AN INVESTIGATION OF THE HALO EFFECT ACHIEVED THROUGH ALTERATIONS OF STANDARD RAKU FORMULA AND PROCEDURES

PROBLEM IN LIEU OF THESIS

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TABLE OF CONTENTS

Page

LIST OF FIGURES iv

Chapter

I. INTRODUCTION TO THE STUDY. 1

II. DESCRIPTION OF PROCESS AND RESULTS 6

III. CONCLUSIONS. 28

REFERENCES. 32

LIST OF FIGURES

Figure Page

1. Flying Antlers 8

2. Untitled Vessel Two. 10

3. Burned Earth III 12

4. Hermeneutics II. 14

4b. Detail of Hermeneutics II. 15

5. Your Basic Falling Leaves. 17

5b. Detail of Your Basic Falling Leaves. 18

6. Land Lizard. 20

7. Poseidon's Pebble II 22

7b. Detail of Poseidon's Pebble II 23

8. Untitled Vessel Eight. 25

9. Surface Revealed 27

CHAPTER I

INTRODUCTION TO THE STUDY

The raku technique of firing ceramic vessels is unique in that the vessel is red hot and glowing when it is withdrawn from the kiln as opposed to cool to the touch. The raku piece remains this hot for a minute or so after it is out of the kiln. It is possible for the surface to be modified, both physically and chemically while the vessel is in this condition of extreme heat (Riegger, 1970, 13). The post-reduction period of the raku process takes place after the ceramic piece has reached the point of maturity, around 1750 degrees fahrenheit. Described simply, the piece is put into an atmosphere lacking oxygen and containing free carbon at a time when it is responsive to chemical change. How this condition is created and the length of time it influences a vessel are factors controlled by the potter (119).

While involved with the raku process, I became increasingly aware of the negative and positive contrast between glazed areas and the smokey black and gray unglazed areas on the surface of my ceramic forms. I became curious about combining these positive and negative surface areas with the linear qualities of free-hand brushwork. However, my personal sense of aesthetics felt that the glazed surface treatment conflicted visually with the matt texture of the brushwork in the unglazed areas. The surface contrast was too strong and it became apparent that one consistent surface treatment was needed to provide visual coherency. Being concerned with the high contrast of the surface textures, I focused upon the halo effect achieved during the post-reduction stage of the raku process. The halo can be described as a matt, white, thin, ghost image surrounding the outline of the black oxide brushwork. I believed that further investigation would reveal new surface effects through variations of the standard ingredients and conventional application of the raku halo formula. Research utilizing ceramic vessels as media was warranted to fully investigate the results of these variations and their potential aesthetic impact.

My research explored the possibilities of achieving the raku halo through variations of the standard engobe (pronounced on-gobe) and oxide formulas, using ceramic vessels as media. This included alterations of the ingredients, consistencies, and methods of application. The following questions were addressed:

1. Are there noticeable differences in the visual quality of the halo as a result of the changes in the engobe and oxide formulas or their application methods?

2. How do the different formulas and processes affect the textural surface treatment of the vessels?

3. To what extent are these effects employable in my future creative work?

Throughout the research, a journal was kept including individual information about research pieces, a statement of results, and my reaction to those effects. From this information, an analysis of the completed vessels was compiled.

The investigation was executed upon a series of non-functional vessels arranged into two categories. The first category deals with variations of applications and consistencies of the standard engobe formula. The first vessel in this category is presented as an example of the typical effects of the standard engobe formula and oxide treatment. The three remaining vessels in this category are examples of research into the effects of altered consistencies and applications of the standard engobe formula.

The second vessel category consisted of variations of the standard engobe ingredient ratios and application techniques. The altered ingredient ratios were brushed, dipped, sprayed, and poured onto the ceramic vessels. Variations of the oxide stain ingredients were used on all nine research vessels with the exception of the first.

With a minimum of nine experimental vessels, a range of surface treatments and developments was anticipated. Expected results included an assortment of raku halo qualities, textural effects, and high value contrasts. It was hoped that this research would provide dramatically successful results that could be used in my future ceramic work.

