Raku: The Gentle Art of Violence

Carl Stockwell

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RAKU
The Gentle Art of Violence
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Introduction

Eleven hundred days, three tons of clay, fifty thousand grams of glaze and six thousand dollars ago I set out to explore Raku. Over that time and with those materials, forms have emerged and evolved, a palette of color has developed and the magic of the technique is still as exciting today as it was when I first began.

I propose to explore color and form within the Raku process using a minimum number of glazes to achieve a maximum of results. I think the "exploration of color and form" is quite self explanatory. Over the past two years there has been, I believe, an incredible evolution and sophistication of form and content from my previous work. Like many such changes, it stems from personal growth as well as my environment.

Less evident is the reason for the second parameter of using a minimum number of glazes. After all, why should it be so important to limit oneself, to make it more difficult to achieve a goal, particularly if it is assumed that the end result is what matters most? The answer to that lies partly in what we face upon completion of our degree program and how we intend to put our education to use. Most practicing potters can't afford to stock a complete glaze pantry with which to experiment.

I think few students really are aware of the potential of their glazes and this is a mistake. While in a school situation, we have at our fingertips the means, the tools and the availability of knowledge and experience to explore these avenues, to examine the limits of our materials, to experiment without the fear of failure and hopefully to learn enough from this to make objective evaluations of what we are
doing. All too often, the time which should be spent experimenting is wasted on the futile attempt to get a "finished" product. This is why I chose the second parameter of restraint and discipline for my thesis work.
Concepts

In order to present a more complete picture of what I have accomplished, it is necessary to stop and reflect on my attitudes and beliefs as they apply to my work.

This "mini-philosophy" will be covered within four areas: color, design, impression and process. Each is unique unto itself but for a piece of work to be successful there must be a relationship between all four. When any one element overrides the others or is not treated equally, the piece suffers even though the reason may not be apparent. Certainly at one point in time we have all handled a piece of pottery and felt something was missing. It is often difficult to really understand what is missing in terms of the relationships and balance with the rest of the piece. The graphic design or imagery may be superb but its relationship may compete too much with the design and color of the remainder of the piece. This interaction of the elements may be discordant enough so as to leave us uneasy. There are times when I assemble all the components (slabs and pieces of clay) for a platter and each of them has been used successfully, but when the process is complete, something is lacking.

Color and design are the two most closely related of the elements. In the final analysis, they create the impression of success or failure. The colors which I consider complete are not just superficial readings of green, red, yellow or blue, but rather include the nuances within, the variegation of hues and how they interact with the other patterns on the piece. These colors have to fulfill several requirements in order to be considered a success. The first would be
the harmonious balance of mood and content from the colors as they relate to the piece as a whole. I will sometimes pull a piece from the kiln, but after it has been washed and cleaned, I find the glaze doesn't fit though it may be beautiful in its own right. Part of this can be attributed to its balance and contrast with the rest of the object. Another requirement is that it must work in part as well as in the whole. The intricate areas within the glaze must contribute to its overall presence as well as retain its own identity, like small jewels surrounded by a sea of color. There must be room for these areas to breathe, to live. These areas of color must also work with the boldness of design which governs each of the patterns and their contrasts with one another. Often a piece can have great colors, if you separate each of them, but it doesn't work as a unit because there is no contrast within, no room for the eye to rest and no area with which to measure. There must be a point of perspective in designing these color relationships and if that perspective is ignored the piece suffers.

This concept of design through the color is also extended to the form. The forms I have chosen to work with are quite simple in nature and as such offer two advantages. The first is that they do not compete with the patterns of clay and color, and the second is that they can be constructed easily and quickly. The lack of competition allows me greater latitude to explore the relationships of clay patterns. The form thus acts as a vehicle for my ideas to take shape without having to integrate them in a more complex manner. I am looking for a sense of unity, a cohesive action that can make a statement on its own. These simplistic forms allow me that. The second advantage of quick construction enables me to work at my own pace, unhindered by the more time consuming processes of construction. This has allowed me the freedom to
try new patterns, to explore new relationships and to reject work more readily.

