Both Coasts Boast—

—a ceramic exhibit unequalled in the history of ceramics. No, neither will be an exhibit of museum pieces, but of the materials and equipment that go into their making. The Shrine Convention Hall in Los Angeles and Convention Hall in Asbury Park, N. J., are being turned over to scores of manufacturers and suppliers of ceramic materials and equipment.

At each show, they will have gathered together their latest innovations, as well as their standbys, to show you what’s new and useful in the world of ceramics.

These shows, perhaps, will seem mighty strange to you “old timers” who not too many years ago had to compound and build everything yourselves, and had to “scratch” for information. But things have changed. Today overwhelming demand by discriminating ceramists has prompted hundreds of ceramic manufacturers and suppliers to develop “packaged” materials and studio-size equipment of undisputable quality. And they all will be available for your scrutiny at each show.

Whether you are a teacher or student, professional potter or hobby craftsman, the exhibits will be of momentous interest and importance to you. You'll be able to air your gripes, or voice your praises of the products—directly to the manufacturers. You can appraise your own (antiquated?) equipment, and you can learn what's new and what's coming up so that you can start budgeting now.

You can't afford to miss these shows. Be sure to attend one or both.

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March 20-29

East Coast
May 13-17
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FEBRUARY 1953
Letters

Readers in the Foreground

Gentlemen:
We received our first copy this morning and we are very much pleased with it and look forward to the next issue. We were very much surprised when we flipped it open to the center and stared ourselves in the face. We are the two who are in the foreground of the picture taken at the Amaco workshop last summer... 

Teeny and George Radliff
Teeger Ceramic Studio
Sherard, Miss.

The 'Baby's' TV Debut

Gentlemen:
WE LOVE IT AND YOU FOR MAKING THE BABY MORE THAN A DREAM. WILL SHOW IT ON MY TV PROGRAM SATURDAY. WISH YOU COULD SEE THE BROADCAST.

KAY HARRISON
Norwest Ceramics
Detroit, Mich.

Applause for Black

Gentlemen:
Have read the first issue of your new magazine and thoroughly enjoyed it. It is just what we have been looking for.

In the article "Opening the Door to Copper-Red Glazes," by Harding Black, a Kiangnan Feldspar is used in the glaze. Could you give me the formula for this feldspar?

Mrs. H. R. Corbsorg
Denver, Colo.

Intrigued with Paddle

Gentlemen:
The new magazine looks most interesting. Our ceramics class teacher attended the Herron Workshop which is written up in the first issue. I am very much intrigued by the possibilities of work with the paddle [shown in Mr. Wood's article].

Mary A. Miller
YWCA
South Bend, Ind.

An "A" for "Q & A"

Gentlemen:
Is my face red! I [started to write a letter suggesting you include a question-and-answer column. Though I thought I had digested the issue well, I found before writing a word that [there is one].

Not incidentally, I would like to pass a compliment, not only on format and content but to all who instigated its publication. I feel that your publication is going to add much to my knowledge and enjoyment. I practically live ceramics.

G. Laurence Jelf
Lincoln Park, Mich.

Mrs. Robineau Fan

Gentlemen:
I have received the first number of your magazine and wish you good luck.

In reading your Robineau article it reminds me of 26 years ago when I had an exhibition in the Chicago Art Institute, and received a first prize Gold Medal. Chicago was the center for porcelain decorating, but the starter was Bishop in Detroit, Aulich and Campana in Chicago. Mrs. Robineau was interested in furnishing the pieces while our group followed the decorative part. Ladies did come from every state in the country, painted a few pieces and went home to teach others.

We knew Mrs. Robineau well.

D. M. Campana
D. M. Campana Art Co.
Chicago, Ill.

Better Never Than Late

Gentlemen:
In addition to wishing you every success in your new venture, I would also like to make a suggestion regarding your [Itinerary column].

Get the data re shows and other events in your magazine early enough that the potters can get their entries packed, or blanks sent for, or even something made for some certain show... .

Duane Matterson
Huckleberry Hill Pottery
Monterey, Calif.

Gentlemen:

... include in future magazines the dates of coming shows and exhibitions in time for an artist to enter some of his pieces.

Virgina K. Barnes
Cleveland, Ohio

We'd love to. Let's hope the organization will get their news releases to us well in advance (three to four months before show time).

Letters to the Editor:

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WRITE TO
Thomas C. Thompson Co.
1539 Deerfield Rd., Dept. C.M.
Highland Park, Ill.
Congratulations

Gentlemen:

Congratulations for the "commencement" issue. You have started out with a splendid job. A member of my department [Art Education] showed me his copy of the first issue today. I am quite excited about the publication as a whole. It definitely is a "must" for every art department and every teacher of arts and crafts.

Derwin W. Edwards
Miami University
Oxford, Ohio

Gentlemen:

Have twice read cover to cover! Something we have long needed. Hope you will keep standards up to high level in this original issue. (I am only a hobbyist.)

Batavia, N. Y.

Gentlemen:

May I extend to you and your staff my very heartiest and sincere congratulations on your first issue. It far exceeds my greatest expectations. I wish you every good for the coming year. We need such a magazine very much.

I was pleased to find the Society of Connecticut Craftsmen under your list of Ceramic Organizations. I have been a member and former treasurer of this organization. Of a membership near 400, there are about 75 ceramists . . .

West Hartford, Conn.

Gentlemen:

Your new CERAMICS MONTHLY is indeed a pleasure to read. Congratulations on the high quality, the excellent size, and the very fine articles. After reading the first issue, I am sure that it is going to fill the empty gap that has been so evident for both the hobbyist and the professional in the ceramic field.

I am looking forward to the future issues, and shall especially look to an occasional article on . . . china painting . . .

Mrs. Norma E. Newman
New London, Conn.

Gentlemen:

Thanks very much for a wonderful magazine. I have written to many advertisers and mentioned my gratitude for their ad in a splendid magazine, CERAMICS MONTHLY.

Norma E. Newman Studio
Olean, N. Y.

Gentlemen:

If I received the first copy of CERAMICS MONTHLY, and was delighted with it. You have brought life, color, and modernity into the field of ceramics. Your magazine should be very successful. It is just "what the doctor ordered" for the potters of the U.S.A . . . who now have a voice and a forum.

East Gloucester, Mass.

Henry Bollman

Our sincere thanks to all. Sorry space limitations permit us to publish only a few of the many comments received.

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A BOOKLET about Orton Standard Pyrometric Cones, published by the Edward Orton Jr. Ceramic Foundation, Columbus, Ohio, may be obtained free through your ceramic supply dealer.

Included in the booklet are a brief history of the development of the pyrometric cone, a description of the device, an explanation of the principle behind its use, how to set them, and many other facts about cones.

"POTTERY ARTS," catalog put out by the Pemco Corp., Baltimore 18, Md., contains a special section entitled "Pottery Techniques." Well illustrated, it covers all the basic techniques of pottery making, and will make a handy reference and guide for the teacher or beginning student.

To obtain the catalog, write Miss Strickland, Pottery Arts, Pemco Corp., Baltimore 18, Md., enclosing 25 cents. Please mention CERAMICS MONTHLY.

TEMPERATURE EQUIVALENTS of cones, in both Fahrenheit and Centigrade, can be determined quickly by the use of a handy wall chart being offered by the L & L Kiln Co., Chester 16, Pa.

The chart is four by nine inches in size, has large, easy-to-read type on smear-proof heavyweight cardboard. Temperature range is from cone 022 to cone 30. It's free; simply write to L & L, and mention CERAMICS MONTHLY.


"Clay in Action" is on sculpturing a portrait in clay. "Color in Clay" shows an exposition of methods used in an English pottery factory. It demonstrates the relationships between good designs, art principles, and modern technology. The third film depicts each step of four different methods of pottery making.

"Color Keying in Art and Living," a non-ceramic film but applicable to the field, shows the dramatic relationships of color as applied to everyday subjects of living.

For rental information write the Britannica firm direct, and mention CERAMICS MONTHLY.

FILMSTRIPS AND SLIDES on the history of art are available from the Herbert E. Budek Co., Inc., 55 Popular Ave., Hackensack, N. J. Among the series titles are "The Culture of the American Southwest," "People and Places of Latin America," and "The History of Western Art." A brochure giving complete details on these and other series is offered free by the Budek firm. In writing them, please mention CERAMICS MONTHLY.

DESIGN BOOKS by Jane Snead, being marketed by Jane Snead, P.O. Box 72, Media, Pa., present scenes of the Gay Nineties, Pennsylvania Dutch, Chinese, and the American West. The books measure 9 1/2 by 11 inches, are 48 pages long, and cost $1.50 each. Designed to save the artist many hours of research, they may serve as lesson projects, or home craft ideas.

"ENAMELING on Copper and Other Metals" is the title of an illustrated 39-page booklet offered free by the Thomas C. Thompson Co., Dept. CM, 1539 Deerfield Rd., Highland Park, Ill.

It takes the novice through the fundamentals of enameling, including preparation of enamels, metals used, tools and equipment, preparation of metal for enameling, its application, creating designs, the various types of enameling techniques, firing methods, and finishing. A handy glossary and a bibliography are appended.

For your copy, write the Thompson company, mentioning CERAMICS MONTHLY.
itinerary

address notices of ceramic group meetings and shows to itinerary
Editor, Ceramics Monthly, 3494 N. High St., Columbus, Ohio

WHERE TO SHOW

DISTRICT OF COLUMBIA
Washington
March 5-29
Members and non-resident members within 25-mile radius of Washington may compete in the Smithsonian Institute's 61st Annual Exhibition. Mediums include sculpture not previously exhibited in Washington. There are cash awards and medals, and work is due February 28. Contact Mary Hovanian, 5429 31st St., N.W., for entry blanks.

