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HTL-16 for Cone 8
(2300°F)
$175.00 f.o.b. Columbus,
Crating $12.00
Pyrometer $25.00

Top-loading ElectriKilns save time ... cut power costs. All wiring and switches are completely safe ... approved by Underwriters' Laboratory. Extra-long-life elements in recessed grooves mean easier replacement, no loose staples.

<table>
<thead>
<tr>
<th>TOP-LOADING</th>
<th>Firing Chamber</th>
<th>MAX. TEMP.</th>
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<td>TL-4</td>
<td>11</td>
<td>11</td>
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</tbody>
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FREE HARROP CERAMIC REFERENCE CATALOG

What do YOU need in a kiln?

There's a Harrop ElectriKiln for EVERY purpose.
Hobbyists ... Teachers ... Studio Operators ... all find they get better results with a Harrop ElectriKiln.
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The Great Lakes
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Ceramic Hobby Exhibition
of 1954
May 19, 20, 21, 22, 23

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OLIN RUSSUM CHOSES PEMCO PRODUCTS

A course in ceramics has been added to the curriculum at the Baltimore Museum of Art. The Museum is fortunate in having Mr. Olin Russum as the instructor. Mr. Russum is a Master of Fine Arts from Claremont Colleges in California. His work has been exhibited in the Syracuse Ceramic National Shows, in several galleries in this country and in the Museum of Faenza, Italy. Mr. Russum is presently operating a studio in Monkton, Maryland.

In the candid shots at the right, beginning students are receiving instructions in glazing their first pinch pots. Also shown are some bisque fired pieces decorated with colored slip.

The clay chosen by Olin Russum for classroom work is Pemco's 2016 moist clay, to fire at cone 06. It is packed in plastic bags in a handy 50# fibre drum. This clay is used for modeling and for throwing on the wheel.

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Tips for Travelers?

Gentlemen:

My wife and I are planning a trip to Europe in the spring and our itinerary includes Spain, southern France, Sicily, Greece, the islands of Greece and western Turkey. Our main objective will be to visit potters and potteries in these countries. We would appreciate suggestions from Ceramics Monthly readers, giving us names of potters in these countries and their location, as well as any information regarding the type of work they do. Also, we would be especially interested in hearing from readers who have visited potters in the countries which we plan to visit.

Paul Bates
Asaria, Kan.

World travelers wishing to aid Mr. Bates may write him at Box A, Asaria.—Ed.

Tarnished Lusters?

Gentlemen:

We learned to our great sorrow this summer, when at the Museo Internazionale Delle Ceramiche in Faenza, Italy, of the untimely death of its much beloved and highly esteemed director, Dr. Gaetano Ballardini [see May issue for article on Delle Ceramiche in Faenza].

Knowing of the fine contributions that Dr. Ballardini has made, especially in the field of faience, I thought you might like to carry a note of the loss of this fine scholar and ceramist in your magazine. He had given Prof. Koch and myself great assistance in our research the last few years in the Hispano-Mauresque and Italian lustres.

I was greatly disturbed, discouraged, and disappointed at the title article “An Introduction to Prepared Lustres” by Mrs. Mary Pruden which appeared in the October issue. Disturbed that such an opinion of the exquisite qualities of the Arabic, Hispano-Mauresque, and Italian lustres, in contrast to the contemporary lustre products, should be voiced in a technical education journal such as yours. Disappointed and surprised that a periodical which we thought was going to meet a great need and which gave splendid evidence of doing so as judged by such excellent articles as those of Perkins, Littlefield, Bohrod, Lukens, Smith, etc., would print without even editing an article which presumably was directed to a grade school child’s mentality...

(Ed.) Berthe C. Koch
Univ. of Omaha
Omaha, Neb.

Referring to early Egyptian and Persian potters, Author Pruden stated: “Many museums have pieces of their beautiful ware. However, there are colors available to today’s potters that would make the ancient Persians envious...” Having seen such lustres we must agree with her: today’s commercial lustres are as much a boon to luster artists as commercial enamels are to enamelist.—Ed.

San Antonio, Texas

Gentlemen:

I have always been pleasantly surprised by the covers—except October.

James Russell

Well, do you like it?

I am enclosing a sketch which describes my general reaction [see cut]...

New York City

Harold Weinmann

Cover that Cover!

Gentlemen:

It was interesting to read about your cover artist in the November issue [Letter From The Editor]. I’ve enjoyed all the covers... except October. That one should never have been “uncovered...”

James Russell

JAMES RUSSELL
San Antonio, Texas

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PRICES

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<th>Model No.</th>
<th>Firing Chamber</th>
<th>Price</th>
<th>Crating Charge</th>
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Top Loaders to 2300° F

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<td>$260.00</td>
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JANUARY 1954
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itinerary

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CANADA, Toronto
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CONNECTICUT, Norwalk
June 6-July 4

KANSAS, Wichita
April 11-May 11

NEW YORK, Buffalo
January 31-February 25
Annual exhibition by the members of the Ceramics Section of Buffalo Museum of Science. In Print Room of the Museum. Entries will be received at regular meeting, January 29. Demonstration January 31, February 7, 14, 21. Only hand-built ceramic creations eligible for prizes. Entry fee: $1. For further details write Miss Neville Cocker, 40 Vernon Place, Buffalo.

NEW YORK, Buffalo
March 9-April 4

NEW YORK, New York
February 16-March 11
“Ceramics Today,” annual exhibition of the New York Society of Ceramic Arts, at Museum of Natural History. For entry blanks write Rose Krebs, 517 W. 36th St.

(Please turn to Page 10)

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Used as a drip, or laid on in design over UNFIRED glazes, FROST gives YOUR work the distinction of an exhibition piece. Simple to use, amusingly lovely—and SO economical. Use it in combination with the glorious, new BEACHSTONE GLAZES

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Name:
Address:
City.________Zone.________State.________

( ) Check here if you would like information on other glazes as they are developed.

DEALER INQUIRIES INVITED

itinerary

(Begins on Page 8)

WASHINGTON, Seattle
March 7-April 7
Northwest Craftsmen's Second Annual All-Crafts Show at the Henry Gallery, University of Washington. Open to craftsmen living and working in Oregon, Washington, Idaho, Montana, and British Columbia. Pottery, ceramic sculpture, and enamels included. Receiving dates: February 12, 13. Prizes; jury; entry fee. For entry blanks write Northwest Craftsmen, Henry Gallery, University of Washington, Seattle 5.

