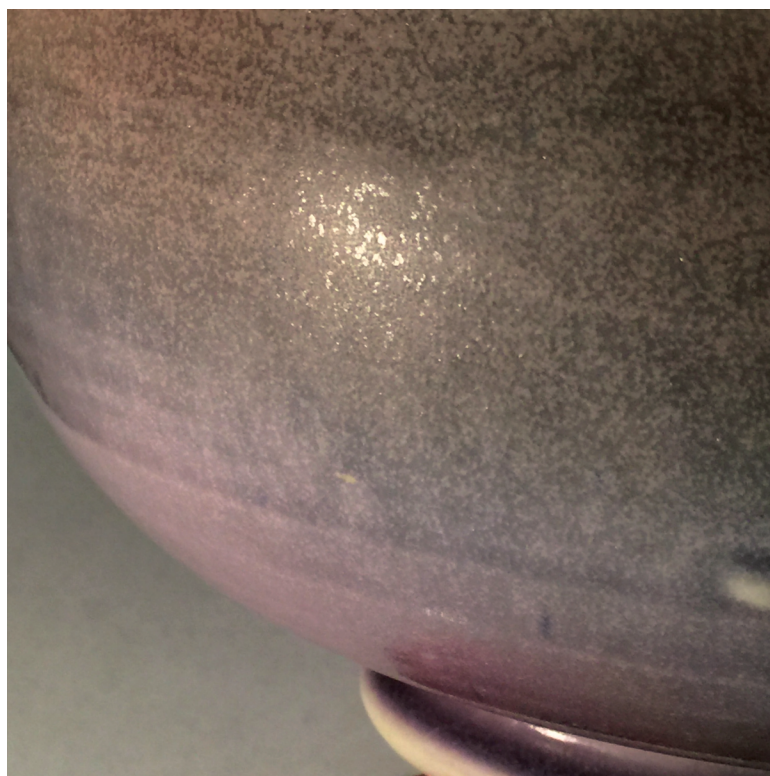


Figure 28. Final glaze surface detail

The research and testing was finally completed with another round of line blend method on Mackersie's Copper with different colorants to finalize a palette that gives a feeling of calm and sensuality.¹⁵ The artist knew that if colors were too intense, they glaze would flatten out, so proper percentages was important. She mixed one, three, and five percent of a dozen different Mason Stains,

including a range of purples, orange, pink, greens, manganese, and cobalt carbonate. The final selections were six prominent shades for overall body coverage and two shades used for

highlighting and shadowing. Makersie's Copper was used only on the outside of the ware and was sprayed on. A liner glaze was used to compliment in the inside.

Conclusions

The review of literature, multiple rounds of testing, and hundreds upon hundreds of test tiles produced the desired result. The artist concluded that with careful selection of materials and controlled processes, old assumptions could be overcome. While the impact of cooling cycles was not as dramatic as the artist had hoped, the effect was powerful, and there is potential for more investigation and experimentation to increase the range of results found in common electric kilns. Similarly, bright colorants can be controlled and manipulated to provide complex surfaces and attractive colors. Through countless hours of work, the artist proved her original assumptions, and achieved her goal of creating textured, satiny, pastel in color glaze surfaces, with depth, development, and complexity (fig. 29).



Figure 29. Teapot, creamer, and sugar bowl, "Wellness"

Outcomes

The palate of bright hues will immediately attract the viewer, creating a positive visceral response (fig. 30, fig. 31, and fig. 32). The complex surfaces and texture will engage the user, and create positive emotion, thereby expanding the individual's creativity, peace, and cognitive consciousness.¹⁶ These impacts open up the space in the person or group to fully engage in the activity. This engagement is key to the ultimately experience in the moment and reflection on the experience afterwards. Complete engagement is important in the small individual moments during one's day, and during larger collective events with others. Beyond the impact of the beauty created by the glaze, the palate and surface will open up possibilities for rich experiences that can further individual and communal wellness. The form and function of the individual pieces will achieve these possibilities.



Figure 30. Series of bowls, "Wellness"



Figure 31. Serving dish, "Wellness"



Figure 32. Pitcher and cup, "Wellness"

Appendix

VC Ellens Halloween		
Potash Feldspar: Custer*	53	
Barium Carbonate	16	
Whiting*	22	
Grolleg Kaolin (Eng-China)	9	
-----	-----	-----
Total	100	
3 cups @ 625.5g each 100mL= 148g Added 2 tsp. of Epsom salt/water mix Score: (CA) 3		

Creamy Base		
Nepheline Syenite	24	
Whiting	4	
Gerstley Borate	12	
Dolomite	11	
Silica	40	
Grolleg Kaolin (Eng-China)	7	
Zinc Oxide	2	
-----	-----	-----
Total	100	
3 cups @ 619.g each 100mL= 142.4g Score: (CA) 3		

Stront Crystal-Cool ¹⁷		
Potash Feldspar: Custer*	22.5	
Nepheline Syenite	22.5	
Strontium Carbonate	12.4	
Lithium Carbonate	5.7	
Ferro Frit 3124	5.7	
Whiting*	16.8	
Kaolin* (EPK)	14.4	
Titanium Dioxide	13.5	
-----	-----	-----
Total	100	
3 cups @ 687.9g each 100mL= 149.6g Added 2 tsp. of Epsom salt/water mix Score: (CA) 3		