MARYLAND
Hagerstown
April 1-20
Cumberland Valley Artists 21st Annual will take place at the Washington County Museum of Fine Arts. For present and former residents of Cumberland Valley area. All art mediums will be represented. No fee; jury and awards. Send entry cards by March 17; works by March 24.

NEW YORK
New York
April 2-26
The National Academy of Design, 1083 Fifth Ave., will hold the 128th Annual Exhibition for all artists. Mediums include sculpture. A jury will award prizes. Work due March 19.

New York
March 8-22
The National Arts Club of the American Artists Professional League is holding the Grand National Member Art Competition; for members only. Mediums include sculpture. There is a $4 handling charge for each entry. Address inquiries to your chapter president or Chairman, The Grand National, National Arts Club Building, 15 Granery Park.

New York
April 12-May 3
Riverside Museum will present the Sixth Annual of nickel-and-brick Artists. Mediums include sculpture. Entry fee is $5, and prizes are offered. Entry cards due April 6; work, April 14. For further details contact May Heil- man, 1915 Morris Ave., Bronx 53.

 PENNSYLVANIA
Indiana
April 17-May 26
The Annual Art Exhibition of the Indiana State Teachers College will be put on by the Student Cooperative Association. Sculpture will be accepted, and the show is for all artists. The fee is $3.50; purchase and cash prizes will be given. Entry and work due by March 15. Address Dr. Orval King, Art Department Director at the College.

TEXAS
Beaumont
May 3-31
Beaumont Art Museum, 1035 Calder Ave., will present its Second Annual show, and will accept sculpture. Open to Texas, Louisiana, and Mississippi artists. Cost is 5 for two membership entries, $3 each for non-members. Purchase and cash prizes. Applications due April 1; work, April 7.

WHERE TO GO

CALIFORNIA
Los Angeles
March 20-29
The Fifth Annual California Hobby Show is to be held at the Shrine Convention Hall, 700 W. 32nd St. For show details write Fred de Liden, 417 N. Figueroa, Los Angeles 12.

FLORIDA
Clearwater
March 25-April 19
Exhibition of the 17th Ceramic National circuit show. Florida Gulf Coast Art Center.

ILLINOIS
Chicago
February 10
Monthly meeting of the Midwest Potters & Sculptors. For further information contact Carolyn Esselin, 1501 E. 60th St., Chicago 37.

(Make to Page 32)

OUR COVER this month amplifies the theme of Dorothy Perkins' article (Page 14): that nature suggests free forms. You won't find leaves, stones, or flower petals—in such—in the asymmetric pot. They're there in essence only.

FOR THE
IN CERAMIC COLORS

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A Potter's Markets

by T. A. RANDALL

the potter's ware, not easily arrived at, has to sell. here are some marketing tips and comments

It is curious that the problems of the studio potter have been diagnosed as largely of the "how-to-make-it" variety. In most cases these are the least of the potter's worries. The most acute problems do not present themselves until after his pots are made and he has to decide what to do with them. Perhaps it will be helpful to look at the retail market and the ways in which it is apt to influence the studio potter's methods and purposes. Of course, to do this it is necessary to give the studio potter the benefit of the doubt and assume he has enormous personal energy, unlimited creativity, and superb skill; and that he has technical knowledge, and is in full command of his medium.

Then, all that remains to worry about is how to sell the product. And that involves facing up to the realities of the retail market and the better (at least, less painful) wholesaling methods.

A potter's markets may be said to possess the following "virtues": Sluggishness, Diffusion, Instability, and Paradox.

Sluggishness. Since the prices of individually produced pots are unavoidably high, the one-man potter sooner or later finds his ware "going" best in small retail outlets or galleries specializing in custom furniture, accessories, and interior decorating.

For one reason or another, they are not so interested in volume or rapid turnover selling as they are in the character of the goods they handle. What their clientele seems to be looking for is something expensive, something "different." More likely, though, what they want is simply some token or sign of the human touch in design.

This means, perhaps, that the individual producer is well advised to call up and develop some quality not to be found in industrial design and to keep this quality clearly differentiated. With patient persistence he can even turn sin into virtue and quite naturally develop the design qualities true to his own particular forming processes which by definition would be different from those of industry.

Yet, since those retail outlets seem by nature uninterested in volume selling, the artist-potter cannot hope to find any one shop to purchase even his comparatively minute output. (Average sale, per potter, per shop, per week, is from one to one and a half pots.)

How many shops, then, are necessary? Perhaps, something between 20 to 40 outlets per potter might do. Considering the surprising number of artist-potters practicing these days, are there enough shops to go around? Very probably, if you can find them.

Diffusion. Fortunately and unfortunately, congenial outlets are spread all over the map. Fortunately, because fluctuation in seasonal buying tends to cancel out geographically; that is, Florida buys when New York doesn't. The unfortunate element is that distance and diffusion place a super-

(Please turn to Page 30)
Leach, Hamada, & Yanagi, internationally known craftsmen, discuss American pottery, and an American potter responds

THE Midwest Craftsmen's Seminar, held at the St. Paul Gallery and School of Art, St. Paul, Minn., November 17-29, presented the participants with the opportunity of pooling their experiences with those of three internationally famous leaders in the craft world — Bernard Leach, Shoji Hamada, and Suetsu Yanagi. Together they worked toward the solution of some of the critical problems facing the craftsman today.

Among the subjects that came up for seminar discussions were the assimilation and selection from the various cultural traditions, the education of the professional craftsman, the place and possible use of scientific and industrial aids, and the marketing of the craftsman's work.

This report places emphasis upon the opinions expressed by the three leaders of the Seminar and the audience participants, including myself.

The dominant leader of the Seminar, Mr. Leach, an Englishman, is recognized by all serious potters, whom I know at least, as being the leading contemporary authority on handcrafted pottery. He was born in China, educated in London, and trained in Japan — studying and producing pottery under the instruction of Kenzan the Sixth, an old pottery master. When Kenzan the Sixth died, Mr. Leach fell heir to the title of Kenzan the Seventh. Upon his return to England he established his own pottery at St. Ives in Cornwall, England. His pottery is unique in that all ware produced there is hand thrown and hand decorated.

Dr. Yanagi is Director of the Folk Art Museum in Tokyo. He is especially qualified as a connoisseur of high quality weaving and of the best handcrafted pottery.

Mr. Hamada is considered one of a select few leading contemporary potters in Japan. He completes the trio of close friends who have in common a keen intuition for beauty and a mutual admiration and respect for each other.

The Seminar in St. Paul as conducted by the three was extremely interesting and illuminating.

NOW, here are some of the trio's comments and answers to questions involving the rise of ceramic art in the United States.

First of all, Mr. Leach's opinion about the pottery work going on in this country is that the influence of the Sung Dynasty potters of China is clearly evident. Mr. Leach also says we are influenced considerably by the Pre-Columbian Indian and the contemporary abstract idiom—which are extremes difficult to unify—and, in his words, "require strong digestive capacities—integration on the part of the potter equivalent to that of the best modern artists." Few can achieve this, he says; many fall by the wayside, especially in America which unavoidably lacks a common tap root of cultural support. Mr. Leach believes that we in America have our roots in the traditions of perhaps 30 countries—and not one a tap root. Japan, on the other hand, has a cultural background of centuries. We need to look for integration—to determine what we have, and then use it.

Mr. Leach pointed out that, perhaps without realizing it, we possess two traditions which in his mind are worth (Please turn to Page 28)

Mr. Brownson is an instructor in the Department of Art, Wittenberg College, Springfield, Ohio.
CLAY is a straightforward material to work with, yet many ceramic-minded individuals associate mystery with this backbone of ceramics. Insufficient information is the reason.

Although you will probably purchase all or most of your clay, you should prepare at least one batch yourself, starting with crude clay, so that you may learn something about the material's "mysteries." Testing a clay's properties and developing a body suitable for one of your projects will ultimately give you a better command of your purchased material, and respect for it as well. So, if you have dug your own clay or fallen heir to someone's leftovers, you will want to test it before preparing a large batch to see how it can be used best, or if it is usable at all.

Advanced potters are interested in many of the clay's properties. They want to know how much the clay will shrink during drying and firing, how high it must be fired to produce strong non-porous ware, and what the color will be under various firing conditions and temperatures. It appears, however, that ceramists are basically interested in a clay that is workable.

To the beginning potter, too, a workable clay should be the basic goal. So here are some simple preliminary tests which will help determine which of your samples are usable and how they may be used.

The quickest way to distinguish the qualities of a clay is to first change the lumps into a powder. Using a mortar and pestle on one lump at a time is generally best. However, the lumps can also be crushed in a cloth sack or on the floor with a hammer, mallet, or rolling pin. About one cup of powdered clay from each sample will be enough.

As you crush the lumps watch for small white chunks. They may be lime and later can cause considerable trouble. Lime will not be harmful in the dust form, but a piece of it the size of a pin head can cause a flaw in the finished article, as shown in the illustration on page 26. A test for lime is to touch the clay with a drop of ten per cent hydrochloric acid. If the chunks fizz, lime is present; and it may be advisable to eliminate that sample.

After powdering each of the clay samples, they should be put into a plastic condition by mixing with water in the conventional manner. It is best to allow the plastic mass to sit overnight, then patiently work it into a smooth even consistency. If the mixture seems too dry, add a few drops of water; but do not permit it to become sticky.

WORKABILITY of a clay is most important. The sample at upper left is too "short" and unmanageable. That at upper right is extremely plastic, feels rubbery, works well, but will prove impossible to dry without cracking and warping. In the center, a blend of the two, with excellent workability resulting.

