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Structural influences in nature

John Hair

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Rochester Institute of Technology

A Thesis Submitted to the
Faculty of the College of Fine and
Applied Arts in Candidacy for
the Degree of
Master of Fine Arts

Structural Influences in Nature

by

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May 18, 1985
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Thesis Proposal

The purpose of this thesis will be to explore botanical elements, seeking to gain greater insights about form, structure, and volume. I intend to use this information to create forms that are not clay reproductions (of plants), but personal interpretations about the natural order and structure found in nature.
Introduction

My involvement with clay both in undergraduate school and after has alternated from functional wares to more sculptural, conceptual works. After college I became involved with functional pottery as a means of support. This was satisfying but my time spent exploring nonfunctional forms diminished.

As my exploration of ideas relating to form progressed, one constant persisted, the wheel continued to be the primary method of construction. I created precise, symmetrical forms that were then altered and added to by different handbuilding techniques. During my first year of graduate school my exploration of form continued with the thrown form, although I learned the value of references from the past and present. As I studied different cultures from the past I became more aware of the powerful influence nature has had on artisans over the centuries. I also realized the similarities between shapes found in nature and the forms I had made on the wheel.

It was a natural decision for me to use nature as reference because the precise, crisp contours and the strength and organization of structures would be valuable in my study of form.

As my research began, I discovered many similarities between the plastic qualities of the thrown form and those of seedpods and other floral elements. The similarities I found also existed at a structural level. Many of the shapes that existed in nature developed as a result of their function and their environment. These natural structures developed in a
way that allowed them to be physically capable of support while also providing protection for the seeds to grow to later reproduce the species.

From the outset, it was my intention to explore the potential of the thrown form in my study of nature. I intended to alter and handbuild additions to these forms when necessary to achieve a particular concept or gesture.

As I began to throw the clay form I soon realized that to capture the gesture and contour of various botanical shapes required pushing the clay almost to the point of collapse in many cases. This became an important factor in the development of this body of work. As the work progressed it became apparent to me that exaggerating the proportions of elements within the form, or the entire form itself, created a dramatic, sometimes surreal result. However, the finished piece is dependent upon the artist's ability to translate the concept in his mind into the material he has in front of him. An important reason for choosing the thrown volume as a basis for my exploration of structure and form was the fact that the process afforded me a pliable shape that could be manipulated as a whole. Because I chose to approach this problem in this fashion it was necessary to envision what thrown shape to use in order that I could subsequently alter it to conform to my initial concept.

I experimented with many variations of shape in an effort to effect a compromise between my ideas and the limitations of the clay. Through this experimentation I began to realize
that there were many variations of a few basic shapes.

Similarly, I found that subtle variations of a few basic thrown forms combined with the subsequent alterations and additions afforded me a large vocabulary from which to draw.

Harry Martinson states that:

It may be that there are certain fundamental laws regulating design, laws that are generally valid in living and inanimate nature and that there is a large, yet limited number of possible shapes among which nature can choose but no more.

There is strong evidence that this is so. If there were unlimited choice in design, it would be impossible to speak of laws of form; we should have anarchy, an infinite, chaotic multitude of whims of nature, differing from one occasion to another. (1:7)*

In my exploration of form I concentrated on three groups of primary interest. They were seedcases, cacti and succulents, and flowers. As I investigated these different groups I also became interested in the metamorphosis of form that took place as the plants matured, bloomed, and then began to decay. As I observed the botanical elements I was attentive to color and color relationships within the various categories and within individual structures.
I. The Work

Before I begin to discuss my most recent work I feel that it is essential to explain the progression of earlier work that reinforced and directed me to my current exploration of plant forms.

My endeavors in clay are continually changing; sometimes the changes are subtle and other times more extreme. My creativity is stimulated by influences of contemporary artists as well as those who practiced their craft long before my lifetime. The influences may be ones that I am consciously aware of such as the dramatic thrown forms of Geofrey Swindell. In them he creates an inflated quality reminiscent of a mushroom, while retaining a delicacy and crispness of form throughout (Plate 1).