Tom Coleman-crystal matte		
Potash Feldspar: Custer*	37	
Strontium Carbonate	13	
Lithium Carbonate	4	
Whiting	14	
Gerstley Borate	6	
Kaolin* (EPK)	11.5	
Titanium Dioxide	14	
-----	-----	-----
Total	100	
Score: (CA) 1.5– Nice reaction to colorants and rutile		

Heino-Render Satin Matte ¹⁸		
Potash Feldspar: Custer*	30	
Nepheline Syenite	20	
Whiting	17	
Gerstley Borate	4	
Silica	5	
Grolleg Kaolin (Eng-China)	14	
Zinc Oxide	9	
Bentonite	2	
-----	-----	-----
Total	100	
3 cups @ 654.8g each 100mL= 141g Added 100g water making 1:1 ratio Score: (CA) 2.5		

Helen Mackersie Matte		
Nepheline Syenite	50	
Spodumene	13	
Strontium Carbonate	22	
Lithium Carbonate	2	
Silica	7	
Kaolin* (EPK)	6	
-----	-----	-----
Total	100	
Titanium Dioxide	10	
3 cups @ 673g each 100mL= 152g Added 3 tsp. of Epsom salt/water mix Score: (CA) 2 Chalky look and feel		

Pewter - Katie Anders		
Nepheline Syenite	25	
Whiting	17	
Dolomite	8	
Silica	17	
Tennessee Ball Clay	33	
-----	-----	----
Total	100	
3 cups @ 602.4g each 100mL= 171.5g Score: (CA) 3 Recipe needs tweaking		

Mackersie Copper ¹⁹		
Minspar (Soda Feldspar)	62	
Strontium Carbonate	15.5	
Dolomite	20.5	
Bentonite	2	
-----	-----	----
Total	100	
3 cups @ 629g each 100mL= 145.2g Added 2 tsp. of Epsom salt/water mix Glaze hard-panned; first test tiles were runny. Might need a third tsp. of Epsom salt /water mix. Score: (CA) 2.5		

VC 71 ²⁰		
Potash Feldspar: Custer*	40	
Talc	9	
Ferro Frit 3124	9	
Whiting*	16	
Silica*	16	
Kaolin* (EPK)	10	
-----	-----	----
Total	100	
3 cups @ 629.5g each 100mL= 144.1g Added 2 tsp. of Epsom salt/water mix - D9x, D9x, E9x, E9x, B9x second dip in the wrong cup. Score: (CA) 5 – Fits better on a pure ^6 clay body. Looks good @ 1 dip.		

VC "D" ²¹		
Soda Feldspar: Minspar	51	
Whiting*	19	
Silica*	6	
Kaolin* (EPK)	15	
Zinc oxide	9	
-----	-----	-----
Total	100	
3 cups @ 394.9g each 100mL = 95.4g Added 1 tsp. of Epsom salt/water mix Score: (CA) 1 – Love on ellen buff, great base, didn't like the addition of rutile.		

VC Pam Fredericks ²²		
Nepheline Syenite	44	
Lithium Carbonate	6	
Whiting	12	
Gerstley Borate*	12	
Silica	13	
Kaolin (EPK)	13	
-----	-----	-----
Total	100	
Titanium Dioxide	11	
3 cups @ 665.5g each 100mL = 148.5g Added 1 tsp. of Epsom salt/water mix Score: (CA) 1 – Soft and nice to touch, also holds texture well. Definite trial for final glaze.		

Toubes Blue-Green Matte ²³		
Potash Feldspar: Custer*	10	
Whiting*	45	
Grolleg Kaolin (Eng-China)	45	
-----	-----	-----
Total	100	
3 cups @ 568.4g each 100mL = 145g Score: (CA) 5 – Needs a retrial. Something went terribly wrong.		

Stiff Transparent ²⁴		
Nepheline Syenite	30	
Ferro Frit 3124	10	
Dolomite	10	
Silica	35	
OM4 Ball Clay	10	
Zinc Oxide	5	
-----	-----	-----
Total	100	
Bentonite	3	
3 cups @ 630.7g each 100mL= 146g Score: (CA) 5 – Class favorite, shiny, transparent and creamy at the same time.		

MC 18 ²⁵		
Nepheline Syenite	51.9	
Barium Carbonate	10.4	
Lithium Carbonate	2.6	
Whiting*	23.4	
Kaolin* (EPK)	11.7	
-----	-----	-----
Total	100	
Tin Oxide	8	
3 cups @ 730g each 100mL= 154.4g Added 1 tsp. of Epsom salt/water mix Score: (CA) 4 – Worth looking at. A lot of texture but very runny. Needs a lot of testing.		

MC 19A ²⁶		
Ferro Frit 3110	20	
Whiting*	20	
Silica*	36	
Zinc oxide	20	
Bentonite	4	
-----	-----	-----
Total	100	
3 cups @ 628.6g each 100mL= 147.2g Took measurements and then added 100g water to thin it out. 1:1 ratio Score: (CA) 1 – Seems stable and shows crystal growth. Lovely with Copper Carb.		

MC 51 ²⁷		
Soda Feldspar: Minspar	61.9	
Barium Carbonate	15.5	
Dolomite	20.6	
Bentonite	2	
-----	-----	-----
Total	100	
Zircopax	8	
3 cups @ 620.3g each 100mL= 145.6g Added 2 tsp. of Epsom salt/water mix Score: (CA) 2.5 Maybe a good glaze for a different project.		

