A Study of Majolica Pottery Decoration

Robert Sutton Rae
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A STUDY OF MAJOLICA POTTERY DECORATION

A Thesis
Presented to
The Faculty of the Department of Art
Central Washington State College

In Partial Fulfillment
of the Requirements for the Degree
Master of Arts

by

Robert Sutton Rae

August 1968
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So often we accept assistance and practical help from those about us with inward appreciation but little outward acknowledgment. This, therefore, is to express sincere thanks to Dr. Louis Kollmeyer, Mr. Richard Fairbanks, and Mr. Edward Haines who made this study so meaningful.

A special thank you is extended to Mr. Howard Tollofson who offered many different ideas to the research.
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Neolithic man found that by polishing clay vessels he could make them much less porous, more functional and more pleasant in appearance. Soon he felt the need to embellish their surfaces, usually with decorations of a symbolic or religious nature. Much later, as in sixteenth century Europe, the ware became secondary in importance and sometimes served only as a background or "canvas" on which a narrative story was painted.

There have been many methods and countless variations in which pottery has been decorated throughout the centuries, and one method called **maiolica** or majolica, a glaze-on-glaze or pigment-on-glaze technique, is especially outstanding because of its beauty, versatility and its contribution to the potter's art. Museums and collectors all over the world exhibit fine examples of majolica and much has been written on the subject. Photographs of seven such pieces are included in **CHAPTER III on THE ORIGIN AND DEVELOPMENT OF MAJOLICA starting on page 17**.

I. THE PROBLEM

**Statement of the problem.** It was the purpose of this study to investigate the origin and development of majolica decoration and to execute original variations of these techniques on pottery made by the candidate.
Importance of the study. It is possible for a piece of pottery to be a complete statement in itself through only its form without additional embellishment of its surfaces. Previously, pottery made by the candidate has been almost devoid of decoration in the hope of achieving a complete expression in form alone. While most of this work strongly emphasized form, it was thought that a higher level of expression might be reached through a study of pottery decoration. However, upon the realization of the tremendous scope of the entire field, it was felt that more could be gained by limiting the study to just one type of decoration. The choice of majolica is the result of a research overview of the various historical methods of pottery decoration. It seemed most interesting both in its historical and technical aspects.

Also there is the additional advantage of majolica's potential educational values. This technique of decoration could easily be correlated with historical units in the classroom or in a study in art history and at the same time could be a meaningful medium for individual expression.

It is also hoped that a more thorough understanding of and greater skill in pottery decoration would be a result of this study, which in turn would benefit the candidate as a teacher and potter.

Limitations of the study. It was not intended in this study that authentic clay bodies or glazes be used but that
the particular character and charm of majolica might be achieved at both low and high firing temperatures by formulating appropriate glazes for a versatile stoneware body.

The pieces which were decorated were original in form and designed to be functional vessels as well as to display the majolica technique.

It was not deemed necessary to experiment with all variations of majolica. However, a few pieces are included which attempt to demonstrate an interpretation of some of the style and spirit of historical decorations. The motifs and designs were not intended to be copies or imitations of those used in the past by other potters or cultures. Rather, they were an honest attempt at individual expression in keeping with the limitations of the decoration medium and the experience of the candidate.
CHAPTER II

REVIEW OF THE LITERATURE

A search for information and research related to majolica was carried out at the University of Washington main and art libraries, the Seattle Public Library, the Victor Boullion Library at Central Washington State College and also the candidate's personal library. Although it is recognized that the search of literature on majolica ware has not been exhaustive, it may be reasonably assumed that the writings reviewed are representative of those available. No reference has been located that suggests a duplication of the present study which includes both the historical treatment of majolica decoration and an actual application of similar techniques plus additional innovations to originally produced pottery forms.

I. HISTORY OF MAJOLICA

Barber reports that the use of a combination of tin and lead oxides to glaze earthenware pottery "originated in Babylonia or Assyria centuries ago" (1:9, 1:3, 7:5). The practice was taken to Egypt and Persia by the Arabs and from there to Morocco and into Spain by the Moorish potters in about the fourteenth century. Majorcan trading ships bringing goods from Spain to Genoa and Pisa carried some of the strikingly beautiful Moorish pottery. Knowing the ships
were from Majorca in the Balearic Islands off the Spanish coast, the Italians called the ware majolica.

The "tin-enamed" or stanniferous ware became very popular in Italy and soon spread to other parts of Europe where it came to be known as faience in France, Germany, Spain, and Scandinavia, and delft in Holland and England (10:338).

Majolica ware remained quite popular in Europe until the arrival of Wedgwood's creamware just after the middle of the eighteenth century, after which the demand for the tin-enamed ware declined rapidly (10:364).

