

CLAY AND GLAZES FOR THE POTTER

Revised Edition

DANIEL RHODES

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Title page picture: Stoneware Vase (Mei-ping). Tz'u Chou ware. China, Sung Dynasty. The light body has been covered with a black slip, through which the design is scratched. The glaze is transparent. The Avery Brundage Center of Asian Art and Culture, M. H. de Young Memorial Museum, San Francisco.

CLAY AND GLAZES
FOR THE POTTER



For Lillyan, again

Author's Preface to the First Edition

My purpose in writing this book has been to present in as clear and understandable a form as possible the important facts about ceramic materials and their use in pottery.

The ceramic medium has a rich potential. It is so various and adaptable that each culture and each succeeding generation finds in it a new means of expression. As a medium, it is capable of great beauty of form, color, and texture, and its expressions are unique not only for variety but for permanence and utility as well. To make full use of the medium, the ceramist or potter not only needs skill, imagination, and artistic vision; he also needs to have a sound knowledge of the technical side of the craft. This knowledge has not been easy to come by, and many of those seriously engaged in pottery have learned through endless experimentation and discouraging failures. It is hoped that the present work will enable the creative worker to go more directly to his goal in pottery, and that it will enable him to experiment intelligently and with a minimum of lost effort. While technical information must not be considered as an end in itself, it is a necessary prerequisite to a free and creative choice of means in ceramics.

None of the subjects included are dealt with exhaustively, and I have tried not to overwhelm the reader with details. The information given is presented in as practical a form as possible, and no more technical data or chemical theory is given than has been thought necessary to clarify the subject.

I wish to acknowledge here my debt to my colleagues at the State University of New York College of Ceramics at Alfred University, and particularly to Dr. S. R. Scholes, Sr., for his thoughtful editing of the manuscript.

Daniel Rhodes
Alfred, N.Y.

Author's Preface to the Revised Edition

In this revised edition I have added new material on a number of topics including Raku, salt glazing, the use of fibers and fiberglass in clay, fuming with metallic salts, and overglaze processes. I have expanded the text in many places both for clarity and to include useful information which has come to my attention since the book was first written, and I have revised certain passages to bring them more in line with my present thinking. The basic form of the book has been retained, and I have resisted the temptation to add more details, feeling that an overly detailed exposition of a subject can hamper rather than aid understanding.

While the forms of ceramic art may change suddenly and drastically, materials and methods change very slowly, and potters today are using for the most part techniques which have been common for centuries. If no other book on pottery-making existed, *Arte del Vasaio*, written in Italy in 1559 by Cipriano Piccolpasso would do quite well as a handbook. This earliest of books on pottery techniques tells how to dig clay, how to build a wheel and kiln, and how to throw, trim, make handles, glaze and decorate. Although the basic elements of the craft are relatively unchanging, new colors, new textures, and new reactions do occur constantly in the ceramic laboratory. This results from an almost infinite number of variables in material combinations, application, firing, and re-firing. Thus ceramics, even after thousands of years of development, remains endlessly fascinating and a field of activity in which a variety of creative insights can find expression.

In the period since this book first appeared, studio potters have been concentrating on stoneware, and there has been much interest in reduction firing and more recently in salt glazing. The exploitation of these basic methods was a healthy trend, and the quality of individually made pottery has improved greatly. Traditions and standards which originated with early Chinese and Japanese pottery were absorbed and adapted to fit our particular esthetic needs. In some mys-

terious way this Oriental influence supported the freedom and energy which clay working gained from abstract expressionist tendencies in art.

During the past few years many ceramists have begun to make greater use of the brighter colors and the varied surfaces which can be obtained at lower firing temperatures. It is good that a more complete range of possibilities is being made use of and that the pre-eminence of stoneware as the preferred medium of the studio potter is being challenged. Many potters are finding that making earthenware may involve more complex procedures than stoneware. In the case of earthenware, exacting control of formulation and firing is necessary and unless slips, glazes, and over-glaze colors are skillfully applied the results can be disastrous. The use of low fire bodies and glazes may call for more, not less technical knowledge and craftsmanship.

The selection and documentation of the illustrations for this edition was a collaborative effort of my wife Lillyan and myself. She also assisted in every other phase of the revision. The illustrations are not intended as a complete survey of ceramic possibilities. Rather they are a selection of pieces to which we respond and which we feel are stimulating and worthy of study.