B14: R-1000 ²⁸		
Nepheline Syenite*	38.8	
Strontium Carbonate	15.3	
Wollastonite	15.3	
Gerstley Borate*	10.2	
Silica*	10.2	
Kaolin* (EPK)	10.2	
-----	-----	-----
Total	100	
3 cups @ 619.5g each 100mL= 145.3g Score: (CA) 3 eh.		

B13B: R.S. Matte ²⁹		
Nepheline Syenite*	60	
Strontium Carbonate	22	
Lithium Carbonate	5	
Silica*	5	
OM4 Ball Clay	8	
-----	-----	-----
Total	100	
3 cups @ 629.6g each 100mL= 145.3g Added 3 tsp. of Epsom salt/water mix Score: (CA) 2.25		

74 Frosty White ³⁰		
Nepheline Syenite*	42	
Whiting*	10	
Silica*	30	
Zinc oxide	18	
-----	-----	-----
Total	100	
Bentonite	3	
3 cups @ 628.2g each 100mL= 147.2g Added 2 tsp. of Epsom salt/water mix Score: (CA) 2 Buttery look.		

90 Frosty Matte ³¹		
Nepheline Syenite*	40	
Barium Carbonate	25	
Wollastonite	15	
Silica*	5	
Red Art	15	
-----	-----	-----
Total	100	
3 cups @ 630.9g each 100mL= 185.6g ???? Added 2 tsp. of Epsom salt/water mix Score: (CA) 3 – Starts forming crystals but forgettable		

121 White Crystal Base ³²		
Ferro Frit 3134	40	
Silica*	25	
Zinc oxide	25	
Titanium Dioxide	6	
Bentonite	4	
-----	-----	-----
Total	100	
3 cups @ 626.9g each 100mL= 174.8g X's and y's got switched by accident Score: 2 – showing crystalline growth		

122 Crystal Base ³³		
Lithium Carbonate	10	
Whiting*	5	
Silica*	37	
OM4 Ball Clay	20	
Zinc oxide	20	
Titanium Dioxide	8	
-----	-----	-----
Total	100	
3 cups @ 633.7g each 100mL= 150.3g Score: 1 – Possibly an electric firing version of Cone 10 R of Recipe C		

189 Revised SSWC ³⁴		
Potash Feldspar: Custer*	54	
Nepheline Syenite*	4	
Whiting*	16	
Silica*	4	
Grolleg Kaolin (Eng-China)	12	
OM4 Ball Clay	6	
Zinc oxide	4	
-----	-----	-----
Total	100	
3 cups @ 646.3g each 100mL= 142.9g Score: 4 – Satin and Dull		

222 Green Tan Crystal Glaze ³⁵		
Nepheline Syenite*	75	
Whiting*	4	
Dolomite	5	
Silica*	10	
Zinc oxide	2	
Bentonite	4	
-----	-----	-----
Total	100	
Score: 2.5 - Buttery when thin		

Smooth, Speckle		
Soda Feldspar: Minspar	43	
Talc	4	
Barium Carbonate	10	
Whiting*	5	
Silica*	20	
Grolleg Kaolin (Eng-China)	7	
Old Hickory Ball Clay	5	
Zinc oxide	6	
-----	-----	-----
Total	100	
Nickel Oxide	1	
3 cups @ 625.4g each 100mL= g Added 1 tsp. of Epsom salt/water mix Score: 4 – Satin		

Crystal Milky		
Soda Feldspar: Minspar	32	
Cornwall Stone	20	
Barium Carbonate	22	
Whiting*	12	
Zinc oxide	9	
Bentonite	5	
-----	-----	-----
Total	100	
3 cups @ 620.1g each 100mL= 147.7g Score: 5		

Ruby's Ivory Base ³⁶		
Ferro Frit 3134	12.5	
Dolomite	37.5	
Silica*	12.5	
Tile 6	37.5	
-----	-----	-----
Total	100	
3 cups @ 591.2g each 100mL= 174.1 Added 100 mL water making 1:1 ratio. Score:1 – Waterfall		

White Dolomite		
Soda Feldspar: Minspar	28	
Whiting*	5	
Dolomite	30	
Silica*	10	
Old Hickory Ball Clay	27	
-----	-----	-----
Total	100	
3 cups @ 625g each 100mL= 141g Added 100mL of water making 1:1 ratio. Needed more water / added another 100 mL making a 1: 1.10 ratio. Score: 5 too chalky		

Smooth Stone White Cream		
Potash Feldspar: G200HP*	50	
Cornwall Stone	15	
Whiting*	16	
Grolleg Kaolin (Eng-China)	10	
Old Hickory Ball Clay	5	
Zinc oxide	4	
-----	-----	-----
Total	100	
3 cups @ 617.7g each 100mL= 142.5g Added 1 tsp. of Epsom salt/water mix Score: 4 – Satin		

Sample A2 - Arts 540 ³⁷		
Barium Carbonate	22	
Strontium Carbonate	15	
Ferro Frit 3134	22	
Dolomite	4	
Silica*	4	
Kaolin* (EPK)	33	
-----	-----	-----
Total	100	
Score: 2.8 – Scaly when thick		