Most of the available clays in the Near East at this time fired to a reddish brown, making decoration with bright colors difficult. The addition of tin oxide to their lead glazes rendered a beautiful opaque white luster and when the designs were painted directly into the dry raw glaze and then fired, the result was indeed unique (11:81-82).

With many white clay bodies available today there is no longer the need for the tin-enamel procedure to obtain bright-colored decoration. However, majolica has an alluring quality which attracts present-day potters. The result is strikingly different from other methods of decoration and, because of the procedures used, requires the utmost of the skill of the artist-potter.
II. METHOD OF PROCEDURE

The procedure followed in this study was first to conduct research on the history of majolica and then, using this knowledge, attempt to effect a personal expression by means of the majolica medium.

Wheel-thrown platters, plates and bowls and also four slab-constructed pots were first made to provide appropriate surfaces for the decoration. Many glaze tests were made to formulate suitable base glazes for firing at both cone 05 and cone 9. The pottery was glazed, then decorated and fired using variations of the majolica technique in the hope of achieving new and stimulating results. Color photographs of the finished pieces have been included in the study as a representation of this creative work.
CHAPTER III

THE ORIGIN AND DEVELOPMENT OF MAJOLICA

Potters have been glazing and decorating their wares for at least 5000 years. Although they employed the empirical method of formulating glazes, without benefit of later scientific knowledge, their products set standards that appear to be as high as those of today. It has been fairly well established that the Egyptians made the first glazed ware and utilized the soda compounds which are so plentiful in the desert areas of the Near East (15: Ch. 9).

The first instance of the use of tin enamel has been found on glazed brick panels from the ruins of Khorsabad (Dur-Sharrukin), Nimrud (Kalakh), Susa (Iran), and Babylon. However, the date of its introduction has not been definitely established. A sample from Nimrud, which is now in the British Museum, is thought to have a date of about 850 B.C. Some extremely large friezes, one of them approximately eleven yards in length, are recorded as being from the Perian royal palace at Suza from the fifth century B.C.

The copper green glazes contain lead which may have been deliberately added for its fluxing properties. This technique of glazing, like that of tin enameling, fell into disuse and was forgotten. Much later, in the ninth century A.D., it was rediscovered in Mesopotamia.
Some of the most colorful and inventive pottery in history was produced in the Near East and shows the characteristic flavor of decorative pattern expressed by ancient Persian potters. The most typical wares of this region used brilliant overlays of metallic lusters. Examples of various types of the pottery of Persia are shown on this and the following two pages.

Figure 1. Bowl painted in black and cobalt on a white slip. Kashan. About A.D. 1200. From the Gerald Reitlinger collection shown in Encyclopaedia Britannica, (14th ed.), XVIII, 1964. Used by permission. Photograph somewhat darker than original.

In the seventh century, the Arabs conquered this region now called the Near East. Their potters adopted the Persian style and took it with them when they moved into Spain in the eighth century. The style known as Hispano-Moresque began to appear in Spain during the thirteenth century after the Arabs were driven out by the Moors (9:457). While there were many different kinds of Hispano-Moresque articles produced, the most famous and popular pottery was that which was painted with a so-called golden-brown luster obtained from oxides of silver and copper.
Lustered pottery changes color as the light strikes it from different directions. This iridescence is caused by a certain thickness of the metallic film deposited on the surface of the glaze during the firing. This effect will not occur if the film is too thick or too thin (17:20).

Frothingham (6:2) writes that it is generally agreed that luster glazes were developed early in the Islamic period. How the Muslim potters learned the luster process is not certain, however some authorities believe that they acquired the technique from Egyptian glass painters.

Historical data and modern experimentation have yielded some knowledge of the methods and materials used by the ninth century Muslims to formulate their luster glazes. Metallic copper and silver mixed with sulphur or the bisulphides of these metals were calcined to form copper and silver oxides. This compound was then ground and mixed with red ochre, which contained ferric oxide, and fluxed with vinegar. It was then ready to be brushed onto white glazed earthenware (6:3).

On some pieces, the luster covered the entire surface of fine lead-glazed earthenware. On others it was used to paint designs on vessels which had been glazed in opaque white (6:2).

These vessels were fired again in order to reduce the oxides to the metallic state but at a low temperature in a reduced atmosphere. This caused the surfaces to be coated
with a black deposit, but when rubbed off, the decorations of metallic silver, copper, or gold were revealed (6:3).

The photographs on this and the next four pages point out some of the variety in form and decoration of Hispano-Moresque ware.


Sometime in the first half of the fourteenth century Moorish pottery was conveyed to Italy by way of Majorca, an island off the coast of Spain. In Italy, the tin-enamed earthenware was named _maiolica_ after the place where it was mistakenly thought to have originated (10:344, 338; 12:8-9).