DURING the "working up" of the samples you should have formed preliminary opinions regarding their potential. The actual testing involves little more than close inspection of the feel and workability of the clays and knowing how to relate them to the physical properties.

For example, one of the samples may be similar to the ball of clay in the upper left of the illustration. It may be low in plasticity and will crumble when you try to roll out a coil. This type of clay, used by itself, will, of course, be unsuitable for most potting techniques. It may, however, be ideal for making casting slip. If you can manipulate it at all, you can be sure it will not crack or warp, even under extremely short drying conditions.

Again, a sample may be too plastic or rubbery, like the clay in the upper right of the illustration. It may be extremely pleasant to work with, but its unusually

(Please turn to Page 26)
the theory behind it—and how to eliminate this chief offender among glaze defects

The Potter is plagued by problems. His craft is not a simple one and, while the casual observer may be aware of nothing beyond the more obvious aspects of the forming of ware, the application of glaze, and the firing processes, these steps are actually the end-products of a great amount of experimentation and development. For those ceramic workers who use ready-prepared clay bodies and glazes, the experimenting has been done. They are spared the research which is so necessary to the ceramic purist who insists, for instance, upon developing his own glazes and who earns his reward in glaze effects which are uniquely his own.

To such a worker, glaze development is not a tedious chore. He derives great satisfaction from delving into the infinite number of combinations of glaze materials, always looking for the special effect in color or texture and rejecting that which is commonplace. However, if he has respect for his craft, he is not satisfied by simply achieving desired visual and tactile qualities. His ware must be technically sound and free from defects, so that they are able to perform their intended function.

The chief offender among these defects is crazing.

Craze lines occur in a pleasing pattern, when used with discretion on some ceramic sculpture and even on pottery if the clay body is so well vitrified that no leakage will occur. When used decoratively, crazing is called “crackle.” It is possible to control the size of mesh in the net-like pattern of a crackled glaze so that interesting variations in crackle will appear on the same piece of ware. Many of us are familiar with certain crackled wares of the Sung Dynasty of China which, fortuitously or not, have absorbed stain in the craze lines, so that the crackle pattern is strongly evident. There is, however, no excuse for the use of a crazing glaze if the craze lines have no decorative value or if the presence of

Mr. Littlefield is Professor of Ceramic Art at Ohio State University, Columbus, Ohio.

CERAMICS MONTHLY
crazing defeats the function of the ware. It is with this phase of crazing that we are concerned here.

Crazing is caused by tensile stress in the glaze. The fired glaze shrinks until it is too small for the body of the ware on which it is used. The behavior of the glaze is somewhat similar to that of a tightly fitting garment made of poor material, which, when its wearer is caught in a rainstorm, shrinks so much it finally splits at the seams.

All substances expand when they are heated and contract when cooled. Some substances expand and contract more than others. Each substance has a rate of expansion and contraction peculiar to that substance, and this rate is known as the coefficient of thermal expansion. In ordinary crazing, tensile stress results from the difference between the coefficients of thermal expansion of the fired glaze and the body on which it has been applied.

Many temperature control devices operate on this principle. For example, the commonest type of thermostat employs two metal strips, having different expansions bonded together face to face. As changes in temperature occur, the two metal strips change in length, but to different degrees. Since the two strips are bonded to each other, they are forced to change their position (to become curved or to straighten, depending upon whether they are being heated or cooled). The device is so designed that the change in position actuates an electrical switch or a valve, causing more or less heat to be supplied.

When a piece of glazed ware is cooling in the kiln, the molten glaze becomes more and more viscous until it finally becomes rigid. Then, as room temperature is approached, the relative coefficients of expansion of body and glaze become important. If the coefficient of expansion of the glaze is greater than that of the body, the glaze coating contracts more during the cooling than the body does and is therefore subjected to a stretching action (tension). If this stress is great enough, the glaze will relieve the stress by crazing, or "splitting at the seams.

Glazes have a certain amount of elasticity which may permit them to resist this type of crazing for varying periods of time.

Ordinary crazing, meaning that it occurs during or soon after the cooling of the ware, may be remedied through a variety of means. Since the fault lies in the fact that the coefficient of expansion of the glaze is greater than that of the body, any step toward equalizing these coefficients will tend to correct the crazing. This may be done by changing the composition of either the body or the glaze. Usually it is easier to alter the glaze composition, but there are occasions when changes in the body are necessary.

A GLAZE is a glass and as such is a fusion of many oxides. Each of these oxides has its own special coefficient of expansion, some high and others medium or low. If a glaze contains a predominance of high-expansion oxides, then that glaze will have a high rate of expansion and contraction and will probably craze on most bodies. The crazing can usually be corrected by replacing the offending (high-coefficient) oxides with oxides of lower coefficients. In the following table, the numbers indicate the relative rates of thermal expansion and contraction.

<table>
<thead>
<tr>
<th>Oxide</th>
<th>Coefficient of Expansion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium oxide (soda, Na₂O)</td>
<td>10.0</td>
</tr>
<tr>
<td>Potassium oxide (potash, K₂O)</td>
<td>8.5</td>
</tr>
<tr>
<td>Calcium oxide (lime, CaO)</td>
<td>5.0</td>
</tr>
<tr>
<td>Aluminum oxide (alumina, Al₂O₃)</td>
<td>3.0</td>
</tr>
<tr>
<td>Lead oxide (PbO)</td>
<td>4.2</td>
</tr>
<tr>
<td>Barium oxide (BaO)</td>
<td>3.0</td>
</tr>
<tr>
<td>Zirconium oxide (ZrO₂)</td>
<td>2.1</td>
</tr>
<tr>
<td>Lithium oxide (lithia, Li₂O)</td>
<td>2.0</td>
</tr>
<tr>
<td>Zinc oxide (ZnO)</td>
<td>1.8</td>
</tr>
<tr>
<td>Silicon oxide (silica, SiO₂)</td>
<td>0.8</td>
</tr>
<tr>
<td>Magnesium oxide (magnesia, MgO)</td>
<td>0.1</td>
</tr>
<tr>
<td>Boric oxide (B₂O₃)</td>
<td>0.1</td>
</tr>
</tbody>
</table>

It can be seen by examining the table that a glaze containing much potash or soda is almost certain to craze, since these two oxides have high coefficients of expansion. This explains why copper-blue glazes, usually rich in potash and/or soda, are notorious crazers. The substitution of lithium for a part of the soda-potash content will tend to decrease the crazing because lithium has a much lower coefficient of expansion. For the same reason, the substitution or addition of other materials (for soda and potash) will have a favorable effect so far as crazing is concerned. However, in the case of copper-blue glazes, some of the oxides would be unsuitable because they would destroy the blue color, causing it to change to green. The worker will find many situations, while dealing with crazing, in which changes in glaze composition must be made with caution. Otherwise, while he may correct the crazing, he will also bring about undesirable changes in color, texture, or maturing temperature.

Although the substitution or addition of any low-expansion oxide would help to correct crazing, there are certain aspects which should be viewed in an attempt to effect a remedy. An important one for consideration is the content of soda and potash. Do the raw materials in the glaze batch supply, in the aggregate, a rather large quantity of these oxides? If so, those materials should systematically be reduced in amount and replaced by other materials such as white lead, red lead, lithium carbonate, celestite, whiting, zinc oxide, or feldspar, all of which will supply oxides having lower thermal expansions.

ZINC oxide seems to be especially beneficial in most glaze types. Hermann Seger, widely regarded as being the father of ceramic technology, recommended the addition of silica to either the glaze or body as a means of correcting crazing, a method which is sound for many types of glaze, but which does not work well for some boratic and feldspathic compositions. In these glazes the addition of silica often seems to increase the crazing.

Such changes as the partial replacement, in the glaze batch, of barium carbonate for white lead or red lead, or magnesium carbonate and zinc oxide for whiting, will all result in a glaze of lower thermal expansion and of lessened crazing tendency.

The maturity of the glaze and of the clay body upon which it is used is an important factor in the control of crazing.

Crackle is the term for the craze lines when they appear in a pleasing pattern and are used decoratively. Here the author combined a white crackle glaze with a black stain to enhance a stoneware bowl.
This is the first article in a series on the subject of "free form"—a subject of many meanings and interpretations. We can see, merely by looking about any gift shop or department store, that free form is a popular means of expression, and one with which many liberties have been taken. It is the purpose of this series to help the reader to a fuller understanding of the term, as well as to a variety of methods by which free forms may be made.

First, let us establish a meaning for the term as it will be used here. "Free form" applies particularly to forms which are not symmetrical in at least one view. Forms which are symmetrical are those which are the same on both sides of a center line or plane, such as the conventional bowl. Forms not symmetrical are called asymmetrical. Free forms are asymmetrical in at least one view. They
"YOU may turn to nature for the essence of her forms; for the tumbled smoothness and easy contour of a stone from the beach, the lines and grace of a single flower petal..."

may be symmetrical in some, but not in all views. The terms "free," "asymmetrical," and "sculptural forms" are used interchangeably in this series.

Free form is also "free" in the sense that the potter's own capabilities of form expression, along with the structural quality of the clay with which he is working, are the dominant factors in the determination of the form.

You may ask, then, "Is a round piece which has been drain cast in a mold or thrown on the wheel, and then bent out of its original shape, a free form?"

In a very broad sense, such a form could be termed a free form, but as the term is being used here, it could not. It could not inasmuch as the drain casting or the throwing of the piece would impart evidences of the limitations set up by those methods. The base of the piece, for instance, would be typical of cast or thrown ware. Rather, the free form is one which is created independent of those limitations imposed by either drain casting or throwing.