³ Norman, *Emotional Design*, 19, 20

⁴ Norman, 65

⁵ Norman, 29

⁶ Britt, *Complete Guide to Mid-Range Glazes*, Various Pages

⁷ Hesselberth & Roy, *Mastering Cone 6 Glazes*, 35

⁸ Marians, “The Many Faces of Iron: An exploration in cooling,” 54

⁹ Marians, 54

¹⁰ Marians, 55

¹¹ Hesselberth & Roy, 144

¹² Marians, 54-57

¹³ Hesselberth & Roy, 35, 144

¹⁴ Daly, *Developing Glazes*, 49

¹⁵ Daly, 49

¹⁶ Norman, 19

¹⁷ Britt, 176

¹⁸ Britt, 81

¹⁹ Wilson, *Ceramics: Shape and Surface*, 34, 36

²⁰ Cushing, *Cushing’s Handbook*, 122

²¹ Cushing, 123

²² Cushing, 127

²³ Cushing, 117

²⁴ Cooper, *The Potter’s Book of Glaze Recipes*, 61

²⁵ Jernigan, *Dry Glazes*, 84

²⁶ Jernigan, 86

²⁷ Jernigan, 86

²⁸ Jernigan, 102

²⁹ Jernigan, 102

³⁰ Cooper, 64

³¹ Cooper, 68

³² Cooper, 80

³³ Cooper, 81

³⁴ Cooper, 104

³⁵ Cooper, 117

³⁶ This was an unpublished recipe developed by a classmate of the artist and used with permission

³⁷ This is a proprietary recipe developed by the artist, described earlier in Chapter 3

Chapter 4: Functional Ware

Concept

While color and surface texture drive much of the user's visceral reaction to an object, form is also essential to the initial response. The artist believes that bulbous forms and soft curves invite the user's eye to follow along and enjoy the surface palate (fig. 33). Round forms generate shadows which creates depth and increases the two dimensional surface. This aligns with Don Norman's list of things our brains instinctively perceive as pleasing, which includes rounded, smooth, sensuous, and symmetrical objects.³⁸ This broad design concept was the beginning of the artist's development of form.

Believing that the experience of the user and functionality of the objects in *Wellness* is as essential to the thesis as the aesthetics, the artist focused on relevant details. She built sturdy forms that will not be perceived as fragile. The artist wanted the user to focus on themselves and their experience and be able to take the object for granted. In other words, she wanted to increase the user's comfort and security by creating pieces that do not need to be handled with

care. She wanted the forms to be instinctually discoverable.

However, just as she developed the palate to appeal to common collector and artists alike, she also designed forms that would both utilitarian and attractive. To create beautiful objects, she focused on the transitions, and the points that encounter the user and the world. She thought about knobs, thickness of handles, sizes of foots,



Figure 33. Lidded forms, "Wellness"

etc. These points were made to be attractive, not complicated. To meet the objectives of the thesis, wanted work that draws the user in through beauty, is approachable and discoverable, and then delivers an exceptional performance resulting in an overall pleasing, calming, and centering experience (fig. 34).



Figure 34. Series of bud vases, “Wellness”

Surface Texture

Focusing on transitions and points of connection also connected to a broader metaphor explored in surface texture. Over many years, the artist has incorporated splitting line carvings and drawings into her work (fig. 35). As she went through early sketching and development

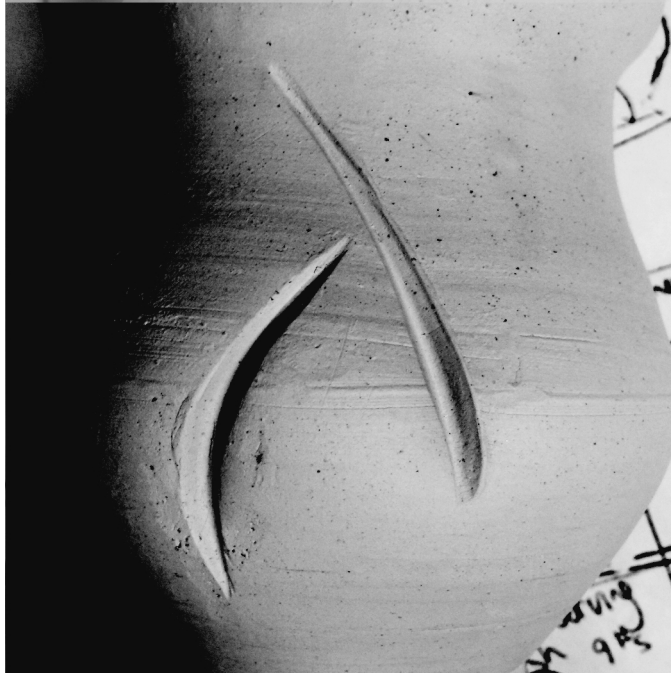


Figure 35. Surface texture detail.

stages of this thesis, she reflected on these images, and found power and beauty in them. To her, they represented points of transition, and hopeful moments of change. They display the beauty of division and growth, choice and change.

In the first quarter of one's life she is bombarded with choices, big and small, that impact who that individual ultimately becomes and how she views the world. These moments and decisions,

while seemingly small, can dictate the path of the person's entire life. The artist's work *Generations*, described in Chapter 2, displayed how despair, hope, and love build the foundation of one's emotional experience, and can change over time and over generations. This thesis is the next step in that narrative, by finding and nurturing wellness over seemingly predestined despair.

Throughout life, there are times where one wants or needs to break off and go in a new direction. One can be on a difficult or challenging path, and can work to make a decision to break away and change course. One can be feeling overwhelmed or burdened by life, and then reach a crossroads and take the path less traveled to peace and serenity. The goal is not to disregard one's history, but to understand it, and move forward. Accordingly, when clustered together these designs become roots representing one's history and the foundation created by the total of all decisions and changes of the past.