WHERE TO GO

ALABAMA, Birmingham
December 13-January 10
"Design from Britain," a traveling exhibition of British handcrafted and machine-made objects for the home, including pottery. Nearly 200 pieces on display. At Birmingham Museum of Art, 711 19th St., N.

NEW YORK, Rochester
December 11-January 10
Rochester Memorial Art Gallery, 490 University Ave., displays the "American Craftsmen" exhibition. Ceramics and numerous other crafts, outstanding work by contemporary Americans, are shown.

OHIO, Youngstown
January 1-31
Sixth Ohio Ceramic Annual at Butler Art Institute, 524 Wick Ave. Enamels, pottery and other ceramics by present and former residents of Ohio.

PENNSYLVANIA, Philadelphia
January 27-February 14
"Textiles and Ceramics," traveling exhibition from the Fourth Biennial of the Museum of Cranbrook Academy. At Philadelphia Art Alliance, 251 S. 18th St. Distinguished ceramics and textiles comprise display of 100 or more items.

PENNSYLVANIA, Pittsburgh
January 24-February 14
"American Craftsmen," traveling exhibition, on display at University of Pittsburgh, Fine Arts Department. More than 100 examples of ceramics, enamels, silversmithing and other work by outstanding contemporary craftsmen are included in this show sponsored by Smithsonian Institution.

TENNESSEE, Chattanooga
January 24-February 14
Well-designed British home furnishings, both handcrafted and machine-made, comprise "Design from Britain" exhibition. Pottery included among nearly 200 objects in this traveling display. At George Thomas Hunter Gallery of Art, 10 Bluff View Ave.

WES VIRGINIA, Huntington
December 13-January 10
Pottery, ceramic sculpture, and textiles, work of distinguished craftsmen, comprise "Textiles and Ceramics" exhibition at the Huntington Galleries, Park Hills, 3605 McCoy Rd. Display selected from Fourth Biennial of the Museum of Cranbrook Academy.
JUST READ THE LAST THREE LINES

Now really, you are being very foolish not to do so as we asked you to. There isn’t a thing in this paragraph worth reading, tho’ we feel that the last three lines we were talking about are relatively important and would like to get the message they convey across to you.

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712 Centre St. Freeland, Pa.
HOW A FILM—a film on ceramics. Let master craftsmen demonstrate on the screen how clay is shaped, decorated, and fired. See how dinnerware is manufactured. "Visit" potters in other countries.

The motion picture is a powerful teaching medium; and films about ceramics can be an invaluable aid to students, teachers, recreation leaders— to ceramic enthusiasts who seek new ways to interest others in the craft.

At the regular meetings of the hobby club or art league, they can be used to supplement a short program, or a group of films can be the feature event of the evening. Films can be used for small groups or large to instruct, arouse interest, and inspire.

Recognizing the value of films and the need for a comprehensive list of available titles, the editors of Ceramics Monthly have compiled an up-to-the-minute list with pertinent information about each title. This list is set forth here for the convenience of our readers.

Films are easily obtained. They may be borrowed, rented, or purchased outright.

A convenient source for borrowing is your own local public library, if it has a film division. On presentation of a library card, a film may be borrowed at little or no charge for a twenty-four hour period. Another source is the museum, university, or public school system. They usually have film libraries of their own and often are able to loan or rent their films to outside groups.

Should none of these institutions be able to furnish the titles you want, there is the commercial film rental service to turn to (listed under "Motion Picture Film Libraries" or a similar heading in the classified telephone directory). The dealer is the agent for major film distributors, and he can obtain most titles or at least tell you where to locate them. Incidentally, distributors prefer that film users contact the nearest audio-visual agency before writing directly for specific titles. The films sought are frequently available locally. If the film cannot be located, however, the companies will gladly refer you to the proper agency or send the film directly.

Whether the film is to be obtained from a public or a commercial source, the reservation should be requested well in advance of the date of showing. Distributors actually recommend at least four weeks’ notice.

Locating film libraries has been made easy by the magazine Saturday Review. For a geographical list of such libraries, sent 10 cents to Cecile Starr, editor, Ideas on Film, Saturday Review, 25 W. 45th St., New York 19.

We present the Ceramics Monthly film list on the following page. Choose a subject; set the reel in motion.
The Potter's Wheel

Richard Petterson of Scripps College demonstrates how to throw pitchers. A review of fine examples of thrown ware is given. 10 minutes; black-and-white rental, $3 a day; $6 a week; $45 purchase. Color rental $6 a day, $12 a week; $90 purchase.

Simple Ceramics

Mr. Petterson shows how to use simple household utensils for decorating a clay slab which is later slung in a hammock mold to make a bowl. 10 minutes; rental and purchase same as above.

The Latest Release in the Series. Mr. Petterson takes the viewer through the steps of making a clay bowl. 10 minutes; color; $3 for five days; $100 purchase.

Clay in Action

How to sculpt a portrait in clay is demonstrated by Anthony C. Balloco, of Chicago Teachers College. This film emphasizes as basic measurements, principal planes, tools, and interpretation are discussed. 12 minutes; $2.50, one to three days; $50 purchase.

Colour in Clay

This is the story of modern English commercial pottery. The clay is shown as it is worked at the potter's wheel, and at the turner's lathe. Afterwards, the pottery is decorated, glazed, and fired. The film exemplifies the successful combination of art principles with modern technological methods. 11 minutes; in color; $4 for one to three days; $100 purchase.

Pottery Making

The film describes each step in the making of pottery by four different methods. A vase is formed on a potter's wheel, an Indian bowl is fashioned with coils of clay, a vase is made in a plaster mold, and a table piece is assembled from patterned slab pieces. Explains how each object is dried, bisqued, glazed and glazed-fired. 11 minutes; $2.50 for one to three days; $30 purchase.

Clay Pottery

The process of creating pottery, from the digging of the clay to the finished product, is shown. Produced in cooperation with the Universal School of Handicrafts, New York. 10 minutes; $2.50 a day; $40 purchase.