We cannot deny that free form design imposes certain limitations upon the potter. Again, let us emphasize that such limitations are those to which the potter becomes sensitive, those of which he becomes increasingly aware, through repeated experiences with form design. His own limitations of sensitivity, as well as those of the clay with which he is working, remain dominant, just as the sculptor's sensitivity and the quality of the stone he is cutting are dominant in the creation of a piece of sculpture.

There is, indeed, much in free form pottery that is akin to sculpture. Just as architecture—unless it is produced

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for a particular wall setting—should be pleasing when viewed from any direction, so should asymmetric forms. Just as a piece of sculpture should make you want to view it from all sides, so should asymmetric forms. Just as a small piece of sculpture gives you the desire to handle it, so should asymmetric forms. Just as some textural variety is pleasing in sculpture, so is it pleasing in asymmetric forms. And, finally, just as a good and pleasing piece of sculpture is no accident, but a carefully considered work, good free forms are not accidents either!

Almost every potter wants to try his hand at free form, although all his previous experience may have been in throwing or in making symmetrical molds and casting into them. His thrown or cast ware may be exceedingly good in design—simple and pleasing, with decoration, if any, and glaze well suited to the forms. Now, however, he feels an urge to try a sculptural form. Immediately he becomes absorbed in an involved form which has more cuticles than a Victorian manor, more fussiness than a teething babe. He feels that he wants to keep the basic plasticity of the clay evident, and in so doing he evolves a form which is almost too plastic—one with a rubbery quality—overworked and tortured.

If the potter is not displeased with his creation, his reaction to the free form experience will be of the "There's nothing-to-this" order. His form is poor, but he is unaware of the fact and feels that the problem of designing free forms is not such a problem after all. This reaction is particularly surprising, though not entirely unusual, in view of the fact that in thrown or cast ware he is so much more discreet—so much more the master of good form.

On the other hand, the aspiring free form designer may feel desperately alone. His prop of smoothly traveling
IN TURNING to forms of nature for inspiration, it is all too easy to think of natural forms as being yielding, soft, and feminine in their character.

wheel or nice round mold is gone—and he finds progress elusive. By dint of repetition and simplification of his forms, however, he may—and in all probability will—eventually evolve a rather simple amoeba- or kidney-shaped form which is not displeasing, even though a bit trite. Whether the prevalence of amoeba and kidney forms which so often emerge as "firsts" in the realm of free form is fostered by their prevalence on the market, or whether these forms simply evolve with the greatest ease is questionable.

Satisfaction with an initial attempt or satisfaction with a trite result—either of these points in sculptural form design may be reached and considered end points by the potter. But neither is more than a mere beginning. It is possible to build an understanding of form which may lead the potter into the engrossing and pleasant expression of a new field of form.

YOU may ask, “Why bother with free forms? I am able to throw and to make molds—what does free form offer me?”

First, free forms offer you one of the most creative approaches to ceramic design. Second, free forms offer you the means of producing your own most personal expression in clay. No two free forms need ever be identical, even though the basic shapes may be somewhat similar.

The sculptural shape is as personal as any work of art can be: as personal as Moore's sculpture or as Marin's water colors. It is from your personal field of creative experience that your sensitivity to such forms must come. This personal field of experience includes things you have seen and done in the past, and is augmented with the creation of each new form.

The development of each new shape brings new ideas. The development of each new idea brings a greater simplicity of statement. It is through such development, through the production of asymmetric forms, that you will find not only pleasure in making the forms, but a broadening and greater sensitivity to all forms. Your recognition of the form problems which arise in all methods of production will be greatly strengthened by the constantly alert attitude which should be maintained in designing free forms.

You may ask, also, “When and where is the free form suitable?” Asymmetric forms are informal in character and are therefore particularly suited to our mode of life today. They would, indeed, seem out of place in a “classical” residence, but so few of us today lead a formal life that asymmetric forms are becoming more and more popular. Commercially, free shapes are now produced for dinner ware as well as for accessory items for the home. The development is all to the good in that it provides us with a variety in our table ware—table ware which tended heretofore to be sterile, formal and of a depressing uniformity regardless of the style of family living. The variety is welcomed: it is only unfortunate that so many of the forms available are themselves poor in design. But this fact should not, of course, deter you as an individual potter from seeking to express yourself in free shapes. Indeed, the good shapes which you evolve may come to have a strong influence on those offered on the market in the future. Your forms may be either functional in character or purely decorative, as in the manner of sculpture. The range of possibilities is limitless—or limited only to your own ideas and experience.

Nature has been a major inspiration, throughout the centuries, in all the arts, but surely there is none in which the artist and nature are so interdependent as in the potter’s art. The potter is bound to nature in his acceptance of the

"... HERE, as in nature, we need the contrast of a certain visual strength of line—in opposition to, and in support of, the softer lines."
"FREE FORMS" offer you one of the most creative approaches to ceramic design ... the means of producing your own personal expression in clay.

very materials with which he works. Clays—whether crude or refined, oxides from which glazes are formed, and fuel for firing, are all part of nature's riches. It is for man, the potter, to use these riches advantageously in the creation of pleasing forms.

To the layman, the potter is always "playing with mud" and if this definition of his efforts is not entirely appreciated, it does bear a certain amount of truth! The potter's "playing," in the sense of enjoying his activity is important—especially so in the consideration of free shapes. This is not to say that there is no serious thinking involved in the evolution of free shapes. The designer must be constantly alert to the changing aspect of his form. There is, in fact, an element of "playing" in the sense that limitless possibilities for form suggest themselves as the work continues and that the potter is free to pursue these possibilities, confirming or rejecting them as they develop.

NO TWO free forms need ever be identical, even though the basic shapes may be somewhat similar.

NATURE is generous: she provides us with a never-ending source of ideas for free shapes—but beware—they are ideas only, not models to be copied! How prolific must be the potteries turning out relish dishes—faithful reproductions of grape leaves to the last minute vein, or catsup containers—plump red tomatoes with green stem and leaves for a handle. We know that these items are good sellers. We know also that good sellers are essential to mass production, but mass production is not our concern at this moment. Rather, we are concerned with the evolution of good and basic sculptural forms. It is not, therefore, for the exact reproduction of nature's forms that you may turn to her.

You may turn to nature for the essence of her forms: for the tumbled smoothness and easy contour of a stone from the beach, the lines and grace of a single flower petal, the strength yet fragility of a shell, the thrust of a plant as it springs from the earth, the softness yet angularity of a piece of driftwood. In turning to forms of nature for inspiration, it is all too easy to think of natural forms as being yielding, soft, and feminine in their character. It is true, however, that the straight line and the angle are known in nature, although they are constantly being softened by the forces of nature. Similarly, it is all too easy to forget the line of visual strength in designing free shapes, to make the form swoop and curve with never a resting place for contemplation. Here, as in nature, we need the contrast of a certain visual strength of line—in opposition to, and in support of, the softer lines, As an aid to the early development of free shapes, there is much to be gained from the essence of natural forms—and much to be lost through slavish imitation.

This general discussion of free form will be augmented in subsequent articles, progressing toward further creativity, and will also include information on clays and glazes which are particularly suited to sculptural forms.
THE husky figure of Harding Black, professional potter of San Antonio, Texas, usually enveloped in a coarse canvas apron, seems the antithesis of the popular conception of the frail, aesthetic artist. Yet out of his kilns come delicate and fragile porcelains with thin and iridescent glazes almost unknown since the Ming Dynasty of 4000 years ago.

But perhaps it is the manifestations of characteristics shown in his outward appearance—his stolidness, his determined jaw—that have aided him in becoming known for his stoneware and porcelains decorated with copper-red glazes and celadons. "Perhaps the reason," his mother wrote recently, "lies in his single-mindedness. From the beginning he knew what he wanted to do. And he has done it."

From the first he was a quiet and sensitive child, she says. His interests lay solely in art and beauty of lines, and he spent hours quietly carving toys and little manikins out of wood.

At 18, Harding had finished high school and one year of college. Then the Depression of the early '30s began, and he could not go on with college.

He haunted San Antonio's Witte Memorial Museum—a burgeoning center of art in the Southwest—and its curator, Ellen Quillin, accepted his offers to assist in its various functions. Both staff and patrons about that time seethed with interest in an archeological expedition to the Big Bend country of Texas to unearth evidence of prehistoric man. Mrs. Quillin recommended that Harding be included in the exploratory party. The youth was fascinated with the prospect and quickly accepted.

"It was wonderful experience," he says today, "living like that in the open, scrabbling in ancient kitchen middens for the shards of pottery left there by Indians dead long ago."

Possibly it was that experience that started him thinking about working in pottery himself. Or maybe he just began because, times being what they were, he wasn't always able to collect his $9 weekly salary from his electrical shop job. At any rate, Harding decided he wanted to duplicate in clay a little stock Venus of exceptional beauty which the expedition director had acquired in Mexico.

He searched the Texas countryside for the clays and finally found just what he wanted. Then he fashioned 100 of the little figurines and fired them in the oven of his mother's old cookstove.

Soon the figurines, which he sold for ten cents a piece, came to him to learn his techniques. A number of artists in ceramic circles. A number of artists came to him to learn his techniques. But as teachers often do, he learned as much from his students as they from him. Harding found that his senses of color, design, and texture were undeveloped, and he set out to develop them. Whether or not he has learned these things is shown in the beauty of his ceramic pieces.