The carving became a central creative expression of the artist's hopes for herself and those who engage in *Wellness*. To create a connection between the artist and the user, between the individual pieces and complete line, and between service to self and service to others, she incorporated the carving across the works.

Research

Clay Body

Throughout the artist's career, she has worked primarily with porcelaneous stoneware. Initially she presumed she would use the same clay body for this project. However, after the wide range of test tiles described in Chapter 3, she completed a round of test forms to make sure the results found in tiles would stay the same. She had a small amount of porcelain in her studio, and decided to include a couple of objects with this body of testing. The results were surprising and stark. On the tiles of porcelaneous stoneware, the glazes fired cleanly and had vibrant colors. On full sized vessels, however, the impurities in the stoneware created bubbles in the glaze and muted the colors. However, the porcelain pieces were vibrant and beautiful. This began an unanticipated research phase to identify the best clay body for the thesis.

She wanted a material that could be easily formed into large curving shapes with good structure while producing striking surface texture and color palate. She created and glazed test objects with four different approaches. Three collections were varied mixes of porcelain and porcelaneous stoneware, with 66%, 75%, and 85% of porcelain. The fourth group was created completely with porcelaneous stoneware coated with porcelain slip.

The slip coating appeared contrived and fake and was quickly eliminated. The three mixes were all successful. The higher percentage of porcelain the better the result, with only nominal variation. At that time, the artist planned to vary the percentage of porcelain depending

on the piece. The smaller the object, the higher the percentage of porcelain. As a result, some of the final work has 15% porcelaneous stoneware. However, as production continued, mixing the clay bodies proved more cumbersome than initially anticipated. She ultimately chose to use 100% porcelain for the majority of the pieces.

Form, Function, and Emotion

As noted in Chapter 3, emotion and cognition are an integrated information processing system. Affect makes immediate judgments and cognition interprets and makes sense of the world. “Cognition assigns meaning, affects assigns value.”³⁹ Because of this, form and function are fundamental to all three levels of cognition researched by Norman. The form and color integrate to create positive visceral reaction, which opens the user to have a satisfying experience, resulting in pleasing and complex reflective response.

In *The Design of Everyday Things*, Norman explains the importance of what he terms the Gulf of Execution and the Gulf of Evaluation. First one observes and engages with the object, setting expectations and goals, assessing how to engage, receiving feedback on the function, and having a productive relationship with what the object affords you; the Gulf of Execution. Then the person identifies what happened, the meaning of the experience, and if the outcome was satisfactory; the Gulf of Evaluation. This is cyclical, as one changes future expectations based on past outcome.⁴⁰

It follows that despite the beauty of the palate, surface, or curves; the drama and movement created by altered forms and detailed transitions; and the interesting juxtapositions of personal and communal objects, the entire thesis crumbles if the work is not supremely functional.⁴¹ Each piece is designed and crafted with the intention of serving the end user, not just be viewed by patrons. Functionality goes beyond the basic task of a piece. It is about the

relationship between the person and the object, and all that it affords the person.⁴² A bowl is not just a vessel for food, but it may afford sharing with others, or warming hands when filled with hot soup, or providing an opportunity to try a new cuisine.

Norman's research is on product and system design, not art. When an artist looks at these two gulfs, it is from a different vantage point than the Industrial Engineer. The artist seeks to create beauty that is functional. Each form in the line has its own design structure. The pitchers have appropriate proportions between the, "part that contains and [the] part that delivers the contents,"⁴³ and their handles are properly related to the curves of the body.⁴⁴ Spouts are crafted to ensure clean pouring. The openings of cups and mugs are carefully considered to ensure ease of pour and functioning with the body.⁴⁵

As Leach notes, "It is also important to remember that, although pottery is made to be used this fact in no way simplifies the problem of artistic expression: there can be no fullness or complete realization of utility without beauty, refinement, and charm, for the simple reason that their absence in the long run be intolerable to both maker and consumer. We desire not only food, but also the enjoyment and zest of eating."⁴⁶

Artistic success in functional ware does not require drama, ornamentation, or flair. Rather, simple, honest craftsmanship that has, above all else, sincerity.⁴⁷ The artist's original inspiration of bulbous, sensuous curves creates simple lines that bring the user and viewer's eye along the surface of the piece. This leads to opportunity at transition and meeting points. The artist paid careful attention to trimming, making sure the pieces appeared stable, yet delicate and not bottom heavy.

Hopper notes that in the ceramic traditions of the Far East, attention to the visual and tactile qualities of the piece by the maker are central, but too often in, "the western hemisphere,

they are looked at with suspicion. We tend to look for shapes that are machine-pure, with perfect surfaces. Machine-pure shapes are, more often than not, made for the convenience of the machine.”⁴⁸ By attending to the details, the artist sidesteps the machine and creates a relationship with the user. She leaves behind pieces of herself in the choices she makes. By producing functional, beautiful work she expands the affordances of the work to include serenity, peace, connection, and, ultimately, wellness.

Outcomes

The work was initially conceived in two distinct lines, with each piece either being designated for individual or communal use. The artist created original production lists for each and began by having distinction in the design approach. In the early phases of two-dimensional and three-dimensional sketching she kept concepts and notation distinct (fig. 28 and fig. 29). As the work progressed, her conception evolved. It was clear that the two lines had more in

common than initially realized. This was frustrating at first, and she attempted to find ways to steer back to the original concept.