The concept of impressionism is not just a school of painting. Literally, it is how we perceive our world. When I look at paintings by Van Gogh and Monet I am reminded that these works of genius, so powerful and compelling, were executed by men whose gift was not an extraordinary painting skill but rather one of vision, an ability to see as no one else had seen before. They saw their world in their terms of color and form and content. It is in this context of perception that I derive my own feelings of impressionism and relate it to my work. The patterns and content of design stem from the impressions of my world, my experiences.

Rather than paint a mountain in a figurative sense, I try to break it down into its elements and forms and manipulate, alter and rearrange them to convey a similar feeling. The same is true of a landscape where I try to present some of its elements as I see them. The blocks of color stemming from these impressions are derived in much the same way. As I look over that broad landscape there is a patchwork of color, a multitude of hues that often boggles the mind. As I squint slightly the colors seem to blend and run into one another until they create large, bold patterns. From these patterns I begin to see the contrasts and relationships of one area to another. These techniques hold true in studying the sky, clouds, water and all the other things that make up my world. They all have a unique spirit about them for each is an element of the earth, the common denominator, and each has its own relationship to fire, the spirit of Raku.
Tools

Before going into the last phase of my concepts, the process, I want to cover some material which will help make it more relevant. These areas will encompass the kiln, my tools, the clay body and glazes.

Because of the size of my work and my need to be able to fire without help, special consideration had to be given to a kiln. It had to be large enough to handle the largest of my work, be easy to operate and just as importantly, be efficient to fire. The drawings on page 17 spell out most of the details concerning its construction and operation but I want to cover some considerations given to the design of it.

Probably the foremost thought was that of the work to be fired. Since the bulk of it is large platter forms, I would require an area 24 inches square and because of the tall containers and spheres it would have to have a minimum height of 20 inches.

Because of the wide range of height in the work, I ruled out a side-hinged door. It would have been effective when pulling large lampshades and spheres but would be impractical for platters which are only four inches high, and which represent a major part of my work. The best alternative then was for a door system which could be raised only as much as was necessary to get to the piece firing at that time. I designed a counterweight and pulley system which minimized the effort to raise and lower the door and yet which would keep it in place as needed.

A final consideration is the aspect of safety. With this type of door system it minimized my exposure to the kiln's heat and thus reduced the
possibility of burns. I also found I could fire for a longer period of time without feeling tired. This was important because most accidents or burns occur when I am tired.

To date, the kiln has proven to be very successful both in terms of operation and efficiency. The efficiency factor becomes more important as the costs of fuel continue to rise.

I have become very attached to my pitchfork. I developed it three years ago when I was making large platters and needed a simple means of getting them out of the kiln. Tongs were tried but weren't effective because of the platters' size and weight. I needed something to slide under them. I found that by removing the center tines from an old pitchfork it could slide under the work easily and with its five foot handle I didn't have to be as close to the open door. Two words of caution are needed here. The handle will burn and char and will have to be replaced periodically. Also, if you intend to make one, try to find an old pitchfork to begin with. After eight months I had to replace the original one and bought a nice new one which lasted one day before the tines looked like cooked spaghetti.

Two other tools should be mentioned in the interest of safety. The first is the face mask, without which I do not like to fire. The one I presently use has a clear plastic shield which covers the entire face. It has proven to be a real facesaver when a long day of firing is planned. There are other types, such as the glass fiber welder's hood with its glass insert and a third which resembles my plastic one except that it uses screening in place of the plastic. I have used all three but still prefer the first type. I think its light weight, low cost and durability make it an excellent investment for anyone planning to do
more than one or two pieces of Raku. The other items of apparel which are very important are the gloves. When I have to have my hands and arms inside the kiln to pull a large piece I want them well protected. Small asbestos gloves simply will not do. The pair I use are constructed of several layers of leather stapled together and lined. They also have a second section which extends up over the arms. They are made by the Knoxville Glove Company, Knoxville, Tennessee and are called Silver Surfers. They do cost more than the asbestos type but for the person who is serious about Raku they are a very worthwhile investment.
Clay Body