I wish to thank Michael Kan of the Brooklyn Museum, Pat Oyama Clarke, Elisenda Sala, Norman Bielowitz, and Jean Biagini for their assistance.

Daniel Rhodes
Alfred, N.Y., 1972

Introduction

Clay is a deceptively simple material. It is cheap and abundant. Often it may be found in the earth already softened with moisture and ready to be worked. It keeps forever and improves with age. Unfired clay objects may be crumbled, mixed again with water, and made into something else. As a material it is soft, pliant, plastic, impressionable, without grain or direction. It can be modeled, pounded, flattened, rolled, pinched, coiled, pressed, thrown on the wheel, cast into molds, scored, shredded, pierced, stamped, extruded, cut, or spun. Small and delicate objects may be made with it, or massive architectural forms. Clay shapes may resemble the looseness of a crumpled dishrag or may have the precision of electronic machines. In color, objects made from clay may be dazzling white, creamy, red, orange, yellow, grey, brown, black, or textured with spots, streaks, speckles, flashings, and tintings. They may be smooth and ivorylike, or rough, sandy, gritty, or harsh. Fired clay can have a translucence approaching that of glass or a density like that of the hardest stone.

All these possibilities are to be found in the craft of ceramics. Clay, formless in the earth, is laden with potential. It responds to shaping, to drying, to firing, to blendings and combining, to texturing, to smoothing. A given lump of clay may become a roof tile, a brick, a votive sculpture or effigy, a water jug, a child's toy, or a venerated tea bowl or vase in a museum case admired by thousands. The knowledge of ways to make things from clay and to fire them brought about a significant advance in man's standard of living. Bricks, tiles, drain and water pipes, dishes, bowls, cooking pots, and sarcophagi have helped to make life easier and more pleasant, and have lent dignity to burial.

But many difficulties arise in shaping and in firing clay. Every child or adult addressing himself to the problem of making something out of clay has the same initial response: this is *easy*. It is easy, but clay has its own subtle ways of resistance to mishandling. Clay does not have the obdurate hardness of stone, the

temperamental stringiness of wood, or the hard-to-join quality of metal, but it has a fragility and changeableness which require coddling. One set of problems arises from the inevitable shrinkage of clay as it dries. Firing, with its further shrinkage and almost total transformation of the material from one form to another, brings still more difficulties which must be anticipated and mastered. Thus even the most primitive clay-working procedures have been directed by craftsmanship of a delicate sort; each brick, tile, or pot has been nursed into existence with some care. Clay working admits of spontaneous, rapid, intuitive methods but does not tolerate carelessness.

Countless generations of potters have bequeathed to us a craft of great complexity and beauty. In many cultures pottery making was one of the household arts. In the art of clay working there is a place for feminine as well as masculine sensibilities. Merely to handle a raw, dried pot properly and to get it into the kiln requires some feeling of tenderness toward it.

Like most crafts, ceramics is based on a relatively few principles. A large number of variables may arise, ranging from differences in the composition of the materials to the vagaries of the fire. The work of chemists and earth scientists has, of course, brought a great deal of order and understanding to a craft which once was practiced entirely by rule-of-thumb methods. But the practical answers to the potter's technical problems still have to do more with craft than with science, with the patient application of "shop" knowledge rather than with the microscope or the test tube. What the potter needs in order to get the ceramic process under some measure of control is an understanding of the principles which govern the behavior of his raw materials. He needs to know, among other things, why clay shrinks, why some clays shrink more than others, why pots sometimes crack during the cooling of the kiln, and how to blend and fire his materials to obtain certain desired colors and textures.

Clay is one of the few materials which has no apparent value of its own in a raw state, yet can be made into valuable objects. The value is put there by the potter. Clay itself is relatively amorphous and the forms the potter makes are entirely of his invention and draw little from the inherent form of the clay. Of course, clay imposes certain limitations of shape. For example, forms which are too attenuated are not suitable to clay because of the brittle nature of the fired material, and forms which are too extreme may collapse in the wet state before they can be finished. But within these limitations the potter is free to express his vision, and the forms of objects which have been made from clay have been characterized by tremendous variety and freedom.