The exact time the Italians began producing majolica ware is not known. However, Pietro de Bono of Pola in his work _Margarita preciosa_, 1330, mentions tin as an important ingredient of the potter's glaze. The first piece of actual pottery which can be dated—a jug with the arms of Astorigo Manfredi, Lord of Faenza, from the latter part of the fourteenth century—indicates by its crude technique that production of this ware was just starting (16:8).
Early Italian maiolica used copper green and manganese purple decoration. An example of this type of work done at Orvieto, in Umbria, is shown in the photograph below. Pitchers with unusually large pouring lips decorated with very simple, if not crude, designs are typical of this period (10:366).

![Figure 13. Jugs from Orvieto and Faenza; panata (jug with applied spout) from Umbria, Archaic period (thirteenth-fourteenth century) Faenza Museum. From Five Centuries of Italian Majolica by Giuseppe Liverani. Copyright 1960. McGraw-Hill Book Company. Used by permission.](image)

In the first part of the fifteenth century the spread of Renaissance plastic art helped also to initiate the highly artistic development of the majolica painting technique. Even though production and interest were steadily growing, it remained relatively insignificant as an art medium. The ware at this time was mostly utilitarian and of good quality.
This type of ware is illustrated by the photograph below.


In the latter half of the fifteenth century, society sought elegance which became the essence of life. There were re-evaluations of taste and values, and pottery became a fine art. The potters painted masterfully in precise brush strokes of unusually rich colors (18:10-11). Vydrova summarizes this period:
Modern man's conception of Italian majolica as a characteristic national artistic expression is formed from these products, in which the creative power of the Italian people found expression in this way for the first time. It left a unique imprint also on other Italian majolica wares, we perceive primarily strong, vigorous, racially individual features which we do not meet in the same measure in the later French Faiences and even less in the Delft ceramics, which owe their fame rather to an elaboration of Chinese designs than to creative invention. (18:11)

By the start of the sixteenth century, majolica wares were not only being used for utilitarian purposes but also as backgrounds for pictorial compositions. Some of these, in the form of plates or dishes, had a rim decorated to serve as a frame for the painting in the hollow, like that shown in Figure 15.

Sometimes the picture covered the entire surface of the piece, as in Figure 16.


From the beginning, Faenza produced some of the finest examples of this type of art but was later surpassed by the potteries of the Duchy of Urbino, at Castel Durante (13:71). This was a very important center for majolica production. Thirteen factories were manufacturing the ware in the Via della Porcellana until 1632 when it closed down. Their best pottery was produced between 1508 and 1580; an example of this type of work is shown in Figure 17.
Another factory was Gubbio, noted for its marvelous metallic luster colors, especially a rich ruby red, shown in Figure 18. Giorgio Andreoli was the foremost modeler and potter of the town.

The work from Cafaggiolo in Figure 19, where Pierfrancesco established the majolica works, is often characterized by dark cobalt blue background with light green and bright orange yellow (2:72 and 88).
The early Italian majolica contributed much to the eventual manufacture of the nineteenth century ware which is often collected today. First, it set a very high standard for future potters which few have been able to attain. In various parts of the civilized world, the apparent interest of most potters of the nineteenth century was not so much a search for new forms of vessels and decoration techniques, but an attempt to imitate with local materials the beautiful work of the Renaissance potters. Secondly, the high quality majolica inspired mostly decorative forms such as plaques, wall platters, ewers, urns and tiles rather than utilitarian forms. Finally, it visibly affected the vivid coloring used in later ware (5:3-4).
In France, majolica type ware was called faience. At the time Renaissance art was diminishing in Italy, Bernard Pallisey, a French potter working independently, developed a white glaze which would cover a colored earthenware clay body making it possible to achieve brighter colors in its design. Pallisey, and those who imitated his techniques in France and Germany, produced the more exotic effects in both the form of the molded pieces and their coloring. Pallisey used nature as his inspiration for design motifs, such as reptiles, fish, shells, and plants which greatly influenced the designs used on later pottery elsewhere (5:4).

The delft ware of Holland can easily be recognized by its unusual blue and white glaze. Freeman (5:4) states that technically the Dutch delft of the seventeenth century belongs to the same generic type of pottery as the Italian maiolica, French faience and Spanish and Persian forerunners. Although the delft painting technique is the same as majolica, its coloring and decorative designs are direct imitations of Chinese porcelain, which is a very different kind of ware. In many cases the unschooled observer could easily mistake one for the other. Possibly the only contribution delft made to later majolica style was a more delicate texture which did have a definite influence on the English majolica.