The raku halo was a challenge to attain and I found the matt surface to be particularly pleasing. The halo contributes a stark accent to the brushwork, emphasizing linear qualities while creating a dramatic break from the negative surface area.

Chapter References

Riegger, Hal. 1970. _Raku art and technique._ New York: Van Nostrand Reinhold.

CHAPTER II

DESCRIPTION OF PROCESS AND RESULTS

This study investigates the possibility of achieving the raku halo through alterations of a standard raku formula and process; it does not explore timing variations. The specific information for the standard halo formula and procedure was acquired in 1982 during a raku workshop given by Curtis Scott at the Obranovitch Pottery in Dallas, Texas.

The standard process requires that a bisqued vessel be brushed with a thin layer of engobe followed by black oxide brushwork. Once the vessel is fired to maturity, a dull red color in the kiln, it is withdrawn with long tongs, and placed into a chamber containing combustible material. A lid is immediately placed on the chamber, producing a reduction environment for less than one minute. The lid is removed briefly, allowing the combustible to re-ignite. Another small amount of combustible is thrown into the chamber and the lid is returned to create an air-tight, reduction environment where the vessel is allowed to smoke for five minutes. After five minutes, the vessel will have cooled enough to be unaffected by the air and is removed from the post-reduction environment.

Vessel One

The first vessel, entitled Flying Antlers (See fig. 1 on page 8), is an example of the surface finish that results from using the standard raku halo ingredients, consistency, and method of application. The standard engobe wash consists of:

1 part kaolin

1 part flint

1 part colemanite.

The engobe was applied to the bisqued vessel with a soft brush. The consistency of the engobe was watery thin. The standard black oxide stain contained equal measurements of black iron oxide and copper carbonate. The oxide stain was used for the brushwork on top of the engobe wash. The vessel was fired in the raku kiln and newspaper was used for the post-reduction material.

The surface finish of this vessel exhibits the typical results produced with the standard raku halo formulas and methods. The white halo is visible along the outline of the brushwork while the values of the background range from gray to black, sometimes including white.

Fig. 1. Flying Antlers.

Vessel Two

This untitled vessel (See fig. 2 on page 10) was an attempt to achieve the raku halo through altered application and consistency of the standard engobe formula. The vessel was sprayed with very thin layers of the standard engobe formula. The brushwork consisted of:

1 part black iron oxide

1 part copper carbonate

1 part red iron oxide.

Newspaper and damp grass were used for post-reduction materials.

The surface treatment resulting from this attempt to achieve the raku halo is considered unsuccessful in that only a trace of the halo is visible. The halo effect that is visible is of poor quality. The surface lacked depth due to the thin engobe layer. The brushwork had a slight rust coloration due to the introduction of the red iron oxide into the stain. The post-reduction materials created a light, overall reduction with ghost images resulting from the damp grass.

Fig. 2. Untitled Vessel Two.

Vessel Three

The standard engobe formula for the raku halo was poured onto this vessel entitled, <u>Burned Earth III</u> (See fig. 3 on page 12). The engobe was poured, at a consistency comparable to milk, onto the vessel in overlapping layers. The altered oxide stain used for the brushwork consisted of:

1 part black iron oxide

1 part cobalt carbonate.

The vessel was post-reduced in a mixture of hay and damp weeds freshly pulled from the kiln yard.

The results of this vessel treatment were exceptionally productive. The altered engobe application was very successful: the halo was strongly apparent around the brushwork and the surface of the vessel had an interesting depth because of the thicker engobe application. The oxide stain was also exciting in its fired form, because of the matt blue coloration showing in the brushwork on this vessel. In addition, the post-reduction materials were also successful because of the ghost image created by the damp weeds as they rested against the vessel in the post-reduction chamber.

Fig. 3. Burned Earth III.

Vessel Four

Hermeneutics II (See fig. 4 on page 14) is the last vessel in this first category testing the applications and consistencies of the standard raku halo engobe. The vessel was dipped into a thick mixture of the standard engobe formula. The consistency of the engobe was comparable to cream. The altered oxide stain used for the freehand brushwork consisted of:

1 part red iron oxide
1 part copper carbonate
1 part cobalt carbonate.