Pottery, at least to those who make it, seems to have a value which is quite beyond the sum of its usefulness and beauty. There is in pottery a thread of connection with the earliest traditions of civilization and culture. Pottery forms, even simple ones like cups or plates, still symbolize for us in a particularly direct way some of the most fundamental of human activities. Many ordinary pots, including those with no special claim to distinction, seem to share something in common with the greatest examples of a craft which has been the vehicle for fantasy, humor, symbolism, and sculptural invention as well as for the more mundane practical needs of the kitchen and barnyard.

Ceramics may be defined as the art of making permanent objects of usefulness

and/or beauty by the heat treatment of earthy raw materials. Ceramics includes, besides pottery, glass, brick, tile, and other structural clay products, refractories, laboratory porcelains, sanitary wares of all sorts, dielectric porcelains, insulators and other elements used in electronic devices, cements, plaster, lime, and vitreous enamels on metal. The industries which mine and quarry ceramic materials, fabricate and distribute ceramic products as a whole form an important segment of industry. Rarely does the taking of ceramic material from the earth upset the ecological balance of nature, and used or discarded ceramic objects sink unobtrusively back into the earth and cause no pollution. Ceramics, one of the first useful arts to be developed by man, continues to be an essential activity.

Contents

| | |
|---------------------------------------|------|
| Author's Preface to the First Edition | xiii |
| Preface to the Second Edition | xv |

Part I CLAY

| | | |
|---|---|----|
| 1 | Geologic Origins of Clay | 3 |
| | 1. The Nature of the Earth's Crust. 2. Forces of Geologic Change. | |
| 2 | The Chemical Composition of Clay | 6 |
| | 1. Typical Composition of Clays. 2. The Molecular Composition of Clay. 3. The Origin of Clay from Feldspar. | |
| 3 | The Physical Nature of Clay | 9 |
| | 1. Particle Size and Shape. 2. Plasticity. 3. Primary Clay. 4. Secondary Clays. | |
| 4 | Drying and Firing Clay | 13 |
| | 1. The Process of Drying. 2. Early Stages of Firing—Drying and Water-Smoking. 3. Oxidation. 4. Quartz Inversions. 5. Vitrification. | |
| 5 | Kinds of Clay | 19 |
| | 1. Kaolin. 2. Ball Clays. 3. Fire Clays. 4. Sagger Clay. 5. Stoneware Clay. 6. Earthenware Clays. 7. Other Kinds of Clay. | |

6 Clay Bodies

24

1. Definition of a Clay Body. 2. The Ways in Which Clay Bodies Need to Be Altered to Make Them Useful. 3. Porcelain as an Example of a Clay Body. 4. The Method of Arriving at a Suitable Blend of Materials. 5. Formulating a Stoneware Body. 6. Clay Bodies Designed for Particular Forming Methods. 7. Throwing Clays. 8. Modeling Clays. 9. Casting Clays. 10. Bodies for Jiggering and Pressing. 11. Color and Texture in Clay Bodies. 12. Earthenware. 13. Stoneware. 14. Porcelain. 15. Ovenproof and Flameproof Bodies. 16. Reinforced Clay Bodies.

7 Mining and Preparing Clay

64

1. Prospecting. 2. Mixing Clay. 3. Aging, Kneading, and Deairing Clay.

Part II GLAZES

8 The Nature of Glass and Glazes

77

1. Silica as the Basis of Glass. 2. Making Glass. 3. The Distinction between Glass and Glazes.

9 Early Types of Glazes

81

1. Egyptian Glazes. 2. Early Lead Glazes. 3. Ash Glazes. 4. Slip Glazes. 5. Feldspathic Glazes. 6. Salt Glazes.

10 The Oxides and Their Function in Glaze Forming

85

1. Oxidation and the Oxides. 2. The Glaze Oxides. 3. The Function of the Oxides in Glazes. 4. How Glazes Melt in the Kiln. 5. Silica SiO_2 . 6. Alumina Al_2O_3 . 7. Sodium Oxide Na_2O . 8. Potassium Oxide K_2O . 9. Lead Oxide PbO . 10. Calcium Oxide CaO . 11. Barium Oxide BaO . 12. Magnesium Oxide MgO . 13. Zinc Oxide ZnO . 14. Strontium Oxide SrO . 15. Antimony Oxide Sb_2O_3 . 16. Lithium Oxide Li_2O . 17. Boric Oxide B_2O_3 .