I may also see dozens of references on a trip to a museum or gallery. These bits of information are subconsciously stored in my memory to be used at a later time. Because of this combination of conscious and subconscious awareness contributing to the formation of my concepts, there are sometimes elements that appear in my work that I can't immediately account for. Such was the case at times in my current work. I will explain the progression of concepts and influences as I perceived them in relation to the development of my work.

*Numbers in parentheses refer to numbered references in the bibliography; the numbers after the colon are page numbers.*
In the spring quarter of my first year at RIT I was working with lidded jars. The idea of them being functional was not of importance to me. Most of them were "monkey traps" as Bob Schmitz described them. A person could put his hand in, but as he grasped the contents it was very difficult to remove his hand without dropping most, if not all, of what he had picked up. I was more concerned with utilizing the plastic quality of the clay, pushing it to its physical limit, to create very plastic-looking gestural forms (Plate 2). As I worked with this concept, I realized these jars also had the feeling of fullness and softness. Combined with this inflated feeling was the allusion to an inner armature or supportive skeleton. With this idea in mind I began to investigate different possible configurations of the implied understructure. At times I became very literal and allowed the skeleton to pierce the thin skin of the pot. Other times I preferred the mystery created by the unseen implied structure hidden below the surface. Because of the association with the circular motion of the wheel, it was inherent that I would encounter the spiral configuration. Although it didn't occur to me at the time, I later realized how often the spiral pattern occurred in nature. I explored many variations from a tight, repetitive, spring-like design to one with a long, fluid, irregular coiling motion. I sensed that the forms still lacked the dynamic gesture and the sculptural presence I was seeking.

I changed the shape of the jars, and began to alter the
bases in an attempt to inject more vitality into the forms (Plate 3). It was at this point that Bob Schmitz asked me why I was restricting my exploration to lidded containers? I hadn't realized the obvious fact that the body of the jar had become subservient to the lid. I abandoned the cover as my primary concern was not about function or containment. With this new freedom my work changed radically. The forms undulated and seemed to spiral and grow like buds in the spring. I continued to further pinch and alter the forms in an effort to instill a feeling of growth. I tried twisting the forms in varying degrees to create a spiral which I felt injected more energy into the form (Plate 4).

As the spring quarter ended my forms had become very plant-like although somewhat unresolved in my mind. I was excited about what I had discovered but wished to pursue the ideas further. Over the summer I had only one opportunity to work with clay, but the concepts I had touched upon in the months previous lingered in my mind.

As I resumed my work that fall I focused on specific references from nature, although my intention was not to duplicate botanical shapes. I wanted to explore the possible synthesis of elements taken from many different sources in the plant world. As references I collected xeroxes of seedpods, cacti and other floral designs that I felt would be informative. I became interested in the relationship of the configuration of the seedpod to the size, shape, and number of seeds contained within. Nature did not create the forms by
chance; each pod's shape was dictated by its function of first protecting and containing the seeds while they matured and then distributing them to start the cycle of life again. I also studied the transformation of form and surface contour as the growth progressed (Plate 5).

My first clay forms were an attempt to create an imaginary seedpod-like shape in which the surface contours invited the viewer to intuitively create an image of what the contents had been (Plate 6).

As my research progressed I began to focus on the finger-like appendages growing from the upper edges of some seedcases such as the saxifraga granulata or meadow saxifrage.

The fruit is a globular capsule with two long appendages, which are the hardened remains of the pistil. Between them is an opening, through which the seeds are shaken by the wind. (1:33)

I was interested in these appendages initially as a means of enclosing the interior to contain the implied contents. I also became aware of the negative space created by the appendages (Plate 7).

At this point I sensed that my work was beginning to look like clay replicas of my source material. I continued to work, now using only a few references pertaining to form and volume combined with bits of information drawn from memory. At first I focused on growth and the integration of the tentacles with the forms from which they grew (Plate 8). I examined different modes of attachment and the function of appendages in various seedcases.
Plate 7
Seedcase
Height 14" x Dia. 7"
The Nigella Sativa has its five horns pointing stiffly upward, direct continuations of the outer edges of the five follicles. The Nigella hispanica is more graceful, with twisted points on the long horns, which spread apart as the fruit ripens (1:61).