Harding made his first pots on an old wheel made from a potato peeler of World War I vintage found at Fort Sam Houston. In his present quarters on the Witte Museum grounds—an old stone house, once the home of Francisco Ruiz, alcalde, or mayor, of San Antonio de Bejar—he has the latest and most efficient machinery to aid him. He has three large gas-fired kilns and ample room for his large ceramic classes, besides display cases for his ceramic pictures.

Now in his mid-thirties, Harding Black is becoming more and more appreciated by the artistic public each year. And his achievements can only be attributed to his quiet but stubbornly persistent efforts.
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A SAGGER is a fire-clay box in which ware are placed to protect them from flames when being fired in an open-fire kiln. The word is an old English corruption of “safeguard.”

DESIGN and decoration are not interchangeable terms. Whatever decoration a pot may have is part of its design. Designing a pot entails consideration of its form, function, color, texture, and decoration.

FELDSPARS should not be indiscriminately substituted one for the other because they may differ widely in composition. As an example of the danger involved, if one were to substitute 100 parts of a certain Dakota feldspar for 100 parts of a certain Maine feldspar, he would have to add 8 parts of kaolin and 38 parts of flint in order to approximate the chemical content of the Maine feldspar.

A SOUR odor arising from the plastic clay you have been storing for several months does not mean the clay has spoiled. It indicates only that harmless bacteria have been at work in the clay, feeding on the organic matter (which is present in all clay). Incidentally, they do more than just create a disagreeable odor; their activity makes the clay more plastic and workable.

THE GLAZE recipe given you by your potter-friend John Doe, who lives halfway across the continent, may fail to give you the same exciting results obtained by friend John. The recipe probably refers only to tangible raw materials and firing temperature, ignoring the fact that many other things of a more nebulous nature can be powerful factors in the behavior of a glaze. Some of these are the kind of kiln used, gas or electric; the rate of temperature increase during firing, humidity, atmospheric pressure, the use of natural gas or artificial gas, the presence or absence of certain minerals in the mixing water, method of mixing or grinding the glaze, and the manner of application of the glaze to the ware. Of great importance is the body on which the glaze is used.

STONEMANRE is not made of stone, as the term suggests. The name is applied to ware usually made of a natural clay body which becomes well-vitrified in the approximate range of cone 5 to 10. As a rule, stoneware clays are admirably suited to the salt-glazing process, and their stoney appearance when thus treated is probably responsible for the name.

When fired under normal oxidizing conditions the color of the clay may vary from light buff to rather dark brown, the hue for any particular clay depending chiefly upon its iron content. Under reducing conditions of firing the colors will range from light gray to dark blue-gray.

Remember, stoneware is not stoneware unless it is well-vitrified. Underfired stoneware clays are merely earthenware.

PORCELAIN is ceramic, although there seems to exist a wide-spread belief that it is not. One often hears references to “porcelain” and “ceramic” as though they were different things. The fact is that all porcelain is ceramic, but all ceramics are not porcelain. Porcelain is simply a particular kind of ceramics, along with white earthenware, red earthenware, stoneware, and others.

A definition of porcelain would depend largely upon who is making the definition. An engineer or scientist would probably relate the chemical and physical properties and insist upon a minimum standard of whiteness. The ancient Chinese were not concerned with these criteria and, to them, porcelain meant primarily any well-vitrified body. They did not even insist on whiteness, having been more interested in the quality of tone or “ring” emitted when the ware was struck.

The modern potter’s idea of porcelain is that it be white, fired at cone 9 or higher, translucent, and that the body and glaze mature together.

SANDPAPER is a valuable tool for the woodworker but it has little use in pottery making. The experienced potter has learned that a moist, fine-textured sponge is more effective in removing roughness from his green ware than is sandpaper. The sponge not only removes protruding irregularities but also tends to fill the pits in the surface. One of the serious objections to the use of sandpaper on clay is that it leaves a deposit of fine dust on the surface, often causing crawling of the glaze.

COPPER is probably the most versatile of the various metals used as colorants in glazes. Under various conditions of glaze composition and firing conditions, copper can produce blues, greens, reds, purples, blacks, browns, and yellows. The last two are quite rare and are usually unpredictable products of reducing conditions resulting from attempts to produce copper reds.

ENGLISH china clays, English ball clays, and Cornwall stone have been largely replaced in the United States by domestic materials. One reason for the former wide-spread use of English materials is that many pottery plant superintendents and foremen were English-trained. They were either unable or unwilling to adapt themselves to the somewhat different characteristics of our domestic materials. Another reason is that in the early days of the American ceramic industry domestic deposits of suitable clays and other materials had not been developed sufficiently to meet the demand.

Today, the great kaolin deposits of the southeastern United States and the ball clay workings of the Kentucky-Tennessee area, together with widely distributed feldspar and syenite deposits, are adequately replacing English materials, in both quantity and quality.

WHEEL-THROWN pottery forms were made in Egypt as early as 3500 B.C. This contrasts sharply with the complete absence of wheel-thrown pots in the pre-Columbian Americas. The potter’s wheel was not known in the Americas (nor was a wheel of any type) until the coming of Europeans.
RESULTS of engobe decoration can be rewarding if the special qualities of each technique are recognized and used creatively. To illustrate, author Martz says “fish” in seven different “languages”—(from top to bottom) slip painting, slip trailing, wet slip trailing, mishima, sgraffito, paper friskets, and rubber resist.

THE decorative possibilities inherent in the use of engobes are quite rewarding when approached inventively, with an eye to a full exploitation of the opposing aspects of the several techniques. Incising, brushing, inlaying, trailing, pouring, and reserving all have their special qualities which wait only to be recognized and used creatively.

Engobe and slip are the same material. The different words suggest different uses. Engobe is slip used for a decorative purpose. However, slip can be used decoratively without being called an engobe, as in slip painting and slip trailing. The word “engobe” generally implies covering the surface of the piece completely or in large areas as when used with paper friskets or for sgraffito.

Engobe, like slip, is a fluid mixture of water and clay or other ceramic materials. It may consist of a single clay or of several ceramic materials properly proportioned. For contrast, the engobe is always a different color than the clay body upon which it is used. Engobe is often applied to the piece when it is either leather hard or dry. In rare cases an engobe may be applied to a bisque piece; in the wet trailing method it must be applied to the moist clay. In each situation the right type of engobe must be used, and the exact method of using it is established by trial and error.

In the total planning of a decorated pot we cannot overlook the body upon which the slip is used nor the glaze with which it is covered, but our point of departure now is the slip or engobe itself. Starting with any given idea, each of the techniques illustrated here will produce a result distinct from the others. Let’s take a single subject as the basic idea, fish, for example, and see how each one of the decorative methods has suggested to one person its own special way of saying “fish.”

Mr. Martz is an instructor in ceramic art at Indiana University, Bloomington, Ind.
SLIP PAINTING this bowl was done with a Japanese brush using slip made more unctuous and brushable than usual by the addition of glycerine and Karo Syrup. Because a damp clay surface is more receptive to slip the bowl was thoroughly sponged immediately before painting. A good deal of experimental practice is necessary to discover what kind of strokes and other marks the brush can be counted on to make; and, the design chosen should be painted freely.

In slip painting, filling in a predrawn outline is not only sterile in concept and result, it is an insult to the brush and an embarrassing revelation of aesthetic illiteracy in the artist.

SLIP TRAILING produces a thick, fluid-looking line. The flow of slip through the tube is only partially controlled by the hand pressure on the bulb. Once the tube is down on the surface the continuous flow of slip leaves no time for pondering. The slip flows whether the hand moves or not. A quick movement leaves a thin line, sometimes with skips. Momentary hesitations are recorded by an extra thickness at the beginning of a line and where the line doubles back on itself.

The demand of this method for continuous action extracts from the artist, almost by force, an expression as personal as handwriting.

WET SLIP TRAILING, a fascinating English slipware technique, has not been exploited by contemporary American potters, and yet it seems uniquely capable of producing a contemporary expression. Its excitement stems from the lack of all but the most rudimentary control. One never knows how it will end.

For this bowl, a flat disc of moist clay was laid on a pallet, white engobe poured over it and allowed to drain off. On the moist clay the engobe remains wet and mobile for a long time. Black slip was then trailed onto the wet surface. A certain distortion is inevitable as the two slips mingle and settle to a common level. Exaggerated distortion can easily be gained by shaking or rapping the underside.

On this bowl the tip of a small brush was drawn through the upper fin and around the eye and also produced the whiskers.

When the slip has dried enough to become firm, the flat disc of clay is given its form in a hammock mold or in a bisque bowl or over a drape mold.

MISHIMA is an inlaying technique attributed to the Koreans. The design is first incised or impressed in the soft or leather hard clay. Second, slip is carefully brushed into the depressions so formed and unavoidably over most of the surface, too. After drying comes the third step, which is scraping the surface clean leaving the slip only in the incised or impressed marks.

The upper fish was completely incised and the body of the lower fish was impressed with a V-shaped stamp made of bisque. A rigid incising tool is more closely related to our Western writing instruments than to the brush. So most of us may feel more at home doing mishima or sgraffito than using the brush or slip-trailer.

Richly textured, brocade-like effects can be developed by all-over imprinting with simple stamping tools made of bisque.

SGRAFFITO is easy to do, and is a favored technique for intricate line patterns. A variety of tools will produce a stimulating contrast in line quality from broad gouges done with a wire loop to thin, pen-like lines made with a needle point.

All photographs in this article are courtesy the Photographic Laboratory, Indiana University.
Sgraffito is essentially a kind of engraving technique and derives its name from the Italian word meaning "scratched." The surface of the piece is first coated with engobe. When this is firm, but still soft, the design is cut through it revealing the body beneath.

