



Helena area stoneware slip glazes
by Doris Jean Strachan

A THESIS Submitted to the Graduate Faculty in Partial fulfillment of the requirement for the degree of
Master of Applied Art
Montana State University
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Abstract:

Land surrounding Helena, Montana, was explored for clay and sands for use as stoneware glazes. Samples were collected from several areas and from different types of locations, such as lake and river banks, road cuts and rocky hill sides.

A Map is included which shows the main areas explored and locations from which successful samples were taken.

The samples were fired at cone 9 and cone 10 to discover their potential use as glazes. Those which appeared to possess suitable color and texture possibilities were selected for further testing. When alteration of the color or texture appeared desirable or necessary, natural or commercially refined material was added.

As a result of the tests a stoneware glaze palette with color ranging from tan to black and texture ranging from shiny to matt was obtained. This palette is suitable for reduction firing. A limited stoneware glass palette suitable for oxidation firing was also obtained. Information concerning the formulas, firing temperatures, and results of the tests are recorded in the form of data sheets.

A number of colored slides of test cups and pots glazed with the natural glazes are also included.

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A THESIS

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at

Montana State College

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TABLE OF CONTENTS

Title page	1
Acknowledgments	3
Abstract	4
Introduction	5
Statement of the Problem	12
Procedure	13
Data Sheets	16
Conclusion	54
Appendices	
I Map of areas explored for natural glaze materials	56
II Colored slides of test cups and pots glazed with natural material glazes	57
III Literature cited	60

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I will never be able to express in words the gratitude I feel for the help given me by my parents.

ABSTRACT

Land surrounding Helena, Montana, was explored for clay and sands for use as stoneware glazes. Samples were collected from several areas and from different types of location, such as lake and river banks, road cuts and rocky hill sides. A map is included which shows the main areas explored and the locations from which successful samples were taken.

The samples were fired at cone 8 and cone 10 to discover their potential use as glazes. Those which appeared to possess suitable color and texture possibilities were selected for further testing. When alteration of the color or texture appeared desirable or necessary, natural or commercially refined material was added.

As a result of the tests a stoneware glaze palette with color ranging from tan to black and texture ranging from shiny to matt was obtained. This palette is suitable for reduction firing. A limited stoneware glaze palette suitable for oxidation firing was also obtained. Information concerning the formulas, firing temperatures, and results of the tests are recorded in the form of data sheets.

A number of colored slides of test cups and pots glazed with the natural glazes are also included.

INTRODUCTION

Dr. Soetsu Yanagi, the director of the Japanese Folk Art Museum and the intellectual leader of the Japanese craft movement of today, has stated: "To me the greatest living thing is to live beauty in our daily life and to crowd every moment with things of beauty. It is then and then only, that the art of the people as a whole is endowed with its richest significance. For its products are those made by a great many craftsmen for the mass of the people, and the moment this art declines the life of the nation is removed far away from beauty. So long as beauty abides in only a few articles created by a few geniuses, the Kingdom of Beauty is nowhere near realization."^{1.} Today many of the articles of everyday use found in the homes of both rich and poor alike are far from beautiful. Among these are pottery objects. If one type of article must be singled out for improvement, to begin the process of surrounding the mass of the people with beauty, the choice of pottery articles seems a logical one. As Marguerite Wildenhain said in her lecture at Scripps College, "for what articles has man needed more in the past and will he continue to need more in the future than vessels from which to eat and drink and

1. Bernard Leach, A Potter's Book, Transatlantic Arts Inc., New York, 1951, p. 7

in which to store liquids and solids."^{2.}

Marguerite Wildenhain has described the pottery of the last century as non-expressive, non-skillful, non-imaginative and non-beautiful in spite of all the technical knowledge, all the machinery and expensive experimental equipment, all the material, costly or common, finely ground or coarse.^{3.} Today the greatest need is not for technical improvement in the field of pottery, but for aesthetic improvement. This is true in the case of the glassy surface applied to pottery to enhance the beauty of the object as well as make it smoother to the touch and more varied in color and texture, that is, the glaze.

Man's practice of glazing his pottery and the character of the glazes he has employed have changed a great deal with the passing of time. The primitive peoples left their pots unglazed, while today, most commercial pottery is entirely glazed. The first glazes, called slip glazes, were made up of natural materials, which the potter found in his own locale. These glazes were usually characterized by their sobriety of color and variety of texture due to unrefined materials, the method of application, or the uncontrolled fire.

2. Marguerite Wildenhain, The Potter in the New World, Scripps College Bulletin, Claremont, California, 1953

3. Ibid.

Today there is wide use of highly refined, perfectly controlled, white glazes. All the ingredients for such a product can be ordered from a ceramic supply house.

The early glazes were an outgrowth of applying slips and metallic oxides for utilitarian or decorative purposes. In discussing slip decorated pottery of the early New England potters, John Spargo stated: "In the manufacture of common pottery, slip is used for two main purposes. For one thing a local clay used for the body of the ware often presents a coarse or unattractive appearance. This may be overcome by giving it a coating of slip made from a finer clay of better appearance. The body clay used may be inferior not in appearance only, but from the standpoint of utility as well, and the application of the outer coating of a superior clay may be dictated by that consideration rather than that of appearance. This may be called the primary use of slip. The secondary use is for decorative effect. The use of clays of contrasting colors in order to obtain ornamental effects has been practiced by potters in all lands and ages."^{4.}

For centuries the potters of the East have used slips not only for decoration but also for glaze. Herbert H. Sanders in his article "Pottery Form and Decorative Techniques" relates

^{4.} John Spargo, Early American Pottery and China, D. Appleton-Century Company, Inc., New York, New York, 1938.
P. 127

how early Chinese potters discovered the glazing possibilities of clay. He states, "As the early potter explored the various clays in the vicinity of home or workshop, he found great variation in the qualities of the various clays. Some of these at times had been so combined with impurities during the forming process that they produced a completely glassy surface when fired, and when wares were made from these they refused to retain their form, but slumped and melted into distorted glass-like objects."⁵

The early Eastern potters were not the last to make use of slip glazes. In the United States natural glasses were used by New England potters in the early 1800's and perhaps even earlier. Lura Woodside Watkins, in her book on Early New England Pottery, first mentions the use of slip glazes in connection with Ashfield Pottery, which was produced in the early 1800's. She states: "The Ashfield potters produced a good deal of ware covered with a dark slip glaze inside and out."⁶

The slip used by the Ashfield Potters was Albany slip, which was obtained from Albany, New York. This slip, which fired a black, light or reddish brown in color, was used by

5. Ceramic Age, Ceramics Publishing Company, Newark, New Jersey, July, 1953, p. 54

6. Lura Woodside Watkins, Early New England Potters and Their Wares, Harvard University Press, Cambridge, Massachusetts, 1950, p. 108

great numbers of early New England potters, located in such states as New Hampshire, Vermont and Connecticut.