In most cases the appendages varied in direct correlation to the stage of growth of the seedpod itself.

The long, narrow follicles are empty; the tiny black seeds, which filled them in Autumn, have been dispersed by the wind. The veins of the follicles form a fine network, sometimes with transverse lines, like the underside of a snake. These beautiful markings can be seen best in the spring after the plant has been exposed to wind, rain, and frost through the autumn and winter. (1:29)

As the seedpods grew and matured their appendages, which in many cases were their lifeline to the parent plant, they maintained graceful, pliant gestures. As the pod reached the end of its growth the appendages usually appeared less fluid. I realized that I could depict not only growth or decay but also volume. By arranging these follicles in specific patterns I could define a space and create an imaginary volume within their confines. I could also repeat the surface contour or shape of the clay form (Plate 9). Although this group of work concentrated on surface contour, repetition of form, and the relationship of the appendages to the body, I also was making note of the surface contours occurring on the interior surfaces.

At this point I changed my focus to the investigation of inner structure while still sustaining a sense of growth. I used orchids and other flowers at various stages of growth as reference. I liked the complexity of the flowers as a whole with their varied individual elements. I studied the way in
Plate 9  Untitled  Height 14" x Dia. 8"
Plate 10
Floral Form
Height 13" x Dia. 14"
which nature had created a contrast between the graceful, flowing lines of the outer petals and the central vessel-like portion containing the reproductive organs of the flower, the outer petals unadorned in contrast to the textural embellishment found on the central form.

When I returned to the wheel I concentrated on forms that I felt would be reminiscent of a flower blossoming, also creating interesting inner surface contours and spatial relationships. After experimenting with various shapes, I decided that the form that satisfied these requirements most accurately was one that flared open at the top and remained narrow at the base. I studied these forms as I altered first the lip to create a fluid gesture. Then I shaped the body of the form in an effort to relate to and reinforce the movement initiated in the lip (Plate 10). I sought to create a unification of the lip, body, and base.

To articulate challenging, even disparate, units is one of the things that makes a good pot especially interesting. For it is in this that variation and invention have their freest play, and that proportion, architecturally, mathematically, and/or physiologically suggestive can be fully developed. (2:115)

As I worked with variations of the flared shape it became evident that the format that best related to the feeling of growth was the spiral. I experimented with this twisting motion found in buds as they begin to open, noting the changes as I experimented with proportions and the degree of twist exerted on the clay (Plate 11). I began to see similarities in the physical limitations and structural properties between
Plate 11

Floral Form

Height 13" x Dia. 12"
Plate 12

Untitled

Height 16" x Width 8" x Depth 5"
the altered thrown forms, with their convoluted surfaces, and their botanical counterparts. The angle between the foot and lip of the flared, thrown form, stretched to its physical limits, created the same relationship as a flower in full bloom with its petals cantilevered away from its base. Forms created in clay are governed by laws of gravity and mass as are structures formed in nature.

In the midst of this body of work, directly related to structure and form references, I produced a group of forms specifically to explore a technique that I had briefly touched upon a few years earlier. I felt the technique would be applicable to the concepts I was doing currently. The technique consisted of throwing a form and performing the desired alterations to the lip and body. Next, the inner cavity was filled with newspaper to support a slab of clay that was cut to fit over the opening, thus enclosing the form. Later after the form was leather hard, it was placed top down on the wheel and recentered. The original base, now facing upward, was cut open and pulled up in preparation for the last step. Finally, a new cylinder was thrown and then attached to the top of the original form. Depending on the stages of hardness, the two sections could be altered simultaneously. I realized after I finished the first form that it possessed characteristics similar to some of the succulents I had xeroxed earlier.

