CERAMICS AS A CREATIVE MEDIUM FOR
SIXTH AND SEVENTH GRADE PUPILS

APPROVED:

Major Professor

Minor Professor

Director of the Department of Art

Dean of the Graduate School
CERAMICS AS A CREATIVE MEDIUM FOR
SIXTH AND SEVENTH GRADE PUPILS

THESIS

Presented to the Graduate Council of the
North Texas State College in Partial
Fulfillment of the Requirements

For the Degree of

MASTER OF ARTS

by

211861
Alex L. Pickens, B. A.

Dallas, Texas
August, 1952
# TABLE OF CONTENTS

**LIST OF ILLUSTRATIONS** ...................................................... v

**Chapter**  
I. **INTRODUCTION** ................................................................. 1

   The Importance of Clay as a Creative Medium  
   Statement of the Problem  
   Scope of the Problem  
   Procedure

II. **TESTING OF CONSTRUCTION TECHNIQUES** ................................. 4

   Hand-sculpture Technique  
   Evaluation of Hand-sculpture Technique  
   Thumb-press Technique  
   Evaluation of Thumb-press Technique  
   Coil Technique  
   Evaluation of Coil Technique  
   Slab Technique  
   Evaluation of Slab Technique  
   Scoop-out Technique  
   Evaluation of Scoop-out Technique  
   Gravity-pull Technique  
   Evaluation of Gravity-pull Technique  
   Paper-core Technique  
   Evaluation of Paper-core Technique  
   Molding and Casting Techniques  
   Evaluation of Molding and Casting Techniques

III. **TESTING OF APPLIED ORNAMENT TECHNIQUES** ......................... 23

   Stamped-impression Technique  
   Evaluation of Stamped-impression Technique  
   Incised-line Technique  
   Evaluation of Incised-line Technique  
   Graffito Technique  
   Evaluation of Graffito Technique  
   Slip-trail Technique  
   Evaluation of Slip-trail Technique  
   Slip-painting Technique  
   Evaluation of Slip-painting Technique  
   Wax-resist Technique  
   Evaluation of Wax-resist Technique
<table>
<thead>
<tr>
<th>Chapter</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>IV. EXPERIMENTING WITH GLAZING AND FIRING TECHNIQUES</td>
<td>31</td>
</tr>
<tr>
<td>Glazing Techniques</td>
<td></td>
</tr>
<tr>
<td>Evaluation of Experiments with Glazing Techniques</td>
<td></td>
</tr>
<tr>
<td>Kiln Operation</td>
<td></td>
</tr>
<tr>
<td>Evaluation of Experimenting with Kiln Operation</td>
<td></td>
</tr>
<tr>
<td>V. SUMMARY AND CONCLUSIONS</td>
<td>38</td>
</tr>
<tr>
<td>Summary</td>
<td></td>
</tr>
<tr>
<td>Conclusions</td>
<td></td>
</tr>
<tr>
<td>BIBLIOGRAPHY</td>
<td>40</td>
</tr>
</tbody>
</table>
# LIST OF ILLUSTRATIONS