**Paper Friskets** are a kind of stencil or mask. For use under engobe, the friskets are saturated with water, then laid on the dry clay surface. The engobe is brushed over the friskets and the entire surface in this case. As soon as the engobes can be handled without damage the friskets are carefully peeled off with a needle-sharp point.

Friskets yield an extreme precision of shape unobtainable in any other way. Small, simple paper units will lie close to the surface much better than large, complex shapes which wrinkle and buckle. Complex designs can easily be built up by combining a number of small units.

**Rubber Resist** can be thought of as a liquid frisket brushed directly on the dry clay surface. The liquid rubber dries in a few minutes and the engobe is brushed over the surface. When the engobe is firm enough to be handled without damage the rubber is peeled off revealing the clay body beneath it. The effect is the reverse of slip painting, brush strokes in body color against a background of engobe color.

While very similar to the wax resist method in which melted or a wax emulsion is brushed on, the use of rubber has several very definite advantages. It works more easily from the brush than melted wax. It does not deteriorate in the jar. It eliminates the need for bisque firing to burn out the wax. And not least, the liquid rubber is immediately obtainable from several sources of supply.

**Tools and Materials** used in the foregoing decorating techniques are easily obtainable. For slip trailing, a simple arrangement can be made from a balloon and a medicine dropper, as shown in the illustration.

The balloon can be filled with a fluid slip simply by pouring a thin stream into its mouth. For a pasty slip a small funnel is helpful. The small rubber bulb is removed from the stopper and the balloon is firmly attached in its place with a rubber band. Save the rubber bulb, for it makes a tight-fitting slip-on cap for the open end which will prevent evaporation for several weeks.

With a gas flame the tip of the glass tube can be
SLIP TRAILER, from a toy balloon and medicine dropper.

SGRAFFITO TOOLS, from piano wire, bobby pin, welding rods, and hack saw blade.

PAPER FRISKETS are laid dripping wet on clay surface; they are peeled off with a needle-sharp point.

rubber latex may be brushed on, and dries to a nearly transparent film. It is easily peeled off.

softened to change the size of the opening. In use, the balloon is a limp container which never sucks air back into the slip as do syringes. Such a situation would interrupt the flow of slip.

A personally selected variety of sgraffito tools provides an automatic contrast in line quality which is more exciting visually than the use of an unchanging line.

paper friskets are laid dripping wet on clay surface; they are peeled off with a needle-sharp point.

bound to wooden handles; a bobby pin for a smaller loop; a small steel welding rod hammered flat on the end and filed to a smooth, rounded blade; and two more welding rods ground and filed, one bluntly pointed, the other needle-sharp. On the extreme right is a piece of hack saw blade, its round end notched with a needle file. (This was used on the mishima bowl border.) It easily incises a multiple line over curved surfaces. The last one is another welding rod hammered flat on the end and filed to a smooth, wide-angle point. The width of its incised line varies with the pressure applied.

friskets are best cut from newspapers with a sharp knife or blade. Cutting through several layers of newspaper produces six or eight units at a time. They are saturated with water and laid dripping wet upon the clay surface. The water holds them down until the engobe can be applied. When many friskets are applied the first ones sometimes have to be remoistened quickly with a wet brush just before engobing. A needle-sharp point is used to prick up a corner of the frisket to peel it off.

rubber latex may be brushed on, and dries to a nearly transparent film to which the engobe does not adhere. Its dully glistening surface can be seen in the photograph.

Customarily sold for making flexible molds, the latex is a rather thick, white liquid. It flows from the brush more readily when thinned a little with diluted ammonia. It is very important that the brush used be immediately and thoroughly rinsed clean in diluted ammonia, because if allowed to dry in the brush the rubber cannot be removed.

A corner of the rubber film is pricked up with a needle-sharp point, and the rest is peeled off with a slow firm pull.

After trying all these methods and visually tasting their different qualities individually, one begins to think of combinations of one with another. An enriched visual orchestration can be achieved by using slip painting with sgraffito, mishima with slip trailing, two colors of slip superimposed each with its own pattern in rubber resist. The possibilities multiply astoundingly. We become impatient with our pedestrian hands as the mind races like groundfire through the permutations of body, slip, glaze and technique.

body textures smooth or coarse, sparked by slip stippled or smeared or brushed, light upon dark, dark upon light, speckled, streaked. Glazes that flow, that pool, that are clear or murky, revealing, obscuring, enhancing, and all of it spiced with color. Slip sensuously brushed, crisply incised, regimented with friskets, trailed with abundant wetness. These are the potter's alphabet. You and I need only the courage to use it.
EVERY normal woman wants a baby; and every normal potter (if there is such a thing) wants to build his own kiln. With the help of Providence, and my wife, I got both.

“What,” I asked myself, “did Robinson Crusoe have in 1718 that I haven’t got in 1953?”

He wrote in his diary, “I had no notion of a kiln such as potters burn in; but I placed three large pipkins, and two or three pots in a pile and placed firewood all round it, with a great heap of embers under them; I plied the fire with fresh fuel till I saw the pots in the inside red-hot quite through. I let them stand in that heat for five or six hours, till I found one of them did melt. For the sand, which was mixed with the clay melted by the violence of the heat; so I slacked my fire gradually, watching all night. In the morning I had three very good, I will not say handsome pipkins, and two other earthen pots as hard burnt as could be desired, and one of them perfectly glazed with the running of the sand.”

All I myself needed was a desert island and a pile of driftwood to build an open-air kiln, er, and an alarm clock, to keep me up at night, to stoke the fire. The driftwood was plentiful, but the local fire warden, I feared, might object to my using my back yard as a desert island, with an open-hearth furnace, surrounded by neighbors’ frame houses, each with a drippy 50-gallon kerosene drum parked carelessly outside of the kitchen door, where a chance spark could land and (to put it mildly) cause trouble.

So, I compromised on an iron barrel kiln such as I had seen in a text book. I salvaged such a barrel from one of the beaches near Gloucester, Mass., where I live, and I transported it to my garage in my ancient jalopie. The garage was now to be converted into a potting studio, and the jalopie must needs spend the winter out in the cold.

My first problem was to cut out the top of the thick steel drum with the aid of a cold chisel, a heavy ball hammer, and plenty of elbow grease. This part of the operation sounded like a boiler factory had come to town, and brought neighbors’ heads popping from every window in the vicinity.

Then I turned the drum over, and cut out a round hole about eight inches in diameter in the center, as an aperture for the flames of the oil burner. This added bit of heavy hammering on the hollow drum brought more heads in neighboring windows . . . and a good deal of fist shaking and tongue wagging, too.

I set the drum on a foundation of brick, which in turn rested on the cement floor of the garage. On the top of the drum, I mounted a removable funnel-shaped outlet, to lead into the chimney. A tinsmith built it for me, together with the chimney, which he made of blue-annealed steel, to withstand the anticipated heat.

Now I was ready to line the kiln with a fire-wall, which I made of a mixture of fire clay and grog. (Robinson Crusoe rescued a barrel of grog of another and more potent kind.) I envied him his refreshment as I toiled with my less alcoholic variety. The wall was about two inches thick, around the interior of the drum . . . which, by the way, was three feet high and two feet wide.

Building sagger boxes to hold the pottery was the next task. They were simple, round cylindrical pots, with perfectly straight sides, about one inch thick, and 14 inches in diameter. They could be stacked on top of each other, allowing two inches of ventilating space all around, for the gasses of combustion to pass up into the flue. The bottom of each sagger acted as the top of the one below, so I needed only one top cover for the tier.

Now, I drilled a spyhole in the barrel, right through into the top sagger.

All was now ready for the heating unit, which was an old fuel-oil burner, which had been abandoned for a more efficient one in the house next door.

My good neighbor said, "I would rather present it to you than sell it to the junk dealer for old metal. Take it, and good luck to you; you will need it." The last sounded ominous.

This formidable burner I placed directly under the bottom aperture of the
kiln; then I connected the fuel lines, and before you could say Jack Robinson, or Crusoe, Robinson, I was ready for business.

During all this time, I had managed to turn out enough pots on my wheel to fill all four of the saggers, whose interiors totaled about three cubic feet of kiln space... enough to fire many small pots.

THE GREAT moment arrived... to light the kiln for the first time. It was to be a bisque firing of my greenware. All I needed was a bottle of rare champagne to break over her bow, as for about two hours, and then looked through the spypot. The color seemed about right for bisque firing, so I turned off the flame, and waited for the kiln to cool, until the morrow.

Now came that thrilling moment, which all potters adore... the opening of the kiln. In this case I opened it, with a three-foot crow bar, to force the metal top flue.

As I said, there were four saggers; but the peekhole was in the top one. The contents of that sagger were fired to just about the right hardness for bisque ware.

But in the next sagger, they were too hard, and in the third one, they had begun to melt; and in the bottom one near the full heat for the ten-room house, the poor little pots were entirely fused, and lay melted in sad heaps upon the floor.

I rebuilt the kiln, and tried again, with less heat. This time, the top sagger was underfired, and the bottom one O.K. Well, as Ring Lardner said, "to make a long story longer," I went through many experiments, trying to control the heat, and the gasses, and the refractory refractories; but after spending weeks of time, and several tons of clay (or so it seemed to me) and consuming a lot of grog (non-alcoholic), I bade farewell to Mr. Crusoe and his picturesque but impractical ways. I got out a mail-order catalog of ceramic supplies, and ordered a small but effective electric kiln.

At the outset, I had a sneaking desire to be a sort of Grandma Moses of ceramics, with my 18th Century production methods. My calm disregard for the laws of physics and chemistry was my real downfall. I learned the hard way that the picturesque is rarely profitable, except for a genius like Grandma; and the sciences are best left to the scientists.