When I first began Raku, I knew the value of having a good clay body that would withstand the torture of thermal shock. Because I thought this could only be accomplished by the addition of large amounts of grog or silica sand to an otherwise tough body, I suffered working with a heavily grogged body. Not only was it not plastic but the amounts of grog prevented much surface sensitivity. Last year I took a different approach; one from a standpoint of flameware. This type of body makes use of two ingredients to counter the thermal shock: talc and a lithium compound, usually spodumene. After some initial testing I came up with one which seemed to possess most of the properties I needed. The main ingredient would continue to be fire clay (50%) but to that I added 20% talc, 15% spodumene and 20% ball clay (OM#4). I used this for some time and was pleased, however it was still a little short so 2% bentonite was added and this remains the formula today. The relatively high amount of spodumene has caused this to be more expensive to have made but with the decrease in losses it has more than paid for itself. Another advantage is in the area of throwing. If you have ever spent a day throwing clay that was comprised of 30% grog, you can understand how it felt to switch to this more plastic, grog-free body. Two other advantages have come to my attention. The first is the increase in dry strength. This is quite important in view of my lamps, large bowls and platters which were susceptible to cracking while being moved or handled. The other is the low shrinkage factor (5% from wet to cone 08). This has helped greatly in the construction of many pieces. The low shrinkage reduces the changes between the pieces of clay with which they are built.
Glazes

In my opening statement of objectives, I dwelt on the use of a minimum number of glazes to achieve the maximum of results. Currently, I use two glazes, one underglaze stain and two sulfates. The results from these five materials have been encouraging. The formulas for both glazes are in the appendix.

The first is a standard white crackle which I have used with consistently good results. It is a good glaze to use as a vehicle for the stain and the sulfates. The crackle pattern varies from a fine wispy line to one with large bold open areas. It can be controlled somewhat by rapidly cooling the piece either by air cooling or spraying the piece with a very fine mist of water just after it comes out of the kiln. This usually gives a finer network of crazing lines.

The second glaze is an alkaline copper type. Its effects range from a soft, almost muted green to a bright turquoise or copper luster and just about everything in between. The real key to this glaze is in the reduction and the variations used. This is discussed under Process.

The last three coloring agents I use are the Burgundy underglaze stain for the pinks and two sulfates, copper and cobalt. The sulfates are used primarily as lustering agents for small highlights on platters and for the interiors of the lamps. With the exception of the sulfates, which are sprayed, the glazes and the stain are applied by brush.
Process

When I use the word process, I mean it in reference to the last two stages before the final product: glaze application and post firing reduction. I have saved these areas for last because I feel strongly about their effects and how they represent the spirit of Raku. They are the culmination of the work. When I first began I used a lot of glaze brushed evenly over the entire surface, fired it, and as the piece was pulled it would immediately go into the reduction drum and be smothered with straw. Today, I realize there is an art to both of these areas, a sensitivity that is reflective of the individual.

Unless it is impractical, I apply all my glazes by brush. I find brushing gives me more time to relate to the piece and feel that this is much more personal a method than dipping or pouring. Another reason for brushing is the ability to control the thickness of the glaze. Because I am using only the two glazes, I experimented a great deal with the different effects of thickness variation. While there is a difference with the white crackle, it is the alkaline copper glaze that undergoes the main changes. When it is applied thickly, its effects range from a deep blue to a copper luster if the reduction is heavy and more in the greens when the reduction is light. A medium thickness will usually yield a more turquoise color that also ranges into the deep greens and when it is applied very thinly, and the right reduction is used, it will range from a brilliant yellow to a pale orange-red. All of this is due in part to that variation of thickness, but it is not that alone. This is where the reduction comes into play.
The reducing phase is probably the most complex aspect of Raku and it is certainly the most magical. Because of this, I have tried to break it down into segments more easily dealt with: materials and time factors.

Almost any combustible material can be used as a reducing agent, although some have certain advantages over others. I shall cover those which I used during my research but should note that they are only a few of the many possibilities. Straw is one of the most common because it is easily obtained, easy to handle, and quite dependable. Its smoke seems to be more acrid than others and its fire is a bit lazier until it gets going. The combustion is not as complete as with leaves or newspaper and it has a tendency to mark the surface which may or may not be desirable.

Another material which works well is finely shredded newspaper. Its fire is much quicker and the combustion more complete than straw's but because of that, there is little residue to trap any heat and help retard the cooling of the work. Also, the ink seems to have metallic traces to it which leave their own effects on the glaze.