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Clay for Hand Sculpture; Seventh Grade</td>
<td>4</td>
</tr>
<tr>
<td>2.</td>
<td>Hand-sculptured Figures; Seventh Grade</td>
<td>5</td>
</tr>
<tr>
<td>3.</td>
<td>Thumb-press Bowl under Construction; Seventh Grade</td>
<td>6</td>
</tr>
<tr>
<td>4.</td>
<td>Thumb-press Bowl Completed; Seventh Grade</td>
<td>6</td>
</tr>
<tr>
<td>5.</td>
<td>Clay Rolled for Pottery Base; Sixth Grade</td>
<td>7</td>
</tr>
<tr>
<td>6.</td>
<td>Base Cut and Placed on a Bat; Sixth Grade</td>
<td>8</td>
</tr>
<tr>
<td>7.</td>
<td>Building a Wall by the Coil Technique; Sixth Grade</td>
<td>8</td>
</tr>
<tr>
<td>8.</td>
<td>Pottery Made by the Coil Technique; Sixth and Seventh Grades</td>
<td>9</td>
</tr>
<tr>
<td>9.</td>
<td>Sculpture Made by the Coil Technique; Sixth Grade</td>
<td>9</td>
</tr>
<tr>
<td>10.</td>
<td>Cutting Parts for a Rectangular Box; Seventh Grade</td>
<td>10</td>
</tr>
<tr>
<td>11.</td>
<td>Pressing Clay into a Seam; Seventh Grade</td>
<td>11</td>
</tr>
<tr>
<td>12.</td>
<td>Square Bowl Made by the Slab Technique; Seventh Grade</td>
<td>11</td>
</tr>
<tr>
<td>13.</td>
<td>Tile Made by the Slab Technique; Sixth Grade</td>
<td>11</td>
</tr>
<tr>
<td>14.</td>
<td>Covered Box Made by the Slab Technique; Seventh Grade</td>
<td>13</td>
</tr>
<tr>
<td>15.</td>
<td>Scoop-out Bowl under Construction; Sixth Grade</td>
<td>13</td>
</tr>
<tr>
<td>16.</td>
<td>Scoop-out Bowl Completed; Sixth Grade</td>
<td>14</td>
</tr>
<tr>
<td>17.</td>
<td>Sculpture, Solid Mass; Seventh Grade</td>
<td>14</td>
</tr>
<tr>
<td>Figure</td>
<td>Description</td>
<td>Page</td>
</tr>
<tr>
<td>--------</td>
<td>-------------</td>
<td>------</td>
</tr>
<tr>
<td>18</td>
<td>Hallowing Solid-Mass Sculpture; Seventh Grade</td>
<td>14</td>
</tr>
<tr>
<td>19</td>
<td>Gravity-pull Plate under Construction; Sixth Grade</td>
<td>16</td>
</tr>
<tr>
<td>20</td>
<td>Gravity-pull Plates Completed; Sixth Grade</td>
<td>17</td>
</tr>
<tr>
<td>21</td>
<td>Paper-core Sculpture, Beginning; Seventh Grade</td>
<td>17</td>
</tr>
<tr>
<td>22</td>
<td>Paper Armature for Sculpture; Seventh Grade</td>
<td>18</td>
</tr>
<tr>
<td>23</td>
<td>Paper-core Sculpture, Completed; Seventh Grade</td>
<td>18</td>
</tr>
<tr>
<td>24</td>
<td>Slip Casting Pottery; Seventh Grade</td>
<td>20</td>
</tr>
<tr>
<td>25</td>
<td>Slip-cast Bowl; Seventh Grade</td>
<td>21</td>
</tr>
<tr>
<td>26</td>
<td>Exterior of Kiln</td>
<td>35</td>
</tr>
<tr>
<td>27</td>
<td>Interior of Kiln</td>
<td>35</td>
</tr>
</tbody>
</table>
CHAPTER I

INTRODUCTION

The Importance of Clay as a Creative Medium

Clay has been recognized as an important creative medium for use with children since about 1837. It was Friedrich Froebel, founder of the kindergarten, who, observing the delight of children in playing in mud, dough, putty, and wax, recognized the potential value of clay modeling and made it of greatest use in education.¹

Although the importance of clay as a creative medium has been admitted since the early part of the nineteenth century, its use in elementary schools has not been widespread. This is hard to understand since clay is one of the most easily procured of all materials. Often clay deposits of excellent quality may be found locally. This clay the children may dig, refine, and use in the classroom. Where clay is locally unobtainable on creek banks or in road cuts, it is usually inexpensive at ceramic supply companies or at local potteries.

The child who will not respond to the plastic quality of clay is rare. In this period of physical development,

¹Kate Douglas Wiggin and Nora Archibald Smith, Froebel's Occupations, p. 255.
between eleven and fourteen years of age—which some authors have called a "period of repression in children's painting"—the natural approach to creative activity is through the manipulation of materials.

The use of clay with children approaching adolescence is of special significance. Here, better than with any other material, the teacher may provide a gradual transition between an unconscious and a conscious approach to three-dimensional expression.

Statement of the Problem

In view of the fact that clay has not been used so extensively or wisely in elementary art education as the generally recognized importance of the material seems to justify, the purpose of this study is to explore the possibilities of clay as a creative medium and to determine which of the many ceramic techniques are most suitable for use by pupils in the upper elementary grades.

Scope of the Problem

The observations and recommendations made in this study are the result of experimentation carried on from 1950 to 1952, with the participation of 500 sixth- and seventh-grade pupils in five elementary schools of Dallas, Texas. Much of

---


the work described was done at Lisbon Elementary School, where the writer is an art teacher; but in order to broaden the scope of the study, work being done in four other Dallas schools was included.

Procedure

Chapter I introduces the subject, states its importance, and defines the limitation of the study.

Chapter II presents and evaluates the construction techniques used in the experiments.

Chapter III records and evaluates the experiments involving applied ornament techniques.

Chapter IV presents the basic glaze formula which was used in the study and records and evaluates the methods used for applying the glaze to bisque-fired ware. The firing techniques employed are also discussed.

Chapter V summarizes the work and presents conclusions gathered from the experimentation completed in the course of study.

Photographs supplement the written record.
In schools where clay is used as a creative medium with pupils in the upper elementary grades, construction techniques vary widely from the simplest method of creating hollow form to the most intricate casting techniques. It seemed advisable, therefore, to perform some experiments to determine the relative effectiveness of the techniques commonly used. Eight construction techniques were chosen: hand sculpture, thumb press, coil, slab, scoop out, gravity pull, paper core, and molding and casting.