International Film Bureau, Inc.

Clay Pottery

CRAFTS OF FIRE

This film depicts the part fire plays in the making of enamels, glassware, porcelain, pottery, and dinnerware. 10 minutes; rental $3; $35 purchase.

China Clay

Many phases of the industry are shown—how china clay is obtained from pits in Cornwall, how it is processed and finally becomes Great Britain's third largest export of raw material. 11 minutes; rental $1.50; $32.50 purchase.

Pottery on the Gold Coast

A government training center set up at Alajo to teach Africans methods developed by potters in other countries is portrayed. You see the complete technique of pottery making from the raw clay to the finished article. 9 minutes; $2 a day; $30 purchase.

Pueblo Arts

In this film are many fine "shots" of Maria of San Ildefonso, the well-known Indian potter. 11 minutes; in color; rental or loan; $100 purchase.

Modern Talking Picture, Inc.

Mexican Potters

Pottery making is depicted as part of the art of living in Mexico. The audience learns how the native Indian, the Spanish-Colonial, and the Modern International cultures influence the Mexican arts and crafts. 11 minutes; color; no rental; $90 purchase, including reel, can, shipping.

Paul Hoeffer Productions

LET'S PLAY WITH CLAY: ANIMALS

Only the hands are used to make such simple forms as a bird, pig, rabbit, fish, cat, and snowman. For use in elementary school art education. 11 minutes; rental; $50 purchase.

Let's Play with Clay: Animals

Youth America Films, Inc.

LET'S PLAY WITH CLAY: BOWLS

The film begins with rolling a piece of clay between the hands to make a ball, then shows how to form this into a variety of useful shapes—a teacup, saucer, cream pitcher, sugar bowl, and several decorative bowls. For elementary school art education. 11 minutes; rental; $50 purchase.

Basilis Productions

LET'S PLAY WITH CLAY: PIGS

This film shows five different ways to make pigs. It is good in elementary school art classes where clay is used. 11 minutes; rental; $50 purchase.

Paul Hoeffer Productions

THE ART OF KERAMOS

Keramos himself, the venerable guiding spirit of the clay art, tells his story to two modern women. Their conversation is accompanied by reenactments of ancient pottery methods, close-ups of historic earthenware, scenes of modern factory manufacture. 22 minutes; in color; rent-free, except for transportation.

Paul Hoeffer Productions

The Art of Keramos

ALMANAC FILMS, INC.

This film describes each step in the making of pottery. 11 minutes; in color; $4 for one to three days; $50 purchase.

Audio-Visual Center, Indiana University, Bloomington, Ind.

Decoration

This and the following five films make up the "Ceramics in Clay" series released by Indiana University. Each is under the direction of Karl Martz, well-known Director of Ceramic Arts at Indiana, and he himself gives the demonstrations. In "Decoration" is demonstrated the use of three basic materials for applying decoration on a clay surface—clay, glaze, and slip. Mr. Martz explains the mishima, sgraffito, and wax-resist methods. Summary includes representative pieces done by using these materials. 10 minutes; in color; $3 for five days; $100 purchase.

Glaze Application

Presents four methods—dipping, pouring, brushing, and spraying—and points out the advantages of each. Demonstrations include special techniques, proper preparation of a piece of clay for glazing, and precise finishing before firing, with stress on good craftsmanship. 10 minutes; in color; $3 for five days; $100 purchase.

Mold Making

The latest release in the series. Mr. Martz demonstrates how a piece is made from the mold by the slip casting, draping, and pressing methods. 10 minutes; in color; $3 for five days; $100 purchase.

Simple Slab Methods

Mr. Martz takes the viewer through the steps of forming a clay slab from several pieces of clay. Correct use of basic tools is emphasized. 10 minutes; in color; $3 for five days; $100 purchase.

Stacking and Firing

Shows the correct stacking of both green and glazed pottery in a small kiln and each step of the firing process. Spectator is shown the use of stilts and plate pins to support the pieces, placement of the ware in the kiln, the use of pyrometric cones, and the necessity for firing and cooling pieces carefully. 10 minutes; in color; $3 for five days; $100 purchase.

Throwing

Illustrates the forming of pieces on the wheel, removing from the wheel, trimming the base, forming a foot ring, and using special throwing techniques in shaping a plate and pitcher. 10 minutes; in color; $3 for five days; $100 purchase.

Bailey Films, Inc.

5609 De Longpre Ave., Hollywood 28, Calif.

The ABC of Pottery Making

A demonstration of the coil method of hand forming. Steps shown are wedging, making the base, rolling the coils, building the body, finishing and firing. 9 minutes; $2.50, one to three days; $30 purchase.

Elia Kaz, 808 Sir Francis Drake Blvd., Kentfield, Calif.

Make a Planter Plaque

Miss Florence Ludins, teacher of fine arts, New York secondary schools, shows the complete process, from making the form, throwing the clay, to the casting of the mold. Slanted toward junior and senior high schools. 2 reels; silent; $4 a day; $50 purchase.

Encyclopaedia Britannica Films, Inc.

1150 Wilmette Ave., Wilmette, Ill.

Clay in Action

How to prepare a piece of clay for glazing, and discussion of the necessity for firing and cooling. 11 minutes; for five days; $100 purchase.

Franco-American Audio-Visual Distribution Center

972 Fifth Ave., New York 21, N. Y.

Les Arts de Feu

The making of pottery, enamels, and glass. Text of narration supplied. French. 10 minutes; $3 a day; not for sale.

Un grand potier

Auguste Delahercche, French potter, designs and makes ornamental pottery. French. 20 minutes; $3 a day; $60 purchase.

FILM CENTER, INC.

64 W. Randolph St., Chicago 1, Ill.

Clay Pottery

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Keramos himself, the venerable guiding spirit of the clay art, tells his story to two modern women. Their conversation is accompanied by reenactments of ancient pottery methods, close-ups of historic earthenware, scenes of modern factory manufacture. 22 minutes; in color; rent-free, except for transportation.

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CERAMIC PORTRAITURE invariably involves working with rather large masses of clay. This introduces technical problems which were not encountered while working with the slabs and the coils discussed in previous articles (see October, November, December). Large sections of clay are difficult to dry without cracking. Even if successfully dried, firing must then be reckoned with.