The oxide stain was applied onto the vessel before the layer of engobe had completely dried. A mixture of sawdust and strips of newspaper were used for the post-reduction materials.

The results of this vessel treatment were particularly pleasing to me. A strong halo was achieved along the outline of the brushwork. The altered oxide stain produced a matt copper luster which can be seen in the detail of fig. 4b (See page 15). The thicker engobe application had given the surface a richer depth.

Fig. 4. Hermeneutics II.

Fig. 4b. Detail of Hermeneutics II.

Vessel Five

This vessel, Your Basic Falling Leaves (See fig. 5 on page 17), was the first vessel in the second category testing the effects of altered engobe ingredient ratios, methods of applications, and consistencies. The vessel was brushed with a creamy consistency of the following engobe variation:

3 parts kaolin

1 part flint.

The oxide stain for the brushwork consisted of:

1 part red iron oxide

1 part cobalt carbonate

1 part copper carbonate.

The post-reduction environment included a mixture of dried corn husks and sawdust.

While the raku halo on this piece was not as strong as the halo on Hermeneutics II (See fig. 4 on page 14), I still consider the surface finish of this piece to be rewarding. The variations of the oxide stain ingredients contributed an array of lusterous matt colors in the brushwork which can be seen in the detail of fig. 5b (See page 15).

Fig. 5. Your Basic Falling Leaves.