With the refinement of culture has come the refinement of glaze material. With the mechanization of the world has come the mechanization of preparing and applying glazes. With the sophistication of people has come the sophistication of man's taste in the color and texture of glaze. At the same time, and perhaps in reaction to the purity and perfection, but coldness, of the above mentioned tendency, an appreciation of the charm and variety of glazes made from natural minerals and slips has persisted, and, indeed, seems to be growing. Albany "slip" is still in use today generally on porcelain insulators and such articles of pottery as crocks and bean pots. Natural glazes are now being marketed for the studio potter by the Natural Ore Glaze Company, in Central City, by Mr. and Mrs. H. M. Swartwood and Ed. and Jane Oshier.

The glazes used on the majority of pottery today, while technically pure and perfect, often lack warmth and charm. In extreme cases they show man's fondness of disguising the character of the material with which he works, making an essentially mineral glaze resemble mother of pearl or wood.

Some potters, recognizing their glazes as dead and cold, have attempted to put into them the life and warmth of the old glazes. Impurities and imperfect firing have been accredited

with being the cause of the colors and textures characterizing these old glazes. While this task is not impossible it is extremely difficult. In describing slip glazes the Ceramic Industry Magazine states that "Artificial mixtures of ingredients of identical composition with the natural clays have failed to give the excellent gloss and color attained by the natural clay."⁷ And W. B. Honey, keeper of the Department of Ceramics, Victoria and Albert Museum of London, states: "Simplicity and directness are special virtues in ceramic coloring, and there is little to be said for glazes artificially mottled and broken in imitation of the accidental markings on a Chinese glaze"⁸. Would it not be more logical and honest, in striving for the character of the old glazes, to take advantage of the possibilities of glaze materials in their natural, unrefined state, as was suggested by Leach in his book entitled, A Potter's Book.

One type of potter who has recognized and taken advantage of these possibilities is the person Leach describes as the artist craftsman, working alone or with the aid of a few assistants. He markets his products in competition with factories which have largely replaced him.

7. Ceramic Industry, Industrial Publications, Chicago, Illinois, February, 1954 p. 65

8. W. B. Honey, The Art of the Potter, Whittlesey House, London, p. 103

Today another group of craftsmen is making some use of natural glazes. Its numbers are even fewer than those mentioned above. These craftsmen are the individual or studio potters who produce pottery for their own enjoyment and, in some cases, a limited number of sales.

If beautiful pottery is to play a part in the attainment of the Kingdom of Beauty then it must be made available to all people. This would involve the mass production of these items. The existing number of artist craftsmen and studio potters can not produce pottery in mass quantities. However, each potter should feel his responsibility toward raising the standard of beauty and should produce, to the fullest of his ability, beautiful pottery, making sensitive and honest use of all the materials with which he works, whether they be commercially refined or natural and unrefined. Perhaps then, and then only, will the consumer seek the high standards characterizing his ware and will the commercial producer seek out and employ the philosophy and, in turn, some of the materials he has used.

STATEMENT OF THE PROBLEM

As an individual potter I was faced with a number of problems which, in my opinion, had to be solved in order that I might attempt to produce functional pottery that was useful and attractive to the eye. One of these problems was the choice of materials with which to work. For the body I decided to use stoneware because I felt the strength it possesses is a necessary quality of any article which is to be put to everyday use and because the clay and kiln needed in its production were available for my use. Because I felt that natural glazes possess a great deal of charm and warmth and because the equipment needed and the procedure followed in their preparation and use are relatively simple I decided to try to develop natural unrefined materials available in my own locality.

The purpose of the following series of tests is fourfold: the first is the location of inexpensive sources of glaze for my own work; the second, the development of glazes suitable for use on different types of pots - useful containers, table ware and decorative pots; the third, the development of glazes of individuality and character. The fourth purpose is to demonstrate the possibilities of slip glazes to other potters interested in exploiting local resources.

PROCEDURE

It must first be pointed out that neither the approach to nor the methods used in the testing of these natural materials was scientific in nature. Rather, they were techniques which any potter could employ who had basic pottery equipment and a limited amount of knowledge concerning the general principles upon which glazes are based.

Location of Material

All the natural materials tested were found in the neighborhood of Helena, Montana. Twenty-seven samples were taken from five main areas: the first, lying between Helena and Unionville; the second, between Helena and Cox Lake and including the near shore of the lake; the third, between Helena and Black Sandy beach; the fourth, centering around Lakeside and extending a short distance beyond the Trout Creek bridge; and the fifth, along the Rutte highway and the Jackson Creek road.

Preparation of Material for Testing

The first step in the preparation of each natural material was the removal of such foreign matter as rocks and twigs. The material was then ground by hand, with the aid of mortar and pestle, until it could be passed through a fifty mesh screen.

Selection for Testing

Samples of natural materials were brought in over a period of months. The first test made on each sample was the melt test, which involved firing the material without the addition of other natural or commercially refined substances. Selection of those to be further tested is based on the results of the melt tests. Since one of the goals was a suitable palette of various colors and textures, those glazes which appeared to possess the greatest color and texture possibilities were chosen.

Test Cups and Application of Glaze

The glaze tests were fired on hand-thrown, bisque test cups which measured approximately two inches in height and two inches in diameter. This type was used for several reasons. They could be thrown and finished quickly, their size was economical as far as kiln space was concerned, and their shape enabled the observation of glaze action on a lip and vertical wall. The clay formula consisted of thirty parts China clay, thirty parts Denver Fire clay, thirty parts Kentucky Ball clay and ten parts feldspar. For economy of time and material the glaze was applied to the cups by pouring the insides and dipping the outsides.

Test Identification and Recording

For identification purposes the number of the test, the cone to which the test was to be fired and the symbol for the type firing was marked on the bottom of each cup.

A data sheet was kept on each glaze. The data recorded included the number of the test, the cone to which it was fired and a description of the type and amounts of material used. The results of all tests, including the melt test were also recorded. Other data recorded includes the month the sample was collected, the general location of all the natural materials that were tested and the specific location of those which were selected for intensified testing.

Firing

Atmosphere: The majority of the tests were fired in a reducing atmosphere; however, a limited number were fired in an oxidizing atmosphere. The reduction firing was done in a large gas burning, down-draft kiln. A small, electric Globar kiln was used for the oxidation firing.

Temperature: The temperature at which the glazes were tested ranged from cone 8 (2300 Fahrenheit) to cone 10 (2381 Fahrenheit). The firing time for both kilns was approximately twenty-four hours.

DATA SHEET

SAMPLE #1

COLLECTED JUNE 1953

NOTE: All ingredients measured by weight.