Difficulties in drying and firing can be minimized if solid masses of clay are avoided. In portraiture this can be accomplished in several ways. The original model need not be dried and fired. It can be kept moist and used to prepare a plaster mold and then be discarded. Or the original model can be made of solid clay which is hollowed out before drying and firing. The initial form can be built from coils in much the same method as you would coil-build a piece of pottery. Slab building can also produce a hollow model.

Another method, one which we shall examine more closely here, is to build up the piece on an armature. Let's watch the sculptor, Albino Cavallito, as he makes a portrait of a boy.

The armature (see photo series on following pages) consists of a wooden post, fastened to a firm base. Wet newspaper is wrapped around the post to form a ball shape somewhat like a coconut. The paper extends far down on the post. Every portion of the post must be covered with paper so that the head will lift off easily.

When the wet paper core is finished, the sculptor covers it completely with clay. The work is high up on the post; the neck ends several inches above the base, and the paper core projects below it. An elongated, ball-shaped head and a neck are roughly outlined. This is the basic form for starting the portrait. (To help the beginner gain some idea of the steps used to construct the planes of a head, Sculptor Cavallito designed the plaster models shown on the left.)

Starting with the rough form on the armature, the sculptor makes a basic head shape. Then the major planes begin to appear. Depressions are made for the eye sockets; the plane of the nose begins to take shape. The front and the sides of the larger masses of the head are shaped. The lines of separation between front and side planes on the forehead, cheek, and chin are indicated.

UP TO this point the sculptor has been constructing a basic head. Now, he studies his model and adds pieces of clay to the basic form to build up a shape with the character and pro-

FOURTH IN A SERIES, this article is from Mr. Kenny's new book, "Ceramic Sculpture," published by Greenberg: Publisher, N.Y.
portions of the subject. The sculptor moves his modeling stand around the model, as he works, so that he can view his subject from all positions. Balls of clay are added to form the eyes, and lips are roughly blocked out. The nose begins to assume more definite shape. Clay is added to form ears and to indicate the masses of hair.

As he works, the sculptor shifts his light so that planes are lighted from different angles. This helps him to see forms more clearly. The thickness of the eyelids is increased in order to deepen the shadows beneath them giving the illusion of color to the eyes. The surface texture of the skin has been obtained by building up the form, adding pieces of clay and pressing them into place with the end of a wooden tool. There has been no smoothing of the surface. The finish is the result of direct pressure. A few lines serve to give an indication of hair.

When the clay is leather hard, the head is lifted off the armature.

Since an armature was used, the head, of course, is not solid. The walls, however, appear to be still too thick for safe drying and firing; therefore, an operation is performed.

A section at the top of the head is cut and lifted out. During this step the head rests on a cushion made of soft dry cloths. Using a long knife with its end bent into a hook shape, the sculptor scoops out the inside in those places where the wall is too thick.

When the walls are cut down to the desired thickness, the opening is once again sealed. The piece that was removed (the edges roughened and moistened with water to help assure a satisfactory weld) is put back in place, and a wooden tool is used to weld it firmly into position. A little modeling will remove all traces of the patch.

Finally, the base is prepared for mounting on a wooden block. The base is made flat with a hole passing through it so that it can be bolted to the block.

This piece of sculpture required several days for completion. The sculptor constantly studied the model and his work from all angles, sometimes crouching near the floor to look at them from below; at other times standing on a chair to view them from above. He made use of a mirror to see his work reversed for this will often make faulty proportions more apparent. He used a movable light so that he could light his model and the work from all sides throwing the planes into

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sharp relief as he worked on them; to check on his proportions he made frequent use of a pair of calipers.

Of course, Sculptor Cavallito is well fortified with knowledge of anatomy; however, he does not let anatomy get in his way.

A portrait is not merely something that is anatomically correct or just a perfect replica of the model. It must contain something of the subject's personality. It must show the kind of person he is. To capture this you must look at your sitter not only as a shape to be copied but as a human being. You must know him and have a bond of sympathy with him, understand his emotions, his aspirations, his hopes.

Capture the spirit of your sitter in clay, and your portrait will be more than a likeness. It will be a work of art.
WE ARRIVED in Central City, Colorado, in 1951, knowing only that it was a mining town, famous in the early gold mining days, once the center of the Colorado Territory; and that for a month each summer outstanding artists performed opera in the old Opera House on Eureka Street. We had been looking for a place off the beaten track where we could do some writing and where Claire (Mrs. Swartwood) could continue ceramics, an interest stimulated by a year on the southern coast of France with contacts at Vallauris, a town of many potters including Picasso, and at Boit where Provencale ware is produced.

We did not dream, then, that eventually our modest pottery studio would dominate our days and that some five thousand natural ore glaze tests would be dutifully recorded in our journal.

But the course of our lives in Central City is not altogether surprising for in moving to Colorado we had come into one of the most highly mineralized areas in the world. Gold, silver, lead, zinc, and an infinite variety of rarer, less known metals such as tungsten and thorium, are interwoven through deposits of quartz, feldspar, various silicas, magnesia, calcia, mica, and straight old "country" rock known in this area by the realistic miner's term "dig-more." Around Central City, in particular, are large deposits of granite, porphyry, bostonite, hornblende, biotite, and other rock, nearly all of them carrying mineral values with gold,
silver, lead, and zinc found in such large quantities that the immediate area is called “The Richest Square Mile on Earth.”

From these local ores we now have some twenty-five perfected, natural ore glazes, all of which stand up under the acids of normal kitchen use. Their character ranges from exotic crystalline and aventurine through celadons and creamy matts. The disappointments, the tedious hours of digging, crushing, and pulverizing the materials by hand—these have gone without trace. What remains is the excitement of discovery, the glowing color in the newly opened kiln, and a new humility toward both nature and the ancient craft of potting.

T O REMEMBER how an idea starts is sometimes difficult. Unquestionably our idea had some relation to long hours of discussion with Ed and Jane Oshier, both excellent potters, in Denver. They had, from time to time, made experiments with some of the local ores, substituting them for coloring oxides, but without perfect results. Though their time was limited, they were consulting parties on all that followed these first discussions.

