



1935

Pottery in Fifteen Lessons

Agnes Daponte Berne

Follow this and additional works at: https://scholarlycommons.pacific.edu/uop_etds

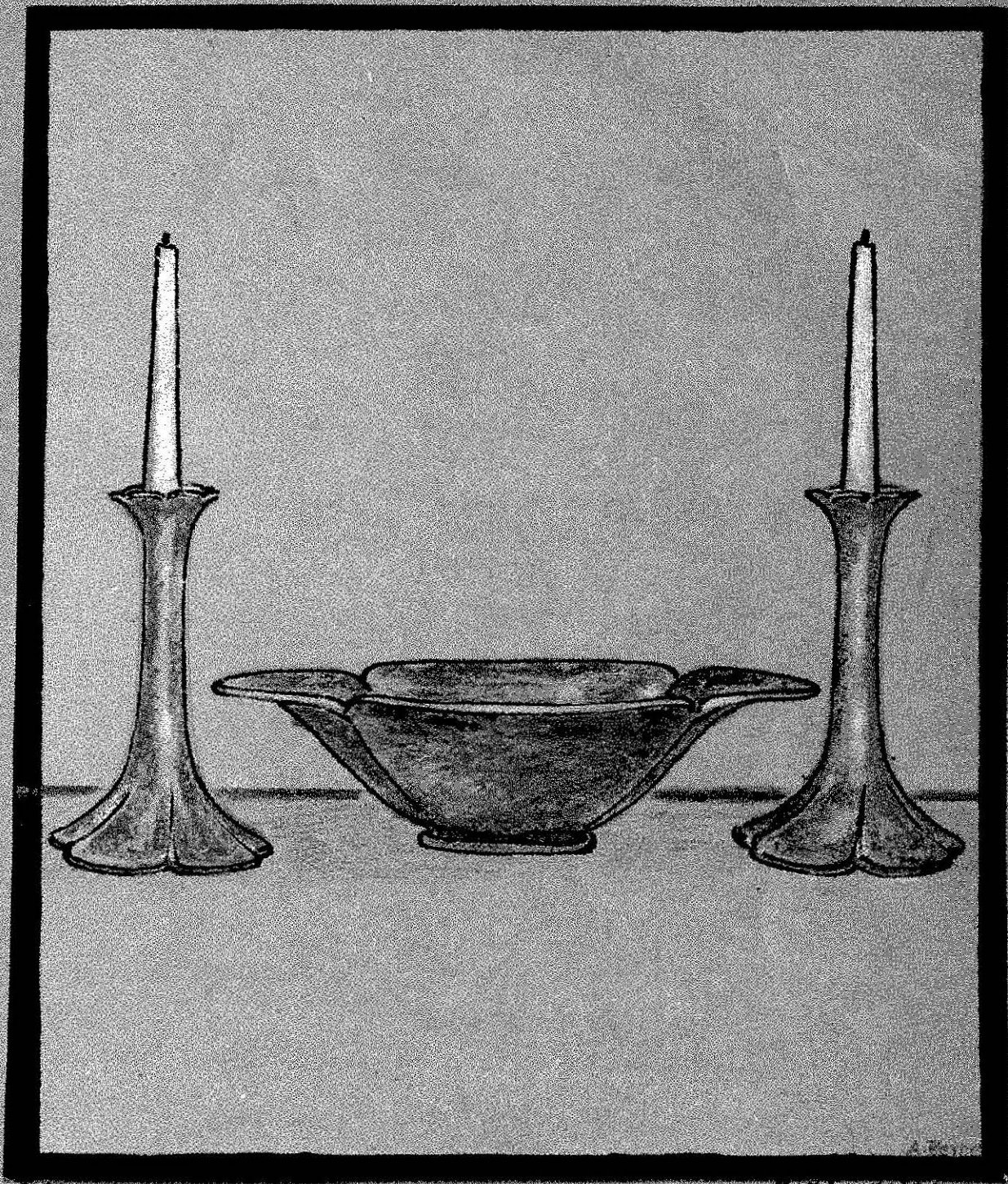


Part of the [Arts and Humanities Commons](#)

Recommended Citation

Berne, Agnes Daponte. (1935). *Pottery in Fifteen Lessons*. University of the Pacific, Thesis.
https://scholarlycommons.pacific.edu/uop_etds/3894

This Thesis is brought to you for free and open access by the University Libraries at Scholarly Commons. It has been accepted for inclusion in University of the Pacific Theses and Dissertations by an authorized administrator of Scholarly Commons. For more information, please contact [mgibney@pacific.edu](mailto:m gibney@pacific.edu).



Jalanavich & Olson

SAN FRANCISCO

"Jalan" Pottery

College of the Pacific
Stockton, Calif.

POTTERY
in
FIFTEEN LESSONS

by
Agnes Laporte Berne

A Thesis
Submitted to the Department of Art
College of the Pacific

In partial fulfillment
of the
Requirement for the
Degree of Master of Arts

APPROVED

E. Grace Ward

Major Professor

DEPOSITED IN THE COLLEGE LIBRARY

Harriet E. Boss Librarian

DATED

TABLE OF CONTENTS

	Page
Introduction - The plan of this Thesis	7
PART I	
History Of Pottery	9
Clay	22
Plaster	28
PART II	
Lessons	
1 - The Plaster Batt	31
Continuation Lesson - Wedging of Clay	34
2-- Making a Cylinder	35
3 - The Template	40
4 - Designing A Piece Of Pottery	42
5 - Making A Vase Or Other Flare Form	46
6 - Footages	49
7 - Building By The Slab Method	51
8 - Throwing.....	53
9 - Turning	57
- Preparatory Lesson - Deccrative Processes ..	59
10 - To Model A Tile	67
Continuation Lesson - To Make A Tile Mold ...	68
11 - To Make A Saucer Mold	71
12 - To Make A Vase Mold	74
Preparatory Lesson, Slip	77

13 - To Cast A Vase	80
14 - Preparation For Glazing And Firing	83
Preparatory Lesson - Glazes	86
15 - To Glaze A Piece Of Pottery	97
Firing The Kiln	98

PART III

Appendix

Glossary Of Terms	105
Equipment	108
Suggestions For Special Equipment	111
Table Of Pyrometric Cones	112
Bibliography	113

Index

Plates

- I - The Manufacture Of Pottery - From Bene Hassan
 - II - Corinthian Vases - Geometric Style - Greek
 - III - Vase, Black Figure Period - Greek
 - IV - Vase, Red Figure Period - Greek
 - V - Celadon Bowl, Chinese
 - VI - Vase, Famille Rose Porcelain, Chinese
 - VII - Vase, Famille Verte Porcelain, Chinese
 - VIII - Jar and Teapot, Early French
 - IX - Plate, American Historical
 - X - Bowl, Rockwood, Modern American
-

LIST OF ILLUSTRATIONS

	Page
Wire Cutter	27
Plaster Table	27
Casing For Square Batt	32
Modeling Tool	35
Position of Hand For Coiling	39
Pottery Box and Top	39
Template	40
Forms To Be Avoided By Beginner -----	46
Shapes for Flexible Metal Scrapers	47
Teapot and Strainer	50
Position Of The Hands In Centering	53
Position Of The Hands (Fig.2)	54
Position Of The Hands (Fig 3)	54
Position Of the Hands (Fig. 4)	54
Turning Tools	58
Tile Mold	70
Wire Loop Tool	71
Saucer Mold	71
Position Of Model For Turning	73
Vase Mold	74
Pyrometric Cones, correct and incorrect way to set..	84
Special Equipment, wheel and Metal Disc	111

INTRODUCTION

Although the subject of pottery would appear to the layman to be one of complicated formulas and difficult technical requirements, it is possible to reduce the entire procedure to a series of simple, logical processes. To do this is the purpose for which this thesis has been undertaken.

It seems advisable to reduce the entire subject of elementary pottery to fifteen lessons, for two reasons. (1) The instructor who must teach the subject in one semester of eighteen weeks will be enabled by this plan to cover the subject logically and completely if she will adhere to the divisions which have been made. This will give ample time for outside work, tests, etc. (2) The craftsman who wishes to express himself in one more medium, or the home-maker who merely desires the diversion of self-expression, will find the directions, given in this logical sequence, so clear and untechnical that he cannot fail, with sufficient practice, to achieve definite results.

In order that the student may have a general view of the historical field of pottery, for cultural purposes and in order to motivate his reading, a brief résumé of the history of pottery, with emphasis on the important periods in which the art was most highly developed,

has been given.

Complete information concerning materials and their care accompanies the lesson sheets, which have been arranged according to the "unit plan"; and detailed directions are given for actually executing pottery processes, together with practical information regarding sources of supplies, stacking and care of kiln and various "short-cuts". In addition, both teacher and student may find in the carefully selected bibliography, a wealth of reference material dealing with the technical, practical, and artistic aspects of pottery.

This course, as here presented, has repeatedly enabled students in the High School, Junior College and Adult Education Classes of the writer, to create acceptable pottery forms and finished pieces of excellent quality, in the course of eighteen weeks of six hours per week.

THE HISTORY OF POTTERY

9

Legend Attributes Pottery To Supernatural Intervention

Legend tells us that the art of pottery existed in prehistoric ages and its discovery was due to the intervention of the gods. Japan credits its origin to the legendary being called Kami, distinctive of deity. Egypt attributes it to the god Nun, or Ptah, creator of the world; while Greece accords the honor to Vulcan, who, at the instigation of Zeus, made out of clay Pandora, the first mortal woman. Later Keramos, son of Dionysos, became the patron saint of pottery, from which we obtain the word ceramic, or keramic.¹

Pottery Develops In The Prehistoric Age

It is probable that pottery originated in Neolithic ages with man's earliest agricultural pursuits. With this mode of life arose the need for household vessels, especially those impervious to water; vessels for holding water, for storage purposes and for ceremonial rites. These early vessels, of which many have been preserved to us, were fire-hardened,² and because the shapes were intended for domestic use, they were simple and suitable for their purpose. Throughout the Bronze and Iron ages

1- Jervis, W.P., A Pottery Primer, p.17

2- Mac Curdy, Geo. Grant., Human Origins, v.2, pp. 83-85

pottery developed simultaneously in many parts of the world, reflecting in its changes the growth of man's physical and intellectual life.

Egyptian Pictorial Art Records The Progress Of Pottery
Earliest Dated Records: The beginnings of pottery have been variously attributed to Egypt, Babylonia, and Assyria. The earliest pictorial records appear on the walls of the catacombs at Thebes and Beni Hassan, where the whole process of the potter's art, as then practiced, from the turning of the clay on the primitive hand-operated wheel, to the final firing of the ware, is fully illustrated.¹ Egypt is likewise generally credited with having invented glaze, but the final word on the chronology of the art will not be said until the last spadefull of earth has been removed from the sites of ancient civilizations, for recent excavations at Kish, in Mesopotamia, have brought to light objects of gold, precious stones and ceramics which, it has been definitely proven, antedate those of the first Egyptian dynasty and of the Chaldees.² Thus modern science may quite conceivably reconsider the decision which accords to Egypt the honor of having invented the potter's wheel and compounded the first glazes.

¹ Plate I

² Magoffin, R.D.V., The Lure and Lore of Archaeology, p. 9

The Production Of Pottery In Eastern Mediterranean Lands

Accepted Chronology: To follow the generally accepted chronology, it would appear that Phoenecia, which embraced the entire eastern shore of the Mediterranean, obtained its knowledge of pottery from Egypt and Assyria, and that Greece learned from both Phoenecia and Egypt.¹ Before reaching the Continent, pottery attained a very high state of development in Crete, where the beautiful old Kamaras ware made during the Minoan period, is now so treasured that the Government will not permit it to be taken from the country, even for purposes of exhibition in the museum at Athens.² About the time that the art began to decline in Crete, about the eighth century B.C., workshops sprang up on the Continent, where the art flourished and later eclipsed the art of the Cretan potters.

Oriental Influence Affects Greek Pottery

The chief characteristics of the early Greek pottery are its arrangement in bands and its strictly geometric design. The human head is a circle erected on a vertical line representing the neck; the bust is a triangle; the

¹ Jervis, W.P., A Pottery Primer, p.18

² For this statement the writer is indebted to Mr. Leon Richardson of the University of California, who recently returned from a visit to Crete.

arms form acute angles at the elbows. The drawing is

Figures taken from the fragment of a Greek vase in the geometric style, found in the Potteries at Athens. Douglas, Greek Pottery, p.59.



stiff, and strictly rectilinear. Following upon this strictly geometric style, an Oriental note creeps into the decoration of Greek vases. The drawing becomes less stiff, and animal and vegetable motives borrowed from Egypt, prevail in the decoration. In examining early specimens it is most interesting to note this Oriental influence, directly traceable to the contacts of the Greek cities with Egypt and the Asiatic states, in the seventh and sixth centuries B.C. (Plates 2 and 3) But the highest development of the art was reached in Greece between the sixth and fourth centuries B.C., in the marvelous productions of the Black Figure and the Red Figure periods. (Plates 5 and 6) In the decoration of these lovely vases the natural predilection of the Greeks for the human figure reasserts itself, and the art of pottery keeps pace with the fine arts of sculpture and painting.

Rome Disseminates The Potter's Art Throughout Conquered

Lands: With the submission of Greece to Roman domination, the center of Greek vase painting shifted from Athens to Rome, and the Romans in their turn disseminated the art

of pottery throughout the countries which they conquered. The majority of this Roman ware is decorated in relief, and though much of it is very beautiful, especially the brilliant red Samian ware, Roman pottery as a whole, never equalled the beauty of Greek productions. The Romans seemed to lack the knowledge necessary for mixing clays and compounding glazes, and many of the latter were imperfect. After the fall of the Roman Empire pottery seems to have been temporarily forgotten, though it continued in a debased form in Egypt.¹

Meanwhile Persian and Byzantine civilizations had achieved glazed and painted pottery when all over Europe the only examples of the potter's art were mere crude crocks. Mohammedan conquests carried the art into Spain where it flourished and bore fruit in the gorgeously tin-enameled wares which reached Italy by way of Majorca in the sixteenth century and were there called "Majolica" after the place in which they were thought to have been made.² From Italy tin-enameled ware was carried into France, where it received the name of Faience, either from the town of Faenza in Italy, or from Fayence in France, a town where pottery had long been made.³

1 Binns, Chas. The Story of the Potter, p.10

2 Barber, Edwin Atlee, Tin Enameled Pottery, p.6

3 Rhead, G. Wolliscroft, The Earthenware Collector, p 301

Chinese Porcelains Influence the Potter's Art in Europe

It was about this time that Chinese porcelains began to be imported into Europe in considerable quantities. The translucent white body¹ of which these wares were made, and the brilliant and gorgeously colored glazes, fired all Europe to a high state of enthusiasm. Fabulous sums were paid for these porcelains, with the result that European potters, placed at a great disadvantage, sought to meet the competition by producing something like the Chinese wares. Kaolin, the pure white clay which forms an indispensable ingredient of porcelain, was lacking, and for a long time the secret of porcelain making eluded European potters. In the meantime Chinese shapes, colors and decorative motives were copied on every hand. The discovery of kaolin in Saxony by Botger led, about 1709, to the production of hard porcelain.² So important was this discovery considered, that Botger and his workmen were shut up by their royal patron, the Elector of Saxony, and compelled to work virtually as state prisoners.

1 Body or Paste, is the term applied to the composition of which a clay product is made.

2 The porcelain made by Botger is classified as "soft porcelain" by Bushell in the Catalogue of The Morgan Collection, but most authorities concede it to have been true porcelain. Preface, p.3

From Germany the influence of Chinese art spread into France and thence to England, completely dominating, in one way or another the whole field of decorated porcelain. In France, in keeping with the prevailing mode of giving flowery names to objects, the pale green monochrome wares were called "Celadon", after the green-clad hero of *l'Astree*, a pastorelle by d'Urfé, at the height of its popularity towards the end of the sixteenth century. This name, originally applied to a shade of green, came eventually to include all the pale monochrome wares of China. But strictly applied it should be used to designate only the greens. Celadon, then, is not a Chinese, but a French name, and it is interesting to note that France has named other celebrated Chinese wares, such for example, as the "Famille Rose" and the "Famille Verte"¹(pink and green families) among the monochromes, and the gorgeous "Sang de Beuf"(ox blood)

Development Of The Porcelain Industry In Europe

With the discovery of the secret of hard porcelain in Europe, a host of factories sprang up, notably those of Sevres, in France, and Meissen, later known as Dresden, in Saxony. The first porcelain issued from these factories was white, with a modeled relief decoration borrowed from the Chinese. The first painted decoration was

¹ Plates 5, 6, 7.

in blue and white underglaze in the Chinese style.¹

The porcelain industry in Europe reached its highest development between 1730 and 1770. Early in the nineteenth century there was a general decadence in the arts, due to the withdrawal of princely patronage. Throughout the century, however, there was a steady growth and output of ceramic wares, both in Europe and America, but the introduction of mechanical methods brought about the extinction of the craftsman spirit, and subsequent efforts to revive it have been impeded by competition and the necessity for cheap production.