Test No.	Cone	Fire	Test Composition	Test Results
1	8	O.	#1	medium green tan devitrified, opaque
1	10	O.	#1	same
1a	10	O.	100 parts #1 25 parts china clay	somewhat crystalline
1b	10	O.	50 parts #1 50 parts #27 5 parts silica	grey-green, transparent, crazed
1c	10	O.	50 parts #1a 50 parts #1b	grey-green, semi-matt, somewhat crystalline, crazed, opaque
1d	8	O.	100 parts #1 5 parts silica	gold-thin, green tan-thick, somewhat crystalline, opaque
1e	8	O.	10 parts silica	same
1f	8	O.	15 parts silica	same
1g	8	O.	20 parts silica	same
1	8	R.	#1	medium green, gritty, semi-matt, opaque
1	10	R.	#1	medium green, semi-matt, ran, devitrified, opaque

General Location - Area 1.

The testing of Sample #1 was discontinued at this point because another sample firing medium green and showing greater possibilities was obtained.

17.

DATA SHEET

SAMPLE #2

COLLECTED JUNE 1953

NOTE: All ingredients measured by weight.

Test No.	Cone	Fire	Test Composition	Test Results
2	8	0.	#2	dark brown, opaque, not mature
2	10	0.	#2	same
2	8	8.	#2	same
2	10	8.	#2	same

General Location - Area 1.

The testing of sample #2 was discontinued at this point because another sample, firing a dark brown and showing greater possibilities, was obtained.

DATA SHEET

SAMPLE #3

COLLECTED JUNE 1953

NOTE: All ingredients measured by weight.

Test No.	Cone	Pire	Test Composition	Test Results
3	8	O.	#3	thin-apple green, matt, crystalline, thick-apple green, matt, devitrified
3	9	O.	#3	cream, semi-matt, devitrified
3	10	O.	#3	thin to medium-matt, cream, thick-apple green crystalline
3a	8	O.	100 parts #3 5 parts china clay	not mature
3b	8	O.	100 parts #3 10 parts china clay	same
3c	8	O.	100 parts #3 15 parts china clay	same
3d	8	O.	100 parts #3 20 parts china clay	same
3e	8	O.	100 parts #3 25 parts china clay	same
3	8	H.	#3	thin-yellow, semi-matt, crystalline, thick-medium grass green, crystalline

General Location - Area 1.

Specific Location - Sample #3 was obtained from a road cut located on the right hand side of the road nine tenths of a mile from the National Park sign on the right hand road to Unionville.

19.

DATA SHEET

SAMPLE #4

COLLECTED JUNE 1953

NOTE: All ingredients measured by weight.

Test No.	Cone Fire Test Composition			Test Results
4	8	O.	#4	dark brown, not mature
4	10	O.	#4	same
4	8	R.	#4	same
4	10	R.	#4	same

General Location - Area 1.

The testing of Sample #4 was discontinued at this point because another sample firing dark brown and showing greater possibilities was obtained.

DATA SHEET

SAMPLE #5

COLLECTED JUNE 1953

NOTE: All ingredients measured by weight.

Test No.	Cone	Fire	Test Composition	Test Results
5	8	O.	#5	cream, gritty, did not begin to melt
5	10	O.	#5	same
5	8	R.	#5	same
5	10	R.	#5	same
5a	10	R.	100 parts #5 20 parts whitening	same
5b	10	R.	100 parts #5 25 parts whitening	same
5c	10	R.	100 parts #5 30 parts whitening	same
5d	10	R.	100 parts #5 35 parts whitening	same
5e	10	R.	100 parts #5 40 parts whitening	same
5f	10	R.	100 parts #5 45 parts whitening	same
5g	10	R.	50 parts #5 50 parts whitening	same
5h	10	R.	50 parts #5 50 parts whitening 50 parts #10	same

General Location - Area 1.

The testing of Sample #5 was discontinued at this point because a glaze firing tan was developed.

21.

DATA SHEET

SAMPLE #6

COLLECTED JUNE 1953

NOTE: All ingredients measured by weight.

Test

Test No.	Cone	Fire	Test Composition	Test Results
6	8	O.	#6	medium green, devitrified
6	10	O.	#6	same
6	8	R.	#6	medium green, gritty, not mature
6	10	R.	#6	same

General Location - Area 1.

The testing of Sample #6 was discontinued at this point because another sample firing medium green and showing greater possibilities was obtained.

DATA SHEET

SAMPLE #7

COLLECTED JUNE 1953

NOTE: All ingredients measured by weight.

Test No.	Cone Fire Test Composition			Test Results
7	8	O.	#7	medium green, devitri- fied
7	10	O.	#7	same
7	8	R.	#7	cream to medium green, cream portion flaked off the sample
7	10	R.	#7	medium green, devitri- fied

General Location - Area 1.

The testing of Sample #7 was discontinued at this point because another sample firing medium green and showing greater possibilities was obtained.

23.

DATA SHEET

SAMPLE #3

COLLECTED JUNE 1953

NOTE: All ingredients measured by weight.

Test No.	Cone	Fire	Test Composition	Test Results
8	8	O.	#3	dark brown, opaque, not mature
8	10	O.	#3	same
8	8	R.	#3	same
8	10	R.	#3	same

General Location - Area 1.

The testing of sample #3 was discontinued at this point because another sample firing dark brown and showing greater possibilities was obtained.

24.

DATA SHEET

SAMPLE #9

COLLECTED JUNE 1953

NOTE: All ingredients measured by weight.

Test No.	Cone Fire Test Composition			Test Results
9	5	O.	#9	dark brown, not mature
9	10	O.	#9	same
9	8	R.	#9	same
9	10	R.	#9	same

General Location - Area 1.

The testing of Sample #9 was discontinued at this point because another sample firing dark brown and showing greater possibilities was obtained.

DATA SHEET

SAMPLE #10

COLLECTED AUGUST 1953

NOTE: All ingredients measured by weight.

Test No.	Cone	Fire	Test Composition	Test Results
10	8	O.	#10	dark brown, flecked with tan, opaque, matt
10	9	O.	#10	black, flecked with rust, opaque, semi-matt
10	10	O.	#10	dark brown, opaque, shiny
10	8	R.	#10	dark brown, opaque, matt
10	10	R.	#10	dark brown, opaque, matt
10a	8	R.	100 parts #10 5 parts dolomite	dark brown, opaque, matt
10a	10	R.	same	same
10b	8	R.	100 parts #10 10 parts dolomite	same
10b	10	R.	same	same
10c	8	R.	100 parts #10 15 parts dolomite	dark brown, opaque, not quite mature
10c	10	R.	same	dark green brown, opaque, matt
10d	8	R.	100 parts #10 20 parts dolomite	dark brown, opaque, not mature
10d	10	R.	same	dark brown, opaque, matt
10e	8	R.	100 parts #10 25 parts dolomite	dark brown, opaque, not mature
10e	10	R.	same	dark brown, opaque, matt

DATA SHEET

SAMPLE #10 cont'd

Test No.	Cone	Fire	Test Composition	Test Results
10f	8	R.	100 parts #10 5 parts red iron oxide	thin-dark red, thick- metallic black, opaque, very matt
10f	10	R.	same	same
10g	8	R.	100 parts #10 10 parts red iron oxide	thin-dark red, thick- metallic black, opaque, very matt
10g	10	R.	same	same

General location - Area 2

Specific location - Sample #10 was obtained six tenths of a mile from number 662 South Davis Street, just to the right of the road.