We had read extensively about early glazes of the Far East, and it was not a long step to decide that some of the charm of these early glazes came from impurities in the natural deposits of oxides with which the potters worked. Another provocative thing was the curious contradiction of the use of Cornwall stone and Carolina stone in this modern, most scientific age. Why was it better to use a naturally complex body such as Cornwall stone instead of the pure oxides which were readily available? On the other hand, why was it economically good sense to take all impurities out of an oxide for ceramic use, only to reintroduce some of these impurities, then add an impure mineral like rutile for variation? These were intriguing questions and, to people as unversed in chemistry and physics as we, they were confusing questions. The minutely exact formulas of commercial glazes were terrifying when we thought of using impure ore where exact quantities of elements were not only unknown, but prohibitively costly to discover through exhaustive analyses and assays.

We summoned all courage and started out to conquer our local materials on a scientific and exact basis. Long hours of reading about the geology of the area—weighty tomes on mineralogy, even an attempt at crystallography which ended in confusion—filled our days and nights.

The only thread of reason running through those first months was the growing realization that all the materials which were part of the local ores and rocks had a defined purpose in ceramics. Silica, soda, and potash feldspars; even sanadine feldspar with its high alumina content; various fluxes such as calcium, magnesium, zinc and lead—all these ran consistently through the mineral deposits that our local mines made available. Yet, in every case, their proportions were completely unknown, and wide variation made it impossible to translate any of the local ores into existing formulas without costly analyses.

We had intended to build our own kiln, and had developed plans for a Globar of majestic proportions (3½-inch cube interior), but too many things were happening and we were impatient. We therefore bought a high-fire, 17-inch, top-loader kiln, and have never regretted the decision—except for the day Claire threw a beautiful 16-inch plate. The Globar still waits to be assembled and will some day be built so that we can go into the higher cones. Because of the kiln, the glazes we have thus far developed lie in two cone areas, 04 and 5. They fire satisfactorily at a wide range, but our tests were primarily in those areas.

THE OSHIERS, Ed and Mary Jane, who encouraged and aided the Swartwoods, check a few of the test tiles against the journal notes.

We fired the first kiln April 2, 1952. We had named each of our materials according to what we thought it might be, or where there was great question, we applied the first name that came to mind. The recorded formulas are weird and wonderful, a curious mixture of personal names and scientific guesses. The following happens to be Formula Number 1 in our journal: 2 parts Black Gup, 1 part Knoll Tungsten, 1.5 parts Ziege local Kaolin (it had a salve-like feel), 0.75 parts Timberline Fluoride.

In that first kiln we had eleven tests brushed on bisqued tiles; we fired to cone 5. The results? Sand and glue in slightly varied density and coarseness. The second kiln had fifty-four tests. More glue and more sand, with no glimmer of hope.

On the fourth firing, test tile Number 1, the following notation: “Believe it or not, a glaze . . . and not only a glaze but an aventurine . . . fine crystals, uneven surface, runny, but a beauty!” That tile sits in front of us now, and it is rather difficult to understand our enthusiasm. The surface is spotty and uneven; the aventurine is pooled and quite dull; the glaze ran like water over the edges of the tile. It really wasn’t a beauty—but it was a beginning.

We mixed original tests in small lots, seldom more

ging, crushing, and pulverizing the materials by hand, have gone without a trace. What remains is the excitement of discovery and a new humility toward both nature and the ancient craft of potting. From the local ores we now have some twenty-five perfected natural...
than 12 grams at a time but enough to cover one test tile. All glazes were ground with mortar and pestle and applied with a brush to about one-sixteenth-inch thickness. As the number of tests reached the four hundred mark, several lines of development were apparent. Each time there was a semblance of a glaze, the ingredients were altered minutely. Often from one suggested glaze, three or more glazes, widely varied in color and in texture, were developed.

The smallest change in our formulas leads to major changes in results. We have one glaze which we now call Evergreen Crystalline. It is a very highly figured gloss surface with a light gray-green background. Against this base appear golden metal crystals formed like miniature chrysanthemums and, when heavily applied and fired to a full cone 5, there is a cerulean blue drift in the base. It is exotic and infinitely varied in pattern; yet it runs absolutely true, firing after firing. The amazing thing is that by altering one ingredient by 10 per cent, the glaze becomes a nearly turquoise color, the figure disappears entirely, and the glaze is almost stony in appearance with good depth and solid color. The two glazes seem to bear no resemblance to each other yet they have the same ingredients, in the same amounts, except for the 10 per cent variation in one material. And this is typical of natural ore glazes.

The same startling variation is true in other materials. We use tungsten-thorium ore which comes from a mine north of us. With slight modifications in mixture, the glaze varies from a deep, reddish brown with metallic grain, rich and lustrous, to a mat gray of excellent character. When we use zinc with this, we get the solid metallic crystalline structure we might expect but it has no relation at all to the other tungsten-thorium glazes.

These are among the many things we cannot explain. They happen, and we observe, but we can find no basis in any ceramic reference. For example, the local quartz with which we had trouble in commercial glazes now gives a wonderfully "fat" quality. A white which we developed, using commercial silica with local materials, had a tendency to crawl when applied heavily yet appeared thin. We ground our local quartz, which is no small task, and used it in place of the commercial silica. The glaze now has a much fatter quality, covers better, does not crawl, is richer to both sight and touch, and has an extended firing range from cone 05 to 7.

We had been fearful of sulphur; every text and all our friends had assured us it would ruin everything. Chalcopyrite is roughly 35 per cent sulphur as is iron pyrite. We have them running strong through a copper-iron-gold-thorium ore which also carries feldspar and quartz. Though we use it continually, a glaze surface has yet to be hurt by it. And we don't know why; although we have wondered about it on many occasions.

Fluorides are considered treacherous materials with resultant fluorine supposed to bubble wildly and cause grief. We have used up to 50 per cent of our fluoride ore in a mixture which gives us a milky white, semi-transparent, glossy glaze, very pleasing over colored clays. This opacity we cannot account for, but the surface is glossy and unmarred and other glazes fired in the same kiln are not injured.