Eighteenth century England saw little need for strictly decorative pieces and initiated the production of utilitarian vessels and table settings as we know them today. Until this
time most of the table ware was of unbreakable pewter and wood, available pottery being too expensive for daily use. Around the city of Burslem were found rich deposits of clays, and manufacturers of pottery began turning out some beautiful utilitarian wares. One of the first improvements over the rough stoneware and salt glaze was a type of colored, high gloss material known variously as Agate Ware, Tortoise-shell and Wieldon Ware. This ware has been attributed to Thomas Wieldon, but actually much of the best of this tin-glazed ware, a type of majolica, was the development of Wieldon's one-time younger partner, Josiah Wedgwood (5:7).

The majolica ware which is common and collectable today was mostly produced in the United States during the last half of the nineteenth century. Production was organized in large part by English-trained workers. The manufacture of majolica in this country soon developed to a point of very high production and low price (5:13).

Though the majority of majolica pieces easily obtainable are considered a cheap ware, those which were made before 1890 were usually fairly expensive and in good taste. American majolica of the 1850's and 1860's was often given as wedding gifts and thought to be a worthy substitute for silver (5:13).

Majolica is important in two ways: in the history of useful ceramic ware it stands as the disseminator of its
technique of tin-glazing throughout Islam and Europe, and it was instrumental in revolutionary change in social habits because smooth, white surfaced pottery could take the place of silver on the tables of the wealthy. Secondly, it invited decoration which was more splendid and delicate in color and more bold and sensitive in drawing than anything done on pottery before or since (14:IX).
CHAPTER IV

EXPERIMENTING WITH MAJOLICA

To those who really enjoy working with pottery it is stimulating to think that many of the methods and theories used today are little changed from those of centuries ago. There is excitement in knowing that master potters of 5000 B.C. in Egypt or 200 B.C. in China were attempting to solve the same problems of form, glazing and firing as are the potters of today. There are so many variables in the field of pottery that, even with all the past experience and scientific knowledge, there is always the uncertainty of success. In order to increase the chances of success one must experiment in directions which will be of most benefit, for there is no substitute for experience.

I. FABRICATION OF POTTERY

In this study it was intended that research be carried out to learn of the original development of the majolica technique of decorating pottery and to employ this knowledge to invent interesting effects with variations of the technique on original pottery forms. Most of the vessels, such as plates, platters and bowls, are simple in shape with surfaces which lend themselves to decorating. For variety in form and construction methods, four slab-built pots are included, which
are somewhat less conventional in concept but also provide surfaces which invite decoration.

The clay body used in the construction of the pottery for this study was of the same formula as that which is mixed for the pottery classes at Central Washington State College, the formula of which is shown in APPENDIX B. This is a stoneware body and has proven stable at both low and high glaze firing temperatures.

II. COMPOUNDING OF GLAZES

Decorating with glazes to be fired at low temperatures was done for two reasons: 1) historically, majolica was used on earthenware and fired at low temperatures; and 2) most public school kilns are electrically heated and have a maximum temperature which is considered in the low firing range. Such is the case in the teaching station of the candidate and in order for students to benefit in the use of the majolica technique, a low firing glaze must be used.

In addition, an attempt was made to create interesting effects with the majolica method using glazes formulated for use at cone 9 in a reduced atmosphere. Glazes fired in this manner produce a very beautiful, earthy quality. The difference in appearance of low and high fired glazes may be compared by referring to the photographs of the ware in APPENDIX A.

After formulating and firing many base glazes on test tiles in a search for an opaque white glossy or semiglossy
base glaze, one for each firing range was chosen. To these were added various percentages of coloring oxides using as a guide Rhodes (15:135, 138) and a list of suggested colorant additions for base glazes from previous pottery courses.

To test the result of brushing a colored glaze directly onto the raw glaze, one test tile was dipped into the low fire base glaze. As each sample of colorant was mixed and brushed onto an individual color test tile, a small area was also painted onto the base glaze tile as shown in Figure 20.

Figure 20. Test tiles of colorants for M-15 cone 05 glazes. Formulas in APPENDIX B.

A different method of painting into raw glaze was used on the high fire test tiles. For each of the solid color tiles in Figure 21 a companion tile was dipped in the base glaze and
then the corresponding color was brushed directly onto it.

Figure 21. First group cone 9 colored glazes.

Additional test tiles were made to show the variations formulated for more variety and intensity in color from those colors in Figure 21 and are shown in Figure 22 below.