The Development Of The Potter's Art In America

The development of the art of pottery in America is important because she is successfully competing, commercially and artistically, with the best productions of Europe.

The earliest examples of the potter's art found in the United States have been taken from the mounds in the Mississippi Valley. As yet very little authentic information has been gained about these early inhabitants of our country. That they may have been connected in some way with the early Peruvians has been contended by some writers on pottery, but there is, as yet, nothing beyond

1 Plate 8

the similarity between pottery found in the mounds, and that found in Peru, to support this belief.¹ In both places, vessels modeled in the forms of animals, fruits, vegetables, shells and other natural objects, have been found, but the workmanship of the Mound Builders is cruder and more primitive than that of Peru. The pottery of the American Indians was, unlike that of other lands, made exclusively by women, and the wheel was never used in its production.

Early European Influence On American Pottery

In early Colonial days efforts were made to introduce the potter's art from Europe, but all of this early ware is stamped with the character of the countries from which the potters came. In the sixteenth and seventeenth centuries Dutch potters settled in Pennsylvania and, under the patronage of relatives and friends, introduced the methods practiced in the old country. Many of these old pieces are most amusing, portraying as they do aristocratic ladies of Colonial society arrayed in the headgear of

¹ Mr. F.M. Setzler, Assistant Curator of Archaeology at the Smithsonian Institute, in a letter to the writer states that "even though a similarity may exist between the pottery forms of Peru and those of the Mississippi Valley, our archaeologists do not consider this a sufficient proof that a direct connection existed between these widely separated peoples."

Holland, and wearing elaborate gowns besprinkled with sprays of tulip, the favorite floral pattern of that country.

In the eighteenth century the Staffordshire¹ potters manufactured for American trade, a series of dark blue and white ware featuring American scenes, statesmen and prominent personages.² This ware became immensely popular and such large prices were paid for it that, as in the case of the Chinese ware imported into Europe in the sixteenth century, American potters sought to meet the competition by copying it. This naturally led to the establishment of more pottery centers, and the acceleration of the industry in this country.

Aside from these potteries which catered primarily to an aristocratic trade, there have always been the small local potteries designed to meet the household needs of the inhabitants of isolated communities. These local wares are neither national nor universal. They are the expression of the individual craftsman's feeling for form. They may be beautiful or ugly, but having been designed for a purpose, they usually possess the charm of simplicity and appropriateness. An interesting example of this early domestic pottery is the Jugtown ware, recently re-discovered by Mr. Jaques Busbee, a New York artist, in

¹ Plate 9

² Staffordshire - a great pottery center of England.

an isolated little North Carolina community.¹ This pottery, dating back to Colonial days, is made mostly of native red clays, decorated chiefly in incised line. The Jugtown pottery is distinguished for its fine forms, which are the natural outgrowth of the potter's wheel on which it is made.

The Progress Of The Ceramic Industry In America In The Nineteenth And Twentieth Centuries

The nineteenth century saw the establishment of many potteries in America. In the twentieth century the perfection of mechanical means, the enlistment of science in the solution of ceramic problems, and the conscious striving of many manufacturers for higher artistic standards, have all contributed to place American wares in favorable competition with the fine productions of Europe. To attempt even a partial enumeration of American pottery would be without the scope of this paper, but Rookwood, Cowan and Roseville will serve as an example of the fine quality of American art wares.²

The Revival Of The Crafts In The Twentieth Century

Side by side with the improvement in artistic quality of American commercial wares, a steady growth of interest

¹ For an illustrated article on Jugtown pottery see Country Life Magazine for November, 1924.

² Plate, Rookwood Pottery

in handicrafts has taken place, with the result that individual craftsmen in America, though still inferior in numbers, are producing art wares worthy to be exhibited alongside the best productions of Europe and the Orient. Such, for example is the exquisite pottery made by Jalanavich and Olson of San Francisco.¹ In perfection of form, finish, and the luscious colors and quality of the glaze, this beautiful art ware, which is, in fact, Oriental in character, recalls the finest old Celadons of China.

That the "Jalan" pottery is scarcely known outside of San Francisco is significant, especially so when one considers the large prices paid for it, and the fact that the local public consumes all that the potters can make. It points to the growth of a discriminating American public, able and willing to recognize beauty where beauty exists, as opposed to the old American snobbishness which perforce must hide its art-ignorance behind a foreign label.

The Growth Of Art Appreciation Is Fostered By Public Schools And Colleges In America

The inclusion of art-education in American public schools and colleges, is doing much to awaken an art-

¹ Frontispiece - Console set by Manuel Jalanavich

consciousness in the American people, and this in turn is being reflected in the quality of our art products. For after all the art of any country is the expression of the art-consciousness of her people. The law of supply and demand applies to quality as well as to quantity, and it follows inevitably that a discriminating public will demand and receive a higher type of beauty in her products.

The ever growing interest in craftsmanship is probably due in large measure to the inclusion of the crafts in public educational institutions. That the quality of this instructions leaves, in many instances, much to be desired, cannot be gainsaid, but that it is possible to teach craftsmanship of a high order is demonstrated by the Newcomb pottery, made at Newcomb College, New Orleans.

Achievements such as this encourage the faith of educators in the efficacy of public school art instruction, and the right of pottery to occupy a foremost place among the practical school crafts, needs no further justification.

C L A Y

Clay is the material which we use to make pottery. It is caused by the weathering, or breaking down of hard rocks, and is found in all parts of the world.

There are three qualities which make clay valuable to the potter. These are (a) its plasticity; (b) its porosity; (c) its fusibility. By plasticity we mean the quality which permits clay to be molded and retain the form given. By porosity we mean the quality which permits it to dry without cracking. By fusibility we mean the quality which causes it to harden under the influence of fire.

Different clays possess these qualities in differing degrees, depending on the kind of rock from which they have been formed; consequently some are valuable for making one type of pottery and some for another. For example, a porous clay is the best for making tiles, because tiles should not warp in the drying and very porous clay does not warp. On the other hand a plastic clay is best for making objects which must be molded by hand. The fusibility (temperature at which the clay particles will fuse or become vitrified) is also highly important, because under-fired clay is soft and leaky, while over-fired clay may be charred, or stony, and in

either case the glaze will be affected.

Clays not only differ in the degree in which they possess the three qualities which we have named, but they differ in color. The following classification will give some idea of their uses according to color.

The Classification Of Clays According To Color

White-burning Clays: These are the most valuable because they are the rarest. They are used in the manufacture of the highest types of ware, such as porcelain. They are seldom used alone, but are mixed with other kinds of clay to form a white "body". Ball clay, used in glazes and clay bodies, and Kaolin, used in glazes and porcelain, are typical examples of white-burning clays.

Buff-burning Clays: These are more common than the white-burning varieties. They are used in the manufacture of a number of different kinds of wares. Terra-cotta, fancy facing brick and most art-pottery, are made from buff-burning clays. They fire at a lower temperature than the white-burning clays, and warp less readily than the red-burning varieties. Their light color makes them suitable to receive light glazes.

Red-burning Clays: These are the most common. They are used to make red brick, flower pots and other cheap ceramic wares. Most primitive pottery was fashioned

from red or other dark-burning clay, which was used in its native state. It is unsuited to receive light colored glazes and is very apt to warp and crack in the drying and burning.

Summary:

From the above account it will be seen that the selection of clay is important and should be made with strict regard to the firing temperature and the type of article to be made. Coarse, gritty clays are suitable for tiles, but would not do for modeling, and vice-versa. All commercial potteries compound their own clay bodies, but it is more practical for the amateur to purchase his clay from some good art pottery.

References

Ceramic Cyclopedia, 4th Edition, p.171, contains a bibliography of the classification of clays.

Wilson, Hewitt, Elementary Ceramic Procedure, published by the Denver Fire Clay Company, contains an article on the preparation of clays for pottery work.

Binns, Chas. The Potter's Craft. p.37

THE PREPARATION AND CARE OF CLAY

Clay may be bought in the dry state and mixed with water as needed, or it may be purchased already mixed and ready for use. The latter is advised since it saves a great deal of time and work, and having been mixed by machinery, the ingredients are more thoroughly blended.

The Care Of Wet Clay

Wet clay should be stored in stone jars, zinc-lined bins or other containers which will prevent too rapid evaporation of moisture. Crocks are satisfactory for storing wet clay, and heavy wooden boxes may be used, provided they are set a couple of inches above the floor level, to prevent the constant moisture from the clay rotting the floor.

In storing the clay, put wet sacks or a little water in the bottom of the container, and cover the clay with wet sacks, which should always be kept moist. If the clay is permitted to dry out it can only be rendered plastic again by a laborious process of soaking, grinding or kneading.

Directions For Mixing Dry Clay:

Place some water in a stone jar or other container. Add the dry clay until it forms a heaped-up mass above the water. When all the clay particles have become

thoroughly saturated the clay may be pounded and kneaded to remove lumps and air holes. This is done in the following manner:

Spread the wet clay on slabs of dry plaster.¹ The plaster will absorb the excess moisture, leaving the clay firm enough to handle. Work up the clay into a compact mass. Cut this in half with a wire stretched taut. Throw one half down upon the other. Repeat this operation until the clay is smooth and plastic.

To determine whether all the air bubbles are out, cut the clay with the wire and examine the surface. If all the air is not out of the clay, tiny holes will appear on the cut surface.

Work the clay into cylinders or cubes. Make a few thumb-holes in the mass and fill these depressions with water. Store the clay as directed under "Care Of Wet Clay."

GENERAL INFORMATION

The process of working and kneading clay is called "Wedging". For this a special table, having an inset plaster top made several inches thick, is most convenient.

Clay which has stood a few days after being wet

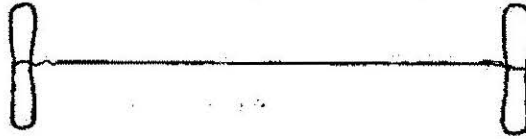
¹ See information on plaster, P.20

down is easier to handle. It becomes more plastic with standing.

To Make A Wire Cutter

Wrap each end of a piece of wire around a stick about four inches long. Leave a free length of wire twelve to fourteen inches long between the handles.

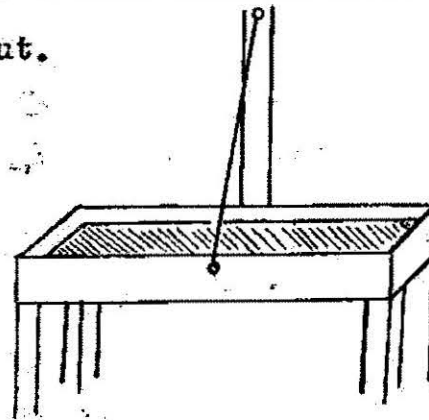
Wire Cutter



To Make A Plaster Top Wedging Table

Build a frame to a height of four inches above the top of any small, sturdy table. Pour plaster to within half an inch of the top of the frame. (Directions for mixing and pouring plaster are given on p. 28) At the center back of the table erect a piece of stout lumber about fourteen inches high and several inches wide. In the center of this at an inch from the top, screw an eyelet. Screw in another eyelet in the center-front of the table frame. Attach a wire from the eyelet in the upright at the back, to the eyelet in the center front of the frame. This makes a taut wire on which the clay may be conveniently cut.

Plaster table showing depth of plaster and upright with wire stretched taut.



PLASTER

General Information

Plaster of Paris is used by the potter for making molds in which to cast clay forms, bowls for evaporating slip and glazes, templates for truing up hand-built pieces and batts for holding finished and unfinished work.

The capacity of plaster for absorbing moisture is the quality which gives it its value for the potter. This capacity is influenced by the amount of water used in the mix. A "soft" mix is one in which there is relatively little plaster. It is correspondingly porous and hence absorbent.

When Plaster of Paris is mixed with water it sets to a solid mass. When the mixture is first made there will be no apparent action, but soon a slight stiffening takes place, and shortly after that the mass becomes solid. As the setting progresses the plaster becomes hot, and the final set is reached when the evolution of heat has ceased.

The Mixing And Pouring Of Plaster.

Decide upon the mix desired, whether "soft", "medium" or "hard". Consult the plaster scale given on page thirty for the correct proportions of plaster and water.

Pour the water into a container which will hold at least twice the amount of water to be used.

Add the plaster by sifting it through the fingers as fast as the water can absorb it.

When all the plaster has been absorbed, plunge in the hand and stir gently, breaking up all the lumps. Continue to stir until the mixture is perfectly smooth and begins to thicken.

When the plaster forms upon the finger a coating which cannot be shaken off, it is ready to pour.

Pour the plaster into a receptacle prepared for that purpose. Set it level on a shelf or table, and rap sharply to jar the plaster and bring air bubbles to the surface.

If the plaster has been poured at the right moment it will settle to a smooth, even surface. If poured too soon water will form on the surface. With a little practice the right moment for pouring can be determined.

Plaster takes from twenty minutes to half an hour to heat. When hot, it is ready to turn out. When cold it becomes very hard and is difficult to trim.

General Admnitions

Keep plaster in a dry place well removed from other pottery supplies.

Always purchase the best quality of casting plaster. The U.S. Gypsum Company carries several good brands. It can be purchased locally through any Builder's Supply Co.

PLASTER SCALE

Quarts of Water..	Pounds of Plaster		
	Soft Mix	Medium Mix	Hard Mix
1/4	5/8	11/16	3/4
1/2	1 1/4	1 3/8	1 1/2
3/4	1 7/8	2 1/6	2 1/4
1	2 1/2	2 3/4	3
1 1/4	3 1/8	3 7/16	3 3/4
1 1/2	3 3/4	4 1/8	4 1/2
1 3/4	4 3/8	4 13/16	5 1/4
2	5	5 1/2	6
2 1/4	5 5/8	6 3/16	6 3/4
2 1/2	6 1/4	6 7/8	7 1/2
2 3/4	6 7/8	7 9/16	8 1/4
3	7 1/2	8 3/4	9
3 1/4	8 1/8	8 15/16	9 3/4
3 1/2	8 3/4	9 5/8	10 1/2
3 3/4	9 3/8	10 5/16	11 1/4
4	10	11	12

Copy this sheet and place it over the plaster table.

LESSON I

PURPOSE

To make a plaster batt for holding finished and unfinished work.

MATERIALS

Casting plaster, water, oil or other grease, skillet or pie pan with level bottom, mixing bowl, scales, quart measure.

EXPLANATION AND PROCEDURE

Grease the skillet or pie tin and wipe off excess grease. Set the vessel on a table with a level surface.

Estimate the quantity of water necessary to fill the container two-thirds full.

Consult the Plaster Scale (p.30) for the correct proportions of plaster. Weigh out the amount needed. (Use medium-hard mix)

Mix and pour the plaster as directed on p.28.

Do not forget to jar the table on which the batt sets. This levels the surface and brings air bubbles to the top.

When the plaster has become hot invert the pan, hold it in a horizontal position well above the table and drop it face-down. This should release the batt without damaging it.

SQUARE BATTS

Square batts are very useful. To make one use the frame of a square cardboard box from which the bottom has been removed.

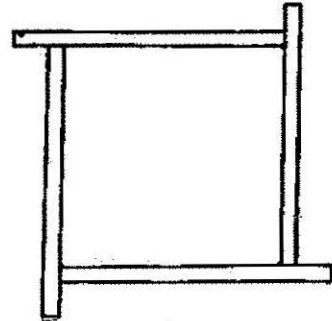
Place the frame on a slab of glass or marble, or on a smooth board which has been greased.

Smear wet clay around the outside edges of the frame at the table level, and firm it down well. This prevents the plaster from leaking out.

Mix and pour plaster as directed above. When the plaster hardens the frame can be easily stripped away.

If a cardboard box of the desired dimensions is not available, a frame may be built of thin strips of wood. The size is not important, but strips one foot long by one and one-half inches wide by five-sixteenths of an inch thick are convenient and may be used for many purposes. A dozen of these should therefore be included in the equipment.

Arrange the sticks as shown in the diagram. Secure them in place with thumb tacks and firm clay around the frame being sure to put some in the joinings at the corners. Pour plaster to the desired thickness.



Plaster left over from making batts may be poured onto glass or marble slabs, smoothed to a thickness of

three-eighths inch, and saved for making templates.