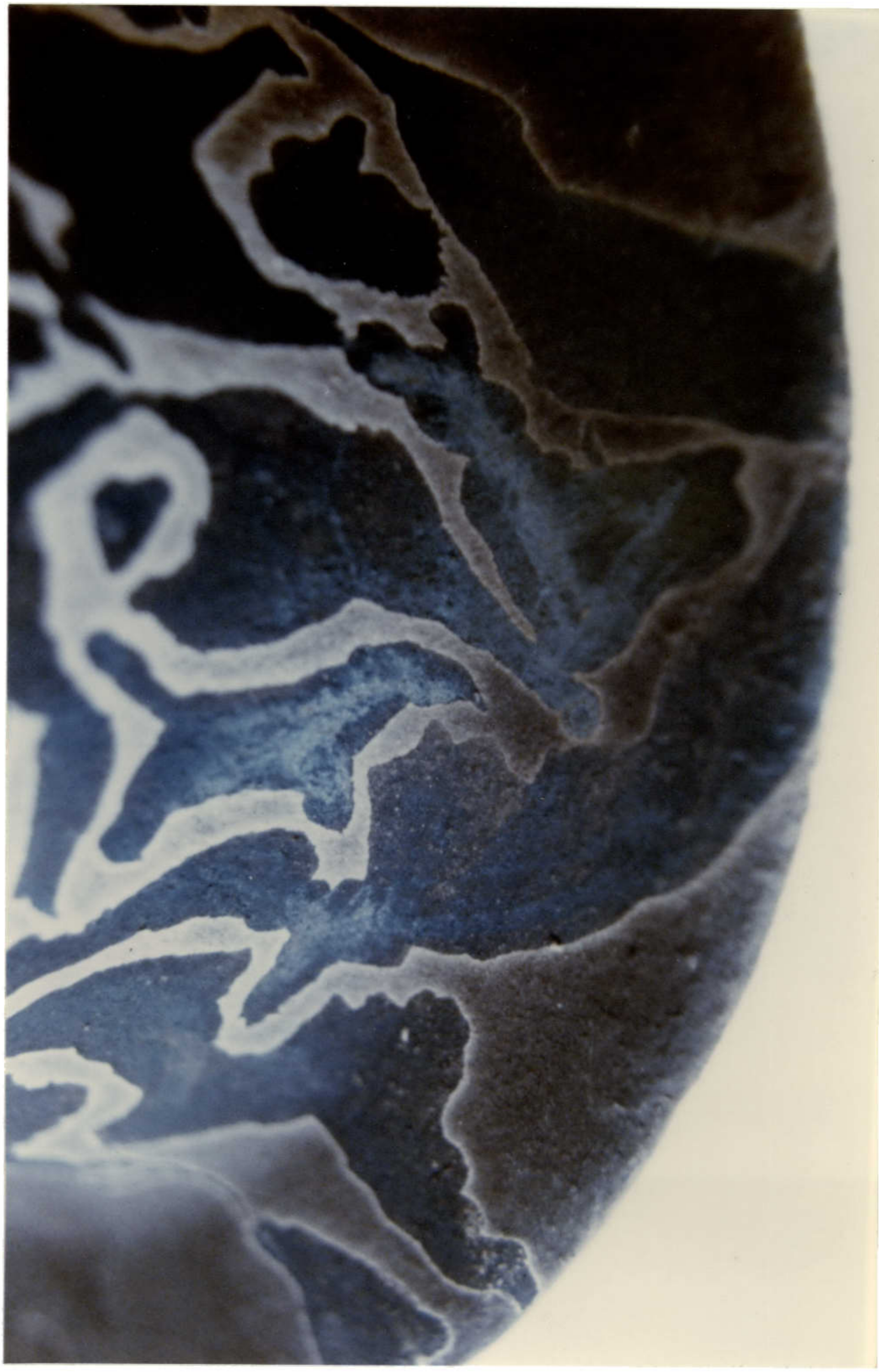

Fig. 5b. Detail of Your Basic Falling Leaves.

Vessel Six

This vessel, entitled <u>Land Lizard</u> (See fig. 6 on page 20), was sprayed with thin layers of an engobe consisting of:

3 parts kaolin

1 part flint.

The altered engobe was a consistency comparable to water. The altered oxide stain contained:

1 part red iron oxide

1 part copper carbonate.

Charcoal, dried grass, and newspaper were used for the post-reduction combustible materials.

While the varying gray values on this vessel were interesting, there was only a vague trace of the raku halo. The halo only appeared on areas of the vessel where the engobe layers overlapped. The oxide stain had a reddish coloration.

Fig. 6. Land Lizard.

Vessel Seven

This vessel, Poseidon's Pebble II (See fig. 7 on page 22), was divided into two sections for research purposes. The upper portion of this vessel was dipped into a thick mixture of an engobe variation while the lower portion was sprayed with a thinner solution of the same engobe mixture. The altered engobe formula contained the following:

4 parts kaolin
1 part flint.

The oxide stain contained:

1 part black iron oxide
1 part copper carbonate
2 parts cobalt carbonate.

The post-reduction environment consisted of charcoal, newspaper and dried grass sprinkled with damp coffee grinds.

Very successful, productive results were obtained from this combined surface treatment. Both the upper and lower portions of this vessel were successful in raku halo quality and textural effects resulting from the engobe and oxide variations. A detail of the surface finish can be seen in fig. 7b (See page 23).

The thick layer of engobe, on the upper portion of the vessel, contracted as it dried forming a fragmentized pattern of surface design. Surprisingly, the raku halo was achieved on the thick layer of the crackled engobe.

Fig. 7. Poseidon's Pebble II.