DATA SHEET

SAMPLE #11

COLLECTED AUGUST 1953

NOTE: All ingredients measured by weight.

Test No.	Cone	Fire	Test Composition	Test Results
11	8	O.	#11	dark brown, bubbled, opaque, not mature
11	8	R.	#11	dark red, opaque, semi-matt
11	10	O.	#11	khaki glaze, rust with green flecks breaking through
11	10	R.	#11	dark red, opaque, semi-matt
11a	8	O.	100 parts #11 8 parts wood ash	black, opaque, shiny
11a	8	R.	same	dark brown, opaque, semi-matt
11a	10	R.	same	dark red, opaque, semi-matt
11b	8	R.	100 parts #11 10 parts wood ash	dark brown, opaque, semi-matt
11b	10	R.	same	dark red, opaque, semi-matt
11c	10	O.	100 parts #11 10 parts fig ash	black, opaque, shiny
11c	10	R.	same	dark brown with black breaking through, opaque, semi-matt
11d	10	O.	100 parts #11 20 parts fig ash	thin-transparent brown, thick-opaque black, shiny, ran

DATA SHEET

SAMPLE #11 cont'd.

Test No.	Cone	Fire	Test Composition	Test Results
11d	10	R.	same	very dark green-blue, opaque, semi-matt
11f	10	O.	100 parts #11 5 parts red iron oxide	black, opaque, shiny
11f	10	R.	100 parts #11 10 parts red iron oxide	thin-dark red, opaque, very matt; thick-black, crystalline, opaque,
11g	10	R.	100 parts #11 5 parts red iron oxide	dark brown, black flecks, opaque, semi-matt
11g	10	O.	100 parts #11 10 parts red iron oxide	red brown, metallic, opaque, semi-matt

General Location - Area 2.

Specific Location - Sample #11 was obtained from the shore of Cox Lake at the picnic site.

DATA SHEET

SAMPLE #12

COLLECTED AUGUST 1953

NOTE: All ingredients measured by weight.

Test No.	Cone	Fire	Test Composition	Test Results
12	8	O.	#12	thin tan-inside and outside of test cup. Crazed, transparent, semi-matt. Thick-inside: tan, devitrified, opaque-matt, outside dark brown, transparent crazed, shiny
12	8	R.	#12	thin-light green, gritty, opaque, semi-matt; thick-medium green, opaque, matt
12	10	O.	#12	thin-tan, opaque, crystalline, semi-matt, thick-dark brown, crazed, transparent and shiny
12	10	R.	#12	thin-grey green, opaque, semi-matt; medium green, opaque, somewhat crystalline; thick-dark green, opaque, shiny
12a	8	O.	100 parts #12 5 parts china clay	tan, green, orange flecks, opaque, semi-matt
12a	9	R.	100 parts #12 10 parts china clay	thin-medium yellow green, opaque, matt; thick-medium green, opaque, matt
12b	8	O.	100 parts #12 10 parts china clay	tan, green, orange flecks, opaque, matt

DATA SHEET

SAMPLE #12 cont'd

Test No.	Cone	Fire	Test Composition	Test Results
12b	8	R.	50 parts #12 50 parts #27	soft grey green, opaque, matt
12c	8	O.	100 parts #12 15 parts china clay	tan, green, orange flocks, opaque, matt
12c	9	R.	150 parts #12 10 parts china clay 50 parts #27	medium thickness-grey green, opaque, matt; thick-darker green, started to turn crys- talline
12d	8	O.	100 parts #12 20 parts china clay	tan, green, orange flocks, opaque, matt
12d	8	R.	50 parts of #12 50 parts #27 4 parts zircopax	yellow green, opaque, crystalline
12e	8	O.	100 parts #12 25 parts china clay	tan-green and orange flocks, opaque, matt
12e	8	R.	50 parts #12 50 parts #27 10 parts zircopax	soft medium green, opaque, matt

General Location - Area 2.

Specific Location - Sample #12 was obtained from a dry creek bed located just off the left-hand side of the road, six tenths of a mile from 662 South Davis Street.

DATA SHEET

SAMPLE #13

COLLECTED AUGUST 1953

NOTE: All ingredients measured by weight.

Test No.	Cone	Fire	Test Composition	Test Results
13	8	O.	#13	cream tan, opaque, very matt
13	8	R.	#13	cream, gritty, not mature
13	10	O.	#13	cream tan, thin to medium-opaque, matt; thick-green, transparent, shiny, ran
13	10	R.	#13	green, not mature, gritty
13a	8	R.	100 parts #13 5 parts dolomite	cream, not mature
13a	10	R.	same	green, not mature
13b	8	R.	100 parts #13 10 parts dolomite	cream, not mature
13b	10	R.	same	green, not mature
13c	8	R.	100 parts #13 15 parts dolomite	cream, not mature
13c	10	R.	same	green, not mature
13d	8	R.	100 parts #13 20 parts dolomite	cream, not mature
13d	10	R.	same	green, not mature
13e	8	R.	100 parts #13 25 parts dolomite	cream, not mature
13e	10	R.	same	light green, not mature

DATA SHEET

SAMPLE #13 cont'd

Test No.	Cone	Pire	Test Composition	Test Results
13f	10	R.	100 parts #13 10 parts colemanite	thin-cream; thick-sage green, opaque, uneven color, matt, ran
13c	10	R.	100 parts #13 20 parts colemanite	same
13h	10	R.	50 parts 13f 50 parts 13g	thin-cream; thick-green, opaque, matt; inside-ran, outside gritty
13i	9	O. 12hr.	50 parts #27 50 parts #13 15 parts zircopax	creamy tan, gold and brown flecks, opaque, shiny
13j	9	O. 12hr.	50 parts #27 50 parts #13 15 parts zircopax 1/4 part cobalt oxide	gray tan, blue and gold flecks, opaque, semi-matt
13k	9	O. 12hr.	50 parts #27 50 parts #13 15 parts zircopax 1/4 part cobalt oxide 2 parts black nickel oxide	creamy light tan, small gold and blue flecks, opaque, matt
13l	9	O.	50 parts 271 50 parts 13k	tan with cream, gold and blue flecks, opaque, matt

General Location - Area 2.

Specific Location - Sample #13 was obtained from a small bank just to the left of the road, located four tenths of a mile from 662 South Davis Street.

DATA SHEET

SAMPLE #14

COLLECTED AUGUST 1953

NOTE: All ingredients measured by weight.