One of the most baffling ores we use seems to have an infinite color range in it. Combining it with local kaolin and zinc-lead ores, we have developed a range of color running from smoky blue-gray through khaki to iron reds and yellows. When used with calcium-lead combinations and in heavy quantity, it throws a rich creamy black. Altering the black formula slightly, we arrive at a rich, deep aubergine. Combining it with feldspar-quartz-mica rock which we call our local "petuntse," and introducing some soda feldspar, we achieve aventurines which are like bloodstone. (The slag from a copper smelter which was once operated in the county also gives aventurine of nearly rainbow color, tracing back to tile Number 1 of the fourth firing. In fact, there are some two hundred fifty tiles in the development series started by that tile.)

As the individual glazes developed, we introduced, from time to time, small percentages of commercial material such as borax, colemanite, tin, and others where they seemed indicated. The major constituents of the glazes, however, have always been local materials which we ground ourselves.

COOKIE JAR made by Ed Oshier is glazed with "Blue Stone" and decorated with "Miner's Sand." The glaze is a stony mat, looking like blue granite. The "Miner's Sand," magnetic iron ore, contains unredeemed gold, giving it a quality unlike ordinary iron oxide.
IF WE were starting over again we would have a few keys to help us arrive more quickly at workable formulas. The first key would be familiarity with the most common rocks and ores including quartz, feldspar, iron, lead, and zinc. Such knowledge does not require an expert because you can soon come to know the common forms; and that helps greatly by limiting somewhat the never-ending field of experiment. A rock containing much quartz obviously gives us a slight but nonetheless noticeable variation. In developing our glazes we found two firing ranges necessary for a glaze was not present in many of the ores; yet in another area the reverse might be true with too much alumina present thus throwing the glazes toward unattractive mats.

We found ourselves at first working with too-small deposits of materials. We have one luscious bowl with a pearl-like white glaze which is, unfortunately, unique—we ran out of the ore just as the experiments reached a successful conclusion. We have, for example, found feldspar with a large proportion of alumina in it most helpful to us, because the alumina necessary for a glaze was not present in many of the ores; yet in another area the reverse might be true with too much alumina present thus throwing the glazes toward unattractive mats. In developing our glazes we found two firing ranges advantageous. Often an experiment fired at cone 04 was not even provocative, but the same formula fired to cone 5 produced a result which led us to experiment further and produce a more than adequate cone 04 glaze.

We discovered that natural ore glazes must be applied quite thickly (one-sixteenth-inch being average) to give best results. And we do not spray our glazes, preferring the traditional fluxing action through tempered by the form in which found. You must become something of a "rockhound" but that has its own rewards.

People fortunate enough to live in a highly mineralized area may find that government surveys are available which give an idea of the nature of the rocks they will have to work with. You may find, near you, limestone and other industrial minerals (although untried in pottery) for nearly every section has such deposits.

It is virtually impossible, however, for us to comment on ores other than those with which we have worked. We have, for example, found feldspar with a large proportion of alumina in it most helpful to us, because the alumina necessary for a glaze was not present in many of the ores; yet in another area the reverse might be true with too much alumina present thus throwing the glazes toward unattractive mats.

Grinding of ore must be done in quantities large enough to establish an average for the ore. This varies, naturally, with the complexity of the material. We must grind a highly complex iron-gold-copper feldspathic ore in nothing less than hundred-pound lots. A smaller quantity gives us a slight but nonetheless noticeable variation.

An important point that should be mentioned is the matter of records. It is impossible to be too exacting with them. Going back over many tests from the early days we are aware of dreadful holes in the information we recorded. Exact firing temperatures (we now draw pictures of our fired cones), thickness of application, condition of bisque ware used, amount of water used in mixing, fineness of grind of the ore used—all these were matters of great importance when it came to perfecting any sequence of tests and judging the direction in which further tests should go.

OUR work has been most rewarding, and has led us to conclusions which we can only defend from experience. First is our sincere belief that the mineral combinations nature has bonded together in an ore deposit have behavior patterns under heat different from similar combinations of commercially purified materials. Our glazes at cone 04 are like stoneware; they are hard and impervious to acids. And they have a more natural, more earthy, more pleasing character than conventional glazes made from purified materials.

The field of exploration and experimentation in natural ore glazes has only been scratched. It can be pursued wherever there are mineral-bearing rocks; and there are ceramic materials in your own backyard. The so-called impurities which exist in all ores add vitality and beauty to glazes as in the case of the early glazes of the Far East. Trial-and-error methods still have much to recommend them. There is no satisfaction like working with an unknown material and solving the problems that it offers. Pottery is still not an exact science after more than four thousand years of progress; and it may be that the best discoveries will yet be made by trying something, not because it has been proven, but because you think it might work.

H. M. Swartwood is a widely traveled author and educator. He and his wife, Claire, spent the last few years experimenting with the natural ores found around Central City, Colorado, in a successful effort to use them in glazes. They recently moved to Anacortes, Washington, where they intend to continue their experimental work, using natural ores from the neighboring San Juan area. About the Oshiers, the author advises: "They have taken over the glazes which were developed, and will offer them commercially through Natural Ore Glaze Co., in Central City. This arose through the number of requests we received during the past year, and a very firm belief on our part that natural ore glazes have an important contribution to make to ceramics. We will continue to exchange ideas, experiments and results with the Oshiers."
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Q. Can a piece which has developed blisters in the glaze firing be mended in any way?
A. Refiring a blistered piece does generally help, if fired slightly higher than the original firing. The blisters should be broken and smoothed off as well as possible, and a light spray of the same glaze applied before refiring.

Q. What kind of clay can be used for ovenware?
A. Low fire red clays and white bodies seem to be best for ovenware. Most red clays are rather coarse grained and sandy in nature; white bodies containing talc have a low thermal expansion. These properties enable the ware better to withstand repeated heating and cooling. Of considerable importance is a good glaze fit. Be sure your glaze is perfectly matched to the body and will not develop delayed crazing. It is advisable, also, to use a leadless glaze to avoid contamination of the food by the lead.

Q. What is the difference (if any) between Globar, Carborundum, and silicon carbide?
A. Globar and Carborundum are silicon carbide. They are trade names registered by the Carborundum Co., Niagara Falls, N. Y. “Globar” is used for the silicon carbide heating elements; “Carborundum” for the silicon carbide abrasive products.