11 Glaze Materials

104

1. Preparation of Raw Materials for Use in Glazes. 2. Flint SiO_2 . 3. Clay $\text{Al}_2\text{O}_3 \cdot 2\text{SiO}_2 \cdot 2\text{H}_2\text{O}$. 4. Feldspar. 5. Whiting CaCO_3 . 6. Magnesium Carbonate MgCO_3 . 7. Dolomite $\text{CaCO}_3 \cdot \text{MgCO}_3$. 8. Barium Carbonate BaCO_3 . 9. Talc $3\text{MgO} \cdot 4\text{SiO}_2 \cdot \text{H}_2\text{O}$. 10. Strontium Carbonate SrCO_3 . 11. Colemanite, or Gerstley Borate $2\text{CaO} \cdot 3\text{B}_2\text{O}_3 \cdot 5\text{H}_2\text{O}$. 12. Litharge PbO . 13. White Lead $2\text{PbCO}_3 \cdot \text{Pb}(\text{OH})_2$. 14. Red Lead Pb_3O_4 . 15. Zinc Oxide ZnO . 16. Antimony Oxide Sb_2O_3 . 17. Soda Ash or Sodium Carbonate Na_2CO_3 . 18. Bone Ash,

| | | |
|--|-----|--|
| Calcium Phosphate $4\text{Ca}_3(\text{PO}_4)_2\text{CaCO}_3$. | 19. | Cryolite Na_3AlF_6 . |
| 20. Lepidolite $(\text{HO}_2\text{F})_2 \text{KLiAl}_2 \text{Si}_3\text{O}_{10}$. | 21. | Spodumene $\text{Li}_2\text{O} \cdot \text{Al}_2\text{O}_3$ |
| 4SiO_2 . | 22. | Lithium Carbonate Li_2CO_3 . |
| 23. Fluorspar CaF_2 . | 24. | Pearl Ash, Potassium Carbonate K_2CO_3 . |
| 25. Niter, Potassium Nitrate KNO_3 . | 26. | Borax $\text{Na}_2\text{O} \cdot 2\text{B}_2\text{O}_3 \cdot 10\text{H}_2\text{O}$. |
| 12 Glaze Calculations, Theory and Objectives | 124 | |
| 1. The Necessity for Different Recipes for Glazes. 2. Grouping Oxides According to Their Function in Glazes. 3. The Theory of Atomic Weight, and the Method of Stating the Quantities of the Oxides in the Formula. 4. The Unity Formula. 5. Calculating Recipes of Glazes from Their Formula. 6. An Example of Calculating from the Batch to the Formula. | | |
| 13 Glaze Calculation Using Materials Containing More Than One Oxide | 133 | |
| 1. The Table of Raw Materials. 2. Equivalent Weight. 3. Feldspar Formulas. 4. Calculation of the Batch from the Formula of a Simple Lead Glaze. 5. Calculation of a Glaze Containing Both Clay and Feldspar. 6. Selection of Raw Materials for Glazes. 7. Calculation of a More Complex Glaze. 8. A Calculation Involving a Complex Feldspar. | | |
| 14 Calculating Glaze Formulas from Batches or Recipes | 156 | |
| 1. An Example of Determining the Formula of a Glaze from a Recipe. 2. Steps in Calculating from the Batch to the Formula. | | |
| 15 Practical Problems in Glaze Calculation | 158 | |
| 1. Comparison of Glazes. 2. Substitution of Materials. 3. Altering Glaze Formulas. 4. Trying Out New Materials. | | |
| 16 The Composition of Glazes | 162 | |
| 1. Fusion Points of Glazes. 2. Fluxing Action of the Various Oxides. 3. The Amounts of Silica and Alumina in Glazes. 4. Limit Formulas. | | |
| 17 Types of Glazes | 170 | |
| 1. Low-Temperature Alkaline Glazes. 2. Lead Glazes. 3. Glazes Containing Boron. 4. Bristol Glazes. 5. Porcelain and Stoneware Glazes. | | |
| 18 Originating Glaze Formulas | 183 | |
| 1. Originating Glazes as Percentage Recipes. 2. Using the Molecular Formula in Originating Glazes. 3. An Example of Writing a New Formula for a Glaze. 4. Originating a Formula Based on the Properties of a Particular Material. | | |