Test No.	Cone	Fire	Test Composition	Test Results
14	8	O.	#14	dark brown, opaque, matt
14	10	O.	#14	dark brown, transparent; thin-ten, shiny
14	8	R.	#14	dark brown, opaque, matt
14	10	R.	#14	black, opaque, shiny
14a	10	R.	100 parts #14 10 parts #5	dark green, transparent, shiny
14b	10	R.	50 parts #14 50 parts #10	black, large chocolate brown flecks, opaque, shiny
14c	10	R.	100 parts #14 10 parts china clay	dark brown, rust spots, opaque, semi-matt
14d	8	R.	100 parts #14 5 parts red iron oxide	thin-rust, thick-dark green, opaque, semi-matt
14d	10	R.	same	thin-rust, thick-dark green, crystalline, opaque, semi-matt
14e	8	R.	100 parts #14 5 parts china clay	dark brown, opaque, matt
14e	10	R.	same	dark brown, rust spots, opaque, shiny
14f	8	R.	100 parts #14 15 parts china clay	dark brown, opaque, matt
14f	10	R.	same	dark brown, rust spots, opaque, semi-matt

34.

DATA SHEET

SAMPLE #14 cont'd

Test No.	Cone	Fire	Test Composition	Test Results
14g	8	R.	100 parts #14 20 parts china clay	dark brown, opaque, matt
14g	10	R.	same	dark brown, opaque, semi-matt
14h	8	R.	100 parts #14 25 parts china clay	dark brown, opaque, rough, matt
14h	10	R.	100 parts #14 25 parts china clay	dark brown, opaque, semi-matt
14i	8	R.	100 parts #14 7 parts tin oxide	dark red-brown, opaque, semi-matt
14i	10	R.	same	thin-bright rust, opaque, shiny; thick- dark greenish brown flocks, opaque, semi- matt
14j	8	R.	100 parts #14 8 parts assorted wood ashes	dark green, opaque, matt
14j	10	R.	same	dark brown, mostly transparent, shiny
14k	8	R.	100 parts #14 10 parts assorted wood ashes	medium green, opaque, matt
14k	10	R.	same	dark brown, transpar- ent, shiny
14k	10	R.	100 parts #14 10 parts fig ash	dark brown, many light green flecks, opaque, matt

DATA SHEET

SAMPLE #14 cont'd

Test No.	Cons	Fire	Test Composition	Test Results
141	10	R.	100 parts #14 20 parts fig ash	thin-transparent, yellow brown; thick-brown with light green flecks, opaque, semi-matt
14m	10	R.	100 parts #14 10 parts zircopax	chocolate brown, opaque, very smooth, semi-matt
14n	10	R.	100 parts #14 20 parts zircopax	light chocolate brown, opaque, very smooth, semi-matt
14o	9	O.	100 parts #14 12hr. 5 parts zircopax	dark grey brown, opaque, matt
14o	10	R.	100 parts #14 10 parts red iron oxide	thin-dark red, opaque, matt, thick-black, crystalline, opaque, matt; very thick-black, metallic, wrinkled
14m	10	O.	100 parts #14 10 parts zircopax	thin-brown, opaque, shiny; thick-grey green, opaque, shiny
14n	10	O.	100 parts #14 20 parts zircopax	thin-light brown, shiny, thick-light grey green, opaque, shiny

General Location - Area 3.

Specific Location - Sample #14 was obtained from a high clay bank located to the left of the road opposite Black Sandy Beach.

36.

DATA SHEET

SAMPLE #15

COLLECTED AUGUST 1953

NOTE: All ingredients measured by weight.

Test

Test No.	Cone	Fire	Test Composition	Test Results
15	8	O.	#15	dark brown, opaque, not mature
15	10	O.	same	dark brown, opaque, gritty, not quite mature
15	8	R.	same	dark brown, opaque, gritty, not mature
15	10	R.	same	dark brown, rust flecks, opaque, semi-matt

General Location - Area 3.

The testing of Sample #15 was discontinued at this point because another sample firing dark brown and showing greater possibilities was obtained.

DATA SHEET

SAMPLE #16

COLLECTED AUGUST 1953

NOTE: All ingredients measured by weight.

Test No.	Cone	Fire	Test Composition	Test Results
16	3	O.	#16	dark brown, gritty, opaque, not mature
16	10	O.	same	dark brown, opaque, shiny
16	9	R.	same	thin-tan, gritty, shiny; thick-dark brown, gritty, shiny

General Location - Area 3.

The testing of Sample #16 was discontinued at this point because another sample firing dark brown and showing greater possibilities was obtained.

38.

DATA SHEET

SAMPLE #17

COLLECTED AUGUST 1953

NOTE: All ingredients measured by weight.

Test No.	Cone	Fire	Test Composition	Test Results
17	8	O.	#17	medium brown, sandy, did not begin to melt
17	8	R.	same	very dark brown, opaque, gritty, semi-matt
17	10	R.	same	same

General Location - Area 3.

The testing of Sample #17 was discontinued at this point because another sample firing dark brown and showing greater possibilities was obtained.

39.

DATA SHEET

SAMPLE #18

COLLECTED AUGUST 1953

NOTE: All ingredients measured by weight.

Test No.	Cone	Fire	Test Composition	Test Results
18	8	O.	#18	tan, gritty, did not begin to melt
18	8	R.	same	thin-grey green, opaque, semi-matt, ran; thick-medium green, transparent, shiny, ran
18	10	R.	same	same

General Location - Area 3.

The testing of Sample #18 was discontinued at this point because other samples firing tan and medium green and showing greater possibilities were obtained.

40.

DATA SHEET

SAMPLE #19

COLLECTED AUGUST 1953

NOTE: All ingredients measured by weight.

Test No.	Cone	Fire	Test Composition	Test Results
19	8	G.	#19	dark brown, not mature
19	10	G.	same	same
19	8	R.	same	same
19	10	R.	same	same

General Location - Area 3.

The testing of Sample #19 was discontinued at this point because another sample firing dark brown and showing greater possibilities was obtained.

DATA SHEET

SAMPLE #20

COLLECTED OCTOBER 1953

NOTE: All ingredients measured by weight.