Hand-sculpture Technique

In this experiment each pupil is given a portion of clay, with time and freedom to explore its plastic quality (Figure 1). The clay is manipulated in the hands until it assumes tactile and visual qualities pleasing to the child. Often the sculpture assumes a familiar appearance, an

Fig. 1.—Clay for hand sculpture; seventh grade.

Photographs by Harold Welborn, age 13.
animal or human figure (Figure 2); occasionally a non-objective form emerges which pleases its creator for personal reasons. No additional clay is added to the original mass; however, portions are sometimes pulled out to produce irregular contours.

Evaluation of Hand-sculpture Technique

Hand-sculpture proved to be a valuable creative experience for all sixth- and seventh-grade pupils tested. It provided an outlet for emotional tension which accumulates in the formal classroom. While actual manipulation was taking place, an excellent opportunity was provided for a discussion of the properties and uses of clay and the planning of other projects. The manipulation of the material and the emotion spent in the creation of forms seemed completely satisfactory. Little regard for the completed object was evidenced. In most cases the clay was returned to the clay jar to be used in another experiment. Occasionally a pupil wished to preserve his work, and some pieces were used later in firing and glazing experiments.
Thumb-press Technique

Perhaps the simplest method of creating hollow form from clay is the thumb-press technique, sometimes called the pinch method. A lump of clay is wedged until it is free of air bubbles and then formed into a sphere. Next a depression is made with the thumb, and a slow, even pressing of the clay continues until the wall is of the desirable thickness (Figure 3). It is important to continue working progressively around the ball of clay, keeping the top as level as possible at all times, until the completed form is achieved.

Evaluation of Thumb-press Technique

When the thumb-press technique was used by pupils in the sixth and seventh grades, very satisfactory results were evident. They learned the process quickly and discovered that the clay wall had to be about three eighths of an inch thick to dry without cracking. Small bowls, cups, and ash trays were easily constructed.
Each pupil who experimented with this technique made an object which was well formed and functional (Figure 4). Great satisfaction was expressed by the pupils, and many made several pieces by this method before they were ready to experiment with another technique.

Coil Technique

The coil technique requires wedged clay and simple equipment which is readily available. In making pottery by the coil method, a small plaster bat, which can be made by pouring plaster of Paris into a small pie tin and allowing it to harden, is needed.

The wedged clay is placed on a cloth and flanked by strips of wood about one-half inch thick. A rolling pin is used to roll the clay into a flattened mass of even thickness, controlled by the height of the wooden strips which serve as runners for the rolling pin (Figure 5). Once the clay has been rolled out, a disc is cut from it to serve as the base for the hollow form (Figure 6). This base is placed on a plaster bat to facilitate handling, and a "rope" of clay is coiled around on the base to begin the wall of the vessel (Figure 7). Next, other ropes are wound
around spirally until a wall of desired height is obtained. The clay is usually rolled into even ropes of about three eights of an inch in diameter and long enough to go around the base once. These coils are joined by rubbing the inner and outer surfaces. In this manner a seamless wall is built. Flat strips cut from the clay which has been flattened in the manner used for constructing the base may be substituted for clay ropes.

Sculpture is made by the coil technique in a manner similar to that described for making pottery. For sculpture a base is unnecessary and coils are made thicker than for pottery.

Evaluation of Coil Technique

The coil technique is a point of departure in many schools which use clay as a creative medium in the art program, but the writer’s experiments indicate that most pupils—
even in the upper elementary grades--are frustrated with the coil method of constructing pottery. Approximately 10 per cent of the pupils who worked with this method were able to master the coil technique for pottery construction to a degree which was satisfying to them. Their pieces were well made and of good form (Figure 8). The remaining 90 per cent were frustrated, and after several attempts, threw their clay back into the clay jar. In view of this high percentage of failure, it would seem that the coil technique for making pottery is unsuitable for upper elementary pupils.

Sculpture made by the coil technique offered considerably more freedom than did the use of this method in making pottery. It was not necessary to roll ropes of clay to a consistent evenness since the inside of the sculpture would be hidden. The ropes were usually rolled thicker for sculpture than for pottery.
Sculpture built by this method grew quickly, and much spontaneity was evident in the finished piece (Figure 9). Usually, sculpture built by the coil technique was large and uncluttered with superfluous detail.

This evidence tends to show that the coil technique should be used, for the most part, in making sculpture rather than pottery at the upper elementary grade level.

Slab Technique

To create an object by the slab technique, it is first necessary to roll a mass of clay to an even thickness (see page 7). Once this mass of clay has been rolled, paper patterns of the parts of the contemplated form are placed on the clay and cut out. (Figure 10). The various parts of the object are then joined with slip, and small ropes of clay are pressed into the seams on the inside for additional support (Figure 11). This process is usually employed in making rectangular ceramic containers. It is suitable for boxes, ash trays, bowls, or vases (Figure 12).