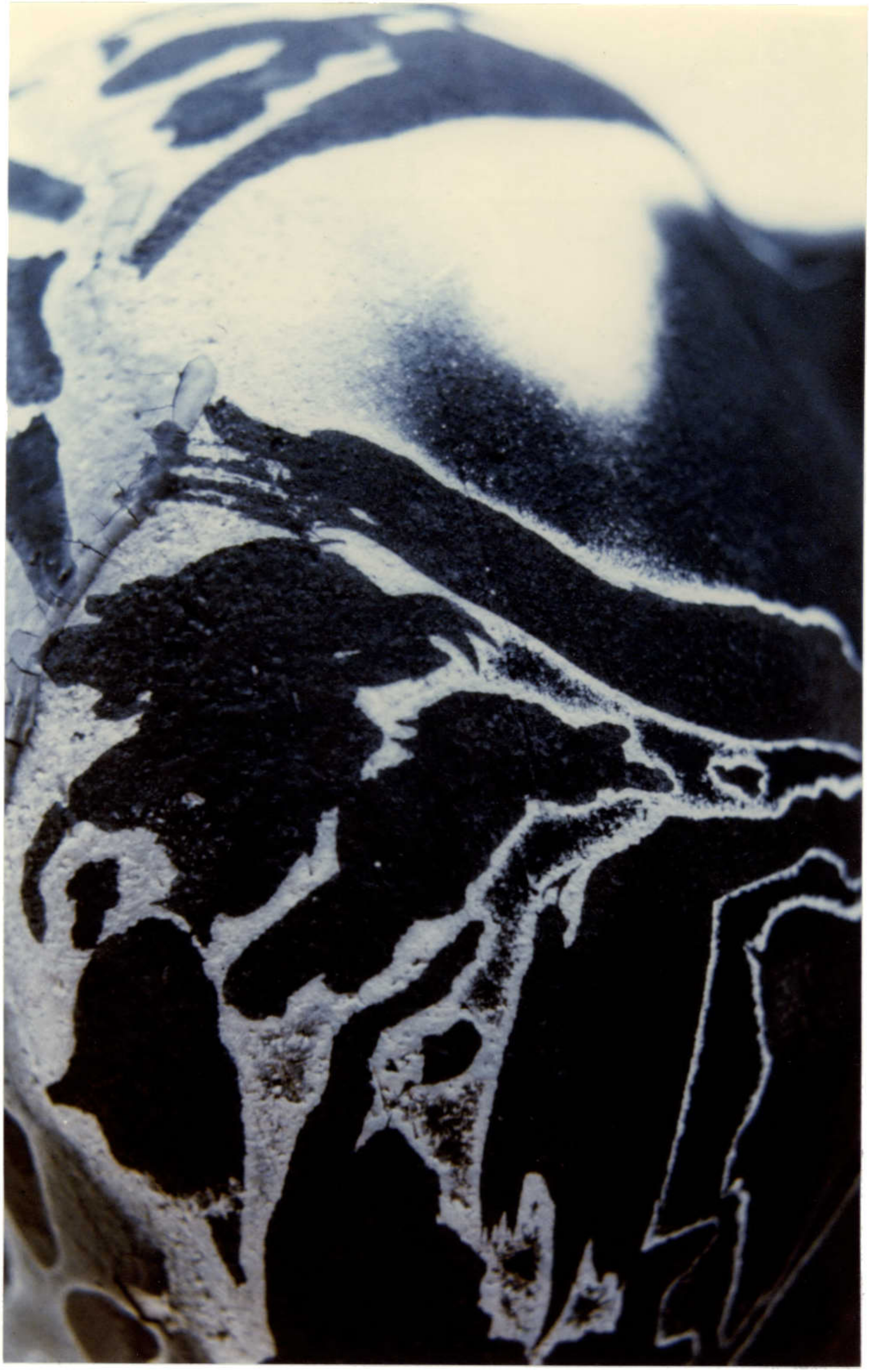

Fig. 7b. Detail of Poseidon's Pebble II.

Vessel Eight

This untitled vessel (See fig. 8 on page 25) was sprayed with thin layers of the following engobe alteration:

1 part kaolin

1 part colemanite

1 part flint.

The oxide stain for the brushwork contained:

1 part cobalt carbonate

1 part red iron oxide.

Post-reduction combustibles included newspaper and damp coffee grinds.

The surface finish of this piece was interesting although no raku halo was achieved through alterations of the standard engobe ingredients and application method. The coloration due to the oxide stain variation ranged from the blues to slate gray. This oxide combination is worthy of further testing for future creative work.

Fig. 8. Untitled Vessel Eight.

Vessel Nine

The final vessel of my research has been given the name Surface Revealed (See fig. 9 on page 27); its surface treatment is one of the most exciting discoveries of this research project. The following engobe variation was both dipped and poured on the vessel:

4 parts kaolin
1 part colemanite
1 part flint.

The oxide stain for the brushwork contained:

1 part black iron oxide
2 parts copper carbonate.

The post-reduction environment for this vessel included dried dung and sawdust.