Q. Is a two-hour firing schedule (to cone 02) for miniature pieces too fast? I fire in a small “test” kiln.
A. You did not indicate whether or not you were having difficulties, either with the ware or the kiln. If your firings are successful and the pieces do not show cracks, crazing, delayed crazing, or other defects, the fast schedule is perfectly all right. In other words, a fast firing schedule in itself is not detrimental.

If you are having difficulties, it is a fairly safe guess that your schedule is too fast and then you should make some attempt to slow it down.

Q. Are “self hardening” and “oven firing” clays really ceramic materials?
A. These products are not ceramic since they cannot be subjected to ceramic temperatures. They are made from mixtures of clay and chemical setters. The “self hardening” becomes hard when it dries; the “oven firing” becomes hard when it is baked to around 500 degrees F.

Ware made from these synthetics does not have the permanence and durability of fired ceramics.

Direct your inquiries to Questions Editor, “Ceramics Monthly,” 3494 N. High St., Columbus 14, Ohio. Please enclose a stamped reply envelope. Questions of general interest will appear in this column.
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FRIT STRANDS

by J. H. SALING

TRY DECORATING with strands of frit to achieve a type of spontaneous decoration not possible by other means. These “glass strings” of various colors, sizes, and shapes can offer the ceramist a wide variety of unique decoration. They are not commercially available but you can easily make them yourself.

If a metal rod or wire is inserted in molten glass and withdrawn, a string of glass will be pulled from the molten batch. (The glass behaves like “stiff” molasses.) As it is pulled, the strand cools almost instantly, enabling you to obtain a variety of thicknesses and shapes. The slower you pull the thicker the strand will be; a quick, long pull develops a very fine one. A straight pull produces a straight strand; and if you vibrate your hand as you pull, the strand will be curled and twisted.

The molten glass can come from any frit or dry glaze. Simply place a small amount in a suitable container and insert it in a small test kiln or enameling kiln. A larger kiln would serve, but do not attempt to use a top-loader. Since the container must be withdrawn while the kiln is at high temperature, a top-loader would prove dangerous.

The container for the molten glass can be a small pinch pot you have made, or a small refractory crucible available at most chemical supply houses. Since the container will be subjected to quick heating and cooling, it will probably crack before it has been used many times. If you make your own container, the addition of grog to the clay body will help the crucible adjust better to thermal shock.

The type of metal rod or wire used is of little importance: any piece of metal stout enough to pull the viscous glass up will work.

For decorating, best results are obtained by firing the strands over a fired glaze. If the temperature is raised merely to the softening point of the strands they will retain their shape and result in an attractive raised decoration.

Although the strands can be placed on an unfired glaze and once-fired, control is limited since you must mature the glaze. If the strands are fired to their melting temperatures, they will, of course, lose their shape, dissolving or diffusing into the glaze. Some diffusion cannot always be avoided. If you want the strands to retain a sharp, well-defined pattern, it would be best to fire them over a mat glaze. Mats are inherently viscous and will be less inclined to disturb the decoration.

Make a generous supply of strands, in different colors and shapes, at one “sitting” so that you will have a varied and plentiful stock for future use.

Mr. Saling is a ceramic technologist in the Ceramic Engineering Department at the Ohio State University.

1. STRANDS can easily be made. Place dry glaze or frit in a clay container and insert in cold enameling, or test, kiln. When contents have melted to a glass, quickly remove the hot container. 2. PULLING strands is done with any sturdy rod or wire. Merely insert rod in molten glass and pull. Work quickly. When glass cools and becomes too viscous, place it in hot kiln until remelted, then remove and repeat strand-pulling process. 3. VARIETY of strands await firing on surface of mat-glazed bowl.

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(third in a series)

Glazing Techniques

by THOMAS SELLERS

BRUSHING the glaze on a piece of pottery is the method most widely used by hobby potters who do not have spraying equipment. Many professional potters also apply glazes in this way when they want to retain a certain handcrafted quality in their work and feel that spraying will give too slick or mechanical a finish.

You will find that applying glaze with a brush is perhaps the most economical of the various methods. Less glaze is needed than for spraying, pouring, or dipping; and less is wasted when the glaze is brushed on.

Glaze that is to be brushed on should be of slightly thinner consistency than that used in spraying or pouring. It should be like thin cream.

A brush that is soft and flat works best; it should be wide enough to hold the glaze on with even strokes, one brush in still another direction. Lay the glaze on with quick, short, slightly overlapping the other but not always brush on easily. Their brushability will be improved by the addition of bentonite, gums, corn syrup, or some of the commercial additives. Most of the prepared commercial glazes have excellent brushability because the additives are already included.

Learning to glaze by brushing takes practice, as with any other method. Success, in this case, lies chiefly in learning to lay the glaze on with quick, even strokes.

DIPPING is still another way of glazing pottery. Like pouring (discussed in the December issue) dipping is a fast process, and you do not have the glaze waste that goes with spraying.

Glaze consistency is the important factor in dipping for it is the means of controlling the thickness of application. If porous bisque is to be dipped, the glaze should be thinned down to prevent too thick a coating on the piece. If harder bisque is dipped, the consistency should be thicker because the piece will not readily absorb the glaze.

A larger quantity of glaze is needed than for other methods because the...
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The Edward ORTON, Jr.
Ceramic Foundation
COLUMBUS, OHIO

A piece is to be almost entirely submerged. For the hobby potter or classroom, therefore, dipping is more suited to smaller objects.

The dipping itself is a quick process; you plunge the piece into the glaze bath, and then set it on two parallel sticks over a pan so excess glaze can drip off.

The piece should be finished in the usual way: clean the foot rim with a flexible scraper and damp sponge; bevel the glaze edge in case the glaze runs during firing. Areas where your fingers grasped the piece for dipping will have to be touched up. This should be done by brushing several coats of glaze on the affected area.

IN THIS series on "Glazing Techniques," we have considered spraying (September), pouring (December), and brushing and dipping. Each method has its own advantages: spraying is generally considered the best way to apply an all-over glaze to a piece of ware. The other three methods are faster and less wasteful of glaze. Pouring solves the problem of glazing the inside of a small-mouthed piece; brushing requires the least amount of glaze; and dipping is particularly suited for fast glazing of smaller pieces.

