ENAMELING ON COPPER AS A MEDIUM OF
ARTISTIC EXPRESSION

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INTRODUCTION

"The artist does not see things as they are, but as he is."
Alfred Tonnelle

"Everyone wants to understand art. Why not try to understand the song of a bird? Why does one love the night, flowers, everything about one without trying to understand them? But in the case of a painting people have to understand. If only they would realize above all that an artist works of necessity, that he himself is only a trifling bit of the world, and that no more importance should be attached to him than to plenty of other things which please us in the world, though we can't explain them."

Although Picasso makes reference only to painting in his above statement, the same attitude might be appropriately held toward any creative expression. Because it is of necessity that an artist expresses himself, he feels compelled to define his feelings and sensations in some tangible form. This tendency to create, however, is present in all individuals, but in varying degrees. "There exists in all men a distinct impulse to make things, an instinct which cannot be explained by theories of libido or will to power."

1. Lewis C. Henry, Best Quotations for All Occasions, Permabooks, New York, 1948, p. 11.
This compulsive desire to create is made quite clear in one of Van Gogh's letters written to his brother Theo in 1888. "Is it not emotion, the sincerity of one's feeling for nature, that draws us, and if the emotions are sometimes so strong that one works without knowing one works, when sometimes the strokes come with a sequence and a coherence like words in a speech or a letter, then one must remember that it has not always been so, and that in the time to come there will again be heavy days, empty of inspiration. So one must strike while the iron is hot, and put the forged bars on one side." 4

The "raw" materials involved in art processes are the same as those which are of concern in human behavior: body-response, feeling and idea, i.e., body movement (a physical reaction), emotion and thought. In other words, what the artist puts into visual form is his conception of various aspects of his environment—it may be his attitude toward war, his feeling for color, or any number of things. His work may be something which is personal and may have meaning for him alone, or it may be concerned with group beliefs or an incident such as is depicted in Picasso's Guernica. Whatever the idea is which the artist wishes to express, it is the above factors which combine into the expressive act which forms his unique statement.

Just as artists differ in purpose then, so do people differ in their attitude toward art. To some individuals a painting must tell a story; to others, art must have an associative value with some remembered experience. Its meaning for the individual is conditioned by his attitude and emotional response to each work of art. Nevertheless, today we want to understand the problem of creative expression not merely in order to see how forms are placed in space, or how volume movements are organized, but to learn how the artists, and we too, can put our inner vision within the limitations of a medium.  

Of the various elements involved in the understanding and appreciation of art, one of the most critical is that of experiencing the process of creating. Merely manipulation of materials into some tangible shape isn't indicative of a creative process if we think of creativity in the sense which Kepes describes it: "To perceive an image is to participate in a forming process; it is a creative act. From the simplest form of orientation to the most embracing plastic (plastic used to designate the formative quality and shaping of sensory impressions into unified, organic wholes) unity of a work of art, there is a common significant basis: the following up of the sensory qualities of the visual field and the organizing of them. Independent of what one "sees"

every experiencing of a visual image is a forming, a dynamic process of integration, a plastic experience.\textsuperscript{6}

If creativity can be thought of in this manner, the implication then is that art isn't simply a matter of technique, but that it is rather a concrete record of a creative and integrated experience which the artist is able to record through his use of a medium. If one could then examine and participate in the creative process, we can get a better insight into the artist's work. We will be able to understand something of what the artist has attempted to give us beyond the realm of factual nature.

Since every individual possesses this innate need to communicate his thoughts, feelings and emotions to other people, schools are making their effort to provide for such expression. Art teachers are realizing that greater freedom of expression can be attained when the student is permitted to work in a wide range of media, since different media will fulfill certain needs better than others. For example, a child filled with enthusiasm about some incident or idea will probably find greater satisfaction expressing this idea in water colors than he might with a block print.

Today this need of self-expression is being met by the expanding art programs appearing in many schools. Students at present are being given more opportunities for creative

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\textsuperscript{6} Gyorgy Kepes, \textit{Language of Vision}, Paul Theobald, Chicago, 1944, p. 15.
expression than they were in the past when art activities consisted primarily of copying pictures or working from patterns.