Figure 22. Variations of colorants used in first group.
III. LOW FIRE GLAZES

The glazes selected for use in this study were chosen because of their appearance on the test tiles, however, in the case of the low fire glaze this did not prove to be reliable. This glaze, M-15, the formula of which may be found in APPENDIX B, is a lead glaze and when test-fired at cone 05, indicated no signs of crawling, yet when applied to bisque fired forms and fired to the same temperature, it crawled on every piece to some degree. All pieces had been allowed to dry for two or three days eliminating drying as a possible cause of the crawling. It was reasoned that the glazed pieces had been fired in a different kiln which was faster heating and which did not give the glaze a chance to heat-soak. An experiment to see if a higher temperature would cause the glaze to fill in was carried out. While watching one of the bowls through the spy hole in the front of the kiln and at the same time gauging by a cone pat of three pyrometric cones, it is estimated that the pieces were refired to approximately cone 01. On some pieces the glaze smoothed over almost completely but left scars where the crawling had been which also appeared in the designs as in Figure 23 on the next page.
Another result of the refiring was that some of the glazes completely smoothed out but the design became almost obscure as in Figure 24.

Figure 24. Low fire lead glaze design almost disappeared.
On one platter, Figure 25, the white glaze crawled very badly in the first glaze firing, curling up and forming beads over the entire surface. One coat of the same white base glaze was brushed on over the entire platter, and refired with the rest resulting in the smoothest glaze of all the low fire pieces. However, the fish design was also quite diffused.

Figure 25. Low fire glaze, smooth but diffused.

Four additional pieces were made and decorated with a variation of the first cone 05 lead glaze which crawled so badly. This second glaze, M-15C, contained different percentages of ingredients (see APPENDIX B) and the largest difference was five per cent less clay. The reason for this is that clay is one of the materials that causes shrinkage and cracking of the raw glaze which in firing can cause crawling. The
The percentage of white lead was reduced by two per cent for the same reason. The result of these changes was a much smoother glaze which crawled only on the undersides of the pieces because the bisque surface was too rough. Crawling was also evident where the glaze was applied too heavily.

To this glaze were added varying percentages of coloring oxides making four different colored glazes (see APPENDIX B). These were used to glaze and decorate one plate by brushing a flower and leaf motif over a dark rust background shown in Figure 26.

Figure 26. Plate. Second low fire glaze, M-15C, for background and design.

On two other pieces, a plate, Figure 27, and a bowl, Figure 28, coloring oxides, listed in APPENDIX B, mixed with water, were brushed directly into raw white glaze. The designs
were inspired by fourteenth and fifteenth century Persian and Hispano-Moresque designs.

Figure 27. Plate. Coloring oxides brushed directly into raw glaze. The initial is in Blackletter, which was used in fourteenth century European court and religious documents.

Figure 28. Bowl. Coloring oxides brushed directly into raw glaze.
The fourth piece, a small plate, Figure 29, was glazed with dark rust on the underside and white on the top side. A few drops of white base glaze were added to the coloring oxides before brushing on the design. The central area is a cross and a crown which conveys a religious theme.

![Figure 29. Plate. Small amount of M-15C glaze mixed with coloring oxides and brushed into raw glaze background.](image)

The addition of white glaze to the coloring oxides made no noticeable improvement in brushing quality or its appearance after being fired.

On all four pieces, the surface to be decorated was painted with one coat of gum tragacanth which greatly improved the surface for brushing. The resultant surface was firm enough for a few penciled lines to aid in brushing the design. Gum tragacanth was also added to the glazes which increased their flowing quality.

Various kinds of brushes were used from pure red sable
round to camel hair flat. The brush used most and found to be most versatile was a number six Japanese brush.

The designs on these four pieces were an attempt to interpret the spirit of the designs of the times during which majolica and its forerunners were produced. Additional designs are included in APPENDIX A showing further adaptations of designs of that time.

IV. HIGH FIRE GLAZES

The results of the cone 9 reduction firing were much more successful which may have been brought about partly through preliminary experimentation on one of the plates. The bisque fired plate was first dipped into the white base glaze to within about one-half inch of the center of the plate. When dry enough to handle, it was dipped into color #R-3-4, a very dark reddish-brown, to about the same distance from the center, leaving a strip of unglazed ware across the diameter of the plate. Ten different colorant variations of those fired on the test tiles were brushed, dipped, dribbled, and trailed onto both the white base and the dark glaze as well as over the section of exposed bisque and over wax resist areas. A needle was used to scratch through the various layers to see how this could be used as a decoration technique. The test plate, Figure 30, proved extremely helpful and resulted in a rather interesting piece in itself.
Figure 30. Cone 9 glaze test plate.