TO THE TEACHER

Where the class period covers a laboratory period of two or three hours, the lesson on wedging clay should be combined with this lesson, since the students will have some free time while waiting for the plaster to set. It is therefore given here as a Continuation Lesson.

GENERAL INFORMATION

All vessels and tools used in the mixing of plaster must be washed immediately and the sink freely flushed for several minutes thereafter.

Definition Of Terms

Batt - A slab of plaster. It may be of any shape but is usually round. In thickness it may vary from three-fourths of an inch to an inch, depending on the diameter.

Template:- The profile of a form. It is used in truing up pieces. Templates may be made of metal, cardboard or plaster.

References

The Potters Craft, Binns, Chas. p 52

Pottery, Noke, H.J. contains an account of the commercial uses of plaster.

CONTINUATION LESSON

PURPOSE

To gain practice in wedging clay.

MATERIALS

Clay, wire, a flat table surface, preferably of plaster (see wedging table, p.27)

EXPLANATION AND PROCEDURE

Take a piece of clay about twice the size of the two fists.

Work it into a compact mass.

Cut it in half with a piece of wire held taut.

Throw one piece down upon the other. Repeat this operation until no air holes show upon the freshly cut surface of the clay.

This process is called "wedging", and must be repeated each time that the clay is used. In handling the clay do not permit it to spread out into a thin sheet. To keep it worked into a compact mass makes it easier to handle and prevents it from drying out and cracking. Do not fold and pleat the clay. If necessary, beat it into form by striking it from all angles on the table. The purpose of wedging is to remove irregularities and expell the air. To fold and pleat the clay, defeats the purpose of wedging. Read carefully the section on Clay, and the Care and Handling of Clay, pp. 22 and 26.

LESSON II

PURPOSE

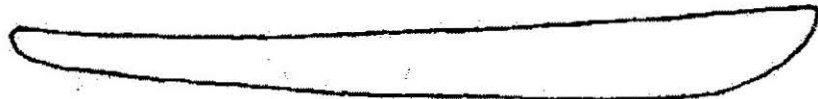
To make a cylinder.

To practice building by the coil method.

MATERIALS

Clay, plaster batt, wire cutter, modeling tool, half a dozen sticks 1 ft. long by 1 1/2 in. wide by 5/16 in. thick, paper, scissors, case knife, compass.

Modeling tool



EXPLANATION AND PROCEDURE

Wedge the clay as directed in Lesson I.

Work it into a cylinder thirteen inches long and about three inches in diameter.

Flatten this cylinder slightly.

Lay three sticks piled one upon the other, on each side of the clay cylinder. Using these as a track slice off the top of the clay with the wire cutter held taut.

Discard the top slice, which will be uneven.

Now remove a stick from each side, and with the wire cutter, take off another slice of clay. Lay this upon a dry piece of cloth which has been stretched upon the table or on a wooden batt.

Remove a second stick from each side of the cylinder

and slice off another strip of clay. Remove this to the dry cloth.

Remove the last pair of sticks. The remaining slice of clay will be of the same thickness as the other two.

Cut these "slices" of clay into strips the width of the sticks, using one of the sticks as a guide. These strips are the "coils" which will be built one upon another to make the walls of the cylinder.

Cut out a four inch disc in paper.

Lay this pattern on a slab of clay $5/16$ in. thick.

Imprint, and cut off the waste with a sharp knife held vertically. This disc of clay is the bottom of the cylinder.

Place the bottom in the center of a plaster batt.

With a modeling tool, roughen the outer edge of the bottom and moisten it with slip.

Place a strip of clay edgewise on the roughened edge of the bottom, and with the left hand cupped about the coil, support it and press it firmly to the base.

Pinch off the surplus clay and join the two ends of the coil with a little slip.

This coil constitutes the first row of the wall of the cylinder. Weld it firmly to the bottom by working across the joining with an up and down stroke of the finger and thumb nails.

Lay a thin coil of clay along the inside of the

joining, and work and smooth it to the wall and the bottom.

Support the piece with the left hand and work always against this support, to prevent the piece from stretching.

Finish the piece on the inside with the fingers and a tool as each row is added. This strengthens the walls.

Add coils of clay until the desired height is reached, but do not build too rapidly, else the weight of the clay on the insecure walls will cause them to sag. After two coils have been added, it is well to permit the piece to set in the wind for a few minutes, or in a warm room (but not in the sun or near a fire). The walls will stiffen and the building may proceed.

Weld the coils carefully together and be sure that the walls are of equal thickness throughout. Otherwise the shrinkage will be unequal and the piece may crack in the drying or firing.

When the cylinder has reached the desired height, leave it to dry until it is firm, but not dried out. This state is called "leather hard" and will frequently be referred to. The piece is ready to finish when it is leather hard.

Invert it. True the bottom with a compass and slightly depress it.

Set the piece upright again and true the top.

rounding off the sharp edges.

Place the cylinder on a dry plaster batt to dry out.

A BOX

Sometimes the first cylinder is very successful.

By making a top for it, it can be converted into an attractive box for holding cigarettes.

Model a disc of clay to fit the top of the box.

Cup the disc slightly in the palm of the hand to take away the very flat look.

Add a flange of clay on the under side. Weld it firmly, as otherwise it will pull away in the drying and firing.

Roll a bit of clay into a ball, flatten it and stick it to the top with a bit of slip. Finish the joining with the tool so that it will not pull away in the drying.

Finish the surface of the top and round all edges.

Due to the shrinkage of the clay, the top must be fitted to the box while both are moist, otherwise they will not fit when dry.

GENERAL INFORMATION

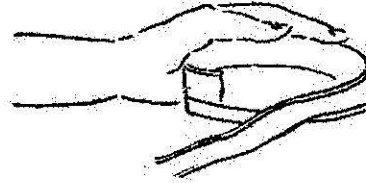
Definition of Terms

Slip: Clay that has been reduced to the consistency of thick cream by the addition of water. It is very adhesive. (See directions for making slip, p 77)

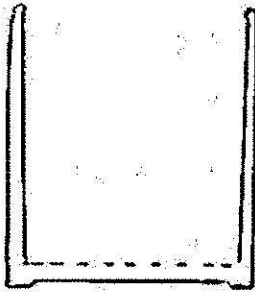
References

The Potter's Craft, Binns, Chas.
Pottery For Artists, Craftsmen and Teachers, Cox, G.J.

Left hand holding
coil in position.
The finger rests
upon the top of
the coil.



Box



Top



LESSON III

PURPOSE

To make a Template.

MATERIALS

Paper, scissors, sharp knife if plaster is used, cardboard, or thin slab of plaster, pencil, square or ruler.

EXPLANATION AND PROCEDURE

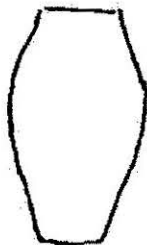
In the very outset of attempting to make pottery, it is important that the student should learn to build true to a given form, since by this means he gains mastery over his medium. The template is the profile of a form, and the guide which helps the student to check up on himself. Before attempting to make a piece of pottery he should make a template.

Cut the pattern of a pottery form in paper.

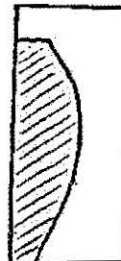
Lay the pattern on a piece of stiff cardboard or on a thin slab of plaster.

With a soft pencil, draw a line around half of the pattern. Cut out the form, leaving the profile in the frame.

The Pattern



The Template



The shaded part is cut away. The white "frame" is the template. Notice that the frame is cut off on a line with the bottom of the vase. This bottom line must be straight!

True the outer edges and square the corners.

Do not use the template to scrape the work, as it gives a mechanical effect and detracts from the hand-made character of the piece.

GENERAL INFORMATION

If templates are made of plaster, all trimming should be done over a waste-paper basket, or out of doors.

Plaster should never be permitted to get into the clay or glazes.

If cardboard is used it should be sufficiently stiff to stand up when pressed against the work.

A template should be made for every new form undertaken.

LESSON IV

PURPOSE

- To design a piece of pottery.
- To stress the importance of form.

MATERIALS

Scissors, paper for cutting, tracing paper, colored mounting paper, pencil.

Reference material: Magazines and books containing fine pottery forms, preferably those with large mouths suitable for hand-building.

EXPLANATION AND PROCEDURE

"The Form's the thing", should be the slogan of every pottery student. However proficient the potter may become in the mastery of technique, the heights of his success will be measured by his feeling for form. Some are born with this sense highly developed, but the average person is dependent on his environment for his standard of what is good and what is bad in form.

Cultivate a sense of form by a study of the masters. The Chinese are past-masters of pottery forms.

Greek forms are noted for their beauty of line and proportion, but they are over-refined, and having, for the most part, narrow openings, they are unsuited for hand-building. The Chinese forms are more truly the forms of the potter, having been produced on the wheel,

while the Greek forms were more often copied from old metal shapes.

In studying pottery forms keep in mind the following points:

(1) Appropriateness, (2) Utility, (3) Decorative quality.

Appropriateness: Under this would come the choice of a form suited to the medium of clay. Clay is a plastic material. It lends itself to curves. Objects made from it should have some bulk and solidity. It cannot be bent and distorted as can metal. Such use of it is inappropriate. To be sure, such uses are made of clay, notably by the Japanese, but they are "pottery tricks". They are a distortion, rather than a legitimate adaptation of the medium, and in the hands of any but experts, would be almost certainly grotesque.

"Appropriateness", then, implies a sympathetic use of one's material based upon appreciation, rather than on a clever distortion of it.

Utility: Beauty and utility is the double standard by which clay objects must be judged. A pottery object must fulfill this double standard if it is to measure up to the highest test of beauty. A teapot must pour; a vase must lend itself to the artistic arrangement of flowers; handles must offer a firm grip. The standard of utility may be disregarded only if the object is

frankly decorative, and is intended for no other purpose.

Decorative Quality: Even in the designing of a strictly decorative object, appropriateness and utility play a part. The medium must be considered, and the object must conform to the laws of good taste. It must not be grotesque, else it loses in decorative quality. Through the use of good proportion and line, the decorative standard may be applied to any piece.

Bearing in mind these general admonitions, certain other points should be observed. They are:

- 1 - The piece should be well balanced, not top-heavy, and the base should be firm.
- 2 - The greatest diameter should not be in the center, equidistant from the top and the bottom.
- 3 - The top and the bottom should not be of the same diameter.
- 4 - Appendages (handles, spouts and tops are appendages) should be taken into consideration in the designing of the piece.
- 5 - The design (decoration) should be thought of in relation to the form.

With the above discussion in mind, study some examples of Chinese pottery, some old English teapot and pitcher forms, and examples of primitive pottery.

Select several of these and trace them, then, taking scissors and paper, fold the paper and cut free-hand the forms traced, until they can be reproduced easily in various sizes.

Mount the best on colored paper.

Problem: Design a vase, keeping in mind the triple standard of appropriateness, utility and decorative quality. Cutting from a folded paper, place the curves at different heights on the piece. Save and mount the best.

Problem: Design a teapot by the above procedure.

GENERAL INFORMATION

For books and magazines containing fine pottery forms, consult the bibliography.

LESSON V

PURPOSE

To make a vase or other flare piece.

MATERIALS

Scissors, paper, cardboard or thin slab of plaster.
(See Lesson p.32) Modeling tool, scraper, plaster batt,
slip, clay, sticks, wire cutter.

EXPLANATION AND PROCEDURE

The directions for making a vase or other form which curves inward or outward (flares) are the same in general as those given for making a cylinder. Review that lesson. Note, however, that in setting the coils of a flare piece they must be placed at an angle, sloping inward or outward, to conform to the contours of the pattern. Some shapes should be avoided by the beginner, for example:-

- 1 - Nearly horizontal lines.
- 2 - If this form is used the weight of the clay will cause sagging and it will be difficult to get the template under it.
- 3 - Sagging will occur if this form is built too rapidly.

Choose simple forms with nearly vertical lines.

Do not attempt large pieces until you can build true to a template. Make several simple jug and vase shapes.

Finishing

Having built an agreeable form, the student should learn to finish. This is done when the piece is in a leather-hard state. A flexible metal scraper made of French palette steel makes an excellent tool. It may be cut to any desired shape with a pair of shears.

Convenient forms
for metal finish-
ing tools.



When the piece is hard enough to handle without deforming, trim the edge by hand, or centering it on the wheel, brace the arm to keep the hand steady, and revolving the wheel slowly, cut the edge level with a sharp tool.

Invert the piece, level the bottom and depress the center of the base. Trim the footing if such is called for in the design.

Finish the surface of the piece by hand, using the metal scraper, or on the wheel as directed in Lesson IX. Round all edges, and bring the clay surface to a glossy finish, using the flat side of the metal, or a wooden tool. A porous surface does not take the glaze well.

Scratch your name and the date on the bottom of the piece and set it to dry on a plaster batt in an even temperature.

GENERAL INFORMATION

French palette steel is carried by Hardware Supply Houses. Ready-made scrapers may be had from the Milligan Hardware Co., East Liverpool, Ohio.

Definition of Terms

Center: To place in the exact center of the potter's wheel. Use bits of clay or slip to fasten the piece in position.

Footing: The base on which the piece rests.

References

The Potter's Craft, Binns, Chas. See chapter on "Turning".

LESSON VI

PURPOSE

To make footages

To make a teapot

MATERIALS

A design for a teapot. Template, modeling tools, slip, clay, nut pick or nail for perforating strainer.

EXPLANATION AND PROCEDURE

Recall previous lessons, especially I and IV.

Design a teapot. Make a template to fit the bowl.

Build the bowl and finish as in Lesson V.

The Spout

(1) Model the spout from a lump of clay and dig it out or (2) cut a paper pattern, lay it on a slab of clay and cut out the shape. Moisten the edges with slip, and folding the clay around the finger or a wooden tool, join and weld the edges together.

Fit the spout roughly to the teapot, and with a pencil or a sharp tool, draw lightly around it.

Remove the spout and draw a second line one-fourth inch inside the first.

Perforate the space within this line. This forms the strainer.

Replace the spout, adjust it carefully and weld.

The Handle

From a strip or coil of clay, model a handle and fit it to the teapot. Mark the location on the pot. Remove the handle. Dab slip on the spot, replace the handle and weld firmly.

The Top

Model a top as directed in Lesson VII.

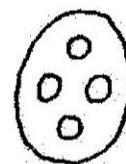
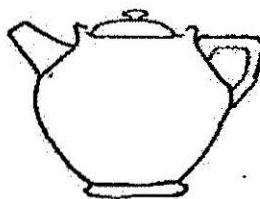
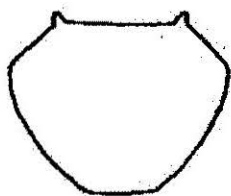
Fit a flange to the top.

Make a hole for the escape of steam.

GENERAL INFORMATION

All appendages such as handles, spouts and bases, are called "footages". Footages are not included in the template, but are added later.

Bases are sometimes included in the template, or they may be trimmed out by hand or on the wheel.



PURPOSE

To make a pottery box.

To practice building by the slab method.

MATERIALS

Clay, slip, sticks, wire cutter, paper, scissors, knife.

EXPLANATION AND PROCEDURE

Design a pottery box.

Make paper patterns for all sections, including the top.

Roll out slabs of clay sufficient to cut all sections of the box.

Lay the patterns on the clay and cut out all sections, including the top, as otherwise it will not fit when dry.

Cut the bottom from a slab of clay slightly thicker than that used for the sides and top.

Allow the clay to set until it is firm enough to handle.

Roughen the edges and moisten them with slip.

Erect the side sections and weld them firmly to the bottom.

Fix the ends in place.

Put a roll of clay around the inside of the box at

the joining of the sides with the bottom, and thin rolls of clay in the corner joinings. Weld these carefully.

Fit a flange on the under side of the top.

When leather hard, finish the piece carefully with a metal scraper. Trim the corners and slightly round all edges.

GENERAL INFORMATION

Pottery boxes lend themselves well to modern decorative motives.

They may be carved or modeled when finished, or before the pieces are assembled.

The top of the box, being flat, is particularly well adapted for underglaze treatment in several colors (see Underglaze Decoration, p. 61)

In connection with this lesson pictures of boxes should be collected and mounted, and sketches made from attractive pottery boxes which may be found in museum collections and art stores.

LESSON VIII

PURPOSE

To practice throwing on the potter's wheel

MATERIALS

Clay, basin of water, wire-cutter, plaster batt.

EXPLANATION AND PROCEDURE

Wedge the clay as directed in Lesson I, p.34.