Tiles may be made by the slab technique. They are cut from a sheet of clay as described above and ornamented in any manner which is suitable to the material. Care must be taken to prevent warping. This is usually done by
Fig. 11.---Pressing clay into a seam; seventh grade.

Fig. 12.---Square bowl made by the slab technique; seventh grade.

Fig. 13.---Tile made by the slab technique; seventh grade.

scooping out part of the central area on the under side of the tile, leaving ridges for support (Figure 13).

Evaluation of Slab Technique

The slab technique presents several problems which the writer's experiments proved were too difficult for pupils
in the upper elementary grades. The most important of
these was the corner seam which had to be properly joined
to prevent cracking in firing; moreover, the problem of
warping was an ever-present one while experiments with the
slab technique were in progress.

Aside from the technical problems which had to be
surmounted in experimenting with this technique, construct-
ing a square or rectangular object from clay seemed in
opposition to the plasticity of the material. Wood or
metal would seem to be more suitable materials for the
execution of these shapes.

In the beginning most sixth- and seventh-grade pupils
showed great interest in using the slab technique to
create boxes for particular uses—for example, cigarette
or candy boxes with covers. This interest seemed to stem
from a desire to duplicate boxes which the pupils had at
home or which they had seen in shops.

Despite many ambitious beginnings, most of the projects
were abandoned before they were completed. Only about 10
per cent of the pupils completed their boxes; however,
those finished were well made and had covers which were
functional (Figure 14).

Tiles were easily made by the slab technique, but few
pupils were able to recognize any value in making tiles.
Many had never seen a tile, while others connected tile
making only with a previous study of Holland. After
photographs of Egyptian brick
designs and several contemporary
tiles had been shown to the
pupils, some well-made tiles
were produced.

The results obtained in-
dicate that tiles are easily
made by pupils of upper ele-
mentary grades, but that since
it seems difficult to motivate
the activity, some other project in clay is more desirable.

Scoop-out Technique

The scoop-out technique re-
quires a lump of wedged clay and
a simple tool which will serve
as a scoop. Either pottery or
sculpture may be made by this
method.

To use this technique in
making pottery, the pupil must
be able to visualize the form
upside down. The object to be
created is built in this position of a solid mass of clay
(Figure 15). Once the desired shape has been achieved, the
clay is allowed to dry to a leather hardness. The solid
form is then turned upright and the inside is scooped out until the walls are of the desired thickness (Figure 16).

Sculpture is produced in a similar manner by this technique (Figure 17). When the form is leather dry, it is cut apart and scooped out (Figure 18). The cut surfaces are then coated with slip and adjacent parts are pressed back together. The sculpture is then allowed to become bone dry before it is fired.

Fig. 16.—Scoop-out bowl completed; sixth grade.

Fig. 17.—Sculpture, solid mass; seventh grade.

Fig. 18.—Hollowing solid-mass sculpture; seventh grade.
Evaluation of Scoop-out Technique

Interesting results were obtained by the writer when this technique was used in the sixth and seventh grades. Sculpture was produced easily and successfully by a majority of the pupils who attempted the experiment. The process of cutting a piece of sculpture apart, hollowing it, and rejoining the parts, provided an excellent opportunity for discussing the correct thickness of a clay well for satisfactory firing. The various uses of slip were also discussed.

A free form was more easily produced by this method than was a symmetrical pottery form. The pieces produced brought about an interesting discussion of functional shapes for pottery and a better understanding of the plastic quality of clay.

The many successful experiments with this construction technique by pupils in the upper elementary grades indicated that it is one of the most suitable techniques for pottery and sculpture at this level.

Gravity-pull Technique

Gravity pull is a simple technique which requires a lump of wedged clay, a piece of thin curtain fabric--scrim or net, a knife, and some thumb tacks. Shallow bowls and plates may be made by this construction method.
A piece of scrim is stretched on a flat surface, and the lump of clay is placed thereon and rolled to an even thickness of about 3/8 inch (see Page 7). From this clay a rectangle, circle, or free form is cut, dependent upon the finished form desired. The excess clay is removed from the scrim. The scrim, with the clay resting on it, is then carefully placed over an open box. The clay is adjusted over the opening until it slopes evenly and assumes the desired depth. The scrim is then tacked around the box with thumb tacks, and the clay is allowed to remain in position until it is thoroughly dry (Figure 19).

**Fig. 19.**—Gravity-pull plate under construction; sixth grade.

**Evaluation of Gravity-pull Technique**

When the gravity-pull technique was used in the sixth and seventh grades, the pupils found it a simple way to construct plates and shallow bowls (Figure 20). The experiment required little equipment and preparation by the pupils. Both round and rectangular objects were produced quickly and easily, with few failures.
This experiment had several desirable outcomes, chief among them being the enjoyment of success on the part of most pupils. Also, an opportunity was provided to discuss the weight of clay and the law of gravity which causes the clay to be pulled downward into the box.