Test No.	Cone	Fire	Test Composition	Test Results
20	8	O.	#20	dark brown, transparent, few pinholes, shiny
20	10	O.	same	medium brown, transparent, shiny
20	8	R.	same	dark brown, opaque, small rust spots, matt
20	10	R.	same	dark brown and light green flecks, opaque, shiny, edge-golden
20a	8	R.	100 parts #20 20 parts zircopax	thin to medium-warm red brown, opaque, semi-matt; thick-medium green brown, opaque, semi-matt
20a	9	R.	same	rust, opaque, very smooth, matt
20b	8	R.	100 parts #20 5 parts tin oxide	thin-medium brown, tan spots, opaque, semi-matt; thick-fudge color, opaque, semi-matt
20c	8	R.	100 parts #20 5 parts red iron oxide	thin to medium-warm brown, opaque, semi-matt; thick-dark green, opaque, semi-matt
20c	9	R.	same	rust, very small dark metallic flecks, opaque, matt

DATA SHEET

SAMPLE #20 cont'd

Test No.	Cone	Fire	Test Composition	Test Results
20d	9	R.	50 parts #20 50 parts #3	thin-gold, transparent, shiny; medium-light green, opaque, semi-matt; thick; light green flecks, opaque, semi-matt, ran
20e	9	R.	50 parts #20 50 parts #27	thin-chocolate brown, lustre, opaque, shiny; thick-dark brown, lighter "oil spots", lustre, shiny
20g	9	R.	50 parts 20a 50 parts 20b	dark red brown, opaque, matt
20h	9	R.	100 parts #20 5 parts china clay	medium-dark red, opaque, semi-matt; thick-dark green, opaque, semi-matt
20i	9	R.	50 parts 20h 50 parts 20e	thin-red, opaque, semi-matt; thick-black with red spots, and lighter oil spots, opaque, semi-matt
20j	9	O.	100 parts #20 12hr 10 parts zircopax	warm, medium brown, opaque, matt

General Location - Area 4

Specific Location - Sample #20 was obtained from a high clay bank located to the right of the road, approximately one tenth of a mile from Lakeside.

DATA SHEET

SAMPLE #21

COLLECTED OCTOBER 1953

NOTE: All ingredients measured by weight.

Test

No.	Cone	Fire	Test Composition	Test Results
21	8	O.	#21	medium brown, transparent, bubbled, semi-matt
21	10	O.	same	thin-tan transparent, semi-matt; thick-medium brown, transparent, broken bubbles, (very small) semi-matt
21	8	R.	same	warm brown, tiny black specks, opaque, semi-matt, very thick, crawled, shiny
21	10	R.	same	same
21a	10	R.	100 parts #21 5 parts red iron oxide	thin-red, opaque, shiny; thick-black, red spots, opaque, shiny
21b	10	R.	100 parts #21 10 parts zircopax	warm light brown, opaque, semi-matt
21c	10	R.	100 parts #21	soft medium green, brown flecks, opaque, shiny
21d	10	R.	100 parts #21 10 parts zircopax 5 parts china clay	orange, small brown flecks, opaque, matt
21e	10	R.	50 parts 21c 50 parts 21d	warm light brown with light green flecks, opaque, semi-matt

General Location - Area 4

Specific Location - Sample #21 was obtained from the lake bank, approximately 300 feet from the bathhouse at Lakeside.

DATA SHEET

SAMPLE #22

COLLECTED OCTOBER 1953

NOTE: All ingredients measured by weight.

Test

Test No.	Cone	Fire	Test Composition	Test Results
22	8	O.	#22	medium green tan, opaque, not mature
22	10	O.	same	dark green and black flecks, opaque, orange peel texture
22	8	R.	same	dark green, opaque, matt
22	10	R.	same	dark green and black flecks, opaque, slight orange peel texture
22a	10	O.	100 parts #22 10 parts zircopax	thin-brown and gray green flecks, opaque, semi-matt; thick-pin holed
22b	10	O.	100 parts #22 20 parts zircopax	cream and brown flecks, opaque, orange peel texture, somewhat pin holed, semi-matt
22d	10	R.	100 parts #22 20 parts dolomite	thin-yellow, opaque, semi-matt; thick-medium green, light green flecks, opaque, matt
22e	10	R.	100 parts #22	thin-golden brown, transparent, shiny; thick medium green, opaque, matt
22f	10	O.	100 parts #22 10 parts dolomite	thin-golden tan, transparent, shiny; thick-dark brown, light flecks, opaque, shiny

45.

DATA SHEET

SAMPLE #22 cont'd

Test No.	Cone	Fire	Test Composition	Test Results
22f	10	R.	same	thin-golden tan, transparent, semi-matt; thick-medium yellow green, opaque, matt
22g	10	O.	100 parts #22 10 parts fig ash	thin-yellow tan, transparent, shiny, crazed; thick-dark brown, transparent, crazed, shiny, ran
22g	10	R.	100 parts #22 10 parts fig ash	thin-golden tan; thick-medium yellow green, opaque, matt
22h	10	O.	100 parts #22 20 parts fig ash	thin-tan, transparent, crazed, shiny; thick-dark brown, transparent, crazed, shiny, ran
22h	10	R.	same	thin-yellow, opaque, matt; thick-yellow green, opaque, matt, ran
22k	10	O.	100 parts #22 10 parts whitening	thin-light tan, transparent, crazed, shiny; thick-dark brown, transparent, crazed, shiny, ran
22k	10	R.	same	thin-light yellow green, transparent, shiny; thick-medium green, opaque, matt, ran

General Location - Area 4

Specific Location - Sample #22 was obtained from the left side of a gully located approximately 100 feet from the left side

46.

SAMPLE #22 cont'd

of the road, one tenth of a mile from Lakeside on the road to
the Trout Creek Bridge.

47.

DATA SHEET

SAMPLE #23

COLLECTED OCTOBER 1953

NOTE: All ingredients measured by weight.

Test No.	Comp	Fire	Test Composition	Test Results
23	8	O.	#23	medium green brown, opaque, semi-matt, very smooth
23	10	O.	same	thin-dark brown, transparent, shiny; thick-medium green brown, transparent, shiny
23	9	R.	same	medium green and brown flecks, opaque, semi-matt; thick-medium green and dark flecks, opaque, semi-matt
23b	9	R.	100 parts #23 10 parts zircopax	medium green, opaque, semi-matt
23c	9	R.	100 parts #23 20 parts zircopax	medium green, opaque, matt

General Location - Area 4

Specific Location - Sample #23 was obtained from the Trout Creek Shore just to the right of the road, approximately one quarter of a mile beyond the Trout Creek Bridge.

The testing of Sample #23 was discontinued at this point because of the loss of the original sample and my inability to obtain another sample due to weather and road conditions.

48.

DATA SHEET

SAMPLE #24

COLLECTED OCTOBER 1953

NOTE: All ingredients measured by weight.

Test No.	Cone Fire Test Composition			Test Results
24	8	O.	#24	dark brown, opaque, semi-matt, crawled
24	10	O.	same	dark brown, opaque, semi-matt, crawled
24	8	R.	same	dark brown, opaque, matt, crawled
24	10	R.	same	same

General Location - Area 5

The testing of Sample #24 was discontinued at this point because another sample firing dark brown and showing greater possibilities was obtained.

49.

DATA SHEET

SAMPLE #25

COLLECTED OCTOBER 1953

NOTE: All ingredients measured by weight.

Test

<u>No.</u>	<u>Cone</u>	<u>Fire</u>	<u>Test</u>	<u>Composition</u>	<u>Test Results</u>
25	8	0.	#25		dark brown, opaque, bubbled, very rough
25	10	0.	same		dark brown, opaque, medium gritty, thick, bubbled, very rough

General Location - Area 1

The testing of Sample #25 was discontinued at this point because another sample firing dark brown and showing greater possibilities was obtained.