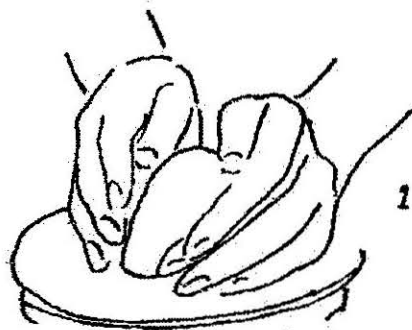
Work the clay into balls the size of an apple.

Place a ball of clay in the center of the wheel.

Sprinkle the clay ball liberally with water, and wet the hands. Keep the fore-arm rigid and the elbow pressed against the side. Grasp the clay with both hands and revolve the wheel. This will force the ball into the exact center of the wheel, and is called "centering". It is the first and most difficult operation connected with throwing, and will require much practice. When the mass runs smoothly under the hands it is perfectly centered.

Centering

Be sure to sprinkle the clay often, and keep the hands wet.



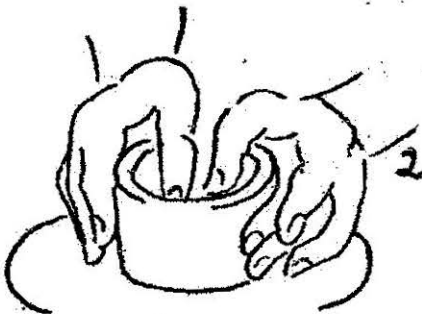
When the clay runs true under the hands, place the thumbs in the center and press down and outward. This will make a cup-shaped depression in the center of the

mass. Around this the walls of clay will begin to rise.

Now insert the two first fingers of the left hand in the hollow and hold them against the right wall.

Bend the forefinger of the right hand and press the second joint and the knuckle against the outer wall so as to oppose the fingers of the left hand. Bring the two hands steadily upward, making the clay rise in a cylinder.

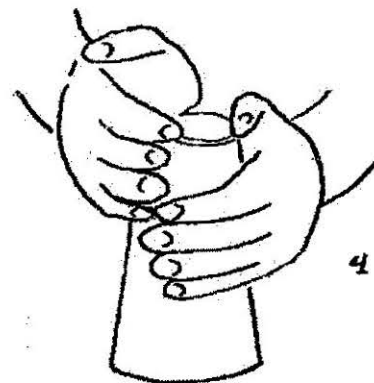
Starting the Cylinder



Raising the Cylinder



If the cylinder spreads at the top, as it probably will, surround it with both hands and press slightly inward. Let the thumb of the right hand lie along the edge. This forces the wall to run level. In contracting, the walls become thickened. Repeat the exercise of pulling up and holding in the cylinder until the walls have become as high and as thin as the clay will stand. (Diagram 4)



Shaping the Cylinder

The top of the cylinder may be drawn in to a narrow opening; or, before the walls have become too thin, it may be flared or spread out. To do this:

Place the fingers of the right hand on the outside of the wall and press inward. At the same time, place the fingers of the left hand on the inside and press outward at a slightly higher level. The revolving clay will assume varying shapes in response to this pressure.

If the walls bulge too much they may be "pulled in" from time to time by surrounding the form with the two hands as shown in diagram four.

Caution: - Be sure to sprinkle the piece often and keep the hands wet.

Practice making cylinders and converting them into simple forms.

To Remove the Piece From the Wheel

Dry the hands. Pass a wire under the piece while the wheel is revolving slowly.

Lift the piece from the wheel with perfectly dry hands.

Set it on a plaster batt which is close by to receive it.

Keep the best forms for the next process, which is called "Turning".

GENERAL INFORMATION

To The Teacher: As much time as possible should be allowed for practice on the wheel. For this reason the lesson is introduced early in the course. After the student has mastered centering and can make a cylinder, he should be encouraged to throw to a pattern.

Directions for Throwing to a Pattern

Make a pattern.

Take measurements with calipers.

Test the piece often by these measurements, attempting to reproduce the form of the pattern.

This exercise is important in order that the student may gain mastery over his medium.

References

The Potters Craft, Binns, Chas.

Pottery For Artists, Teachers and Craftsmen,

Cox, Geo.J.

LESSON IX

PURPOSE

To turn a piece of pottery on the potter's wheel.

MATERIALS

Turning tools, water, sponge, wire-cutter, turning stick.

EXPLANATION AND PROCEDURE

Make a piece of pottery on the wheel. Perfect the shape as far as possible. Allow the shape to become leather-hard.

Center the piece on the wheel and fix it by means of slip or bits of clay pressed against the base of the piece and welded to the wheel.

Jab the sharp end of the turning stick into the upright (see description of upright on plaster table, p. 27) at the back of the wheel.

Grasp the other end of the stick with the left hand, and resting the tool upon it, hold both stick and tool firmly with the two hands. The stick acts as a support for the tool at the same time that it steadies the hand.

Revolve the wheel slowly. Raise the stick and tool together to any desired height and use the cutting edge of the tool to shape and trim up the piece.

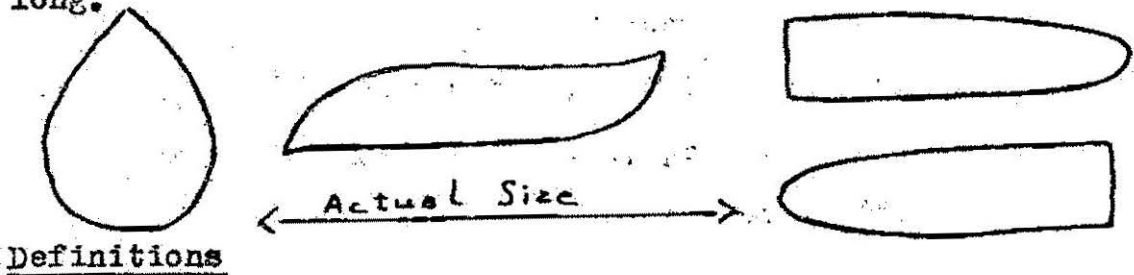
Invert the piece and trim and depress the base.

Sponge the piece lightly and refinish the surface with the flat side of the metal scraper.

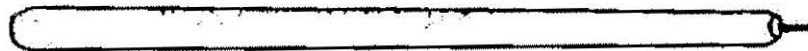
Hand-built pieces may also be finished on the wheel.

GENERAL INFORMATION

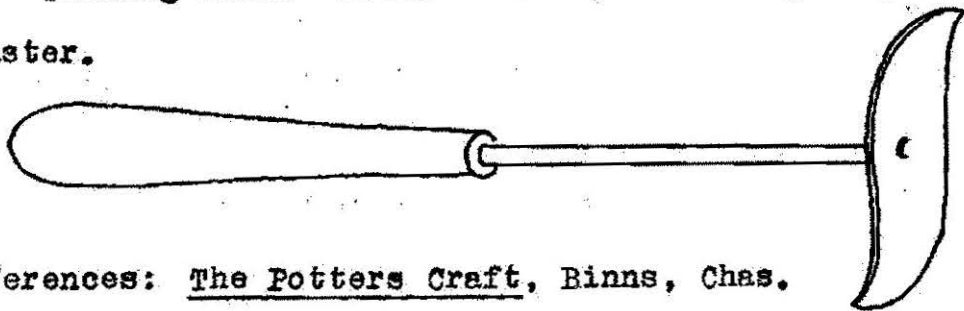
Turning tools may be purchased from the Milligan Hardware Co., East Liverpool, Ohio, but they are rather large and clumsy for amateur work. It is better to purchase heavy gauge French Palette steel and have the tools made to order. The shapes given below are convenient for turning. They should be fitted with handles nine inches long.



Turning Stick: a long stick (a broom handle is excellent) with a sharp pointed nail fitted in one end.



Turning Tool: Metal tools for trimming clay and plaster.



References: The Potters Craft, Binns, Chas.

PREPARATORY LESSON
Decorative Processes

To The Teacher And Student

Tiles have wide possibilities for use and decoration, and being flat, they are easy to handle. They are, therefore, the best objects on which to practice decorative processes. Since the next lesson is to be the making of a tile, decorative processes are discussed here.

KINDS OF DECORATION

Incised Line: This is done by scratching the outline of the design with a sharp tool. It is the first type of decoration applied to pottery by primitive peoples. A nut pick makes an excellent tool for doing this type of work.

Carved Relief: Decorations may be carved into pottery when the clay is in a leather-hard state. Wood block tools are the best for this purpose. The lines should be strong and clean. The design may be carved out, or the background cut away, but in either case the depressed surfaces should be flat. Carving on pottery should not be too deep.

Modeled Relief: This is the second step in decoration attempted by primitive potters. Having successfully incised decorations into the clay, it was not long before they discovered that they could add clay to the surface.

This they did at first in dabs and buttons. The old British ware is an interesting example of this type of decoration. Modeled relief decorations should be done while the clay is in a plastic state, and, in order to insure adhesion, the clay used in the decoration should be, as nearly as possible, of the same moisture content as that in the piece.

Slip Decoration : This is a broad term, applying to a number of quite different decorative effects.

Slip is clay reduced to the consistency of thick cream by the addition of water. It may be used as an outer coating over the entire piece, in which case it is usually spoken of as "engobe". It may be used in the natural color of the clay, or colored by the addition of oxides. It is sometimes dripped or painted on in an outline, and again, decorations are painted onto the piece with colored slips. Colored slips may also be thickened by evaporating them in plaster bowls, and used as inlays. Formulas for colored slips are given on p.

Slip decoration was highly developed by the Chinese. The old English blue and white china was painted in blue slip over which a transparent glaze was applied. The famous Rockwood Pottery was decorated in colored slips. The greens in this ware were obtained by applying a transparent glaze colored yellow, over a cobalt blue slip. The charming effects obtained were, in the opinion of the

writer, far superior to the present-day Rockwood glazes, fine though they are.

Scruffito: This name is sometimes applied to incised line decoration, but properly speaking it applies only to pottery which has been dipped in a slip glaze of a color differing from the body of the piece. The design is traced on to the slip surface and the background spaces of the design are cut away to show the underlying color of the pottery body.

Inlay: This consists of pressing bits of colored clay into the clay body.

Carve out the design. Make a colored slip, using clay of the same composition as the body of the piece. Thicken the slip in plaster bowls. Moisten the depressions in the design with a little slip, to insure their sticking. Press in the bits of colored clay and clean off the edges.

Inlaid pieces are handsomer if unglazed. To make them semi-waterproof they may be soaked in a composition of half bees wax and half turpentine, heated together. (This is very explosive and should be kept away from an open fire) Apply the mixture with a sponge or brush, and when cool, burnish it with an agate tool.

Underglaze Decoration: By this is meant any type of decoration applied under the glaze. Slip decoration comes under this head. Generally speaking, however,

one thinks of underglaze decoration as that which is painted on to green (unfired) or biscuited (fired) ware and covered with a transparent glaze.

Underglaze colors are specially prepared oxides which may be used as paint, or added to glaze to give it color.

Overglaze Decoration: By this is meant any kind of decoration done over the glaze. The old fashioned china painting was overglaze. Further examples of this type of decoration are the Delft and Majolica wares. In both these a tin enamel glaze was first applied to the ware, and the decoration then painted on before the glaze was fired. The application of color to this spongy, unfired surface was extremely difficult, but some lovely effects were produced due to the slight blurring of the outline, which gave a very soft effect.

References: Decorative Processes by J. Wolliscroft
Rheade, Proceedings of the American
Ceramic Society, Vol. II (File at Stan-
ford University)

A list of underglaze colors, with directions for mixing and applying them, are given on the next page.

Satisfactory Underglaze Colors

The following list of colors has been found satisfactory. The abbreviations stand for the name of the manufacturer (see p.

Peacock Blue U.G. #393	R.H.
Cobalt Blue U.G.	L.R.
Chinese Blue U.G.	R.H.

French Green U.G. #969	L.R.
Yellow Green U.G.	R.H.

Pink Oxide #1770D	R.H.
Sang de Beuf U.G.	L.R.

Violet U.G. #888	L.R.
------------------	------

Best Yellow U.G.	Drake
------------------	-------

Best White U.G.	Drake
-----------------	-------

Best Black U.G.	Drake
-----------------	-------

Preparation and Application of Underglaze

(1) Soak the underglaze color in a little water. Pour off the water which rises to the surface. Grind the remaining color in a mortar. Add a few drops of gum Tragacanth. Apply the underglaze color very thin, else it will peel off.

(2) Put a little underglaze color on a ground glass palette. Add a few drops of fat oil. Rub up to a paste with a palette knife. Apply thin in the same manner that one uses china colors.

Definition of Terms

Gum Tragacanth - see p. 84

Fat oil: Evaporated turpentine. It may be purchased

from any art store.

Decorative Processes Applied To Tiles

The decorative processes described may be applied to any kind of pottery. The following description applies to the specific problem of decorating tiles.

To Make An Inlay Tile

Make a tile in Plaster.

Trace on a design.

Carve away the background, leaving the design in relief.

Imprint the plaster tile in the wet clay.

Fill in the depressions with clays of various colors.

To Decorate A Tile In Glaze Of Several Colors

a - Model a tile.

Permit it to dry to the leather-hard state.

Trace on a design very lightly.

Cut away everything but the outline of the design, which is kept in low relief. This serves as a retaining wall to separate the glazes. Be careful not to cut through this wall at any point.

Fire the tile.

Fill in the depressions with glazes of different colors. These must fire at the same temperature.

b - Carrying out the idea of a retaining wall, rub up a little Manganese Oxide to a paste, using mucic-

lage, gum tragacanth or linseed oil. (If linseed oil is used the tile must be re-fired before it is glazed)

Paint on the outline of the design with the manganese oxide. This makes a wall past which the glaze will not flow. It also provides a black outline for the design. These tiles are twice fired.

Modeled Relief

Leaves, floral motives and animals are the best decorative motives for this type of tile.

Choose a design which permits of freedom and naturalistic treatment.

Depress the design with the fingers. Use no tools because they give a clean-cut appearance, whereas in these tiles we wish a flowing surface.

Fire the tile.

Paint the whole surface with underglaze color, fire lightly, and dip the tile in a clear glaze.

Fire again.

The transparent glaze, settling in the depressions, gives interesting depths of color. These tiles are particularly adapted for use in the lower grades, where it is desired to do some tile work.

GENERAL INFORMATION

When working with a small kiln, make no tile over six inches square.

Allow for shrinkage in figuring tiles. The average shrinkage of clay is twelve percent.

Tea tiles should have a border, and the space inside the border should be depressed on the under side in order to prevent the heat of the vessel set upon it from spoiling the table.

Repeat tiles need no border.

The thickness of the tile varies according to the size. A six by six inch tile should be approximately five-eighths thick.

Tiles should be dried rapidly to prevent warping. Slap the tile down hard upon a batt and put it in the sun. A weight placed in the center will help to keep it level.

References: Leadless Decorative Tiles, Wm. J. Furnivall

Definitions:

Flux: Glazes melt under the application of heat. This is termed "fluxing", and a glaze is said to "mature" at the temperature at which it melts.

LESSON X

PURPOSE

To model a tile

MATERIALS

Clay the size of the two fists. A plaster batt, rolling pin, four or five strips of wood, a knife, a nut pick, modeling tools, scissors, paper.

EXPLANATION AND PROCEDURE

Wedge the clay.

Place the wooden strips on either side, as described in Lesson II.

Now, instead of slicing off the clay, use the rolling pin to flatten it to a smooth surface, level with the sticks.

Cut a square from paper, being sure the corners are true.

Place the paper pattern on the clay, and holding the knife vertically, cut out the clay around the pattern.

If the tile is to be designed, slap it down upon a plaster batt and leave it to become leather-hard.

When firm enough to handle without deforming, trace on the design. Decorate the tile by one of the processes described on pp. 59 - 62.

LESSON X (continued)

PURPOSE

To make a tile mold.

To cast a tile ✓

MATERIALS

Tile, strips of wood, slab of glass or marble, plaster of Paris, clay for modeling, Terra-Cotta Clay ✓

EXPLANATION AND PROCEDURE

Place the tile model on a glass or marble slab.

Surround the tile with sticks as described in Lesson I, under making a square batt. Leave a space of one inch all round the tile, between the tile and the wall of sticks.

Smear clay around the wooden strips at the table level and in the corner joints, to prevent the leakage of plaster.

Review the directions for mixing and pouring plaster, and consult the plaster table for correct proportions.

Make a soft mix and pour plaster to a height of three-fourths of an inch above the top of the tile.

When the plaster heats, remove the wooden strips and trim the edges of the mold neatly.

Dig out the clay model.

Dry the mold thoroughly in the air, or in a warm

room, but do not place it near a fire, since this would cause the mold to warp, due to the uneven drying.