With the exception of one plate in the high fire group, Figure 55 in APPENDIX A, which is a fruit motif, all decoration is non-objective or abstract in nature. Delicate brush work was very difficult because of the extremely absorbent base glaze which caused the brush to drag considerably. Adding various amounts of glycerine or gum tragacanth to the colored glazes helped reduce this drag to some extent. Even after trying most of the decoration techniques on the test plate several of the glazes did not react as planned. The thickness of glaze application was one important factor. The brushed stripes on the casserole dish in Figure 31 are almost impossible to discern because of too light an application of the decorative color.
Figure 31. Covered casserole, high fire.

The combination of colors on the bowl in Figure 32 is not as pleasing as was hoped but the two colors fused well at cone 9 without running.

Figure 32. Bowl, high fire. Colors darker and more vivid on actual bowl.
The low fire lead glaze was somewhat powdery after drying on the surface of the ware and crumbled when not carefully handled. Lead glazes are characteristically sensitive and tend to crawl and blister. Too heavy an application, dusty surface, too rapid firing, wrong selection or proportions of raw materials could all have contributed to the crawling of this glaze. However, Rhodes (15:157) admits that even after every caution has been observed the glaze may still crawl.
CHAPTER V

SUMMARY AND CONCLUSIONS

I. SUMMARY

Some pottery forms need embellishment and some do not. In many cases fine, delicate, barely perceptible decoration may be enough—in others, bold, colorful designs will fit the mood of both the pot and the potter. In any case, the decoration of a pot should be an integral part of the piece, not something just added to cover up or improve a mediocre form. A thorough knowledge of decoration techniques enables the potter to include this aspect in the original conception and forming stages of making pottery.

Much of what a potter learns is through experimentation, and can result in either success or failure. Although the results of the present study were not entirely successful, much knowledge and experience were gained through research and experimentation. Continued search should result in a desirable base glaze for use under low range firing conditions which will not be too sensitive for use by beginning potters. The firing and cooling rate of the kiln to be used would also have a definite effect upon the various glazes. These are some of the factors which can be controlled only through experience.

As mentioned previously, the effect of adding glycerine
or gum tragacanth to the colored glazes was varied. For example, the colored glazes containing red iron oxide brushed quite smoothly without any gum or glycerine. However, the glazes containing chrome oxide or iron chromate improved in brushing quality a very great deal with the addition of gum tragacanth. Most of the other glazes improved slightly but were never easy to brush.

Another effect of adding gum is that it thickens the glaze causing a deceiving amount of color to be brushed on. Possibly more concentrated colors in the glazes would have helped, too. Again, experience is the answer.

II. CONCLUSIONS

In order for a potter to grow in his craft, it is helpful to know something of what has been done in the past. Yet the artist-potter should, through experimentation and research, find his own most satisfying way of expressing his ideas. As experience is accrued, ideas, values and concepts change and are expressed in the work of the potter.

This study has made a very positive change in the attitude of the candidate toward pottery. Decoration has become a more integral part of design. Historical research has broadened and enriched as well as stimulated many new ideas. Experimentation has resulted in irreplaceable experiences and is reflected in a higher level of expression in pottery.


Figures 33 through 39 are photographs of ware glaze-fired first to cone 05 and refired to approximately cone 01.

Figure 33. Test Plate. Ten inch diameter; different glazes over each other and over wax resist, slip trailing, scratching through various layers, double dipping, gum tragacanth and glycerine mixed in and painted onto glaze surfaces.
Figure 34. Bowl. Nine inch diameter; M-15 white poured on inside and outside; brushed stems, M-15-3; leaves, M-15-8.

Figure 35. Platter. Twelve inch diameter; M-15 white poured on top and underside; M-15-5 brushed design.
Figure 36. Platter. Fourteen inch diameter; M-15 white poured on top and underside; fish brushed with M-15-4 and M-15-6.

Figure 37. Footed Shallow Bowl. Eleven inch diameter; M-15-3 poured on top and underside; M-15-2 dribbled from plastic squeeze bottle.
Figure 38. Dish. Ten inch diameter; M-15 white poured on top only; design brushed with M-15-2; dark accent lines and underside brushed with M-15-3.

Figure 39. Platter. Twelve inch diameter; M-15-7 poured on top only; M-15-3 painted design and underside to bottom of lip.
Figure 40. Plate. Second group of cone 05 glazes, M-15C. Brushed white on rim and center background; M-15C-5 brushed main background and flower petals in center; stems and seeds in center of flower brushed with M-15C-7; leaves brushed with M-15C-6; white poured on underside.

Figure 41. Plate. White base glaze poured on top and underside; outside rim and other bands brushed while revolving on potter's wheel; large outer wreath and center initial brushed with cobalt carbonate in water; rim and inner wreath brushed with black iron oxide in water.
Figure 42. Bowl. M-15C-7 brushed on underside; white poured inside; design brushed with cobalt carbonate, copper oxide and chrome oxide and copper oxide, each mixed with water.