Though my homemade kiln did not amount to much, my homemade baby grew up (with the aid of my wife) to be tall and slim and beautiful and be preserved in the history of ceramic art. Providence for preserving the baby, and destroying the kiln.

Mr. Bollman owns and operates the Henry Bollman Pottery, East Gloucester, Mass.

Test Your Clay
(Begins on Page 11)

High plasticity will mean excessive shrinkage and warpage regardless of the amount of time allowed for drying. Thus, it is advisable to attempt to use this type of clay to make some large object. You can, however, roll out a slab and see if it is possible to dry it safely.

These are the extremes that you may or may not find in your samples.

LIME in clay can cause considerable trouble during firing. The arrows point to flaws in the surface caused by lime particles the size of pin heads.

LIME in clay can cause considerable trouble during firing. The arrows point to flaws in the surface caused by lime particles the size of pin heads. Alone, these clays are not of much value to the clay enthusiast. However, by combining the two in various proportions, you may develop an excellent all-purpose clay.

A case in point is the center sample in the illustration on page 11, made by mixing equal parts of the other two clays. The excessive plasticity of the one clay, balancing the low plasticity of the other, forms a mixture that has desirable properties.

You may be fortunate in finding a clay that compares with this blend, or in finding two clays that will blend together to form a useful mixture.

Should all of your samples be low in plasticity, you can purchase some highly plastic clay such as bentonite and add it to your "short" clay. About five per cent should prove sufficient.

If all of your samples are too high in plasticity, you can add from 10 to 20 per cent fine sand or potter's flint.

Almost every area contains many suitable clays. And some of the clays' mysteries will come to light after you have worked with them and blended them, enabling you to better understand and better control your medium.

(The author will continue this series of articles on digging and processing your own clay next month with "Preparing Your Clay.")

CERAMICS MONTHLY
answers to questions

Direct your questions to the Editor, enclosing a stamped, self-addressed envelope. Questions of general interest will appear in this column.

Q. Many of my large (cast) pieces collapse in the mold before I even try to remove them. Why?
A. You are emptying the mold improperly. You should not allow the slip to “gurgle” when it is being emptied from the mold. This causes suction and will pull in the soft wall of the piece. Tilt your mold slowly when emptying it, being particularly careful with molds of wide pieces with small necks.

Q. Is it advisable to leave the pilot light on overnight before starting to fire a (gas) kiln?
A. Most potters follow this practice to completely expel the moisture which the kiln walls and the ware may have picked up. It is a desirable practice to follow, but not absolutely necessary, particularly if the kiln is fired frequently, and the ware left in a hot dryer until it is placed in the kiln.

Q. Why do some of my liquid glazes give off a disagreeable odor?
A. If these are glazes you have mixed yourself, you will probably find the offending glazes are those with formulas calling for additions of gum. Gum will deteriorate and give off a foul odor. This can be prevented, however, by adding a couple of drops of formaldehyde to the batch.

Q. Do you use the same molds for casting porcelain slips as you do for pottery bodies?
A. Absolutely. Just be sure your molds are perfectly clean before each casting.

Q. Why do I keep getting air pockets in pieces I throw on the wheel, mostly at the bottom?
A. It sounds as though you are not properly shaping your ball of clay. Always be sure your clay is well-rounded and smooth (not flat-sided, concave, or rough-surfaced), so no air will be trapped between it and the wheel head. For as you pull your clay up, you will transport the trapped air to most parts of your piece. It will, though, stay mostly at the bottom.” (It is assumed your clay is properly wedged.)

Q. Can I use a jigger or jolly on an electric wheel that has a single speed of 100 rpm, or is that too fast?
A. The speed would be quite satisfactory. It is actually a little slower than that used commercially.

Q. What can be put into a mat glaze to make it brush on more easily and evenly?
A. Mat glazes are not inherently difficult to work with. If you are using a commercially prepared glaze, it should be all right without additions. If preparing your own, formulas calling for a large amount of calcined clay may prove difficult to brush on. The workability can be improved by adding about three per cent bentonite. It should be added in the dry batch as it would be impossible to disperse in the liquid glaze.
Craft Seminar
(Begins on Page 10)

carrying on in some form of contemporary expression. The first is that of the American Indian.

Many will agree with me, however, that the characteristically unglazed pottery of the Indian is largely ill adapted for present-day use, since pottery is ostensibly made to be used although it may finally serve solely a decorative purpose. Indian pottery maintains its charm and beauty when made by Indians because of its place in history. But, in my opinion, it would be an anachronism to be continued as a tradition for American potters.

The second tradition, Mr. Leach suggested, is that of our 19th Century forefathers who produced handsome wheel-thrown stoneware jars and jugs which might have been used as vinegar and pickle containers. These pieces were usually decorated with a cobalt-blue trail-like design, simply done, and salt glazed.

I told Mr. Leach I enjoyed looking at American Indian ware and early American pottery and could appreciate it in its period of history; but for the life of me, I could not see it as a tradition that merited continuation.

MR. LEACH says the pot is the natural expression of the man or of the culture behind him.

To this, I agree only partially. We potters in this country are making pots which for the most part are an expression of ourselves or at least a mode which is contemporary. We are too individualistic by nature to produce a ware that is an expression of the culture behind us unless we accept the statement in terms of a heterogeneous culture. Then, of course, his statement can apply.

Mr. Leach made the remark to me that almost all works he has seen in exhibits of studio potters and of students are by those who strive for the "one of its kind" pot, and put an extremely high price on it.

This, I feel, is the result of industrialization. Potters feel that they cannot compete with mechanized industry, and as a result, potters are striving to reclassify themselves as non-competitors of industry and as artist-potters and artists. Thus, the artist-potter justifies his time and effort on a "one of its kind" pot.

I asked Mr. Leach if he didn’t think it just and proper to seek one’s own tradition, rather than pick it up from one’s historical background. He answered that he thought so but it would be a good bit more difficult than if one could be a part of a continuing tradition.

I personally got a great deal of satisfaction when I asked, after showing him photographs of my work, if he thought it wrong for me to identify myself with an Oriental tradition if one must think in terms of tradition. I explained, first, that I had a real sympathy for Japanese hand-crafted products since I had seen at first hand many in process.

Mr. Leach assured me that I should be encouraged in the direction of an Oriental tradition to which I was drifting. Perhaps, he said, I could modify a tradition of my own which would be in sympathy with the purposes and functions of my own particular American culture.

MY English friend made what seems to me a very good suggestion, and I intend to carry it out myself. In my words, it’s something like this: We potters could make a much better adjustment in an industrialized society if we consider the function of the pot before we make it, and then make several of the same shape, or with perhaps some variation of one shape. Finally, we ought to work out a suitable design that can be repeated on all the pots in the series as a pattern. With this approach, a studio potter or student can “get into the swing” of throwing and decorating by repetition. The method approaches the methods employed by potters of tradition. Usually one of the pieces resulting from this process will be better than the rest. It would be the one sent to an exhibit, and the rest sold at low prices. The exhibit piece would be freely executed and lack the tight, self-conscious quality which characterizes so many of the “one of its kind,” “precious pot” variety.

Mr. Hamada is an excellent potter, and was the chief demonstrator at the Seminar, although Mr. Leach, too, contributed much to the demonstrations. Mr. Hamada had some difficulty expressing himself in English. As a result, he was potting extensively while Mr. Leach and Dr. Yanagi lectured, explained the various processes, and answered questions.

Mr. Hamada, however, expressed the thought, in his humble and unassuming manner, that the great majority of pots observed in this country were not so good. But, he says, “The history of studio pottery in America is as yet quite green, but the unflagging endeavor of many honest artists certainly promises well for the future.”

Craze: To undergo crazing. A poorly matured glaze has not developed its full strength nor has it had a chance to establish an intimate bond with the body. In a properly matured body-glaze combination, there is no sharp line of demarcation between the two. The glaze has attacked the body to some degree, taking into itself some of the body constituents so that there is a zone whose composition was derived about equally from body and glaze. This is desirable because it pro-

CRACKLE celadon glaze, Ming Dynasty.

notes chemical and physical equilibrium, tending to equalize the coefficients of expansion of the body and glaze and establishing a strong bond between the two. The addition of fritt to the body composition, as recommended by Seger, is an excellent means of combating crazing because it offers additional silica for absorption into the glaze with a resulting decrease in the coefficient of expansion.

It is not uncommon to discover that a certain glaze will craze when used in heavy application, but will behave perfectly in a thin coating. This occurs because the composition of the thinner glaze is changed to a greater degree by the body materials it absorbs during the firing. It is therefore more closely akin to the body it covers.

The application of a glaze to over-fired bisque ware will sometimes result in crazing because the clay body has become so dense that it resists attack by the molten glaze and defeats the glaze in its effort to adjust to the body. Applying glaze to underfired bisque usually will not cause crazing unless the maturing temperature of the glaze is so low that the body remains under-fired after the glaze firing.
Mr. Mackenzie dips into the background of the originator of many of the Coalport China patterns, Thomas Turner. It was Turner who, in 1780, introduced the celebrated Willow Pattern and invented the dark blue of much of the ware. Without him, the author contends, there would be no Coalport China as we know it. But, he also observes, it was apparently the craftsmen who, by passing their skill from one generation to another, were the dominant factors in maintaining the high quality of Coalport China.

The willow pattern that we knew in childhood, with its bridge of blue leading to unknown thoroughfares.

Those lines, written by William Wadsworth Longfellow, turn up often in the House of Coalport, and well they might, for it is a work about world-famous English Coalport China, originators of the Willow Pattern.