Among the many media being used in schools at present, Enameling on Copper is being introduced (see photographs at end of thesis). The qualities which enamel possesses, and which can't be obtained with other media, such as flexibility of color-value, brilliance, luminous depth and transparency, would appeal particularly to those students who are interested in expressing themselves by means of color. Also, the versatile manner in which enamel can be applied would encourage students to experiment with it until they found a method of application which best expressed their ideas.
VITREOUS ENAMELING ON METAL

Vitreous enameling on metal is really a combination of ceramics and metal craft. Vitreous enamel, as the name implies, is glass, and this glass is fused to the metal by firing in a kiln. If an item is small, fusing may be accomplished by means of a blow torch. Enamels made for copper, silver and gold are either opaque or transparent. The raw materials that go to make up enamels are flint, feldspar, potash, lead and jewelers enamels.

Color enamels are made by the addition of metallic oxides (cobalt for blue, copper for green, manganese for purple, etc.). Some are applied during smelting and others are applied during the grinding operation. When the fine molten glass enamel comes out of the smelters, it is poured into steel slabs for cooling. This keeps the colors clear and transparent. It is these lumps of glass that must be ground up into a powder before it is ready to be applied to the metal.

Enamels for steel and cast iron are always opaque, completely covering the surface of the underlying metal. Bath tubs, stoves, cooking utensils, sinks and refrigerators are a few of the industrial items that are manufactured with opaque enamels.7

After an almost total lapse of interest in enameling during the 19th century, enameling is beginning to emerge as one of the important forms of decoration because of the many new discoveries in chemistry and mechanical inventions. The origin of enameling hasn't been verified, but it's believed to have been discovered and practiced by the Egyptians and Phoenicians. It is, however, a relatively new art in the United States. When enameling was introduced in the United States, it didn't start as an art, but as an industrial process. About 1880 American technical men went to Germany to learn what they could about industrial enamel formulae, and brought them back to this country. Germany at this time was the leader in this utilitarian ceramic field and was successfully enameling utensils, stove parts, and plumbing fixtures.

With a renewed interest in creating more beautiful utilitarian objects, a handful of craftsmen were inspired to keep alive the great traditions of enameling as a fine art expression. Robert A. Weaver, President of the Ferro Enamel Corporation, Cleveland, Ohio, was vitally interested in the enamel art of the past and enthusiastically fostered its new growth and development in this country. Due to Weaver's interest and influence, Edward Winter, a Cleveland artist, was sent to Vienna to study enameling. Prior to World War II, Vienna was famous for the development of highly stylized and decorative craft work in metals, ceramics, and porcelain.
enamel; it served as the training center for some of today's leading enamelists such as Karl Drerup and Mitzi Otten, both New York artists.

Upon Winter's return from Vienna, he continued to work for the Ferro Enamel Corporation. The establishment of a trained artist in an industrial environment was the beginning of the revival of enamel art in this country. In 1934, mural art in enamels on both steel and copper were pioneered, and one of the first artists to attempt this was Winter. The Decorative Arts Exhibit at the San Francisco 1940 Worlds Fair featured three enamel copper murals, the first time any such works had been exhibited on the West Coast.

During the past fifty years, our enameling industry has experienced an exceptional growth and development. The architectural field offers unlimited possibilities to the artist today, especially those experienced in working on large scale projects. The majority of work produced during the first part of the century has been with transparent enamel on copper plaques, bowls, vases, plates, cigarette boxes, and ash trays.

Today, the country as a whole is indicating an awakening interest in small enamels, and a rapidly increasing number of American artists are now turning to enameling, and

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they promise to be an exciting stimulant to the entire industry. Few other decorative media seem to possess such luminous transparencies, flexibility of color, texture and design opportunities as does enameling on steel or copper.

This interest in enamels has also been manifested by its appearance in the school art programs. Teachers, always on the alert for new means of artistic expression, were eager to avail themselves of this medium, and it is now a permanent part of many programs.
ENAMELING AS A MEDIUM OF EXPRESSION

The world of art contains within it the whole drama of life. The creative process of life itself reveals all its phases: conception and growth, play and work; its problems, conflicts, failures, overcomings and achievements. Art may therefore hold within it the possibilities for the development of the child in relation to life far more important than the possibilities for the development of the artist. In other words, art activities can be life situations in which the student learns behavior as an individual working with and among people. He isn't merely given technical training to develop his skill as an artist.