Sawdust, like straw, is widely used because of its availability. I did not use it as often because its fire is too fast and its smoke too dense to control on the glaze. It is an excellent reducing agent when a heavy reduction is called for or when you want to retard the cooling of the piece since it traps and holds a great deal of heat.

The final material, and my favorite, is dried leaves. Of the materials, they are the easiest to use in terms of controlling their placement on the piece and the amount of smoke generated. They burn fast and leave beautiful fire trails on the surface of the work. Their
combustion is more complete than straw but less than newspaper. In my opinion, they offer the best results for the present time.

Each of these materials has its own characteristics and it is up to the individual to decide the effect he wants. Initially, this will involve a lot of experimenting. There are no set formulas as to how much of any one material to use or when to apply it. Each piece has its own latent heat relative to its mass and this in turn will affect the glazes which give different results relative to the intensity of the reduction and the different reducing material.

Air time is that period when the piece has been pulled from the kiln but has not yet been placed in the reducing drum. I feel this is a critical time for the final development of the glaze. By allowing a certain amount of chilling or rapid cooling to take place, I can add some control to the amount of reduction a piece will accept. This is more true for the glaze than the raw clay. The other thing that air time does is induce crazing since the surface is cooling faster than the piece. Like the use and selection of the reducing material, the amount of air time is based on experience with the glaze and the size of the piece. After enough tests you begin to look for small things that tell you when it's time to reduce.

The fire time is by far the most spectacular of the three periods. It covers the time when the piece has been placed in the drum and introduced to the combustible material, but is allowed to burn freely, not trapping the smoke. I feel this is important because here the final glaze colors begin to mature. As the flames begin, they lick at the piece leaving fire marks or small wisps of carbon on the surface of the glaze. It is a beautiful sight when you understand what you are
looking at. As this time period continues, more reducing material may be added to continue building the intensity until the proper moment arrives for the smoking time.

Because it is the last of the three periods, its role in determining the final colors and effects is very important. At this point, the glaze should still be soft enough to accept the amount of carbon necessary to give the desired results. The amount of smoke is important so the fire should be allowed to grow and intensify. The last thing that should be mentioned under smoke time is how long to leave the piece in the drum. Much of this depends on the size of the piece and how much heat it is holding. For small to medium pieces, I try to leave them about twenty minutes. For the larger objects, sometimes several hours might be necessary and there may be times when it is desirable to leave them overnight for a more complete setting of the lusters or other effects.

There is no substitute for experience when doing Raku. The intuitive process is as important as any set of notes. It forces you to remember the small things, the signs of change in the piece as you proceed from step to step.
Conclusions

I proposed to explore color and form within the Raku process using a minimum number of glazes to achieve a maximum of results. I feel this has been accomplished. The forms have been refined, the colors have come to life and the integration of both, in my opinion, has been successful.

This has been a period of learning, exploration, and preparation for the future. I feel I have a better understanding of my materials and the Raku process. I have learned to accept failure as a part of success. Without it we have no yardstick with which to measure ourselves or our work. The experiments have opened new avenues to explore, for this is only the beginning. There are new glazes to extend and work with, new forms to be built, and new ideas to incorporate into the design patterns.
APPENDIX

White Crackle

Ferro Frit 3134  80 grams
Neph. Sy.        20
Bentonite       3
Tin Oxide       6

Alkaline Copper

Ferro Frit 3110  42 grams
Gerstley Borate 30
Flint           6
Soda Ash        6
Kaolin          3
Copper Carbonate 3

#228 Burgundy -- Mason Color & Chemical Co.
Door is connected to counterweight by 3/16" steel cable which passes through 2 pulleys hung from roof. 1" iron pipe is welded to bottom steel plate & goes through top plate & threads into tees.

Kiln Specifications

Plate I
Raku Sphere with Lid 18" x 18" x 6"

Plate II
Raku Platter 18" x 14"

Plate III
Raku Platter 16" x 16"

Plate IV
Raku Hanging Lamp  22" Diameter x 12"

Plate V
Raku Platter 18" x 14"

Plate VI
Raku Hanging Lamp 22" diameter

Plate VII