**Paper-core Technique**

The paper-core technique, suitable only for sculpture, requires more preparation than do other techniques which have been discussed. To build a standing figure by this method, it is necessary to use two 1/4 inch dowel rods about 12 inches long. These are embedded in a lump of clay so that they will stand upright (Figure 21). Around these rods an armature of newspaper is built which suggests the contemplated form. Upon the armature, clay is worked until the desired form is obtained and the walls of the piece are approximately 3/8 inch thick (Figure 22).
When the piece of sculpture is finished and thoroughly dry, the dowel rods are carefully removed. The newspaper which is left inside the sculpture will be burned out during the bisque firing without damaging the clay.

Evaluation of Paper-core Technique

The paper-core technique seems to be suitable for sculpture making in the upper elementary grades. It proved to be an interesting and challenging technique to pupils engaged in the activity. By using the dowel rods and paper, it was possible for the pupils to build tall pieces of sculpture which could not have been easily constructed from an unsupported and solid mass of clay (Figure 23).

Leaving the newspaper inside the completed sculpture provoked many questions about firing techniques, which added to the pupils' understanding of the use of the kiln.
From observation of the experiments involving this technique, the writer observed that it was one of the most popular of all construction techniques introduced. It proved to be a simple and successful way to produce ceramic sculpture in the upper elementary grades. The size of the sculpture gave the pupils an added feeling of accomplishment.

Molding and Casting Techniques

For this experiment, simple molding and casting techniques which require a minimum of technical skill were used. Jewelry and tiles were made in press molds, and pottery was made by slip casting in a one-piece mold.

To make a mold for casting or pressing clay, it is first necessary to make a clay model of the form to be cast. When the model is completed, it must be examined to ascertain the kind of mold most suitable for duplicating the object. If the piece to be cast has no undercuts, a one-piece mold will be satisfactory. More complicated objects require more complex molds.

Molds are made from plaster of Paris which has been mixed with water. The correct proportion of plaster and water—2 3/4 pounds of plaster to a quart of water\(^1\)—must be used if the mold is to be absorbent and firm. An improper mixture results in poor absorption and crumbling.

To construct a mold, the clay model is placed face down inside a cardboard box which is approximately an inch larger than the clay object on all sides. Liquid plaster is then poured over the clay object very slowly to avoid bubbles, until the box is filled. When the plaster hardens, the cardboard and clay are removed. When the mold is thoroughly dry, it is ready to be used (Figure 24).

Ceramic tiles and jewelry may be made in molds cast from clay models. Rather soft clay is pressed firmly into the molds so that it takes the form of the depression. When the clay dries thoroughly, it will shrink away from the sides of the mold so that it can be removed easily.

Pottery may be cast by pouring slip of the consistency of thick cream into a dry mold. The water in the clay is pulled into the absorbent plaster and a residual wall is deposited and built up around the plaster mold. When the wall is of the desired thickness, the excess slip is poured out. When the bowl is dry, it is removed from the mold.
Evaluation of Molding and Casting Techniques

Duplicating an original clay object was an important experience for sixth- and seventh-grade pupils. The construction of molds required careful preparation by the teacher and pupils, but the results of the experiments indicated that the preliminary planning and preparation were not only intrinsically valuable but also assured a successful outcome. These construction techniques provided excellent and logical opportunities for discussion of commercial methods used in producing tableware, industrial ceramics, and plumbing fixtures. Various types of ceramics were examined, and an effort was made by the pupils to identify the type of clay which had been used in each instance.

Many pieces of jewelry produced in press molds had charm and individuality. The tiles made by this method dried evenly and showed less tendency to warp than did the original model. The small bowls cast made suitable ash trays, nut bowls, or glaze-test pieces (Figure 25).

Fig. 25.—Slip-cast bowl; seventh grade.
Observations made by the writer during these experiments indicated that objects could be made in one-piece molds very satisfactorily by pupils in the sixth and seventh grades. Molding and casting were found to be interesting and valuable construction techniques for use with pupils of this grade level.
CHAPTER III

TESTING OF APPLIED ORNAMENT TECHNIQUES

In art rooms where upper-elementary-school pupils work with clay, applied ornament techniques are used extensively. These decorative treatments range from a simple incised linear design to elaborate stencil and rubber stamp ornamentation. It seemed consistent with other experiments recorded in this study, therefore, to select some of the applied ornament techniques used generally by ceramists and teachers, and test them for use by sixth- and seventh-grade pupils. Six techniques were chosen: stamped impression, incised line, graffito, slip trail, slip painting, and wax resist.