To Press Out Or Cast A Tile

Files should be made from a porous clay which will not warp in the drying. (p. 22) But since this clay is usually coarse and gritty, it is unsuited for modeling; therefore the tile is first made in a plastic clay, the decoration is put on and a mold made. The finished tile is then pressed from the mold. In this way it is possible to have a decorated tile made up in a clay body which will not warp.

Directions: Press the moist terra-cotta clay into the mold, being sure to fill all corners.

Let it stand for a few moments.

Wad a bit of clay into a ball, press this firmly against the corner of the tile, raising it with a quick, sucking motion. The moist tile will adhere to the bit of clay, and be pulled loose from the mold. Do this to each corner, and here and there over the surface of the tile. When the tile appears to be loose in the mold, turn it out, slap it down on a plaster batt and set it where it will dry quickly. NOTE - If tiles are left in the molds until they shrink away naturally, they will almost inevitably warp.

Dust a little silica into a new mold to prevent sticking.

GENERAL INFORMATION

Definitions

Silica, also known as Flint, one of the indispensable ingredients of pottery body and glaze. It may be purchased at any Potter's Supply House.

Tile Body: Use terra-cotta mix, which is a clay to which grog (ground clay which has previously been fired) and coarse sand have been added. Terra-cotta mix may be purchased from The N. Clarke & Sons Co., Alameda, California; The Denver Fire Clay Co., Denver, Colorado, or B.F. Drakenfeld, 45 - 47 Park Place, New York.

References

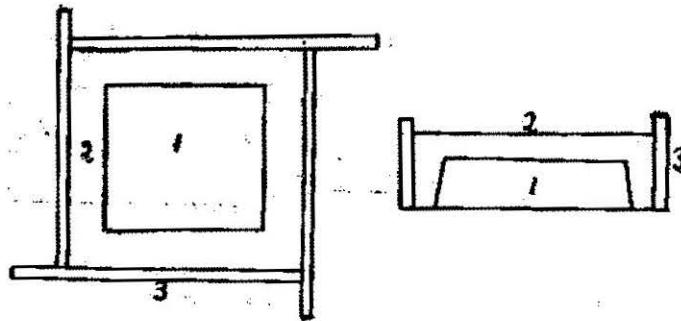
The Potter's Craft, Chas. Binns.

Pottery, Chas. Noke & H.J. Plant

Leadless Decorative Tiles, Wm. J. Furnivall

ILLUSTRATIONS

- 1 - Clay Tile
- 2 - Plaster
- 3 - Retaining-wall



Note: The sides of the tile should be slightly oblique so that it will slip easily from the mold.

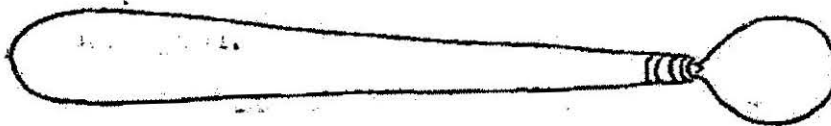
LESSON XI

PURPOSE

To make a saucer or bowl mold.

MATERIALS

Clay, linoleum one yard long and five inches wide.
Metal scraper, straight edge turning tool, wire-loop
tool*-



EXPLANATION AND PROCEDURE

Roll out a clay disc two and one-half inches thick, seven inches in diameter.

Place the disc on the wheel and center it.

With a straight-edge turning tool, run a true edge one inch wide around the clay disc (a)

With a wire-loop tool, roughly fashion the bowl of the saucer (b)

Now cut out the rim of the saucer (c)



Surround the clay disc with the strip of linoleum and tie it securely with a stout string. Surround it with clay at the wheel-level.

Make a soft mix of plaster and fill the space inside the wall of linoleum. When the plaster heats, strip away

the linoleum and pull off the clay. The plaster form is the mold over which the saucer will be made. (d)

Center this form on the wheel.

True and smooth the edges and finish the surface with a flexible metal tool. Dry the mold.

To The Teacher And Student

Before attempting to make a saucer it should be carefully designed.

Make two drawings. Mount one in the natural position and the other up-side-down. Use a mounting of contrasting color.

Pin the first to the back of the wheel to use as a guide in shaping the clay model for the mold.

Reserve the second drawing to be used as directed in making the saucer over the mold.

Making the Saucer from the Plaster Mold

Pin the design of the saucer to the back of the wheel. Place it bottom-side-up, and facing you as you work. (a)

Roll out a slab of clay three-eighths inch thick, using wooden strips as tracks (see Lesson X)

Lay the slab of clay over the mold and pat it close to the surface. Trim off the surplus clay from the edges.

Place the mold on the wheel, center it and fix it firmly in place by means of wads of clay (see Lesson IX)

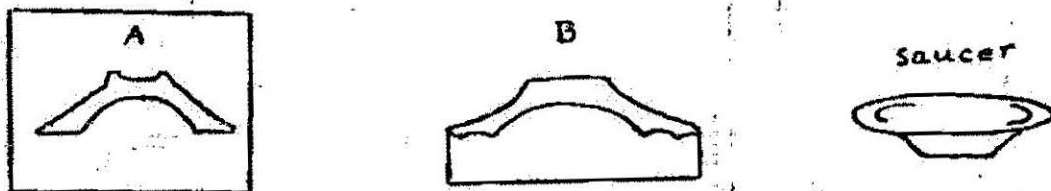
Spin the wheel, and with a wet sponge, sponge the

clay to the mold. Use plenty of water.

Following the inverted design of the saucer, roughly shape the footing with the sponge. Do this while the wheel is revolving.

Use turning tools and scraper to trim and finish the footing and the under side of the saucer. Leave the mold on the wheel for a time and do any additional finishing when the clay has dried out sufficiently.

When the mold releases the saucer, remove it, center it on the wheel, fix it in place with bits of clay, and finish the inside with a sponge and a flexible scraper.



GENERAL INFORMATION

Bowls are made in the same way as saucers. Both should be carefully designed and made to a pattern.

References

- The Potter's Craft, Chas. Binns
Pottery, Chas. Noke and H.J. Plant.

PURPOSE

To make a vase mold.

MATERIALS

Model provided with a clay stopper. Linoleum long enough to surround the model one and one-half times, and wide enough to reach well above the top of the stopper. Clay, stout cord, clothes pin, wooden batt, turning tool, case knife and scraper.

EXPLANATION AND PROCEDURE

Prepare the model with a clay stopper (a) one inch high.

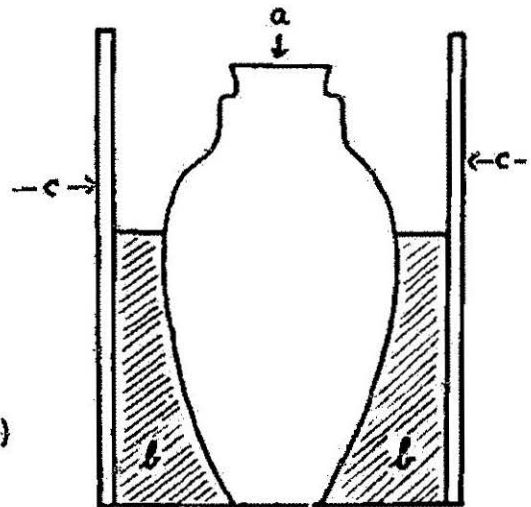
Surround the model with a clay wall one inch thick (b) and built to the greatest diameter of the vase form.

Surround the model, which is now encased in clay, with a strip of linoleum (c).

Smear clay around the edge of the linoleum at the table level, to prevent the leakage of plaster.

Fasten the ends of the linoleum together with a clothespin and tie up with stout cord.

Make up sufficient plaster in soft mix to fill the space around the model to the top edge of the stopper, but no higher.

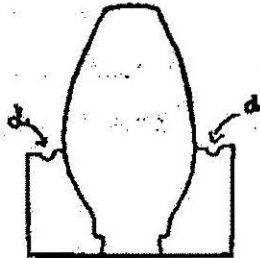


Rap the table on which the model sets, to settle the plaster and bring air bubbles to the surface.

When the plaster becomes firm, but before it heats, remove the linoleum and invert the model.

Remove the clay wall and refinish the surface of the model.

Cut natches in the rim of plaster surrounding the model, at opposite sides of the vase form. (d)



Size the plaster rim, giving three coats of size. Sponge the surface well after each coat.

Replace the linoleum casing.

Tie up, and stop the crack between the casing and the plaster, with a thin roll of clay.

Pour plaster, using same mix as for the first half of the mold, and fill the space to a height of one inch above the bottom of the vase form.

When the plaster sets, but before it is hot, remove the linoleum and trim and finish the walls of the mold. When the plaster heats, separate the two parts of the mold and remove the model.

Finish the inside of the mold with a wooden tool and sand paper.

When put together again, the hollow space within the mold will be found to correspond to the form of the vase.

Dry the mold in the sun or in a warm room, but do not set it near a fire. Uneven application of heat causes the mold to draw, and the castings made from it will not be "true".

GENERAL INFORMATION

Definitions

Sizing: A composition applied to plaster to stop the pores and prevent sticking.

Formule For Sizing

2 table.spoons Lux, dissolved in
warm water.
2 table spoons olive oil.

Allow the Lux to cool until it jells. Add the oil and whip up with a Dover egg beater. Apply with a sponge or brush and wash off the surplus size with a wet sponge after each application. Three applications of size are usually sufficient.

Matches: The technical name given to the locks by means of which the various sections of a mold are held together. They are made by scooping out a hollow in the plaster. When the second pouring is made, the plaster runs into these hollows, forming a "ball and socket" joint.

Slip

Slip is clay reduced to a liquid state by the addition of water. It has a number of uses for the potter. It is used for making pottery objects from plaster molds, for painting on decorations, mending, etc.,. Sometimes a piece of pottery is dipped in a slip of a different color. This is called "slip glazing".

Slip For Casting: This should weigh approximately twenty-six ounces to the pint. The shrinkage on drying will be about one-eighth inch to the inch.

FORMULA

1 pint water
26 ounces dry clay.

Add the clay to the water. Allow it to stand until the clay is thoroughly saturated. Stir to break up all lumps. Rub the mixture through a forty mesh screen. Strain again. This time the slip should pour through the screen.

Slip should stand several days before being used. It should be stored in a cool place and not permitted to dry out.

Silicated Slip: The addition of silicate of soda (water glass) reduces the quantity of water necessary to make slip fluid. It causes the cast objects to set

more rapidly, and since the water content is lower, more pieces may be cast before the molds become saturated. This is an advantage where a number of castings are to be made.

FORMULA FOR SILICATED SLIP

4 gallons Slip

4 ounces saturate solution
sodium carbonate

1 ounce heavy water glass.

Make up a slip with as little water as possible to thoroughly saturate the clay. Add the above ingredients to the slip. Strain. Always stir the mixture well before using it. Add a little water from time to time if necessary.

Colored Slips: These may be made by adding coloring oxides to the slip. Use from one to three grams of oxide to an ounce of clay, depending on the strength of color desired. Grind well in a Ball Mill. Colored stains and underglazes may also be used to color slip.

COLORS

Blue - Cobalt oxide or underglaze blue.
Green - Copper oxide
Black - Underglaze black
Red - Oxide of Iron
Gray-green - Copper Carbonate

Greens may also be obtained by using a cobalt blue slip over the body of the piece, and covering this with

yellow glaze. This method was used by Rockwood to obtain the lovely soft green and brown-green effects for which much of their early ware was famed.

Colored Inlays: These may be obtained from colored slips by simply evaporating the slip in plaster bowls. Slips intended to be used as inlays should be made of the same clay as the body of the piece to be inlaid in order to insure the same shrinkage.

GENERAL INFORMATION

There is an intimate relation between the body of the piece and the slip covering. For that reason it is impossible to give a formula for colored slips which will fit every pottery body. The general rule is, use in the slip the same clay used in the body.

The following formula has given satisfactory results in many instances, and has never failed to work over small areas.

Formula For Colored Slip

Clay, 1 lb.

Zinc Oxide 1 oz.

Whiting 1 oz.

Coloring Oxide, 16 to 24 grams.

Grind the oxide in a ball mill with a small quantity of clay. Make up the slip and add the color. Be sure to mix it thoroughly. Pass through a 60 mesh screen.

LESSON XIII

PURPOSE

To cast a vase.

MATERIALS

Slip (see formula, p.77) Mold, funnel, case knife, plaster batt, modeling tools. Bowl and two sticks of equal thickness. Stout cord.

EXPLANATION AND PROCEDURE

Casting is the commercial method by which pottery is made from molds. By this means forms may be reproduced indefinitely. Although the artist-craftsman rarely wishes to do this, he may wish to reproduce some form, for instance another candlestick to make a pair. Casting is also convenient for making a number of small pieces for testing glazes and practicing various types of decoration.

Put the sections of the mold together and tie them up firmly.

Fill the mold with slip until it makes a heaped-up mound above the top (if the opening at the top is small the funnel is very convenient for this purpose)

Pour steadily. If the pouring is stopped before the mold is filled, grooves will appear in the casting.

When the mold is full, strike the table on which it sets. This brings to the surface air bubbles which may

be present in the slip. Prick these bubbles.

Add slip from time to time, keeping it piled well above the top of the mold.

Test the thickness of the wall of the vase by scraping away the slip near the edge of the mold.

When the clay wall within the mold has become three-eighths of an inch thick, invert the mold and pour the free slip into the bowl placed handy to receive it.

Shake the mold lightly and examine it to be sure all of the free slip has been poured out, and the inside is clean and smooth.

Rest the two sticks several inches apart across the top of the bowl, and set the mold, up-side-down upon them to drain.

When the clay vase inside the mold has lost its gloss, it is time to cut away the "spare". (The spare is the piece of clay wall projecting above the top of the vase. It corresponds to the stopper in the original model)

To cut away the spare, hold the case knife vertically, and pass it between the mold and the spare wall, cutting where the spare joins the rim of the vase. Remove the spare.

Replace the mold up-side-down across the bowl and leave it to dry until it shrinks away from the mold.

This will take several hours.

When the vase becomes free in the mold, set the mold upright, remove the top section, take out the vase and set it on a plaster batt.

When the piece has become leather-hard, finish the entire surface with a tool or on the wheel, and trim and finish the rim and footing.

If you yourself have made the mold for the vase, ^{and} ~~or~~ designed it, you may sign the cast piece. To affix your name to a casting which you have not designed, is artistic plagiarism.

GENERAL INFORMATION

To The Teacher: A cast project should be assigned in the beginning of the lesson period so that the object may be removed from the mold the same day.

References: The Potter's Craft, Chas. Binns.
Pottery, Chas. Noke and H.J. Plant.

LESSON XIV

PURPOSE

To prepare for glazing and firing

(a) Setting pyrometric cones. (b) Making clay tiles and rings for testing glazes. (c) Making Gum Tragacanth solution.

MATERIALS

Clay, Pyrometric Cones numbers 01, 03, 05, 06, 07, 08. Tile mold, Gum Tragacanth flakes, mixing bowl, water, Dover egg beater, wire strainer, Mason jar, knife, black underglaze or Manganese Oxide, turpentine, fine water color brush.

EXPLANATION AND PROCEDURE

a - Read the information about Pyrometric Cones, given on p. 112.

Roll coils of clay one inch in diameter. Cut these into sections one inch long.

Hold the cone with the number facing you. Stick the base into the clay, inclining the cone very slightly to the left.

Firm the clay around the base of the cone.

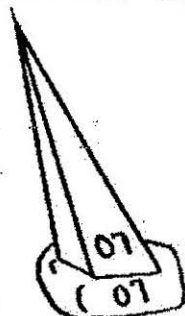
Mix black underglaze or manganese oxide to a paste with a little turpentine.

Paint the number corresponding to that on the cone, onto the clay base.

Set the cones to dry.

Note the angle at which the cones illustrated below are set.

Incorrect Way



Correct Way



b - Tiles: Consult lesson on making tiles.

Cast a tile from the six-inch mold you have already made. Cut this into sections, making nine two-inch tiles. Dry and fire these. Save for testing glazes.

Rings: Roll out a strip of clay. Cut off sections two inches long. Wrap these strips of clay around the forefinger and pinch the ends together. Fire these rings and save for testing glazes. The advantage of these rings is that they may be hocked out of the kiln during the progress of the firing, thus making it possible to test glazes in the biscuit kiln.

c - Gum Tragacanth: Soak one ounce of gum in one quart of water. It will make a thick "jell". Whip this with a Dover egg beater and pass through a sieve. The gum should be a soft, gelatinous mass, but not "runny".

Use about a tea spoon full to an ounce of glaze.