With time, however, she realized this development was not contrary to the thesis, but perfectly

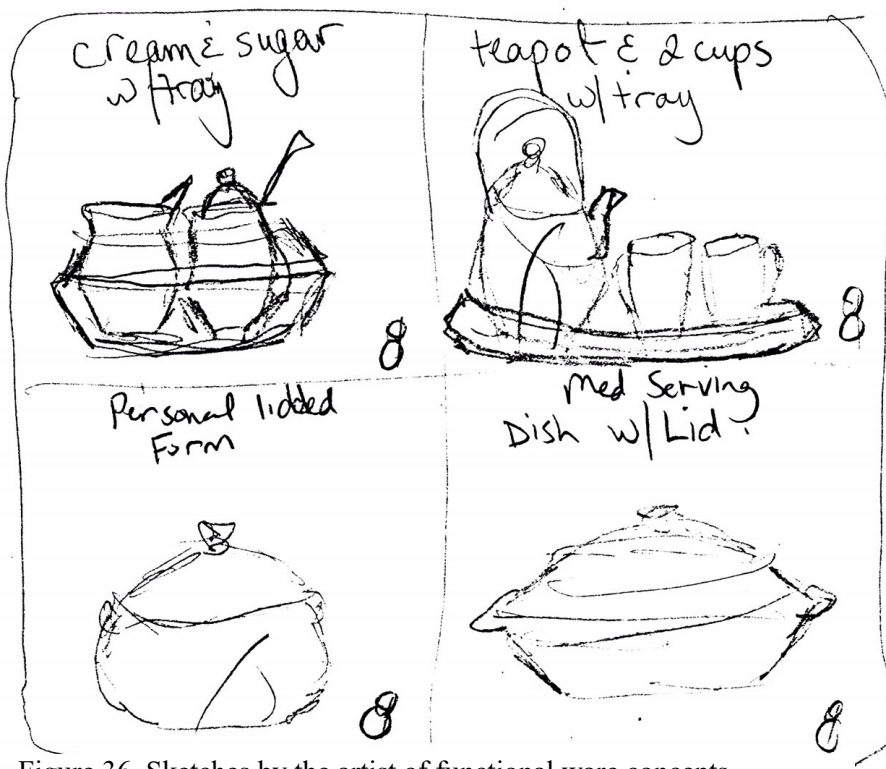
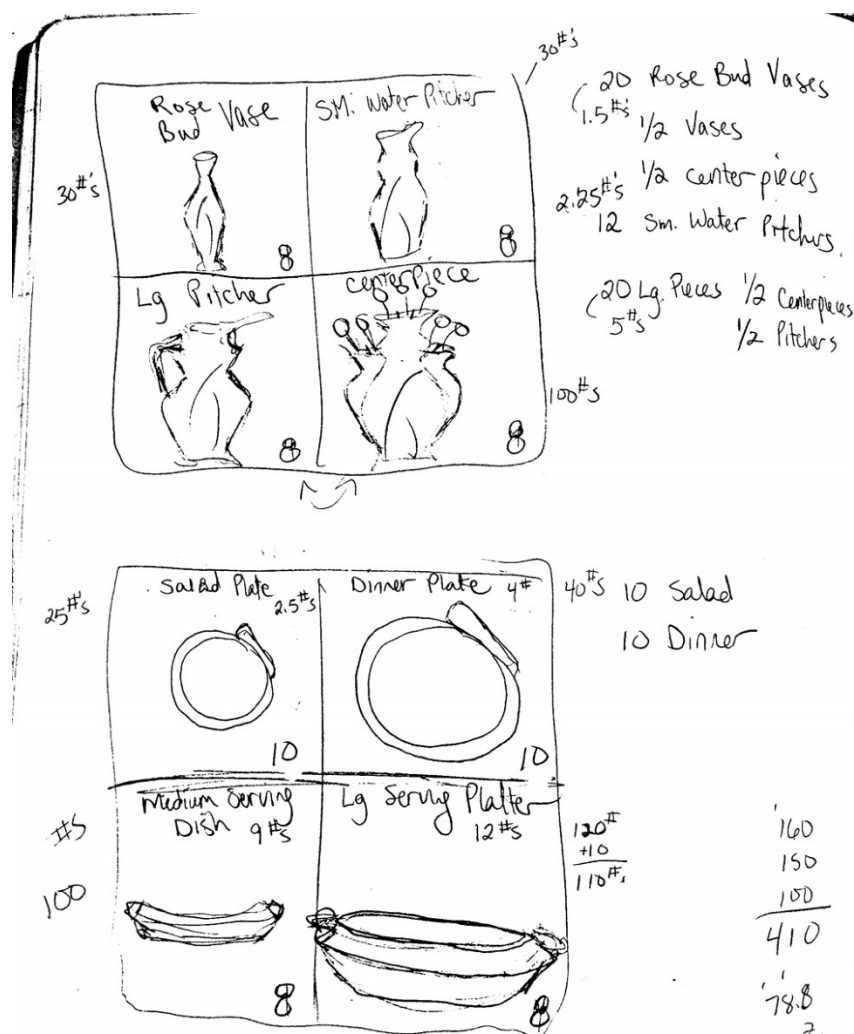


Figure 36. Sketches by the artist of functional ware concepts.

aligned. One's wellness requires service to self and service to others; these are not isolated actions, but two connected poles within one person. Ultimately, some pieces are only appropriate for one or the other, as described in Chapter 5, but they are all interconnected by their central purpose. The objects are similar and connected, and the distinction comes in their use.