| | | |
|----|--|-----|
| 19 | Fritted Glazes | 196 |
| | 1. Reasons for the Use of Frits. 2. Hazards of Soluble Glazes. 3. Methods of Preparing Frit. 4. Calculating a Frit Batch. 5. Calculating a Glaze Which Includes a Frit in Its Composition. 6. The Use of Frit as a Glaze. | |
| 20 | Glaze Textures | 201 |
| | 1. Transparency and Opacity. 2. Bright and Mat Glazes. | |
| 21 | Sources of Color in Glazes | 205 |
| | 1. Theory of Color in Glazes. 2. Iron Oxide. 3. Copper Oxide. 4. Cobalt Oxide. 5. Chromium Oxide. 6. Manganese Oxide. 7. Nickel Oxide. 8. Vanadium Oxide. 9. Rutile. 10. Ilmenite. 11. Iron Chromate. 12. Uranium Oxide. 13. Cadmium and Selenium. 14. Other Coloring Oxides. | |
| 22 | Methods of Compounding and Blending Colored Glazes | 214 |
| | 1. Additions of Single Oxides to Glazes. 2. Line Blends. 3. Triaxial Blending. 4. Methods of Making Glaze Variations without Blending. 5. Use of Glaze Stains. 6. Black Glazes. 7. Test Tiles for Glazes. 8. Glazing and Marking Tests. 9. Recording Tests. 10. The Necessity for Testing. | |
| 23 | Glaze Mixing and Application | 222 |
| | 1. Ball Milling. 2. Mixing and Screening Glazes. 3. The Proportion of Water in Glazes. 4. Floatatives, Gums, and Flocculents for Glazes. 5. Glazing by Painting, Dipping, and Pouring. 6. Spraying Glazes. 7. Thickness of the Glaze. 8. Approaches to Glaze Application. | |
| 24 | Firing Glazes | 232 |
| | 1. Setting Glazed Ware in the Kiln. 2. Formation of the Glaze in the Fire. 3. Managing the Kiln and Gauging Temperature. 4. Uneven Temperatures. 5. Gas and Electric Firing Compared. 6. Firing with Bottled Gas, Oil, and Wood. 7. Failures in Firing. 8. Once-Fired Ware. | |
| 25 | Glaze Flaws | 241 |
| | 1. Crazing. 2. Shivering. 3. Crawling. 4. Pitting and Pinholing. 5. Blistering and Blebbing. 6. Underfiring and Overfiring. 7. Application Flaws. 8. Kiln Accidents. 9. Refiring. | |

| | |
|--|-----|
| <i>Contents</i> | xi |
| 26 Engobes | 250 |
| 1. Engobe Composition. 2. Coloring Oxides in Engobes. 3. Vitreous Engobes. 4. Techniques of Applying Engobes. | |
| 27 Underglaze Colors and Decoration | 255 |
| 1. Pigments Used in Underglaze Painting. 2. Application of Underglaze Pigments. 3. Underglaze Prints. | |
| 28 Overglaze Decoration | 259 |
| 1. Majolica. 2. Overglaze Enamels and China Painting. 3. Overglaze Prints. | |
| 29 Reduction Firing and Reduction Glazes | 263 |
| 1. Theory of Reduction Firing. 2. Effect of Reduction on Clay Bodies. 3. Reaction of Base Glazes to Reduction. 4. The Color Range of Reduction Glazes. 5. Colors from Iron Oxide in Reduction Glazes. 6. Colors from Copper Oxide in Reduced Glazes. 7. Other Colors Obtained in Reduction Firing. 8. Kiln Practice in Reduction Firing. | |
| 30 Special Glazes and Surface Effects | 283 |
| 1. Luster. 2. Salt Glazing. 3. Slip Glazes. 4. Ash Glazes. 5. Crystalline Glazes. 6. Crackle and Pooled Glazes. 7. Egyptian Paste. 8. Red Glazes. 9. Terra Sigillata. 10. Raku Ware. 11. Dry or Unglazed Surfaces. 12. Multiprocess Ceramics. 13. Choices in the Use of Ceramic Materials. | |
| Glossary | 306 |
| Appendix | 310 |
| Laboratory Tests on Clay—Chemical Analyses of Various Clays—Water of Plasticity, Shrinkage, and Absorption of a Group of Pottery Clays—Atomic and Molecular Weights—Raw Materials Added to Glazes for Color and Texture—End Points of Pyrometric Cones—Weights and Measures—Temperature Conversion Chart—Suggested Additions of Coloring Oxides to Oxidation Glazes—Suggested Additions of Coloring Oxides to Reduction Glazes—Glaze Formulas—Books on Pottery and Ceramics. | |
| Index | 327 |