Figure 43. Plate. M-15C-5 brushed on underside; white poured on top side; small amount of white base glaze mixed with coloring oxides; cobalt carbonate for blue areas; black iron oxide for tan areas; copper oxide for green bands brushed on revolving potter's wheel throwing head.
Figures 44 through 59 are photographs of ware glaze fired at cone 9 in a reduced atmosphere.

Figure 44. Platter. Thirteen and one-half inch diameter; R-3-2 poured on top and underside; R-3-4 slip trailed for design.
Figure 45. Plate. Eleven and one-half inch diameter; R-3-12 poured on top and underside; large dots brushed with R-3-4; small dots brushed with R-3-3; edges scratched through with needle.

Figure 46. Plate. Ten inch diameter; R-3-12 on top and underside; R-3-4 brushed design; lines scratched with needle.
Figure 47. Platter. Eleven and one-half inch diameter; R-3-9 poured on top, R-3-3 underside; R-3-4 brushed design.

Figure 48. Platter. Thirteen inch diameter; R-3-7 poured on top and underside; wax resist brushed in interior circular areas; design color R-3-4--two coats.
Figure 49. Weed Pot. Thirteen and one-half inches high; slab constructed; top and part of cylinder dipped in R-3-7A; R-3-4 poured inside and partially outside.

Figure 50. Bowl. Eight inch diameter; R-3-3 poured on top and underside; rim, foot and squares brushed with R-3-9A; circles brushed with R-3-7A.
Figure 51. Bowl. Ten inch diameter; inside, outside below waist and design brushed with R-3-4; background for line design brushed with R-3 base white.

Figure 52. Vase. Fourteen inches high; slab constructed body with wheel thrown foot; inside poured R-3-4 and some brushed on outside; R-3 base white poured all over outside; lines scratched with needle.
Figure 53. Bowl. Fourteen inch diameter; R-3 white on inside and outside; wax resist brushed while spinning on banding wheel; R-3-4 brushed in and out while spinning.

Figure 54. Vase. Sixteen inches high; slab constructed body with wheel thrown neck and lip; R-3-4 in and out; R-3-3 and R-3-4 brushed lines on flat side of bottle; R-3-3 around lip.
Figure 55. Bowl. Nine inch diameter; R-3 white poured on top and underside; design colors brushed on as follows: apple, R-3-7; banana, R-3-2; orange and apple seeds, R-3-4; pear, R-3-3A; leaves and stems, R-3-7.

Figure 56. Plate. Fourteen inch diameter; R-3-3 poured on top only; R-3-4 slip trailed design and brushed on underside.
Figure 57. Vase. Eighteen inches high; slab constructed body with wheel thrown foot and neck; R-3-3 inside; R-3 base white poured unevenly outside; large design shape brushed with R-3-11; center area, R-3-12; jagged lines brushed between these two, R-3-4.

Figure 58. Bowl. Eight inch diameter; R-3-6B poured in and outside; design splattered with R-3-12 from squeeze bottle.
Figure 59. Covered Casserole. Eleven and one-half inch diameter; R-3-4A poured in and outside; design brushed with R-3-4.
On the following two pages are additional designs for plates or bowls which could be glazed and decorated using the majolica process.

Figure 60. Ink drawing. Design for plate using Stewart crest, which is derived from a family coat of arms.
Figure 61. Ink drawing. Design for plate.
APPENDIX B
STONEWARE CLAY BODY FORMULA

50 pounds Mason's Blend

50 pounds Kaiser Refractories
Milled Fire Clay

10 scoops Kentucky Ball Clay

10 scoops Flint

10 scoops Kingman Feldspar

8 scoops Sand

6 scoops Grog
**CONE 05 GLAZE FORMULAS**

**M-15**

<table>
<thead>
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<td>Feldspar</td>
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**M-15 COLORANT PERCENTAGES**

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<td>M-15-2</td>
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<tr>
<td>M-15-3</td>
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<tr>
<td>M-15-4</td>
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<tr>
<td>M-15-5</td>
<td>3% Cobalt Carbonate</td>
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<tr>
<td>M-15-6</td>
<td>3% Chrome Oxide</td>
</tr>
<tr>
<td>M-15-7</td>
<td>4% Nickel Oxide</td>
</tr>
<tr>
<td>M-15-8</td>
<td>3% Iron Chromate</td>
</tr>
</tbody>
</table>
| M-15-9                    | 2% Copper Oxide  
|                           | 3% Cobalt Carbonate  |
| M-15-10                   | 4% Cobalt Carbonate  
|                           | 4% Rutile  |