In conclusion, here is a summary of suggestions which ran through the series. If taken, they will help to assure the effects you want to see when your pieces come out of the kiln:
- Before glazing, wipe dust, grease, and finger marks from bisque ware with a damp sponge.
- If the pot has a small mouth, rinse the inside with water; allow it to dry before glazing.
- Stir the glaze well and screen it to eliminate lumps.
- If a piece is to be handled after glaze application (as in decorating), add gum solution or table syrup to glaze batch (keeps glaze from rubbing off in handling).
- The glaze consistency, generally, should be like thin cream; it should flow, not drip, from the fingers.
- Glaze that is too thin can be flocculated (thickened) by adding a few drops of Epsom salts.
- Generally, a mat glaze requires heavier and more careful application than a glossy one: mat is less fusible and will not correct itself easily.
- Stir glaze while using, or agitate while spraying, to keep heavy particles, such as silica, from settling to the bottom (this is unnecessary if a glaze suspender has been added).
- Kiln shelves and furniture should be coated with kiln wash to prevent glaze drippings from sticking.
- Run tests on test tiles to learn the habits of the glaze.

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suggestions
from our readers

Dollars for Your Thoughts
CM will pay from $1 to $5 for suggestions used in this column. Be sure to include photos and sketches if applicable. All items of interest to ceramists are carefully considered.

Leveling Kiln Stand
In your August issue you give a “Suggestion” on a movable kiln platform. We have been using this idea for several years; however, our platform can be leveled. By using floor flanges which are available from any hardware or plumbers’ supply store, the kiln can be leveled on any floor surface.

R. C. Paddock
Frankfurt, Ind.

Re-glazing Tip
If you have difficulty making glaze adhere to a previously glazed item, heat the object before applying the glaze and use a glaze of thicker consistency. Don’t heat the piece too suddenly or to too high a temperature. The piece need be no warmer than can be comfortably handled. Incidentally, the addition of corn syrup to the glaze will also prove helpful.

Ann Van Kleeck
Columbus, Ohio

Drilling Salt and Pepper Holes
If you have had difficulty making small holes in salt and pepper shakers, try this. Allow the piece to stand until it is leather hard, then drill the hole with a small drill bit. Place the drill bit between the thumb and forefinger. By spinning the bit between your fingers, it will quickly drill its way through the clay leaving a smooth round hole.

It is best to have two drill bits, each

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Ceramics dominate Florida Craft Show

Ceramics—pottery, sculpture and enamels—dominated the Third Annual State Craft Show at Winter Haven, Florida. The exhibition, which closed December 3, was sponsored by Florida Craftsmen, a state-wide organization.

Enamel was a well represented medium; and a sculpture section, included for the first time, proved popular. Jewelry, weaving, woodworking, and other crafts were also represented in the exhibition of more than one hundred fifty items. It was the organization's largest show.

Funds for awards and purchases were given by Mrs. A. G. Matthews, Tallahassee; Thos. C. Thompson Co., Highland Park, Ill.; Florida Federation of Art, and Florida Craftsmen. The show was juried by Mary Purser, Gainesville.

The sponsoring organization made nine purchases from the show for their Permanent Collection; these will be circulated among schools and similar centers in the state, to stimulate interest in crafts.

Florida Craftsmen, which has one hundred sixty-four members, is affiliated with the Florida Federation of Art and the American Craftsmen's Educational Council.

FLORIDA POTTERY prize winners of $25 each were, left to right: covered casserole by Mrs. Ben B. Reed, St. Petersburg, first prize; bowl by Ken J. Uyemura, Clearwater, second prize; covered jar by A. J. Spencer, St. Petersburg, third prize.

GREEN ENAMEL nut bowl won $25 first prize in enamels division for Fred W. Metzke, Jr., Tallahassee. H. J. Atwater, Gainesville, took second of $15 for enamel-on-silver pin at left; James S. Lanham, Gainesville, $12 third prize for pair of earrings.

CERAMICS predominated in exhibition of one hundred fifty pieces. Rugged shapes, earth tones, and frequent lack of decoration characterized pottery by Florida craftsmen.
Texas' Fourth

Ceramic pieces won the two top awards at the Fourth Texas State Ceramic and Textile Exhibition last November. The show, which was open to Texas craftsmen, was sponsored by the Craft Guild of San Antonio.

A wheel-thrown, stoneware jar brought the Onderdonk Purchase Award of $75 to Donna Marie Dickey of San Antonio; and the Estelle Gray Collection Award of $50 went to John Menger, also of San Antonio, for his free form, stoneware bowl. In addition to the general awards, eight prizes were given in the ceramics section of the show.

Members of the jury of selection and awards were F. Carlton Ball, potter, Southern Illinois University; Gene Byron De Fernandez, artist, Monterrey, Mexico; and Estella Henkle, weaver and textile designer, Dallas.

Various Texas organizations and business concerns donated twenty-three of the awards, which totalled $575.

The show included textiles, metal and leather work, enamels, and ceramic sculpture as well as pottery. A majority of the one hundred seventy objects selected for the exhibition were ceramics, with stoneware predominant. More than 50,000 persons visited the exhibition during the two-week period it was on display at the Witte Memorial Museum in San Antonio.

right
MAN WITH CHILD took $25 second prize in ceramic sculpture for Ansel Chapman, San Antonio.

below
INSTALLATION showed handsome display of all mediums, which included clay, fiber, metal, jewelry and leather.

COMPOTE, wheel-thrown stoneware, won $50 first prize in ceramics for Arthur Calder of San Antonio. The drapery and silver shown were also prize winners in the show.
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THE COMPLETE BOOK OF POTTERY MAKING.

By John B. Kenny.

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CERAMICS HANDBOOK.

By Richard Hyman.

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By Herbert H. Sanders.

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The famed Mr. Leach's book is the outcome of 25 years' work in the Far East and England. It deals with four types of pottery: Japanese raku, English slipware, stoneware, and Oriental porcelain. Considerable basic information is between these covers as well, illustrated, some in color. $6.00

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