The thicker engobe layer on this vessel separated from the clay surface forming a crackled pattern of design. The smoke of the post-reduction period soaked into the crevices of the fragmentized pattern. Once the vessel cooled after firing, the thick engobe fell away from the surface of the vessel simply by handling the piece. The cracked smoke pattern was clearly visible on the surface of the clay. This was an exciting result which I consider to be very successful.

Fig. 9. Surface Revealed.

CHAPTER III

CONCLUSIONS

In my thinking, duality is a fundamental rule of life. The results of this research are no exception to the rule. My study into the possibility of attaining the raku halo through altered halo formula ingredients and techniques provided several rewarding results along with a few unattractive consequences.

Surface Revealed, the vessel seen in fig. 9 (See page 27), has an interesting surface treatment which I consider to be the major accomplishment of this research. The application of the engobe layer was so thick that it contracted away from the clay surface as it dried and by doing so, created a fragmented, crackled pattern. Smoke from the post-reduction stage of the firing soaked into the creviced pattern of the engobe. After firing, the thick engobe separated and fell away from the surface of the vessel leaving a definite crackled pattern smoked into the clay. This incompatible reaction between the clay and the engobe could be further manipulated by removing areas in the dried, cracked pieces of the engobe before the vessel was fired. This treatment might also provide additional visual interest and high value contrasts with the negative space of the surface finish.

Other dynamically successful results can be seen in the vessel of fig. 7, Poseidon's Pebble II (See page 22). The lower portion shows a very strong halo achieved by spraying an altered engobe on the vessel. Throughout the research, this vessel treatment is the only example of attaining a quality halo by spraying the engobe. The upper portion of this vessel is also successful in that a strong halo was achieved on the thick layer of altered engobe. The two portions of this vessel work well together with the contrast of surface textures and the cohesive balance of the strong halo surrounding the outline of the oxide brushwork.

The oxide stain substitutes and variations contributed several lusterous matt colors. These colors include the reds and coppers seen in the figs. 4 and 4b on the vessel Hermeneutics II (See pages 14 and 15). The cobalt blue fading into a lusterous lighter matt blue then blue green colors as see in figs. 5 and 5b, are directly attributed to the addition of cobalt carbonate and red iron oxide into the oxide stain (See pages 17 and 18). The introduction of these ingredients into the raku halo stain will now be a standard procedure in my studio work.

A variety of combustible materials were used for the post-reduction firings. Newspaper is the standard material that I use, because there is more control over the reduction by draping the sheets of paper over the vessel. A few experimental combustibles were used including: wet and dry grasses and weeds, coffee grinds, corn husks, nutshells, sawdust, and cotton. The most interesting results came from damp materials which left a ghost-like image where the combustible rested against the vessel during the post-reduction phase. The extent to which the other experimental combustibles affected the surface textures is unknown.

Three highly successful findings resulted from my experimental approach to achieving the raku halo through alterations of standard formulas and procedures. The most successful results observed were surface treatments that included: heavy application of engobe layers, the crackled pattern effect, and additional oxides introduced into stains. Specifically, there are noticeable differences in the visual quality of the raku halo as a result of the changes I employed in the engobe and oxide formulas and their applications methods. The strongest halo achieved through engobe/oxide alterations can be seen in figs. 7 and 7b, Poseidon's Pebble II and its detail (See pages 14 and 15). The different formulas and processes affected the textural surface treatment of the vessels in several ways: the heavier application of the standard engobe formula resulted in the rich textural depth of the surface of Hermeneutics II. The extremely thick altered engobe application created two successful textural surfaces which can be seen on Surface Revealed in fig. 9 on page 27, and in the upper portion of Poseidon's Pebble II in fig. 7 on page 22. It is my goal to incorporate these results into my future ceramic work, beginning with a series of vessels displaying the evolution of engobe layers required to create the crackled pattern as seen in Surface Revealed. The successful results of this research will be the starting point for many of my future ceramic projects.

REFERENCES

Riegger, Hal. 1970. Raku art and technique. New York: Van Nostrand Reinhold.