It is not along unknown thoroughfares, however, that the author leads us but along those half forgotten in the history of the 200 years of events connected with the manufacture of Coalport ware.

Written in a tenor of nostalgia, the short, illustrated book is essentially a chronology of the industrial history of the manufacture of Coalport ware. Mr. Mackenzie opens the book with a word picture of the rustic cottage on the banks of the river Severn where the first Coalport was produced. He ends it with a report on the present manufacture of the ware, the Crescent Works at Stokes-upon-Trent, England.

Books

THE HOUSE OF COALPORT 1750-1950.

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CERAMICS FOR THE POTTER

MAKING POTTERY FOR PROFIT. By Richard D. Cole and Peg B. Starr; Sterling Publishing Co., 122 E. 25th St., New York 10; $2.95.

What to make and where to sell it is a perpetual problem to the clay worker. The authors offer as suggestions sculpture, turning out dinnerware, decorative tiles, lamps, garden and floral pottery, and novelties. As for selling, the reader finds out about direct mail advertising, setting a price, descriptive circular mailed on request. Free descriptive circular mailed on request.

CREATIVE CERAMICS

By Compton Mackenzie; William Collins Sons & Co. Ltd., 427 Fourth Ave., New York 16; $4.
Potter's Market

(Begins on Page 9)

The potter has a chance if he can digest the unpalatable fact that "timelessly beautiful pots" may sell one season and hopelessly flop the next.

He can find encouragement in the discovery of those more humble pots, always overshadowed by the monumental successes and failures, but which are always good and always sell—slowly and unspectacularly. But he has to offset the continuous pressures of changing demands with little more than a sturdy belief in his own creativity and an infinitely rich inheritance from the past.

Paradox. There is likely to be a basic incompatibility between the way the artist-potter likes to work, even to have his blueprinted making more and more individualized designs for his pot-making endeavors; but if he does so in quantity he is defeating his own function because: that is what the "dastardly" machine does much better; because he can't make his pots fast enough to counterbalance their deflation in money value; and because that is not really what is wanted of him in the first place.

So the potter makes his unique pots and takes them to the retailer. The retailer says, "These are very beautiful. I'll buy them all."

Then the potter counts his pennies and asks, "Wouldn't you like to buy some more when I get them ready?"

And the retailer replies, "More what?--he doesn't want duplicates of what he has already bought and he understandably balks at investing his hard won money in what he cannot feel with his own hands. Sad experience has taught him unfaith in the unhappily broken promises he cannot hope to make and maintain personal contact with all the outlets he requires if he is not to smother himself in his own products.

What often results is consignment selling, and in most cases it should not. At its bad worst it is generally an unhappy and short-lived compromise.

The retailer says, in effect, "I want only ones. Your pots are unique and I like what I have seen. But because the pots are one of a kind I cannot make future orders." So a consignment arrangement is made.

Somehow, all seems well, but it is likely to have the following disadvantages: (1) The method inspire confusion in bookkeeping. A potter may know with reasonable accuracy the number and type of pots making up a given shipment. But he has trouble deciding which items are included in which checks. (2) Consignment buying tends to promote indifference of sales effort in outlets where mixed buying methods put the consignment article in competition with articles bought outright by the retailer. He likes to feel the consignment pots are good enough to sell eventually. But where he has no money invested, it is understandable if he doesn't exert himself.

Perhaps one of the solutions having the fewest faults is approval shipment. Here the potter ships his ware with the understanding that within a given period it will either be purchased outright or returned. The "joker" here is that the potter is responsible for the mailing costs. Besides, he must overcome an inertia of the retailer who does not want to bother with the necessity of unpacking, repacking, and shipping.

Difficulties, of course, but not so disheartening as some of those found in consignment selling.

Generally, it is advisable to insist upon cash-and-carry methods as convincingly as possible, falling back on approval shipment when expedient. And if consignment is the only possibility, then grin and bear it. Consignment is not always bad. In the case of the non-profit organization, or the small art center, it is even logical and to be expected.

In any event, sad experience has persuaded this potter that marketing problems loom too large to be casually dismissed as something to be dealt with later; that they are obviously too complex to fit into formulas; but that they do have discernible implications for design thinking and planning to be considered before, rather than after, the act of "making."
FIFTH OHIO CERAMIC ANNUAL. Stoneware bottle (left), award winner by Charles Lakofsky of Bowling Green, Ohio, shown with some of the entries in the Fifth Ohio Ceramic Annual, just concluded (January 25) at the Butler Art Institute, Youngstown, Ohio. Top row: the Lakofsky bottle; The Pink Sweater, by Edris Eckhardt, Cleveland Heights; Cormorant, by Maybelle Falardeau, Cleveland. Bottom row: The Matador by Verna Zika, Youngstown; and Nocturnal Journey, also by Edris Eckhardt. Fifty-five ceramic artists entered 112 pieces in the show, which represents the work of present and former residents of Ohio.

HELEN BUNN COMPETITION WINNERS. Fiber, Clay and Metal, the Helen Bunn Competition for American and Canadian Craftsmen, was held at the St. Paul (Minn.) Gallery and School of Art, November 17-December 24. Bottle with wax resist bull decoration won the Second Award for Peter H. Voulkos, Archie Bray Foundation, Helena, Mont. Decorated bowl by Antonio Prieto, Mills College, Oakland, Calif., drew First Award.

HELEN BUNN HONORABLE MENTIONS. These pieces were given honorable mention in Fiber, Clay and Metal, the Helen Bunn Competition at the St. Paul Gallery and School of Art. Left to right: baking dish set with six ramekins, by Robert Turner, Alfred, N.Y.; bowl with lid, wax resist, by P. H. Voulkos, Helena, Mont.; ash tray, by Alexander Giampietro, Mt. Ranier, Md.; jar, stoneware, ash glaze, by John Foster, Birmingham, Mich.; battle, sgraffito, majolica, by Antonio Prieto, Mills College, Calif.; and stoneware bowl by Mr. Turner.
itinerary

(Begins on Page 5)

MARYLAND
Baltimore
February 13-March 8
Exhibition of the 17th Ceramic National Circuit Show. At the Baltimore Museum of Art.

MICHIGAN
Bloomfield Hills
February 13-March 15
Crannock Academy of Art will hold its Fourth Biennial Exhibit of Textiles and Ceramics. Some 100 artists from all over the U. S. have been invited to compete.

NEW JERSEY
Asbury Park
May 13-17
The Eastern Ceramic and Hobby Show of 1953 is to be held at Convention Hall. For further details contact Jerry Gasque, 77 Ridgecrest Ave., Staten Island 12, N. Y.

Newark
Current throughout 1953
The Newark Museum is showing typical examples of European and American pottery and porcelain through the ages.

NEW YORK
Buffalo
March 4-April 5
The 19th Annual of Western New York Artists will be held at Albright Art Gallery, and will include ceramics among the mediums shown.

New York
February 4-23
A show having the theme "At Home with Ceramics" is being presented at the Museum of Natural History by the New York Society of Ceramic Arts. Entries include pottery, sculpture, enamels, and glass.

Pennsylvania
Philadelphia
February 6-March 1
The Philadelphia Art Alliance, 251 S. 18th St., is holding a competition for craftsmen within a 63-mile radius of Philadelphia.

Washington
Seattle
March 8-April 8
Henry Gallery, the University of Washington, will present the Northwest Craftsmen Exhibition, Washington, Oregon, Montana, Idaho, and British Columbia will be represented.

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OUR FIRST ISSUE IS NOW OUT OF PRINT.

In fact, within two weeks after this debut issue was mailed, the special surplus we printed was depleted.

Those of you who received a copy of Volume 1, Number 1, now own a collector’s item—if you believe in such things; at least, you own some good reading in ceramics!

We sincerely regret we must disappoint so many new friends whose recent subscriptions “to start with the January issue” cannot be filled as requested. Their subscriptions will start with the February issue.

If you are reading this over someone’s shoulder, take advantage of the special introductory offer while it is still in effect. Fifteen months of CERAMICS MONTHLY can be yours for only four dollars. Use the handy card tucked in this issue, or just mail a note to me at 3494 N. High St., Columbus 14, Ohio.

Cordially,

[Signature]

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- "FIRELATOR" LIFT HINGES FOR EASIER HANDLING AND BETTER HEAT SEAL
- STAINLESS STEEL COVER RIM TO PREVENT RUSTING
- HIGH TEMPERATURE KANTHAL ELEMENTS FOR ADDED SAFETY
- #14 CORD, U.L. APPROVED
- AIR-COOLED SWITCH PANEL FOR SAFER OPERATION
- REINFORCED BOTTOM CONSTRUCTION FOR LONGER KILN LIFE
- CONDENSATE DRAINS TO MINIMIZE RUSTING
- NO PACKING CHARGE FOR GREATER PURCHASE ECONOMY

Information about LKF Kilns may be obtained from the manufacturer or any of the Distributors listed below

LAWRENCE KILN & FURNACE CORPORATION
2000 McDonald Avenue, Brooklyn 23, N.Y. U.S.A.

LKF & FIRELATOR DISTRIBUTORS:

Loder Ceramic Studio
1828 Arch Street

Ceramic Art Supply Co.
45 Grove Street
New York, N.Y.

Newton Potters & Supply Inc.
1021 Boyleston Street
Newton Highlands, Mass.

Specialized Ceramics Corp.
200 West Third Street
Plainfield, N.J.

Buffalo Ceramic Supply Center
76 Allen Street
Buffalo, N.Y.

Tapping Studio Supply Co.
3517 Riverside Drive
Dayton, Ohio

Thirk's Ceramics
1616 Court Street
Saginaw, Michigan