GENERAL INFORMATION

To The Teacher And Student: The directions for making gum, rings, tiles, and setting cones, have been given here in the form of a supplementary lesson, but this may be inserted anywhere in the course, as the need for glazing and firing arises. However, at that time, the information on Glazes, Firing and Cones should be carefully read.

PREPARATORY LESSON

Glazes

Glazes are the result of years of study and experiment, and no more than the most superficial knowledge of them could be gained in a short course in practical pottery. The following account is intended to give the student only that information necessary to an intelligent appreciation of his materials, and to render him partially independent of commercial glazes.

Glazes belong to a class of chemical compounds known as Silicates; i. e. they contain silica as a characteristic ingredient. A glaze is a glass. Its ingredients are dissolved in each other. There are three groups of ingredients in a glaze.

- 1 - The basic ingredients, which govern the fusibility of the glaze: Chief of these are lead, borax and soda.
- 2 - The Alumina content: This governs the viscosity of the glaze. By viscosity we mean the ability of the glaze to flow and form a smooth, unbroken surface, free from blemishes. Aluminum is found in the clay and feldspar employed in the glaze.
- 3 - The acid group: This is composed of silicates. Silica occurs in flint, clay and feldspar. This third group controls the whole behavior of the glaze. The silicates unite with all the other ingredients

in the glaze to form a glass.

CLASSIFICATION OF GLAZES

Glazes are variously classified. There are "fritted" glazes, and "raw" glazes.

Fritted glazes are twice fired. That is to say, a part of the glaze ingredients are melted together to a glass, which is then crushed and added to the rest of the glaze formula. This is applied to the ware and fired. Fritted glazes are the finest and the most expensive.

Raw glazes are compounded from "raw" or unfluxed materials, which are mixed together, applied to the ware and fired. They are used on most cheap ceramic wares. They are easier to compound than fritted glazes and are the only ones with which it is practical for amateur potters and students to experiment.

Under the heading of "Raw" glazes, we will consider three types of glaze. These are (a) Transparent Glazes; (b) Enamels or Majolica Glazes; (c) Matt Glazes.

- a - Transparent glazes are those through which the body of the piece may be seen. They may be either colored or colorless.
- b - Enamel or Majolica, is a glaze to which tin oxide has been added to render it opaque. This type of glaze is extensively used on art-pottery.
- c - Matt glazes are low-lustre glazes having a dull, or

"matt" surface. They are extensively used on art ware, and are especially good for using in polychrome effects, since they run very little.

To Mix The Glaze

Glaze comes in a dry powder form. Mix it with water to a paste. Grind in a mortar until perfectly smooth. Add a small quantity of gum tragacanth solution, mix well and add more water to bring it to the consistency of thick cream.

Applying The Glaze

To apply the glaze to a medium sized piece use a three-fourth inch varnish brush. Apply the glaze thick. Do not brush it as though it were paint. Load the brush and put on as much as possible, in a smooth, even coat. Glaze slightly thicker over the high parts of the piece, on the shoulders and towards the top. The glaze runs down as it fluxes in the kiln and if applied too thick at the bottom it will drip off. Put on two coats of glaze. It should be about one-sixteenth to one-eighth of an inch thick.

Clean off all glaze from the bottom of the piece before placing it in the kiln.

In glazing a vase, mix some of the glaze thinner than for painting on and pour this into the vase.

Turn the piece gently, pouring out the glaze at the same time. Work as rapidly as possible to prevent too much glaze sticking in the bottom.

The inside of the piece should be glazed first, and the glaze cleaned from the rim with a knife, before the outside glazing is done. In case different colors are used on the inside and outside, clean the rim very carefully, make an even line and bring the outside glaze up over the rim to meet the inside color.

The Best Glazes For School And Amateur Use

The chemistry of glazes is a study in itself. There is an intimate relation between the glaze and the body to which it is applied. For this reason it is difficult to find glaze formulas which will give satisfaction under all conditions, and commercial glazes are the most reliable and the most practical for school and amateur work. The following manufacturers carry excellent glazes. They will be referred to by the abbreviation placed opposite their names.

<u>Manufacturer</u>	<u>Abbreviation</u>
B. F. Drakenfeld, 45 - 47 Park Place New York City	Drake
Rosslar & Hachlacher Chemical Co., 350 Fifth Ave, New York City	R.H.
L. Reusche & Co., 2 - 6 Lister Ave, Newark, N.J.	L.R.

Samples may be procured from these concerns. In ordering, specify the firing temperature and the type of glaze desired. Make careful tests as follows:

Making Glaze Samples

Mix a small quantity of each of the glazes to be tested. Using manganese oxide rubbed up with turpentine or glycerine, print the glaze number on three of the clay rings previously fired, and on one small tile. Dab a little glaze on one side of the ring, and glaze the face of the tile. Fire the tiles in a glaze kiln, but the rings may be placed near the front of the biscuit or glaze kiln, opposite the peep hole, and drawn out by means of a bent wire, as the firing progresses. As each sample is removed from the kiln, mark on it with a pencil, the number of the cone to which the sample was fired. By this means the correct firing temperature of a glaze can be ascertained in the minimum of time. Select glazes which mature at the same temperature. This facilitates the work of firing. Having selected glazes which appear to be satisfactory, glaze and fire a small piece of pottery before ordering the glaze in any quantity. The samples are only an approximate test of a glaze.

The following list of commercial glazes has been selected among many hundreds of samples, and these num-

bers have proved satisfactory under varying conditions. They mature between cones 05 and 08, which is to say that they have a fairly long firing range. This is a great convenience where the kiln is being operated by amateurs, since, should it "run over" a little, (fire higher than was intended) the glazes will not be burned out.

Commercial Glaze List

Azure Blue -----	L.R.
Mazarin Blue #956	L.R.
Turquoise #3600	R.H.
Yellow #1 -----	Drake
Yellow #663 -----	R.H.
Copper Green #4	L.R.
Green #702 -----	R.H.
Red #680 -----	R.H.
Clear Glaze #1	Drake
* Flux #963 -----	L.R.

* This flux can be mixed with any of the above glazes, and with almost any glaze, to reduce the firing temperature.

Glaze Formulas

For the benefit of teachers and students who desire to mix their own glazes, the following basic formulas are given. They have proved satisfactory on several clay bodies and under varying conditions. Those desiring to experiment, however, are advised to make up only a fraction of the formula and make careful tests at temperatures ranging from cones 08 to 05.

GLAZE FORMULAS

White Enamel

White lead ----	125	parts	by	weight
Feldspar -----	50	"	"	"
China Clay ----	10	"	"	"
Whiting -----	30	"	"	"
Flint -----	60	"	"	"
Zinc Oxide ----	10	"	"	"
Tin Oxide -----	20	"	"	"
Flux #963 L.R.	80	"	"	"

Clear Glaze

Red Lead -----	114	parts	by	weight
Silica -----	44	"	"	"
Feldspar -----	10	"	"	"
Ball Clay ----	10	"	"	"
Oxide of Zinc	1	"	"	"

Using the above glazes as a base, the following table of colored glazes is given (see next page)

The underglaze colors referred to will be found on page 63. The oxides are as follows:

Coloring Oxides

Copper Oxide (black)-	gives green with lead, blue with borax or soda.
Copper Carbonate ---	gives light green to black used as an underglaze. In glazes gives green with lead, blue with borax.
Cobalt Oxide -----	gives various strengths of blue.
Iron oxide -----	gives dull reds, browns; and with Uranium Oxide, gives orange.
Manganese Oxide ----	gives brown, and mixed with iron or cobalt, gives black.
Uranium Oxide -----	Yellow and orange.
Antimony -----	gives yellow and acts as an opacifier, taking the place of tin in the glaze.
Chromium Oxide -----	gives green under some conditions and red under others. Red stains are made of a chrome-tin composition.

MATT GLAZE

Matt glazes are not very satisfactory for amateur use, since they do not run and correct their own defects in the kiln. In order to secure a smooth surface they must be dipped, sprayed or poured on. This takes more glaze than it is usually practical to mix. Matt glazes will usually stay where they are put, however, which is more than can be said for the soft Majolica glazes, and for this reason they can be used in small areas where several different colors are desired on the same piece.

Formula For Matt Glaze

White Lead -----	148	parts	by	weight
Feldspar -----	111	"	"	"
China Clay -----	11	"	"	"
Whiting -----	30	"	"	"
Calcined Kaolin -----	22	"	"	"
Tin Oxide -----	15.1	"	"	"

This glaze may be colored with underglaze colors, which neither add to, nor detract from the formula. The proportions are about the same as those given for Majolica glazes. Experiments may be made for different shades.

GENERAL INFORMATION

Always clean off the bottom of a piece before placing it in the kiln. If glaze is left on the bottom it will stick to the shelves.

Glaze often forms drips on the bottom of the

piece. These may be filed off with a carborendum stone, which can be purchased at any hardware store.

Always be extremely careful in handling colored glazes. The color in raw glazes cannot be detected before firing, but a very small particle transferred to a piece of another color, will show up brightly after firing. Mix or use colored glazes over a newspaper and destroy the paper immediately.

Wash glaze brushes, mortars and pestles and any articles used in glazing, immediately.

Use large Japanese water color brushes, or three-fourths inch varnish brushes for glazing. Do retouching with smaller water color brushes.

Before glazing a piece of pottery sandpaper the biscuited piece lightly, and wash it in clean water. Let it dry before applying the glaze.

Sometimes a piece of biscuit is very dry. Test it by "tasting". Touch the tip of the tongue to the piece. If the tongue sticks, dip the piece in clean water before glazing.

References

- The Potter's Craft, Chas. Binns
- Practical Pottery, J. Lunn
- Ceramic Cyclopedia, Fourth Edition.
- The Chemistry of Pottery, Earl Langenbeck

Equipment For Glazing

Addresses

Mortar and Pestle

Braun-Knecht Heimann,
San Francisco, Calif.
Denver Fire Clay Co.,
Denver, Colo.

Screens, 100 mesh,
120 "

Same as above

Balances,

Central Scientific Co.,
40 E. Ohio St.,
Chicago, Ill.

Chemicals

Silica

Feldspar

China Clay

Ball Clay

Calcined Kaolin

Whiting

Tin Oxide

Lead Oxide (Red Lead)

Lead Carbonate (White Lead)

Zinc Oxide

Gum Tragacanth Flakes

Braun-Knecht-Heimann,
L. Reuche
Rossler and Hachlacher
B.F. Drakenfeld
Denver Fire Clay Co.

(Addresses of the above
are given on p. 89)

Carborendum Stone

Any hardware store

Bowls for mixing glaze

Varnish brush

Sand paper, 00

LESSON XV

PURPOSE

To glaze a piece of pottery

MATERIALS

Glaze, bowl, water, large Japanese brush or three-fourths inch varnish brush. Gum Tragacanth solution, palette knife, sandpaper.

EXPLANATION AND PROCEDURE

Mix the glaze as directed on p.88.

Sandpaper the biscuit piece lightly and wash it in clean water. Let it dry for a few moments.

Apply the glaze first to the inside by filling the piece with glaze and pouring out the free glaze.

Clean the edge.

Paint on the outside glaze in an even, thick coat. Give two coats and test the thickness by scratching the piece with a sharp knife. The glaze should be about one-eighth of an inch thick.

Clean the bottom of the piece carefully.

GENERAL INFORMATION

In handling pieces which have been glazed, be careful not to carry one color to another. Handle glazed pieces as little as possible.

References: The Potter's Craft, Chas. Binns
Information on glazing, this treatise.

FIRING

Firing is one of the most fascinating operations connected with the making of pottery. Every student should learn something about the kiln, its construction and operation.

The Construction of the Kiln

The kiln has sheet iron on the outside, fire brick on the inside, and between these is the insulating material.

The muffle is the place where the ware is put. Pipes which carry the flame go up the sides, back and front. These distribute the heat. The ware inside is completely surrounded and protected from direct contact with the flame.

Difference Between A Pottery Kiln and A China Kiln

The walls of a china kiln are thinner than those of a pottery kiln. Consequently the kiln heats and cools faster, increasing the danger of loss from cracking of the ware. Pottery should be fired slowly up to eight hundred degrees, after which the fire is speeded up to the finish. The dampers are then closed and the pottery allowed to cool slowly. Pottery should soak up the heat. This is not possible in a china kiln.

Stacking And Firing

In stacking the kiln no piece should be placed

closer to the muffle than one inch.

The Biscuit Kiln

Biscuit may be placed flat on the kiln and shelves; pieces may touch or be stacked one inside another. Stack tiles near the center of the kiln. They may be stacked one upon another, two deep or three deep, provided a little silica is sprinkled between them to permit the escape of steam.

Build up the shelves to suit the height of the pieces to be fired. Shelves and props of fire brick may be purchased at the time of ordering the kiln.

After stacking the biscuit kiln, place the cones (see pp. 83 - 84) in position, on a shelf opposite the peep holes in the front and the back of the kiln. Adjust the pipes in the front of the kiln, open the dampers and close the door. Light the burners in the front part of the kiln and turn them very low.

Allow two or three hours for the kiln to dry out thoroughly, then light the back burners and turn them low. At the end of an hour the heat may be increased very slightly, and the kiln raised a trifle every half hour thereafter until it begins to show red inside. From this time on to the finish the heat may be increased every fifteen minutes, the burners being turned up full when the kiln is glowing red inside. The biscuit kiln should take from twelve to fourteen hours to fire.

The pyrometric cones are the temperature indicators by which the heat in the kiln is gauged. Depending on the kind of clay used, the cones used for the biscuit kiln will be 04, 03 or 01. The biscuit will certainly not be fired lower than cone 04, and for art pottery it is unlikely that it will be fired higher than 01. Assuming the cone to be 03, put cones 04 and 03 in the kiln. When the heat in the kiln reaches 1922 degrees Fahrenheit, cone 04 will bend over. From that time on watch carefully, and when cone 03 goes over, turn out the gas and close the draughts. The kiln should cool for at least twelve hours or longer.

The Glaze Kiln

When glazes flux they will stick together if they happen to be touching. Therefore the glaze kiln must be carefully stacked. The pieces are set up on stilts made of very refractory clay, to prevent the pieces from sticking to the shelves.

In stacking the glaze kiln put pieces glazed with matt glaze toward the center of the kiln. They require an even heat for best results. Put the cones in place, using three cones, one of the number to which it is desired to fire, one lower and one higher. In this way it is possible to gauge the extent to which the kiln has run over, in case it should not be turned off at the right moment. However, the glaze kiln is very import-

ant and should be carefully watched.

The glaze kiln may be more rapidly fired than the biscuit. Light all four burners and turn them low for an hour to expell the moisture in the kiln, then raise them at intervals of fifteen minutes until the desired heat is attained. The glaze kiln may be fired in from six to eight hours depending on the cone to which it is fired and the size of the kiln.

To Withdraw Sample Rings From The Kiln

Provide yourself with a long piece of stiff wire bent at one end. Remove the plug in the front (or back) of the kiln, insert the wire and hook out a ring. Replace the plug quickly, as much heat may be lost in a few seconds. The firing temperature of the glaze kiln will depend on the glazes used. Cone 07 is the average.

Protecting the Kiln and the Shelves

The inside of the kiln and the shelves, should be given a coat of kiln wash. This is a composition made up of highly refractory materials. It protects the kiln, and permits glaze which may drop upon the shelves, to be easily shipped off. Kiln wash should be ordered at the time of purchasing the kiln.

GENERAL INFORMATION

There are two excellent kilns on the market. They are the "Revelation" and the "Ceramic". Full information

regarding the care and operation of these kilns may be had from the manufacturers, whose address is given below.

In ordering a kiln order also stacks and shelves, kiln wash, asbestos fibre for stopping the joints around the front tubes, and some grog for making up a tile body. Placing The Kiln: Any shed or room will do for the kiln, but place it well out from the walls, leaving ample room to walk around it.

The kiln should be placed on a cement base.

Read carefully the directions which come with the kiln and be sure that the outlet for gas is sufficient, and the chimney properly placed.

In arranging the kiln room have, if possible, shelves for drying molds, shelves to hold the glazed and unglazed pottery, and a rack for the front tubes. A cabinet with drawers for the different sized stilts is very convenient.

An extension light which can be hung inside the kiln to facilitate the stacking, is almost a necessity. If this is impossible, have a candle handy.

The ideal ventilation for the kiln room is an open space of one foot between the ceiling and the top of the wall, all round the room.

References: Ceramic Kilns, pamphlet published by the Denver Fire Clay Company.
The Potters Craft, Chas. Binns

Addresses

Revelation Kiln, H.J.Calkins Co., State and Gris-
wold Sts., Detroit, Mich.