50.

DATA SHEET

SAMPLE #26

COLLECTED OCTOBER 1953

NOTE: All ingredients measured by weight.

Test No.	Cone	Fire	Test Composition	Test Results
26	10	O.	#26	thin-medium brown, transparent, shiny; thick-black, opaque, shiny
26	10	R.	same	medium green, opaque, matt

General Location - Area 5

The testing of Sample #26 was discontinued at this point because other samples firing medium brown and green and showing greater possibilities were obtained.

DATA SHEET

SAMPLE #27

COLLECTED OCTOBER 1953

NOTE: All ingredients measured by weight.

Test No.	Cone	Fire	Test Composition	Test Results
27	8	O.	#27	light tan, not mature, tiny broken bubbles
27	10	O.	same	same
27	8	R.	same	tan, brown flecks, opaque, shiny
27	10	R.	same	tan, rust flecks, opaque, shiny
27a	10	R.	100 parts #27 5 parts rutile	dark brown, opaque, semi-matt
27b	10	R.	100 parts #27 10 parts titanium	tan, opaque, shiny
27c	10	R.	100 parts #27 5 parts red iron oxide	dark red, opaque, matt, rough
27d	10	R.	100 parts #27 10 parts rutile	dark brown, light flecks, opaque, shiny
27e	10	R.	100 parts #27 10 parts titanium 5 parts rutile	red, opaque, shiny, lustre
27f	10	R.	50 parts 27e 50 parts 27d	red and green flecks, opaque, shiny
27g	10	R.	50 parts #27 50 parts #3	thin-grey green, transparent, shiny; thick-sage green, opaque, matt
27h	10	R.	100 parts #27 1 part copper carbonate	black and red spots, opaque, shiny
27i	10	R.	100 parts #27 1 part cobalt oxide	dark blue black, opaque, shiny

DATA SHEET

SAMPLE #27 cont'd

Test				Test Results
No.	Conc	Fire	Test Composition	
27j	10	R.	50 parts #27f 50 parts #27g	dark brown, bubbled, shiny
27k	10	R.	50 parts #27i 50 parts #27j	dark green brown, rough
27l	10	R.	50 parts #27 50 parts #3 10 parts zircopax	soft light green, opaque, shiny
27m	10	R.	100 parts #27 15 parts china clay	tan, did not melt
27n	10	R.	100 parts #27 20 parts zircopax	yellow tan, opaque, semi-matt
27o	10	R.	50 parts #27m 50 parts #27n	tan, not mature
27p	10	R.	100 parts #27 5 parts china clay	tan, lustrous, opaque, shiny
27q	9	O.	100 parts #27 12hm. 10 parts dolomite	tan, transparent, shiny, thick-tiny broken bubbles
27r	9	O.	100 parts #27 12hm. 20 parts dolomite	very green, opaque, matt
27s	9	O.	100 parts #27 12hm. 15 parts dolomite	tan, transparent, shiny-tiny broken bubbles
27t	9	O.	100 parts #27 12hm 5 parts dolomite	tan, transparent, shiny, few broken bubbles
27v	9	O.	100 parts #27 12hm 10 parts whiting	thin-very light yellow- tan, transparent, shiny, crazed, thick-few broken bubbles

53.

DATA SHEET

SAMPLE #27 cont'd

Test No.	Cone	Fire	Test Composition	Test Results
27w	9	0.	100 parts #27 12hr. 20 parts whiting	same
27x	9	0.	100 parts #27 12hr. 30 parts whiting	same
27y	9	0.	200 parts #27 12hr. 30 parts dolomite 2 parts cobalt oxide	dark blue, opaque, matt
27a	9	0.	100 parts 27y 12hr. 4 parts red iron oxide	very dark blue, opaque, shiny
27a-1	9	0.	100 parts 27s 12hr. 1½ parts copper ear- bonate	very dark green, opaque, shiny

General Location - Area 5

Specific Location - Sample #27 was obtained from a high road cut located to the right of the road 5 miles from the Butte Highway turnoff.

CONCLUSION

A number of natural materials were found which formed glazes when fired within the chosen firing range. However, the glaze palette I obtained is based mainly on six of these natural glazes. The six are numbers 11, 14, 20, 21, 22 and 27. As can be noted on the individual data sheets each of these six when fired alone will form a glaze possessing a surface suitable for tableware as well as decorative pottery. Since the majority of my pots are for table use I felt very fortunate in finding materials which would be suitable for that type of ware without any correction.

The six natural glazes are quite close in color when fired alone, with the exception of #27. They fire various shades of brown or green while #27 fires a tan. However, with the addition of other natural materials or commercially refined coloring oxides, fluxes or opacifiers, their color range can be enlarged. The color palette shown in Appendix II was obtained mainly from the six natural glazes mentioned.

It is interesting to note in Appendix I, that with the exception of #27 the six natural glazes were found close to a body of water. Not only are there large deposits of all of these particular materials, but the deposits are all located close to the road and are easily attainable. These materials require very little preparation for use as they