Stamped-impression Technique

Impressing a design into wet clay is perhaps the simplest and most primitive of all applied ornament techniques. It requires a simple object with tactile quality, such as a twig, pebble, shell, or leaf. An applied design is made by impressing the chosen object into the wet clay and repeating this impression if a repeated pattern is desired.
Evaluation of Stamped-impression Technique

Much enthusiasm was evidenced by the pupils who performed this experiment. Many interesting twigs and pebbles were found on the playground, unusual shells were brought from home, and a coarse straw mat produced a variety of textural effects when pressed into the wet clay. Small bowls, ash trays, and tiles were embellished by this technique with great success.

The stamped-impression technique provided excellent opportunities for discussing suitability of ornamentation to form, and it promoted interest in experimenting with other applied ornament techniques.

Incised-line Technique

To apply an incised line design to a pottery object, it is necessary for the clay to become leather dry. When it is in this condition, almost any pointed tool may be used to cut lines into it. A planned design may be drawn on the object, then incised, or the shape of the object may suggest ornamentation which can be incised freely and directly.

Evaluation of Incised-line Technique

The incised-line technique for ornamenting pottery is used frequently in the upper elementary grades. It was observed in experiments conducted that a majority of pupils who created a clay object expressed a desire to carve it in some manner.
In pottery, lines were often cut with a pocket knife, compass point, or nail. Usually the design was not planned previously, but cut directly into the clay. In some instances this spontaneous ornamentation proved successful, while in others it resulted in superfluous decoration.

In sculpture, the use of incised line was confined to the indication of naturalistic facial features, hair, or textural pattern.

Graffito Technique

The graffito technique requires a clay object to which a colored slip or an engobe has been applied, and simple, sharpened tools which may be used for scratching or cutting a design in leather-hard clay. The slip or engobe covering usually contrasts in color with the clay from which the object was made. When the clay is leather dry, the desired design or pattern is scratched or cut through the colored outer surface, exposing the color of the clay body in the scratched lines.

Evaluation of Graffito Technique

The graffito technique proved an interesting and satisfactory method of ornamenting pottery for pupils with persistence and patience; however, many who experimented with it were disappointed with the results obtained.
The straining and mixing necessary in preparing a satisfactory slip proved troublesome to a majority of the girls tested, and to about 50 per cent of the boys who performed the experiment.

Scratching a design through the slip was completed satisfactorily, once the slip had been applied.

The results seemed to indicate that the technical skill necessary to apply slip or engobe smoothly makes this a difficult problem for pupils in the upper elementary grades. This technique proved satisfactory in few instances and seems unsuitable for use at this level.

**Slip-trail Technique**

To apply a slip-trailed design on a piece of pottery, a small bulb-type (ear) syringe is needed. Slip, which has been mixed to thick cream consistency, is pulled by suction into the bulb of the syringe. A trailed line may then be applied to a leather-dry pot by slight, constant pressure on the slip-filled bulb.

Gum arabic or gum tragacanth is often mixed with slip to be used for trailing. This produces more viscosity and causes the slip to adhere to the leather-dry surface more readily.
Evaluation of Slip-trail Technique

The slip-trail method is often used by ceramists to produce subtle ornamentation on pottery. It is one of the most desirable of all applied ornament techniques from the potter's viewpoint. The technique is difficult to master, however.

Upper-elementary-school pupils who tried the slip-trail method of ornamentation experienced difficulty in squeezing the bulb of the syringe with a sufficiently constant pressure to produce a smoothly flowing line. After much experimentation on brown paper, the pupils attempted to produce linear designs on their pottery. Only about 10 per cent of those who tested the technique were able to control the flow of the slip from the syringe to the degree necessary for producing smooth lines.

The preparation of the slip proved troublesome and frustrating to the pupils and was finally completed by the teacher.

This evidence indicates that the slip-trail technique is not suitable for use in the upper elementary grades.

Slip-painting Technique

Slip which has been mixed to the consistency of thick cream may be painted on leather-dry clay. A soft brush is required, and the slip must be viscous if it is to adhere
readily to the partially dry surface. The addition of vegetable gums will produce this desired viscosity.

Evaluation of Slip-painting Technique

The slip-painting method of ornamenting pottery seemed very familiar to upper-elementary-school pupils. Chinese brushes were used for application of the slip to the pottery and these proved very interesting to the pupils who used them. Designs were brushed freely and many were well suited to the forms. No great difficulty was encountered in this experiment, although some of the pupils who tested the method found painting with slip more difficult than painting with tempera.

In this experiment, as in others recorded, the preparation of slip of suitable consistency constituted the greatest problem.

This experiment provoked questions about Chinese brushes, painting, and pottery. The pupils brought several pieces of oriental porcelain to class for examination.

The excellent results of this technique observed by the writer seemed to indicate that the slip-painting method of applying ornament to pottery can be used easily by sixth- and seventh-grade pupils, provided that the slip is prepared by the teacher or by one of the more skillful pupils.
Wax-resist Technique.