Keramic Kilns, Denver Fire Clay Co., Denver, Colo.

Stilts, Denver Fire Clay Company,
The Potter's Supply Co., East Liverpool, O.

Posts and Shelves, Denver Fire Clay Co.,
Reinheit Studs and Posts,
Mutton Hollow Fire Brick Co.,
Woodbridge, N.J.

PART III

APPENDIX

Glossary Of Pottery Terms

Equipment

Addresses (other than those given under sections to
which they refer)

Suggestions For Special Equipment

Table Of Pyrometric Cones

Bibliography

GLOSSARY OF TERMS

- Batt** - A slab of plaster used for holding the work in making or drying. Also a slab of burned clay used in building up the stacks in the kiln.
- Biscuit** - This term is applied to clay ware after it has been fired and before glazing.
- Body or Paste** - The clay or mixture of materials of which the pottery piece is composed.
- Casting** - The method of making pottery by means of pouring slip into plaster or other molds.
- China** - This is the English name for porcelain.
- Colours** - Oxides and underglazes used in decorating pottery.
- Crazing** - Fine cracks in the glaze due to a disagreement between the glaze and the body.
- Damp-box** - A box, closet, etc. used for storing pottery objects in process of making. The shelves are usually of plaster which are soaked up and retain the moisture. The damp box should be zinc-lined and as air tight as possible.
- Delft Ware** - Term applied to all wares having a tin-enameled surface. It takes its name from the town in Holland where it was first made in the seventeenth and eighteenth centuries.
- Dry Closet** - A closet or set of shelves built for holding pottery while drying. The dry closet should permit of a free circulation of air around the ware. To insure this the shelves should be made of woven wire or strips of board set an inch apart.
- Earthenware** - Embraces all pottery differing from porcelain, whether of a white or colored body, provided it is opaque.
- Faience** - A French word which has been applied to almost everything which is not porcelain. It may properly be applied only to the tin-enameled ware made in France. The origin of the word is variously ascribed to Faenza, the town in Italy from which enameled ware was introduced into

- France, and to Fayence, the town in France where it was made.
- Flint** - A form of silica used in the pottery industry. Ceramics is sometimes called the "Silica Industry".
- Flux** - The glassy substance introduced into the color bases to enable them to fuse at a lower temperature.
- Frit** - The term applied to the molten mass of soluble materials which are melted to render them insoluble before adding them to the glaze.
- Glaze** - The vitreous coating applied to the ware to beautify it and render it water-proof.
- Glost Oven** - The chamber in which the pottery is placed for the purpose of firing the glaze. The glaze kiln is often called the "glost kiln".
- Kiln** - The furnace used for the purpose of firing ceramic wares.
- Lustre** - An irridescent or metallic film applied to the ware in its glazed state.
- Majolica** - A buff, porous body usually covered with a tin enamel. The term is now applied to all wares done in the Italian manner, but strictly it should only be applied to the painted and lusted Italian wares.
- Moulds** - Containers made for reproducing pottery forms. Plaster of Paris is the material now used, but in early days moulds were made from terra-cotta or metal.
- Muffle** - The inside of the kiln. The chamber in which the ware is placed to be fired. It is fitted with pipes through which the flame passes, thus protecting the ware from the direct contact of the flame.
- Overglaze** - Painting or other decoration done on the glazed surface of the ware.
- Porcelain** - Body and glaze of the same substance. Porcelain has a vitrified break and is translucent.

- Sagger** - Vessels of fire clay in which wares are placed to protect them from contact with the flame in an open kiln.
- Slip** - Clay reduced to the consistency of cream through the addition of water.
- Spurs and Stilts** - Pieces of refractory clay having sharp points. They are used for holding glazed pieces during the firing of the kiln.
- Stoneware** - A clay ware which is vitrified and opaque.
- Template** - A pattern for trueing up a pottery form during the making.
- Throwing** - The shaping of a pottery vessel on the potter's wheel.
- Turning** - The trimming down and finishing of the piece on the wheel.
- Underglaze** - Decoration under the glaze. Specially prepared colors used for painting under or over the glaze, or for staining glazes.
- Wedging** - Term applied to beating and working of the clay for the purpose of rendering it plastic and removing air and lumps.

EQUIPMENT

Pottery Kiln

- 3 Sets of Shelves and Props
- 2 Potter's wheels
- 1 Ball Mill, 2 quart capacity
- 2 Sieves, 40 mesh, for straining slip
- 2 Sieves, 100 mesh, for straining glazes
- 2 Sieves 120 mesh, " " " "
- 2 Mortars and Pestles, 1 quart capacity
- 2 Mortars and Pestles, 1 pint capacity
- 1 Gross Stilts, assorted sizes
- 6 Crocks, 1 gallon capacity, for glazes
- 2 Crocks, 5 gallon capacity, for slip
- 3 Bowls, 1 gallon capacity
- 6 Bowls, 1 quart capacity
- 1 Dozen Mason jars with screw tops (for glazes) 1 qt.
- 1 Dozen Mason jars " " " " " 1 pt.
- 1 Water Bucket, 5 gallon capacity
- 1 large wooden spoon
- 2 Table Spoons
- 1 Set of Turning Tools.
- 1 Plaster Knife
- 1 Rolling Pin
- 2 Dozen wooden sticks, 14" long X 1-1/2" wide X 3/8" thick
- 6 Metal scrapers (flexable)
- 1 Plaster Scraper

1 Dozen wooden batts 14"X14" square, made with cross-strips of 4"X4" lumber underneath.

1 Set of Chemist's Balances

1 Set of Plaster Scales.

2 Clay bins, zinc lined, large enough to accommodate clay for the class.

1 Damp Closet with plaster shelves

1 Drying rack with slat shelves set one inch apart

Commercial Assorted Glazes, approximately one pound of outside glaze and one pound of inside glaze to the pupil.

1 Sack of Silica

A list of glaze ingredients is given on page 96.

The quantity to be ordered will depend on the size of the class, and also on whether the class is to do any experimenting with glazes. Silica and lead should be ordered by the hundred pounds, since they are the most used, and are much cheaper in quantity.

Individual Equipment

Smock

2 Hard wood modeling tools

1 Cuticle Stick

1 paring knife

1 tea spoon

1 ruler

1 silk sponge

1 Right angle triangle

1 Ruler

Dividers

1 Varnish Brush, three-fourths inch wide

1 Trowel shaped carving tool #5

1 V shaped carving tool #3

1 Sloyd knife

Heavy cardboard

Scissors

Rag

News paper

Pencil

Note book.

Addresses Not Given Under The Sections To Which They

Refer:

Potter's Wheels: Crosley Mfg. Co., Trenton, N.J.
Patterson Foundry Co., East Liver-
pool, Ohio.

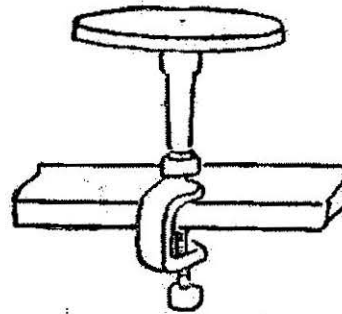
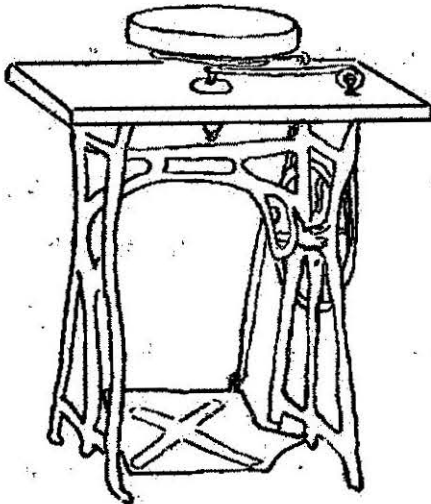
Modeling Tools : Schwabacher Frye Co., San Francisco.
Duncan-Vail Co., San Francisco

Carving Tools : The Loeffler Craft Tools, 99 Liberty
Street, Bloomfield, N.J

Crocks and Bowls: The Panama Pottery, Sacramento, Calif.

SUGGESTIONS FOR SPECIAL EQUIPMENT

A potter's wheel made like a sewing machine is made by the Lewis Institute, Chicago. This may be improvised from any old sewing machine. Such a wheel is in use at the California School of Arts and Crafts, at Oakland, California



Adjustable steel discs for trueing up work are most convenient. These are like the gilder's wheels used in china decoration. They can be made in any school machine shop and are a great addition to the equipment.

A metal locker may be fitted with wire shelves, and a gas plate fixed underneath. This makes an excellent dry closet.

An old washing machine motor may be fitted with an emery wheel for shaping tools and grinding the bottoms of the pots on which the glaze has dripped.

PYROMETRIC CONES
Low Temperature Series

<u>Cone</u>	<u>Fahrenheit</u>	<u>Cone</u>	<u>Fahrenheit</u>
010	1634	05	1886
09	1706	04	1922
08	1733	03	1976
07	1787	02	2003
06	1841	01	2030

Cones are mixtures of minerals designed to melt at a given temperature. They are used in place of Pyrometers to indicate the heat in the kiln. Cone 08 falls at the melting point of silver.

Cones may be had from the Pyrometric Cone Company, Columbus, O., and are much cheaper and in every way as good, as those which can be purchased from any chemical house on the west coast.

The Standard Pyrometric Cone Company publishes a valuable little book which may be had upon request.

BIBLIOGRAPHY

Technical

- Anthonies, S.W.. Pottery and Modeling: Sir Isaac Pitman & Sons, New York, London, Toronto, 1930. \$1.00
- Binns, Chas.F. The Potter's Craft: D. VanNostrand Co., New York City, 1922.
- Ceramic Cyclopedia, Industrial Corporations Inc., Chicago, Ill. 1931.
 Contains a wealth of material for the professional and amateur potter, and for commercial production.
- Furnival, W.J. Leadless Decorative Tiles -- Stone, Staffordshire, 1924 (Out of print. Copy in Calif. State Library) This volume contains formulas for leadless glazes and a wealth of material valuable for the student of historical as well as practical pottery. Illustrated.
- Call, Irma M. and Van Etta, Vivian M. The Art Of Pottery: Bruce Publishing Co., New York, 1930
 Because of the elementary method of presentation, this book, intended for teachers and students, is apt to be valuable to the student working alone. Some inaccuracies.
- Hainbach, Rudolph. Pottery Decoration: Scott, Greenwood & Son, London, 1924.
- Journal Of The American Ceramic Society, 20th and Northampton Streets, Easton, Pa. Published annually.
- Lunn, Richard. Pottery; A Handbook Of Practical Pottery For Teachers And Students. Chapman & Hall, London, 1903.
- Langenbeck, Karl. The Chemistry Of Pottery; Chemical Publishing Co., Easton, Pa. (Out of Print) 1895.
- Wren, H.D. and D.K., Handicraft Pottery For Workshop And School, Isaac Pitman & Sons, New York, N.Y. 1929.
 A good practical treatise.
-

General
and
Historical

- Baessler, A., Ancient Peruvian Art (4 vols) A. Asher & Co. Berlin; Dodd, Mead & Co., New York. 1902 - 1903
Illustrating drawings in relief and in the round, found on Peruvian earthenware. This work is invaluable to students of design and ceramics.
- Barber, Edwin Atlee, Hispano Moresque Pottery; Hispanic Society of America, 156th St. and West Broadway, New York. 1915.
In his introduction to this illustrated catalogue, the author, who is director of the Pennsylvania Museum and School of Industrial Arts, gives a description of metallic lustres and stanniferous enamels; also Moorish pottery of the 14th, 15th and later centuries.
- Burton, William. A General History Of Porcelain (2 vols) Cassell & Co., London, New York, Toronto. 1921
The author, a manufacturer and writer as well as student, begins his first volume with a brief description of Chinese porcelains of the Hân and T'ang Dynasties, continuing thru the history of China to the Present day. One chapter describes Japanese and Cornean porcelains; another Persian wares. About three-fourths of both volumes is devoted to European porcelain. Mr. Burton's work is illustrated with thirty-two plates in color, and eighty in black and white.
- Burton, W., and Hobson, R.L. Marks On Pottery and Porcelain; Macmillan & Company, Ltd. Saint Martin's St., London. 1909.
The joint authors of this pocket volume are authorities in the field of ceramics. The work includes marks on European, British, Persian, Chinese and Japanese pottery and porcelain.
- Buschor, Ernst. Greek Vase Painting; Chatton & Windus, London, 1921
This book contains 160 illustrations and is one of the best books of its kind for the student of Greek art.
- Bushell, Stephen W. Description Of Chinese Pottery and Porcelain "being a translation of the Tas Shuo" Clarendon Press, Oxford, 1910.
The "Tas Shuo" (description of pottery) by Chu Yen, was the first special work written upon the subject of Chinese ceramics

General
and
Historical

- Baessler, A. Ancient Peruvian Art (4 vols) A. Asher & Co., Berlin; Dodd, Mead & Co., New York, 1902-1903. Illustrating drawings in relief and in the round, found on Peruvian earthenware. This work is invaluable to the designer, and the student of ceramics.
- Barber, Edwin Atlee, Hispano Moresque Pottery, Hispanic Society of America, 156th St. and Broadway, New York City, 1915.
In his introduction to this illustrated catalogue, the author, who is Director of the Pennsylvania Museum and School of Industrial Arts, gives a description of metallic lustres and stanniferous glazes; also Moorish pottery of the 14th, 15th and later centuries.
- Burton, William. A General History of Porcelain (2 vols) Cassell & Co., London, New York and Toronto, 1921. The author, a manufacturer and writer as well as student, begins his first volume with a brief description of Chinese porcelains of the Han and T'ang dynasties, continuing through the history of China to the present day. One chapter describes Japanese and Cornean porcelains; another Persian wares. About three-fourths of both volumes is devoted to European porcelain. Mr. Burton's work is illustrated with thirty-two plates in color and eighty in black and white.
- Burton, W. and Hobson, R.L. Marks on Pottery and Porcelain Macmillan & Co. Ltd., Saint Martin's St., London, 1909.
The joint authors of this pocket volume are authorities in the field of ceramics. The work includes marks on European, British, Persian, Chinese and Japanese pottery and porcelain.
- Buschor, Ernst. Greek Vase Painting, Chalton & Windus, London, 1921.
This book contains one hundred and sixty illustrations, and is one of the best works of its kind for the student of Greek art.

- Bushell, Stephen W., Description Of Chinese Pottery and Porcelain, "being a translation of the 'Tas Shuo'" Clarendon Press, Oxford, 1910.
 "The 'Tas Shuo'" (description of pottery) by Chu Yen, was the first special work written on the subject of Chinese ceramics, and is still considered, by native connoisseurs, to be the chief authority on the subject. It describes modern, ancient and Ming wares, as well as individual specimens from various dynasties. The appendix contains two letters in French from Pere d'Entrecolles, a French missionary, who sent specimen of and formulas for Chinese porcelain to France.
- Bushell, Stephen W. and Laffan, Wm.M. Catalogue Of The Morgan Collection of Chinese Porcelains In The Metropolitan Museum, New York. Metropolitan Museum, New York City, 1928 (collection removed from the Museum)
 This is a revision of the original collection of magnificent Chinese porcelains owned by Mr. Morgan. In addition to seventy-two plates the catalogue contains an introduction by the authors. A valuable book for the collector and student of Chinese ceramics.
- Camehl, Ada Walker, The Blue China Book, E.P. Dutton & Co., New York, 1906.
 A description of early American scenes and history pictured in the pottery of the pottery of the times, with supplementary chapter on the collection of Presidential china in the White House; and a complete list of known examples of Anglo-American pottery.
- Chaffers, Wm. The Ceramic Gallery (second edition) Chas. Scribner Sons, New York, 1907
 This work, containing descriptions and illustrations of ceramic wares from ancient times to the beginning of the 19th century, forms a pictorial supplement to the same author's book "Marks and Monograms", and is an excellent introduction to the study of ceramics.
- Donaldson, Harold E. and McClure, Abbot. The Practical Book of American Antiquities, J.B. Lippencott Co. Philadelphia and London, 1927.
 This little book treats of American antiquities, including lace, glass, pewter, silver etc. A chapter is given to pottery. The introduction gives a brief review of the crafts in America.