Therefore, if art activities in which students participate are viewed in this light, the art room can be used most advantageously for the provision of situations in which planned, cooperative action as aesthetic experiences would become essential parts of personal and group problem solving. Such an environment would give students experience in real life situations, and they will be better prepared to function as useful members of society when they leave school.

One of the important concerns of art education today is the growth of personality; the cultivation of persons who are widely sensitive and aware of living in all aspects.

This of necessity involves the development of an individual's capacity to relinquish old worn-out habits, and the capacity of being able to build new habit patterns in keeping with his environmental demands. It would mean as Hayakawa says, "To cease looking at things atomistically in visual experience and to see relatedness."¹⁰ Such individuals would strive to bring satisfaction into life and eliminate ugliness; they would do this by learning to live with each other democratically, ethically, in peace and understanding, and they would be interested in the elimination of ugly cliches and prejudices as much as they would be in the elimination of ugly sites.

The purpose of an art program then could be one which could give students the experience of coping with life situations and also which would stimulate their aesthetic growth, since one of the most important factors involved in the appreciation of art is that of experiencing the creative process of action in the arts.

Such a program would give each student personal satisfaction through creative activities in a wide variety of media and art experiences. In planning an art program though, the teacher must be willing to accept the fact that each student may get something different out of it. Some may discover that it is easier to cooperate with a group

than it is to work alone; some may develop a new appreciation of color; and then there may be some who will derive nothing at all from certain activities. Individuals differ in regard to the things that interest, challenge and satisfy them, and they learn only those parts of what others offer which they can fit into their experience and purpose.

If art experiences might be viewed as the medium through which the adult mind of the teacher and the immature mind of the learner find communion, it is a vehicle for growth. When growth is viewed as a progressive development of an organism, it becomes apparent that there will be some modification in the behavior of the organism. The art teacher can assist in promoting this growth by selecting media and experiences which appear most suitable for meeting the needs of the students. As E. C. Kelly says, "The teacher should make use of new devices for ascertaining the student's degree of surety and his ability to contrive new responses in the face of failure and frustration."11

This attitude of Kelly's is apparently being carried out by many art teachers today, if the expanding art programs in many schools are any criteria. Among the wide diversity of media that are being offered students, the potentialities of enameling on copper as a medium of expression has been recognized. As a medium for expression, enameling can readi-

ly fit the temperament of most anyone; one can be either meticulous, painstaking, slow and exacting, or free, easy, and spontaneous. The characteristics which enamel possesses and which make it a suitable medium for creative expression might be listed as: flexible color-value, brilliancy, transparency, luminous depth and design and texture potentialities.

Of all the design elements with which the artist works, perhaps color has the greatest emotional impact on the spectator. Color seems to strike man more directly than line or texture or shape. Color has been used to symbolize all emotions; it appears on the flags that lead men into battle and on ribbons decorating heroes. While all of the design elements have elemental powers of their own, color seems to reach man's innermost reaction most quickly.12

The rich, glowing and durable colors obtainable with enamel can reflect so intimately, directly and subtly the innermost feelings of the artist that no system for control of all the unending relationships that color creates is possible if a free access to these feelings is desired.

We can speak of light or sombre color effects, of the vibrancy and saturation of color, of contrast and harmony of color, of all the natural properties of color separately or in combination, but we cannot really systematize its use any more than we can systematize line and shape relations in

creative processes, if by creative processes we mean the vital and intense expression of the individual.