These colored glazes were used in the decoration of the first group of cone 05 pottery.
**M-15C GLAZE FORMULA**

White Lead -------- 43%
Tin Oxide -------- 12%
Feldspar --------- 24%
Clay ------------- 3%
Flint ----------- 18%

**M-15C COLORANT PERCENTAGES**

M-15C-2 -------------- 4% Chrome Oxide
M-15C-5 -------------- 8% Black Iron Oxide
M-15C-6 -------------- 8% Rutile
M-15C-7 -------------- 5% Copper Oxide
                                1% Cobalt Carbonate

These glazes were used in the decoration of the additional four pieces of cone 05 pottery.
**CONE 9 GLAZE FORMULAS**

**R-3**
- Feldspar ---------- 35%
- Dolomite ---------- 15%
- Whiting ---------- 5%
- Clay ---------- 10%
- Flint ---------- 35%

**R-3 COLORANT PERCENTAGES**

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<td>R-3-10</td>
<td>1/4% Copper Carbonate, 2% Tin Oxide</td>
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These colored glazes were used in the decoration of the cone 9 pottery.
These colored glazes were used in the decoration of the cone 9 pottery.
COLORING OXIDES

1. Chrome oxide and zinc oxide in equal quantities
2. Copper oxide
3. Chrome oxide and copper oxide in one to five proportions
4. Black iron oxide
5. Cobalt carbonate

These coloring oxides were used on the pottery in Figures 27, 28, and 29.
KILN LOG

DATE: 19 Aug. 67

KILN: Alpine
STACKED BY: Rae--Lewtas

TYPE OF FIRING: C/9 R
FIRED BY: Rae

CONES, UPPER: front 5 6 7 back 10 9 8 0 1 0
LOWER: front 5 6 7 back 10 9 8 0 1 0

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<td>64</td>
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<td>4 7/8</td>
<td>64</td>
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<td>70</td>
<td>bottom C/9 down, C/10 2:00 top C/9 4:00, C/10 1:00</td>
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</tbody>
</table>

OFF Off Dampers open 8 inches

This is the kiln firing log for the final cone 9 firing.
Figure 62. Top and bottom cone pats used in final cone 9 firing.
The following pages are letters granting permission to use the photographs from the various publications which were used as examples in this paper.
August 8, 1967

Mr. Robert S. Rae
Central Washington State College
Muzzall Hall
4th Floor
Ellensburg, Washington 98926

Dear Mr. Rae:

Thank you for your letter of July 31 requesting permission to reprint material from the title(s) listed below in your thesis:

Liverani: FIVE CENTURIES OF ITALIAN MAJOLICA

You have permission to use any excerpt you wish, provided the material is original with our authors; i.e., not credited to any other source. It is understood that your thesis is for customary limited distribution and is not intended for commercial publication. For no other purpose than this restricted use is blanket permission ever granted.

In every case, acknowledgment must be footnoted on the page with quotations, and below illustrations, citing the title, author, copyright and publisher in the following manner:


Sincerely yours,

M/1s

Marjorie Mitchell
Manager, Copyrights & Permissions

Please note:
The signature has been redacted due to security reasons.
June 19, 1968

Mr. Robert S. Rae
1722 Hilbrooke Drive
Walla Walla, Washington 99362

Dear Mr. Rae:

Thank you for your letter of June 13th.

This letter is your authorization to photograph the five illustrations requested from POTTERY OF THE EUROPEANS by Helen E. Stiles for inclusion in your master's thesis. We understand, of course, that you will give full credit in your thesis to title, author, and publishers. This grant is solely for your master's thesis and in the event of publication it will be necessary for you to re-clear the permission with us.

Sincerely yours

Miss Murray Stirton
Permissions Editor

Please note:
The signature has been redacted due to security reasons.
27th June, 1968

AIR MAIL

Mr. Robert S. Rae,
1722 Hilbrooke Drive,
Walla Walla,
Washington, 99362,
U.S.A.

Dear Sir,

Thank you for your letter of 22nd June. So far as the Trustees of the British Museum are concerned there will be no objection to your using the subjects in question as you suggest. If any copyrights in the pictures in Pottery of the Europeans are held either by Miss Stiles or Dutton and Co. the Trustees would not themselves be in a position to give you authority to use them.

I return your photographs with this letter.

Yours faithfully,

Secretary

Please note:
The signature has been redacted due to security reasons
July 18, 1968

Dear Mr. Rae:

Thank you for your inquiry of July 15. We are happy to grant to you the permission to use a photograph of the AIC ewer in your Master's thesis.

Very sincerely,

Ingrid B. Blatnak
Permissions Dept.

Please note:
The signature has been redacted due to security reasons