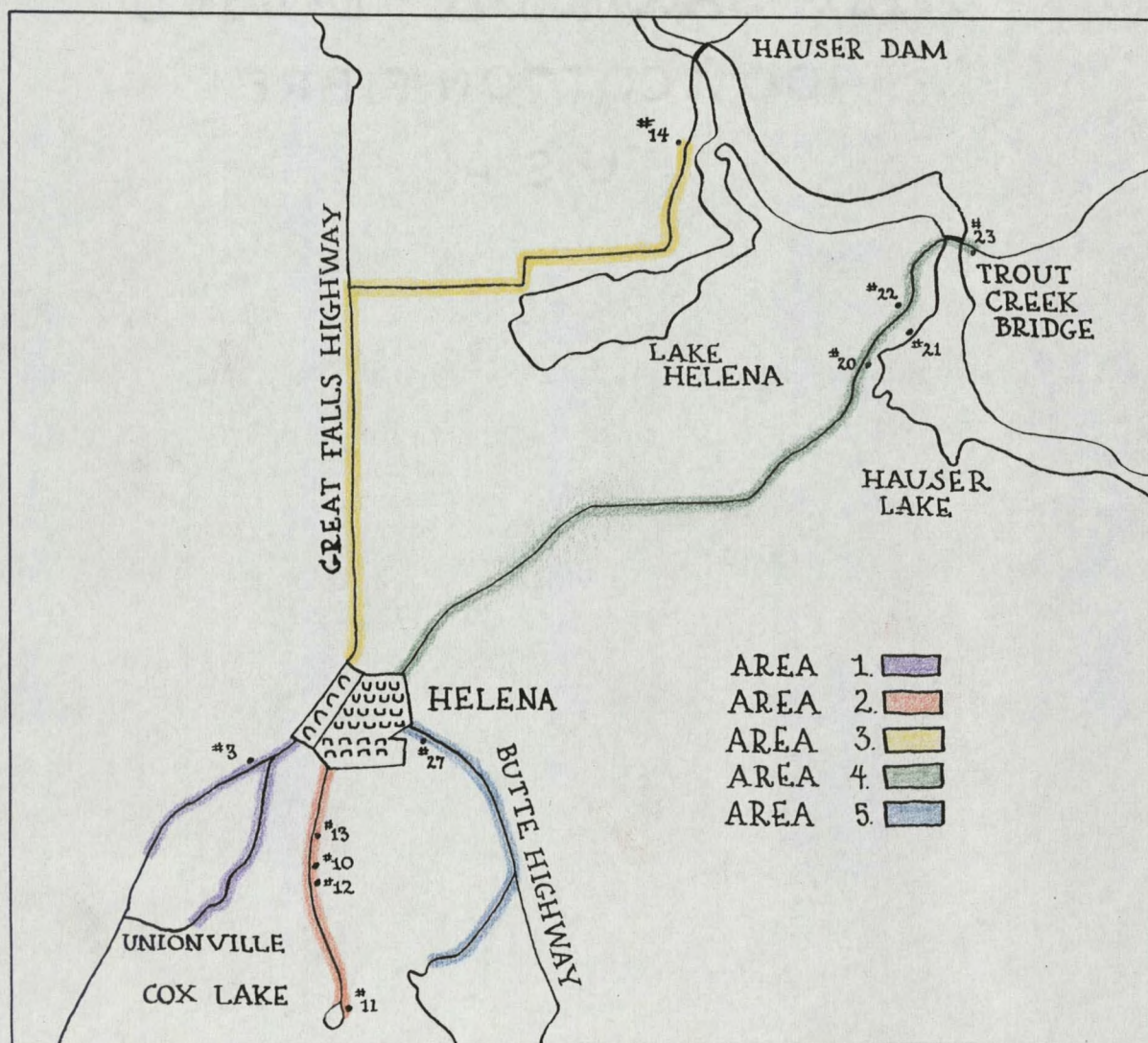
are fine in grain and contain only a small amount of such foreign material as rocks.

I feel that I have benefited in a number of ways from the testing of natural glaze materials. I gained not only a suitable glaze palette for my own work but also something I consider to be of equal importance, that is a greater appreciation for Nature and what she offers to all potters in materials as well as inspiration. I hope that the data contained in this thesis will be of some value to other potters, located not only in the Helena area but throughout the state, and that it may encourage all potters to exploit natural resources in their vicinities. It is also hoped that all who read this thesis may gain a better understanding of and appreciation for glazes made from natural, unrefined materials.

APPENDIX I

MAP

Below is a map which shows the five areas from which samples were taken for testing and the general location of the materials which make up the glazes in the glaze palette. The specific location for these materials is given on the data sheets.



APPENDIX II

COLORED SLIDES

Following are a number of colored slides of pots glazed with the natural glazes and a slide showing some of the colors obtained.

Slide #1 - Test Cups

First Row, left to right - #27s, cone 9, O. #13k, cone 9, O.

#11, cone 10, R. #21, cone 10, R. #14, cone 8, R.

#27, cone 10, R. #22, cone 8, R.

Second Row, left to right - #21d, cone 10, R. #14d, cone 10, R.

#14k, cone 10, R. #20s, cone 8, R. #27r, cone 9, O.

#27a, cone 10, R. #20g, cone 9, R. #11f, cone 10, ox

#20a, cone 9, R. #22g, cone 10, R. #131, cone 9, O.

Third Row, left to right - #21c, cone 9, O. #20e, cone 9, R.

#27c, cone 10, R. #271, cone 10, R. #27h, cone 10, R.

#27e, cone 10, R. #11c, cone 10, R. #22k, cone 10, R.

#3, cone 9, O. #11g, cone 10, R. #20c, cone 9, R.

Fourth Row, left to right - #271, cone 10, R. #3, cone 8, R.

#20j, cone 9, O. #12b, cone 8, R. #3, cone 8, O.

#131, cone 9, O. #10, cone 8, O. #27s-1, cone 9, O.

#14m, cone 10, R. #11c, cone 10, O. #11d, cone 10, R.

Fifth Row, left to right - #22f, cone 8, O. #21a, cone 10, R.

#27n, cone 10, R. #13, cone 8, O. #20, cone 10, R.

53.

#11, cone 10, O. #22d, cone 10, R. #14n, cone 10, O.

#14i, cone 8, O. #20, cone 8, O. #14m, cone 10, O.

Sixth Row, left to right- #14o, cone 9, O. #23, cone 8, O.

#21b, cone 10, R. #13j, cone 9, O. #20, cone 8, R.

#22, cone 10, R. #3, cone 10, O. #27y, cone 9, O.

#12e, cone 8, R. #21s, cone 10, R. #27p, cone 10, R.

Slide #2 - Small Cookie Jar

Glaze: #10, oxidation, cone 9, 12 hour fire, white slip
inlaid decoration.

Slide #3 - Covered Pot

Glaze: #3, oxidation, cone 9, 12 hour fire, #14 inlay
decoration.

Slide #4 - Pitcher

Glaze: #13k, oxidation, cone 9, 12 hour fire,

Slide #5 - Bottle

Glaze: 14d., reduction, cone 10, 24 hour fire.

Slide #6 - Saucers

Glaze: four dark saucers - #20, reduction, cone 8, 24
hour fire, white commercial glaze used for trailed
decoration. Two light saucers - #14m, oxidation,
cone 9, 12 hour fire, light #13j overspray and #14

59.

trailed decoration.

Slide #7 - Covered Pot

Glaze: #21d, reduction, cone 10, 24 hour fire, with #20
inlaid decoration.

Slide #8 - Small Covered Pots

Glaze: left to right - #11, reduction, cone 10, 24 hour
fire. #371, oxidation, cone 9, 12 hour fire.
#12b, reduction, cone 8, 24 hour fire.

APPENDIX III

Literature Cited

1. Campbell, Horace, A NOTE ON THE FIRING OF CH'EN-YAO (TEI-MO-KU) GLAZE, Ceramic Age, Ceramics Publishing Company, Newark, New Jersey, July, 1953
2. Ceramic Industry, Industrial Publications, Chicago, Illinois, February, 1954
3. Honey, W. D., THE ART OF THE POTTER, Whittlesey House, London, England
4. Leech, Bernard, A POTTER'S BOOK, Transatlantic Arts Inc., New York, 1951
5. Spargo, John, EARLY AMERICAN POTTERY AND CHINA, D. Appleton-Century Company, Inc., New York, 1938
6. Watkins, Lura Woodside, EARLY NEW ENGLAND POTTERS AND THEIR WARES, Harvard University Press, Cambridge, Massachusetts, 1950
7. Wildenhain, Marguerite, THE POTTER IN THE NEW WORLD, Scripps College Bulletin, Claremont, California, 1953



















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