Succulents are described as small creeping plants with cluster forming, sometimes ribbed, angular or cylindrical stems, mostly with a tuberculate surface texture. (3:215)
I worked with the spiral creating forms that appeared to be root-like forms pulled from the ground. The forms evolved through subtle, yet distinctive changes influenced by references from earlier work as well as succulents. Of this group of work one piece in particular appealed to me because it encompassed many plant-like qualities, although specific references remained obscured when united to form the vase (Plate 12). I also enjoyed the allusion to loose skin supported by a skeleton or armature. This led me to consider the possibility of actual structures inside some of the earlier pod-related forms.

A structure or remnants of a skeletal system that might serve as an explanation for the contour patterns on the outer shell. Also this inner structure could divide the interior space, much the way seeds relate to a pod's shape. (4:5)

As I began to work with this concept I dealt with the inner structures in a way that their relationship to the outer shell was only implied. In the two works shown in Plates 13 - 14, the inner structures spiraled relative to the pattern created by the outer surface contours. Except for the base, the two structures never physically touched. As I worked with these concepts I experimented also with variations in the volume of the lip and the contours created by the transitions from thick to thin.

My investigation of inner support systems progressed a step further. The structure now was physically attached to the inner wall of the form. I consequently realized that
Plate 13  Seedcase  Height 14" x Dia. 9"
Plate 14  
Seedcase  
Height 14" x Dia. 7.5"
being less literal with the two structures' relationship improved the visual interest within the form. As the evolution continued, the skeleton became only fragments attached to the shell, leaving the viewer to imagine the configuration of the core. Still later the fragments began to grow as if alive from the inner shell (Plate 15). At this stage the inner structures were literally causing the outer surface undulations. My forms became more symmetrical in their arrangement of elements much the same as many forms in nature. Frequently nature divides its seedcases into three, five, or more sections of equal volume. There is an unmistakable visual strength and power in nature's arrangement of form. This strength extends to a formal level as well. These symmetrical sections arranged around a central axis are one of nature's and man's most tried and tested designs.

As I continued to work I began to reflect more of my own imagined references. In an attempt to shift my work in a new direction I experimented with a new form, new to this exploration of botanical influences. I realized that in most of the forms I had thus far created, the vertical proportions were usually greater than their horizontal counterparts. With this in mind, I began to make lower, more open forms, exaggerating the proportions of various elements, particularly the lip of the form. The lip became increasingly dominant, assuming an inflated, almost animalistic quality. As the upper proportions increased in relation to the size of the base, a problem of balance and support developed. It became
Plate 15

Untitled

Height 10" x Dia. 14"
Physically necessary to brace the plastic form in the early stages of construction. The system of bracing I used immediately brought to mind images of legs and/or roots, both of which related to the feeling of animation that was happening in the lip. I tried variations of shape, size, and texture of the support structures until I was satisfied that they not only served to physically balance the form, but also encompassed the images I had conceived. In Plate 16, the support mechanisms remained ambiguous as to plant or animal references, while reflecting the meaty, inflated quality of the lip.

Ensuing forms progressed along similar lines with my attention focusing on the connection of the legs with the outer skin of the form. I looked at the connections of botanical forms with similar inflated characteristics. Mushrooms, cacti, and seedcases were scrutinized.

One contemporary artist's work proved to be informative also. Dave Dontigny, who works with inflated, animated forms reminiscent of cacti, appealed to me because of his approach to subject matter. His "Clay Hybrids" (Plate 17) incorporate elements and proportions in a way that induce images relating to plant, animal, and/or human attributes.

I began to further develop the outer support system, attempting to capture an animated, plant-like feeling while integrating the structure with the inner form. I wanted to further exemplify the animated qualities I had already touched upon (Plate 18). As these structures evolved further, the
legs lifted the forms off the surface on which they rested. The lip continued to grow until it finally rejoined the outer wall (Plate 19). The potential for creating the illusion of weight and volume within the wall became evident.