- Dugas, Chas. Greek Pottery, tr. from French by W. A. Thorpe, Dept. of Ceramics, Victoria and Albert Museum. A.C. Black, Ltd., London, 1926. This delightfully written history of Greek pottery is presented from the view-point of the archaeologist and the art critic. The book is divided into two parts. Part one deals with form and decoration, manufacture and uses of Greek vases; Part II gives an historical account of the development of the Greek vase. This book, which is authoritatively written and post-dates most works on the subject, is of great value to the student of Greek ceramics.
- Hambidge, Jay. Dynamic Symmetry, Yale University Press, New Haven, Conn., 1920. Professor Hambidge explains, by mathematical methods, his theories of commensurable areas as distinct from lines in the construction and measurement of Greek vases. His book has been much discussed by artists and Greek archaeologists, some of whom disfavor the new theory.
- Hunter, George Leland, Egyptian Faience, Good Furniture Magazine, March, 1925. Examples of blue and green faience are described by Mr. Hunter, who also makes a distinction between glaze and glass.
- Jervis, W.P. A Pottery Primer, The O'Gorman Publishing Co. New York, 1911. This little book is far too modestly named. It gives a most entertaining and a very comprehensive outline of pottery. It is highly recommended as an introduction to the study of pottery.
- Kroeber, A.L. Archaeological Excavations In Peru, Field Museum, of Natural History, Grant Park, Chicago, 1926-30.
- MacCurdy, Geo. Grant. Human Origins, (2 vols) D. Appleton & Co., New York and London, 1924. Because of his wide knowledge in the field of anthropology and pre-historic research, Doctor MacCurdy is able to give the student a proper background for the study of ceramics. Highly recommended.

- Mason, Otis Tufton, Woman's Share In Primitive Culture, D.Appleton & Co., New York and London, 1920. The author, Curator of the Department of Ethnology in the United States National Museum, includes in his book a chapter on "The Potter", placing much emphasis on the pottery made by Indian Women in North America.
- Mead, C.W. Old Civilizations of Inca Land, (Hand Book Series #11) American Museum Of Natural History. 1924.
- Rhead, G. Wolliscroft, The Earthenware Collector, Dodd, Mead & Co, New York, 1920.
In this book Mr. Mead, practical potter at the Minton Factories, as well as art connoisseur writer, deals with the whole field of English earthenware, laying special emphasis on the salt-glazed wares of the 17th century. In addition to numerous marks and sixty half-tone illustrations, the book contains a full glossary of technical and pottery terms, and a list of sale prices.
- Riviere, Henri, La Céramique dans l'Art Orient, Librairie Beaux Arts, 2 rue de l'échelle, Paris (2 vols) 1923.
This is one of the most beautifully illustrated works that is to be found in any library.
- Solon, Louis M. Ceramic Literature, C. Griffin & Co., London, 1910.
An analytical index to the works published in all languages on the history and technology of ceramic art; also to the catalogues of public museums and private collections.
- Verneuil, M.P. l'Animal dans la décoration, Librairie Centrale, des Beaux Arts, 13 rue Lafayette, Paris, 1897.

BIBLIOGRAPHY

Current Literature

Art and Archaeology, Art and Archaeology Press, Washington, D.C.

A monthly periodical containing most interesting and well illustrated articles on the latest excavations. Beautiful examples of ancient pottery and other art objects, are to be found in this publication.

Arts and Crafts, Arts and Crafts Publishing Co., Ltd.
34 Bloomsbury St., W.C.1, London.

Arts and Decoration, Arts and Decoration Pub. Co. Inc.
578 Madison Ave., New York.

Creative Art, Albert and Charles Boni, Inc., 66 5th Ave.
New York.

Design (formerly Ceramic Studio) Ceramic Studio Pub. Co.,
307 S. Franklin St., Syracuse, N.Y.

Journal of Hellenic Studies, Issued by the Council at
2 Hinde St. London.

School Arts Magazine, 442 Printer's Bldg., Worcester, Mass.
Indian Pottery, March, 1931
Mexican Art and Pottery, Jan., 1932.

B

Batt	31,32,33,105
Biscuit	105
Bottoms	36
Box	38, 51
Building	35,38, 51

C

Carborendum Stone	95
Casting	80, 82
Centering	53
Clay	22- 26
" Classification of	23, 24
" Care and preparation of	25, 26
" Terra-Cotta	71
Coiling	55- 36
" (Illustration)	39
Colors	63, 78
Cones	83, 84
" Table of Pyrometric	112
Cylinder	35

D

Decoration	59- 61
" Carved	59
" Modeled	59
" Overglaze	62
" Scraffito	61
" Slip	60
" Underglaze	61- 63

E

Equipment	111
-----------------	-----

F

Finishing	47
Firing	98- 102
Flare Piece	46
Footages	49, 50
Footing	48

G

Glazes	86 - 97
" Formulas	92 - 94
" Addresses of Commercial	89
" List of Commercial	91
" Equipment for	86
Grog	70
Gum Tragacanth	64

H

Handles	50
---------------	----

I

Inlay	61, 79
-------------	--------

K

Kiln	98 - 103
" Construction of	98
" China and Pottery, difference	98
" Manufacturers of	103
" Location of	102
" Stacking of	98 - 99

M

Modeling Tool (illustration of)	35
Molds, Tile	68 - 70
" Saucer	71
" Vase	74 - 76

O

Oxides	92
Overglaze	61-63, 78

P

Plaster 28 - 29
 " Scale 30
 " Table 27

R

Rings 84

S

Samples 100
 Saucer 72 - 73
 Scraffito 61
 Silica 70
 Slip 60, 77
 " Colored 78
 " Silicated (formula) 78
 Sticks 32
 Slab Building 51
 Stacking 96-100

T

Teapot 49-50
 Template 33 -40
 Terra-Cotta Mix 70
 Throwing -----53- 56
 Tile Body 70- 86
 Tiles 64- 67
 Tops 36- 39
 Turning 57
 " Tools 58

U

Underglaze 61- 63

Plate I

AT THE RIGHT, A MAN SHAPES A POT WITH HIS RIGHT HAND WHILE WITH HIS LEFT HAND HE
KEEPS TURNING ON THE POTTERS WHEEL. AT THE LEFT IS AN OVEN ON WHICH POTS ARE
BAKED. ABOVE ARE SHOWN THE POTS ALREADY COMPLETED.



FROM WALL-PAINING IN TOMB OF KHNUMHOTEP AT BENI HASAN. DYN. XII (ABOUT 2000 B.C.)

MANUFACTURE OF POTTERY

Plate II



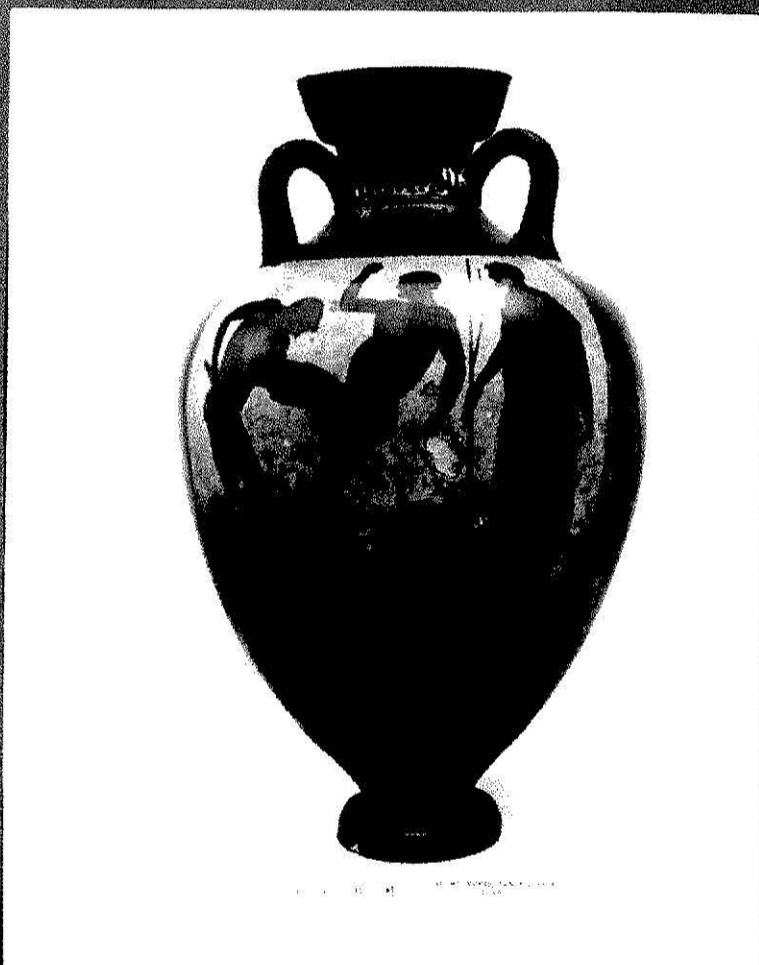
Greek.
IX C. B.C.

Courtesy of
Metropolitan
Museum, N.Y.
Negative # 20754

Corinthian Vases

showing the Orientalizing effect
on the Geometric Style ~

Plate III

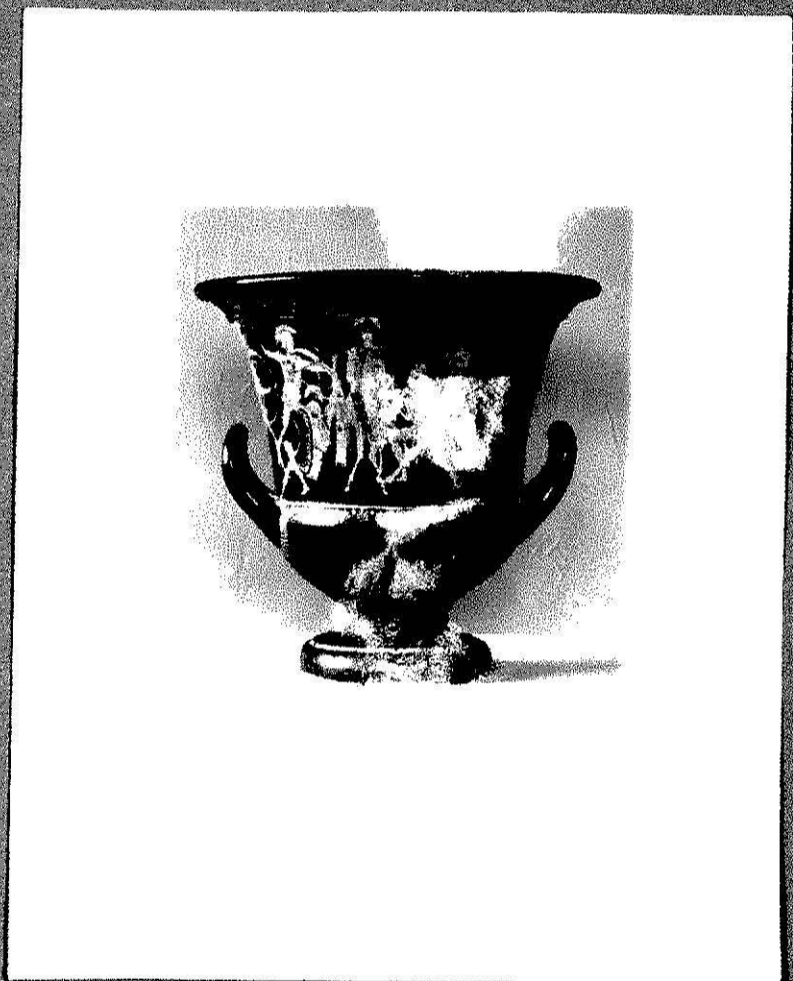


Amphora, Greek.
VI C. B. C.

Found at
Athens
Museum
of Art

Black Figure Period.

Plate IV

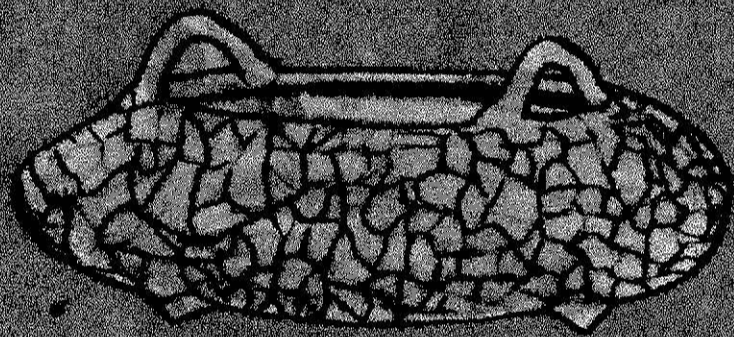


Krater. Greek.
Xc. B.C.

Red Figure Period

Castroville
Museum of Art
Castroville, Cal.
1914

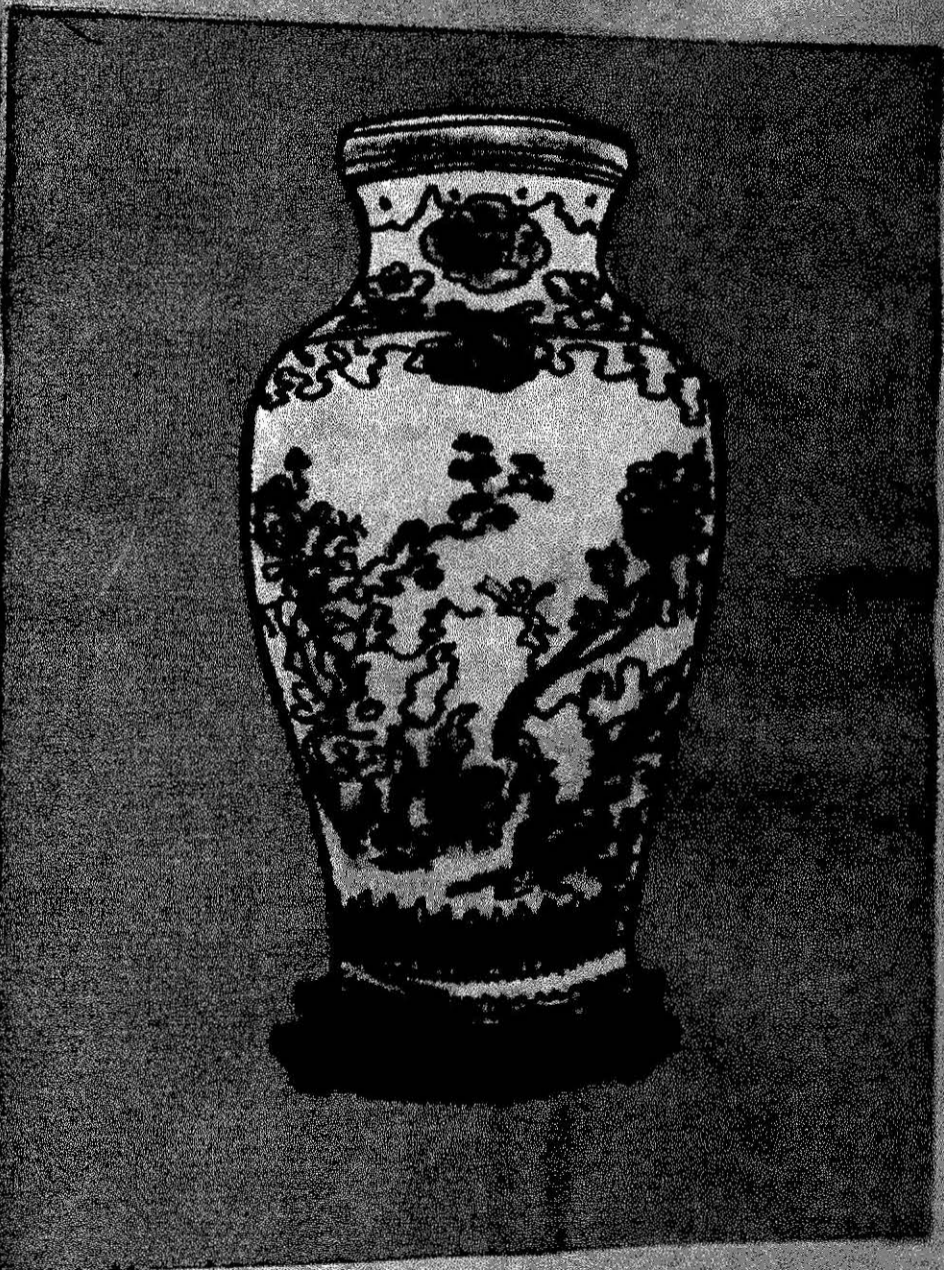
Plate V



Long Square, Chinese

Caladon

Plate VI



Lang'hai

Family Peonies
(17th Century)

Plate VII



Hang'hai

Famille Verte Porcelaine
(Green 1875)



Two vessels, one decorated with a repeating pattern and the other with a relief design and bird-head handles.



James H. ...
...

Plate X



Rookwood

*Courtesy of
Rookwood Pottery Co.,
Cincinnati, Ohio.*