The wax-resist technique for applying ornamentation on pottery requires either a stick of cold wax or hot beeswax or paraffin and a bristle brush.

To create a pattern by this method it is necessary to apply the wax on a piece of bisque-fired ware. If the wax is to be brushed on, it must first be heated; if brushwork is not required, a stick of cold wax, such as a wax crayon, may be used successfully. Glaze is then applied to the bisque ware and the piece is glaze-fired. The glaze will not adhere to the pattern made by the application of wax.

Evaluation of Wax-resist Technique

Interesting results were observed when this technique was used by sixth- and seventh-grade pupils. In the beginning it proved difficult for them to understand that glaze would not flow across lines made by wax, since the wax would melt when fired in the kiln. When this was explained satisfactorily, the experiment continued.

The first pupils who tested this method used melted paraffin and brushed their pattern on white bisque ware. This "white on white" proved difficult for the pupils to follow. Those who tried the experiment later used colored wax crayons or added colored crayons to the melted paraffin in order not to lose sight of the pattern.
Evidence resulting from the experiment indicated that while the wax-resist technique might be used with upper-elementary pupils, other applied ornament techniques tested are more consistently successful.
CHAPTER IV

EXPERIMENTING WITH GLAZING AND FIRING TECHNIQUES

In many elementary schools where clay is used in the art program, glazing and firing techniques are considered beyond the capacity of sixth- and seventh-grade pupils. In such situations, glaze is applied by the teacher, the pupil having little choice of color, and the kiln is stacked and fired by the teacher. As a result the pupils have little opportunity to experience clay as a creative medium from raw state to finished object.

The nature of this study made it seem necessary, therefore, to experiment with glazing and firing techniques and to ascertain their suitability for use in the upper elementary grades. For the experiments recorded, a basic glaze was chosen by the writer and compounded by the pupils. Coloring agents were added to the glaze to produce desired colors, and various methods of applying glaze were tested. The kiln was stacked, fired, and drawn by the pupils.

Glazing Techniques

For experimentation with glazing, a lead-base glaze was selected. This choice was dependent upon simple ingredients, low-firing maturity, and proven results. The
glaze, which is glossy and transparent, matures between Cone 06 and Cone 02. It is composed of the following ingredients:

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>White lead</td>
<td>$\frac{1}{2}$ grams</td>
</tr>
<tr>
<td>Whiting</td>
<td>35 grams</td>
</tr>
<tr>
<td>Feldspar</td>
<td>60 grams</td>
</tr>
<tr>
<td>Clay</td>
<td>22 grams</td>
</tr>
<tr>
<td>Flint</td>
<td>47 grams</td>
</tr>
</tbody>
</table>

Compounding this glaze recipe required that the ingredients be weighed in grams. A scale was supplied for this purpose by the writer and the pupils were instructed in its use.

Four coloring agents, chosen on the basis of availability, cost, and color produced, were selected by the writer for use in the experiments. The coloring agents were cobalt, copper, iron oxide, and manganese dioxide. They were added to the glaze recipe by the pupils, according to the color desired.

To perform this experiment, it was imperative that the pupils weigh carefully the ingredients of the basic glaze recipe. These were then ground by hand in a mortar with a pestle. When the ingredients were thoroughly mixed, a color was decided upon by each pupil. The correct percentage of coloring agent was then added to his portion of the mixture and the grinding continued. When the glaze was

---

2 Ibid.
thoroughly ground, a solution of gum arabic and water was added to the dry mixture, and it was ready for application to the bisque-fired ware (see Page 36).

Four methods were tried for applying glaze to bisque-fired ware: dipping, pouring, painting, and spraying.

Evaluation of Experiments with Glazing Techniques

Experiments with glazing techniques proved valuable from several standpoints.

From a discussion of glazes preceding actual experimentation, much was learned about the properties of a glaze, its ingredients, and its color. When the recipe to be used had been selected by the writer, it was thoroughly discussed by the pupils, who wanted to know the properties of each ingredient and how it would be transformed in the kiln.

When the compounding of the glaze began, there were excellent questions about weight and measure, and great care was taken by those who were weighing the ingredients to have the scale balanced perfectly.

Most pupils were unable to understand why a "black powder" such as copper oxide would turn green when it was fired. After an attempt was made by the writer to explain this process in simple terms, the oxides were labeled with tags which indicated the colors after firing.

No trouble was encountered by the pupils in grinding glass, although some had trouble in applying it.
Dipping an object into glaze proved a simple and satisfactory method for use with pupils of upper-elementary level. Pieces glazed in this way were smooth and had few irregularities when glaze-fired.

Pouring glaze proved troublesome and frustrating to a majority of the pupils tested. Pouring inside a bowl was relatively satisfactory, but pouring glaze over the outside resulted in many failures. The glaze-fired piece which had been glazed in this way was rough and seemed unsatisfactory to the pupil.