I experimented with variations, pulling the lip inward; eventually I realized that I would have to handbuild additions to create the desired volume. This method seemed acceptable although I experienced some cracking during the drying process. This was caused because the two walls were pulling away from each other as they dried. The clay particles' alignment of the thrown portion was different than that of the slab sections; thus the shrinkage caused the clay to move in different directions where the two sections met. This problem probably could have been solved, time permitting, with an extended drying time. The first piece with this method of construction was more vertical in comparison to the preceding forms. I felt that the added depth would help to promote the illusion of volume in the walls of the form. The added depth allowed me to taper the two layers of clay together near the bottom, concealing the decreasing thickness of the wall. To enhance the inflated quality I experimented with different surface treatments, drawing references from my memory, both real and imagined. A patterned arrangement of surface indentations produced the desired effect (Plate 20). In viewing the form at this stage, it had an upholstered appearance on the outside. The interior, in contrast, seemed more fluid and sensuous, much like the inner recesses of a
Plate 20

Untitled. Height 16" x Dia. 11"
flower. I became intrigued with this contrast within one form. I thought of ways to augment this contrast. I considered translating the contrast that had been created in the earlier work between the shell and the inner skeleton into the current piece. I liked the detailed, hard-edged lines of the earlier inner structures in comparison to the softer curves of the outer form. I felt that this inflated piece lacked this contrast in surface and form. With these thoughts in mind I constructed a form to occupy the hollow, receptive interior. Not only did the form contrast in surface texture, but its configuration related to the inner cavity of the containing form while also possessing its inflated qualities (Plate 21).

I continued to explore the relationship between the interior and exterior surfaces in the succeeding piece. I concentrated on the articulation of form and the contrast created between the angular planes of the exterior surface and the smooth, sensuous curves of the interior. I supplemented this contrast by creating a rectangular opening within the circular format of the outer perimeter (Plate 22). In this form the skin of the pot appears to be stretched tightly over an unseen armature. The mystery of this concealed skeleton combined with the machine-like contours appealed to me.

I wanted to exaggerate the fleshy quality, emphasizing the feeling of volume in the form while reducing the interior area. As I completed the body of the next piece, I again sensed the absence of a contrasting inner structure. This
Plate 22 Herranthus Meyeri Vessel Height 14" x Length 15" x Width 13"
piece has floral characteristics that I felt would not coincide with the type of inner structures I had used up until then. Instead of viewing the inner structure as altering the shape of the outer form, I wanted the inner mechanism to exist within the given area as a separate element (Plate 23), similar to the way the reproductive organs of a flower exist, relating to the flower as a whole but remaining visually detached.

In the final floral form I combined bits of information and concepts derived from the previous explorations. This form, when viewed at eye level, at first appears to be inflated as previous forms. The illusion is realized, however, upon viewing the interior. The interior itself creates its own illusion, one of depth. This is the result of the extreme taper of the form combined with the vertical tentacles growing from the bottom. These tentacles create a spatial illusion that I supplemented by filling the interior with water to just below the rolled-over lip. The water not only completed the spatial illusion, but also unified the separate elements, creating an environment within the form (Plate 24).
II. Color

My intention at the outset was to use color as a means of accentuating and integrating form. Color also played an integral part in maintaining a connection with my botanical influences. It enabled me to emphasize certain elements or areas such as contrasting interior and exterior surfaces. Color created a mood, such as softness or wetness, while adding a unique character to each form through subtle changes in hue and intensity due to variations in glaze application and kiln atmosphere. In some instances color added to the sense of animation. Finally, color enhanced the tactile quality of the forms, inviting the viewer to look closer at subtle changes in surface contours. The hues I used generated certain emotions for me but will evoke different responses from each viewer.

Although my initial use of color had been to enhance and articulate form, I selected colors that would also reinforce the sense of softness generated by the form itself (Plates 2-3).

As my concepts changed at the beginning of the first year I began to search for new colors. As I suspected, high-gloss glazes had the potential to totally change the character of a form. The reflective qualities of a gloss glaze made the form appear wet, similar to a flower in the rain. However, it seemed to create a hardness or rigidity, a glass-like quality that I didn't feel was homogeneous with the form (Plate 4). The glaze seemed to create a contradiction, the form appeared
soft while the glazed surface looked impermeable.