In the past colors have had various meanings, and different color preferences have been established. For example, red which was associated with the wounded of battles had come to mean courage; green which is the predominate color found in nature meant growth; purple because it had always been the color worn by kings and queens became associated with royalty. Another view is expressed in the following poem:

Blue is true,
Yellow’s jealous,
Green’s forsaken,
Red’s brazen,
White is love,
And black is death.
Anonymous

Today, however, colors have different meanings, and are used to express the artist’s feelings and moods. This tendency is expressed in Matisse’s comments on color as expression. "The chief aim of color should be to serve expression as well as possible. I put down my colors without a preconceived plan....I discover the quality of colors in a purely instinctive way. To paint an autumn landscape I will not try to remember what colors suit this season. I will only be inspired by the sensation that the season gives me, the icy clearness of the sour blue sky will express the season just as well as the tonalities of the leaves. My sensation itself may vary, the autumn may be soft and warm like a
protracted summer or quite cool with a cold sky and lemon yellow trees that give a chilly impression and announce winter. It would appear then, that when color is used in the manner just described, it has much greater potentialities than previously. How much more exciting it can be to dictate to colors and have them do what you want them to do instead of being limited by color rules and regulations as was prevalent in the past.

When using paints, pastels or crayons it is possible to mix various colors, but when using enamel, one cannot obtain a variety of colors in the same way. Each enamel color has its own potent oxide content which is quite foreign from another, and each color will retain its distinct quality even when mixed with another color and fused in the kiln.

One discovers, while working with enamels, that colors can be mixed into combinations which might at a first glance appear to be a true color. However, upon closer inspection, it will be found that each enamel particle has retained its own color and has not fused with the other. For example, when mixing red and yellow enamel together in an attempt to get orange, the result appears successful, until on looking more closely, each distinct grain of red and yellow enamel is still visible. Nevertheless, this characteristic of enamel can be considered an advantage instead of a hindrance

since it becomes possible to obtain subtle and elusive color qualities. Furthermore, because enamels are available in either opaque or transparent colors, one can obtain a luminous depth of color by using transparent enamels over opaque colors or other materials which might be combined with enamelling.

As stated previously by Kepes, the essentials of the creative process are not to be found in the methods and techniques of representing form and space. This principle is most clearly seen in the work of children. A young child draws and paints what he knows rather than what he sees. The method or technique which a young child develops satisfies him since it serves to express his ideas, and because his mind is more concerned with ideas than the means of expression. He isn't blocked by the difficulties of how to do it.

This tendency of younger children to use a technique which will best satisfy them seems to disappear or is submerged when they approach about the ninth year. It is during this period that the confidence of the child in his own creative power is shaken for the first time by the fact that he is becoming conscious of the significance of his environment. This new awareness of his environment usually has a direct influence on the manner in which he expresses himself artistically. Where previously he drew from imagination and his experiences as they affected him, he now relies on nature as his source of inspiration. Where at one time he was more
concerned with expressing his idea, he now becomes more concerned with the handling of his medium.

The manipulation of a medium is significant in understanding one's creative work, for the manner in which the medium is handled conveys the individual's feeling for color, line and placement of masses. The expression of feeling or the representation of objects as they appear to the comprehension of the student are essential to the building of an inner honesty and faith in his own powers. Interference with this expression may result in a relinquishing of one's own belief in his concepts for those of another, and a conformity may begin which could easily lead to sterility. Therefore, all children, through high school, should be given the feeling that they could use the art media and that they could attain a technique of method of work that would be conducive to the expression of their own ideas.

Encouragement on the part of the teacher plus a variety of media would be contributing factors toward obtaining such results. Since enamel can be applied to copper in such a variety of ways, it would appear to be a most satisfactory medium for self-expression. Enamel can be used in a free, spontaneous way; it can be applied in simple geometric shapes and areas, or in a slow, exacting manner if a more complex type of design is desired.

Another possibility with enamel is to combine it with other materials, such as wire, different metal pieces,
stones, glass, grog or sand. Wire can be twisted into designs, or pounded flat. These materials can be either fused to the surface of an enameled object, or they can be covered with transparent enamels and still remain visible.

Unusual texture effects can be obtained by either sprinkle glass, grog or sand on the surface and fusing, or if preferred by mixing these materials with the enamel and applying both simultaneously. As one becomes more familiar with the characteristics and possibilities of enamel, they will gradually develop their own technique and ease of application and designing.