Painting glaze on an object was the method used most frequently by the pupils engaged in the activity. It was generally satisfactory, although the tendency to spread the glaze thin resulted in many second firings.

Spraying glaze with a hand sprayer proved very satisfactory. It necessitated using glaze that had been strained free of particles. This process seemed troublesome to the pupils, but once it had been accomplished, they found the spraying easy. Cleaning the sprayer was a task, but the glaze-fired piece was ample reward to the pupil.

From the results observed, the writer concluded that dipping, painting, and spraying glaze on bisque-fired objects are suitable techniques for use in the sixth and seventh grades; that compounding a glaze, the most difficult operation in the experiment, should be delegated to the
more skillful pupils; that all pupils seem capable of grinding and applying glazes; that many interesting and valuable developmental experiences resulted from these experiments.

Kiln Operation

The kiln which was used for firing the ware produced during the experimentation recorded is a Paragon Kiln. It is a top-loading kiln and is made in Dallas, Texas (Figure 26). The firing chamber measures 15 x 15 x 17 inches and has a capacity of two cubic feet (Figure 27). It is a high-fire kiln with a range up to Cone 8, which is a temperature of 2,300 degrees Fahrenheit. It was installed in the art room at Lisbon Elementary School in 1952.

For experiments in kiln operation, little was needed other than a kiln, kiln furniture, cones, and ware to be fired.

It was necessary to explain the furniture and the operation of the kiln. The function of each
part was discussed by the writer and questions were asked by the pupils. The purpose of posts, shelves, and cones was explained and demonstrated.

Evaluation of Experimenting with Kiln Operation

Kiln operation proved to be one of the most interesting activities included in the experiment.

Every pupil was interested in what happened inside the kiln and the majority helped in some way to fire the ware which had been made.

No difficulty was incurred in stacking the ware in the kiln. Care was taken in selecting ware to be bisque-fired, for a wet piece might explode and damage the contents of an entire kiln. Glazed pieces were carefully placed on stilts and isolated from other pieces.

Placement of pyrometric cones in front of the peep holes was a coveted job and was performed with great care by the pupil chosen for the assignment.

Firing usually consumed about five hours and the kiln reached Cone 04, a temperature of about 1,940 degrees Fahrenheit. The heat in the kiln was brought up slowly by using four switches, one for each set of coils around the firing chamber. By using these switches, there was never more than 100 degrees variance between the temperature at the bottom of the kiln and that near the top.
Drawing the kiln was an exciting activity. On the day the kiln was to be opened after a glost-firing, many pupils would be waiting at the door of the art room when it was opened in the morning.

The writer observed that pupils in the sixth- and seventh grades were vitally interested in kiln operation. They showed an understanding of the process and exercised great care in handling the kiln.

The majority of pupils tested participated in this experiment and this participation motivated many additional experiments in construction techniques.
CHAPTER V

SUMMARY AND CONCLUSIONS

Summary

The purpose of this study was to explore the possibilities of clay as a creative medium and to determine which of the many ceramic techniques are most suitable for use by pupils in the upper elementary grades. This study did not introduce new methods but tested some of the established ceramic techniques which are now being used or which might be used by pupils in the sixth and seventh grades. The study is based upon experimentation carried on from 1950 to 1952, with the participation of 500 sixth- and seventh-grade pupils in five elementary schools of Dallas, Texas. The study records experiments with construction techniques, applied ornament techniques, and glazing and firing techniques.

Conclusions

As a result of the experiments performed in the course of this study, the writer presents the following conclusions:

1. Clay is an interesting and valuable creative medium for use by sixth- and seventh-grade pupils.
2. Some of the construction techniques tested proved frustrating to a majority of the pupils engaged in the activity; experiments with the coil and slab techniques resulted in many failures. On the other hand, the scoop-out, gravity-pull, paper-core, and molding and casting techniques proved to be very satisfactory for use by pupils at this level.

3. The simplest applied ornament techniques were preferred by pupils in the sixth and seventh grades, the stamped-impression and incised-line techniques being employed most frequently. The other techniques tested—graffito, slip trail, slip painting, and wax resist—were used less successfully.

4. Glazing and firing techniques proved to be within the capacity of sixth- and seventh-grade pupils. The weighing of glaze ingredients and the grinding of the glaze was done with accuracy. Three glaze application techniques—dipping, painting, and spraying—proved satisfactory, but pouring the glaze over bisque-fired ware resulted in many failures. The pouring technique, therefore, seems unsuitable for use at this level. Stacking a kiln for firing proved to be an interesting activity for sixth- and seventh-grade pupils, and once the use of cones and switches and the need for accuracy in the operation of the kiln had been explained, the pupils took pride in performing each step with care to insure a successful firing.
BIBLIOGRAPHY

Books Quoted


Books Consulted