Service to Self

Personal wellness is a 24-hour endeavor. One can never take a break from oneself, and is always responsible for her wellbeing, safety, and whole self. Accordingly, the objects created in



this thesis are not to be used collectively in service of a single event, but in distinct moments in time across an entire day. The objects are not required to relate to each other. Rather, they relate to the user and her or his experiences in specific moments. There are small lidded forms that can hold medications or toiletries one uses to start the day well.

They day can be ended with a water pitcher and cups on the

$$\begin{array}{r}
 160 \\
 150 \\
 100 \\
 \hline
 410 \\
 78.8 \\
 2 \\
 \hline
 157.6 \\
 \sim
 \end{array}$$

nightstand. The objects create a foundation to the individual's entire private and public experience. These facilitate continual service to self, the underlying anchor for wellness.

Service to Others

The objects for service to others facilitate shared moments in time. These moments conceptually rest on the underlying foundation created by the personal wellness experiences.

These pieces do have a relationship with each other. They are meant to be used together during a communal meal, thereby building connection and community.

³⁸ Norman, *Emotional Design*, 29

³⁹ Norman, 25

⁴⁰ Norman, *Design of Everyday Things*, 39, 40

⁴¹ Norman, 55

⁴² Norman, 12

⁴³ Illian, *A Potter's Workbook*, 29

⁴⁴ Illian, 37

⁴⁵ Hopper, *Functional Pottery*, 103

⁴⁶ Leach, *A Potter's Book*, 38

⁴⁷ Leach, 43

⁴⁸ Hopper, 154

Chapter Five: Conclusions

Description of the Body of Work

The artist created over ninety objects of functional pottery in this complete body of work, broadly divided into three groups. Four lidded forms, two square vessels, and eight small bud vases are for intimate use by an individual. Eight tureens, four serving dishes, and three vases are for collective use by a group. Finally, four pitchers, four teapots, five mugs, twelve cups, ten creamers, twelve sugar bowls, and sixteen bowls can be used either in either setting.

Each object can stand alone, and indeed the objects for individual use are designed for unique moments between the user and the single object. When grouped, the pieces relate to each other, creating a dialogue between their individual aesthetics, functions, and the gathering of individuals who use them to serve each other in a communal event.

The work is porcelain, with a few exceptions, fired to cone 6 in electric kilns. The cooling cycle was controlled, with the kiln only dropping 150 degrees Fahrenheit per hour between 1900 and 1500 degrees Fahrenheit. The glaze incorporates Mason Stain colorants to create a bright pastel palette. Together, the base glaze recipe, controlled cooling cycles, and colorants combine to create textured, satiny, pastel in color glaze surfaces, with depth, development, and complexity. The forms are wheel thrown, with some alterations on larger pieces. The pieces incorporate bulbous shapes and sweeping arcs, creating visually stimulating three-dimensional objects. Knobs, handles, and other meeting points are sized for comfort and ease, removing fear of fragility.

The aesthetic bridges between fine art consumer and common collector, gallery patron and dinner party guest, and designer and layperson. The work is approachable and discoverable to a wide audience. The objects are meant to be used in the home as much as they are to be viewed in an exhibit.

The Work's Impact on the User

While created by an artist to be appreciated as art, the work is not to be confined or limited to an exhibition. Rather, the greatest impact is in the emotional experiences created by the actions they facilitate. As Norman explains in both of his seminal works, *The Design of Everyday Things* and *Emotional Design*, one's relationship with an object can be understood at three levels, visceral, behavioral, and cognitive.

Good design must operate on all three levels. Poor functioning can be tolerated in a beautiful object. Alternatively, a visually unappealing object may be disregarded and discarded regardless of how well it functions.⁴⁹ However, when all domains are attended to, the complete experience can influence the person's self-worth, wellbeing, and wellness. Attractive things draw users in, make them feel good, and generate positive emotions that expand thinking. A study found that when individuals used two identically functioning automated teller machines, they found the more attractive one easier to use.⁵⁰

Wellness gets the user's attention through color and form. Each object is understandable, clearly signifying where and how to use the object, and for what.⁵¹ There is no question of applicability, fear of misuse, or concern of breakage. The work teeters on the line between heartiness and specialness. They then deliver the expected performance, resulting in an overall pleasing experience. Ultimately, these experiences create memories, which shape and evolve the user's conception of themselves, as "special objects are those with special memories or associations, those that helped evoke a special feeling in," the user.⁵²

The artist believes wellness cannot be found in a single situation or type of experience, but comes from a tapestry of experiences, a combination of both internal self-care and external

engagement with community. *Wellness* addresses this complexity through ware designed to be used at different times of day and in different settings.

The objects for personal use create a moment, a break in the user's day to give the peace of mind, strength, or whatever is needed to be centered and grounded. It makes the sip of tea more delicious, the swab of a Q-tip more purposeful, the view of a flower more intimate. Together they create a scaffolding that holds up the person's day. The objects for community use create a setting of merriment and genuine love, making the experience about the people gathered together, about meaningful connection. When this experience rests on the scaffolding of the individual experiences, the person moves towards wellness.