In Plates 6-10 I reverted to matte glazes because I felt the matteness coupled with a pastel pallet of colors blended best with my forms and concepts. I later considered the use of a glossy glaze on the interior only as a device to create a contrast between interior and exterior surface (Plates 11-13). The interior of the forms looked wet and inviting, while the exterior maintained a detached sense of softness.

As I experimented with new colors on later work I blended colors by means of directional spraying, accentuating the surface contours. The new pallet of colors began to reinforce the animated quality that I wanted. Unlike the glossy glazes, these glazes appeared plastic-like, yet soft because of subtle tonal changes combined with the rich hues and the matte finish (Plates 14-15).

The work progressed and the shapes became more animated. The contrast of colors within individual forms increased. I also used color to create ambiguity as to the identity or origin of elements (Plates 16, 18-20).

Color proved to be valuable as a means of emphasizing the inflated volume of the double-walled forms. In Plate 22 the contrast, choice, and application of color all work in harmony with the composition to produce a form that possesses both plant and animal references. In Plate 23 the interest in contrasting interior and exterior colors continued. I blended colors in a manner that would not detract from the surface articulations, although would enhance the form. I enhanced
the depth within the form with color while also creating a contrast with the interior element, reinforcing my concept of separating inner and outer structures visually.

In Plate 24, the use of color combined with the activity of the tentacles serves to create a surreal feeling. Also the contradiction between the warm color, implying heat combined with the flame-like motion of the tentacles, in contrast to the water that fills the interior. On another level, the contradiction between the form and color also came to mind. In theory, warm colors appear to move toward the viewer. As this form diminishes in size alluding to depth, the color appears to make the bottom seem closer. The combination of spatial elements and color would be the next logical step in future work.
III. Conclusion

At the completion of this segment of work derived from botanical references, I feel my perception and understanding of form have grown substantially. As a result of this study I have gained new insight into avenues of approaching my artistic endeavors in the future. Technically and conceptually I have broadened my ceramic vocabulary. With my new-found consciousness and sensitivity, my work with clay, be it sculptural or utilitarian, will continue to grow from the knowledge learned here.

In retrospect, as I view this body of work I feel a great sense of satisfaction. My exploration of form has helped me to discover new solutions to questions relating to the foot, body, lip and other segments of the thrown form. Many of these solutions will be useful when translated into utilitarian forms.

I feel the work itself has evolved to cover a wide range of concepts. The forms developed in a progression similar to the growth found in nature, from the seedcase related forms with their allusion to contained inner elements, to the spiraling floral forms with a strong sense of growth, and finally to the double walled forms that are reminiscent of a matured botanical structure, which completed the cycle.
## Appendix

### White Stoneware Clay Body*

**lbs.**

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### Glazes

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<td>Flint</td>
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<tr>
<td>Lithium Carbonate</td>
<td>2.7</td>
</tr>
<tr>
<td>Copper Carbonate</td>
<td>3.0</td>
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</table>

* All formulas are cone 9-10 temperature range.
Black Matt

<table>
<thead>
<tr>
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<td>Dolomite</td>
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<td>Nepheline Syenite</td>
<td>71.6</td>
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<td>Ball Clay</td>
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<tr>
<td>Bentonite</td>
<td>2.8</td>
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<tr>
<td>Cobalt Oxide</td>
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<tr>
<td>Iron Oxide</td>
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<tr>
<td>Manganese Dioxide</td>
<td>3.4</td>
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Carltin's Green

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<td>Barium Carbonate</td>
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<tr>
<td>Flint</td>
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<tr>
<td>Rutile</td>
<td>8.3</td>
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<tr>
<td>Talc</td>
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<tr>
<td>Copper Carbonate</td>
<td>4.0</td>
</tr>
</tbody>
</table>

Various tones, shadings, and color-blends are achieved by using an airbrush. All glazes should be passed through an 80 mesh or smaller screen.
Bibliography


4. Notes from my journal, John Hair.