The function which design performs today is more than that of mere surface decoration—it goes much deeper, and its meaning is broad, complex and penetrating. Problems of use, construction and human requirements are uppermost. Design might be described in the definition which Moholy-Nagy gives in Vision in Motion when he says that design is "the organization of materials and processes in the most productive, economic way, in a harmonious balance of all elements necessary for a certain function. . . . It is the integration of technological, social and economic requirements, biological necessities and the psychological effects of materials, shape, volume, space, and thinking in relationship."14

This type of organization performs a purpose which

appears in a somewhat two-fold manner. One is functional and practical, and the other is purely aesthetic in that the visual quality of the form satisfies sensuous and psychological needs. Actually though, there is no division between the functional and aesthetic quality of a well designed object since both operate together in serving a single purpose.

If then design is considered more than merely a decorated surface, it must be concerned with the entire formulation of an object; it must be concerned with the problems of use and construction and together with its relationships to all aspects of living. Design must be evaluated in the light of certain basic considerations:

1. The use of an object must determine its basic form.

2. The material and the technique of fabrication must find honest expression in the form.

3. The visual quality of the form must satisfy sensuous and psychological needs.

The degree to which an object measures up to this set of requirements is the degree to which it is a good design.

"In addition to the qualities common to all good design, the needs, resources and ideals unique to each culture tend to mark an object as a product of its own time and place. If those needs or aspirations are too far removed from our own, the object created will probably not continue in common use, no matter how admirably it states its own message.

"When new aesthetic, economic, and other social atti-
tudes toward function, material or process of manufacture
crise, then basically new designs may develop. A new concept
will introduce a new product, which in turn may lead to in-
finitc applications of the same principle. For example, the
idea of continuous rotary motion being both faster and more
efficient than a to-and-fro movement was one of the concep-
tions to be applied to everything from bicycles to eggbeaters,
ironers, locomotives and conveyor belts."15

It is apparent that when changes occur in our basic so-
cial attitude, they will create an atmosphere for the devel-
opment of other new products. But today, an obsession with
uniqueness, newness and continuous change for its own sake
appears to be prevalent. This attitude is probably what
Kepes refers to when he writes of the "...deluded self-im-
portance of absolute 'individualism' in favor of social re-
latedness and interdependence."16 Therefore the designer
should not strive to be a stylist or a decorator, one who
changes the surface aspect of things only. Rather, he should
think of design in its fullest sense, and see in its entire-
ty the product he designs.

The photographic material in this thesis will demon-
strate the writer's attempt to solve a design problem cen-
tered about the introduction of Enameling on Copper as a

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15. "The Tradition in Good Design," Everyday Art quarterly,
No. 15, Walker Art Center, Minneapolis, Summer, 1950,
pp. 13, 14.
Medium of Artistic Expression. The purpose of this problem was to design a traveling exhibit which could be sent to high schools and would introduce the potentialities of Enameling on Copper as a new medium to art teachers and students.

The basic considerations of design, listed on page 19, were a governing factor in the execution of this problem. In the planning of the procedure and form of presentation, such items were taken into consideration as the purpose of the exhibit, how it was to be used, and what materials could most effectively be used. In view of the fact that this exhibit might be shipped, made it necessary to design it along simple construction lines so it could be easily packed and handled. The problem of displaying the exhibit also influenced the final selection of arranging it in five boxes. This type of construction seemed to offer the possibility of arranging the exhibit in sections or of displaying it in its entirety, depending upon the space available. The sequence of thought used was one progressing from arousing interest in the medium, presenting its unique qualities, showing the procedure and then the design possibilities which enamel has to offer.

The materials used were utilized to the best of the writer's knowledge. The wooden material was used to serve as protection of the enameled objects and also to be a contributing part in the actual arrangement of the enameled
objects themselves. The examples used were those which it was thought would best express those qualities which enamel possesses, thereby minimizing the use of verbal material.

An attempt was made to design the entire exhibit in as satisfying a manner as possible, one which would appeal both to the visual sense as well as one which would evoke a desire in the spectator to become familiar with this medium.
BIBLIOGRAPHY


PHOTOGRAPHS OF
ENAMELING ON COPPER EXHIBIT
ENAMEL ON COPPER
ITS UNIQUE QUALITIES

color

transparency

luminous depth
Developing a Design