Original Contributions

The work pushes the field forward in two ways, one emotional, the other technical. The artist's passion for functional work has created a discussion on the emotional impact of the experience on the user. University professors and workshop presenters discuss their own thoughts. When potters gather, they discuss their work and emotions. Subjective reflection across the community underscores how pervasive and important emotional impact is to the field but is insufficient. In this day and age, there should be a more empirical way to talk about emotional connection to pottery. The artist could not find this in the ceramic's literature. She found Alexander's *A Pattern Language*. This initially seemed analogous, as architects construct objects that create experiences which effects the user's emotional well-being but did not translate to pottery. She then found Don Norman, whose work greatly impacted this thesis. However, there are limits to the applicability. Mr. Norman comes from an architectural, systems design, and industrial engineering background. It is time for the ceramics community to study specifically at how clay objects can be intentionally and rigorously designed to effect the user's

emotion. This thesis puts emotions front and center and shows how a collection of pottery can create and connect moments for individuals and communities to effect emotions and wellbeing.

The technique of controlled cooling cycles in electric kilns has rarely been explored, except for Ranlett,⁵³ despite the scientific principles being understood and the equipment and technology has existed for nearly four decades. This thesis proved the concept. The artist's research shows that carefully pairing materials with distinct cycle combine to produce a range of effects. Cycles can have a range of approaches, some holding temperature at various points, others slowing and controlling cooling between a specified temperature range. This work exhibits the action and crystal development between 1900 and 1500 degrees Fahrenheit, with the temperature only dropping 150 degrees Fahrenheit per hour. The result is unique work with textured, satiny surfaces, with depth, development, and complexity that is not recognizable as electric fired ware.

Conclusion

During undergraduate studies at Alfred University, the artist identified the essential question, what does it mean to be a ceramic artist? The answer is rooted in emotions and relationships. The artist's individual choices, techniques, moments, and materials come together as a genuine expression of her, manifested in an object that facilitates an emotional relationship between the artist and the user, and between the user and the function of the object? *Wellness* is this artist's an answer to that essential question.

Genuine connection with clay is a personal expression of an artist.⁵⁴ This requires letting go of cognitive critique and fully engaging with the clay. An artist must trust that by connecting and communicating with the material's texture, weight, and essence, it can be, "expanded and contracted into a living embodiment of the potter's intention."⁵⁵ To achieve the goals of

Wellness this artist embraced the vulnerability of letting go of self-consciousness, and returned to her primary interests of functional, wheel thrown, electric fired pottery.

Affordance is the connection between the artist's essential question and thesis statement: the combination of form, function, and complex glaze palate and surface will influence the users' emotions and display the dynamic and interconnected relationship between personal self-care and engagement with community as a means to wellness. Affordance is a possibility, a relationship between the user's capabilities and the properties of the object.⁵⁶ *Wellness* shows that the right relationship of parts, concepts, techniques and self, "gives vitality – life flowing for a few moments perfectly through the hands of the potter,"⁵⁷ resulting in a perceptual and sensory, tactile and visual experience that affords individual and communal moments which foster healing, solace, and wellness.

⁴⁹ Norman, *Design of Everyday Things*, 55

⁵⁰ Norman, *Emotional Design*, 18-25

⁵¹ Norman, *Design of Everyday Things*, 14

⁵² Norman, *Emotional Design*, 48

⁵³ Ranlett, *Super Cool!*

⁵⁴ Leach, *A Potter's Book*, 38

⁵⁵ Leach, 49

⁵⁶ Norman, *Design of Everyday Things*, 11, 12

⁵⁷ Leach, 45

Bibliography

- Alexander, Christopher; Isikawa, Sara; & Silverstein, Murray, *A Pattern Language; Towns, Buildings, Construction*, New York, New York: Oxford University Press, 1977
- Britt, John, *The Complete Guide to Mid-Range Glazes Glazing & Firing at Cones 4-7*, New York, New York: Lark Ceramics, An Imprint of Sterling Publishing, 2014
- Cardew, Michael. *Pioneer Pottery*, London, England: A&C Black Publishers, 2002
- Cooper, Emmanuel, *The Potter's Book of Glaze Recipes*, Philadelphia, Pennsylvania: University Pennsylvania Press, 2004
- Cushing, Val M., *Cushing's Handbook*, Alfred, New York: Val M. Cushing Press, 1994
- Daly, Greg, *Developing Glazes*, Westerville, Ohio: The American Ceramic Society, 2013
- Hesselberth, John & Roy, Ron, *Mastering Cone 6 Glazes*, Brighton, Ontario: Glaze Master Press, 2002
- Hopper, Robin. *Functional Pottery Form and Aesthetic in Pots of Purpose*, Iola, Wisconsin: Krause Publications, 2000
- Illian, Clary. *A Potter's Workbook*, Iowa City, Iowa: University of Iowa Press, 1999
- Jernigan, Jeremy. *Dry Glazes*, Philadelphia, Pennsylvania: University of Pennsylvania Press, 2009
- Leach, Bernard. *A Potter's Book*, London, England: Unicorn Publishing Group, 2015
- Marians, Carol, "The Many Faces of Iron: An exploration in cooling," *Ceramics Monthly* (June/July 2007): 54 – 57
- Norman, Donald A. *The Design of Everyday Things: Revised and Expanded Edition*, New York, New York: Basic Books, 2013
- Norman, Donald A. *Emotional Design: Why We Love (or Hate) Everyday Things*, New York, New York: Basic Books, 2004
- Ranlett, Deanna, "Super Cool! Slow Cooling in an Electric Kiln, Techniques and Tips for electric kilns," 2014
- Wilson, Lana, *Ceramics: Shape and Surface Handouts for Potters*, San Diego, California: Lana Wilson Press, 2005