THE DESIGN AND EXECUTION OF
POTTERY DINNERWARE

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Presented to
The Graduate Division
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Master of Fine Arts

by
David J. Otoupal
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THE DESIGN AND EXECUTION OF
POTTERY DINNERWARE

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CHAPTER I

THE PROBLEM

During the spring of 1960 when the candidate was an undergraduate art major at the University of Omaha some of the problems involved in the design and making of pottery dinnerware were considered and discussed with his instructor and fellow students. Differences between commercial and handmade ware were studied, and various solutions to the difficulties of designing a contemporary line were encountered. Some examples seemed too strictly utilitarian; others tried so hard to appear original that they presented uncomfortable features in use. While all critics agree that, whatever shapes, colors and decorations might be chosen, the pottery should be kept practical as well as uniquely individual and contemporaneous.

After moving to Des Moines and enrolling in Drake University, Graduate Division, the problem of dinnerware was discussed with Richard Fairbanks, instructor of art at Drake, and the possibility of dealing with its solution became a reality. At this time also it was suggested to the candidate that he design and execute models of several different styles of dinnerware varying the shape and motif from the conventional commercial pottery. Before choosing the final design
for the dinnerware, the candidate considered such needs as ease of handling and minimum care of such pottery. With the approval of his advisor, the ideas and material accumulated in the previous year were used to provide a basis for further work during the present year. The problem in its entirety was to design and execute a twelve place setting of pottery dinnerware for use in the average present-day home.
CHAPTER II

ASSETS AND LIMITATIONS

Before beginning the actual design and execution of pottery dinnerware, the candidate considered many aspects of his project. The longer these were studied the more obvious it seemed that the average American housewife is not yet able to buy the kind of dinnerware that she would find most desirable. Perhaps she, her family, and friends deserve something better in this line.

I. ASSETS

One of the most important assets of pottery dinnerware is that it can please the hand as well as the eye. Another asset of hand-thrown ware is that it has a personal warmth, which is significant because it is a personal artistic expression. Other advantages are that when the pieces are made to particular specifications and when serving dishes are made for special purposes, these shapes become varied within themselves. This variety thus expresses one of the basic tenets of good contemporary design, that of providing variations within the dominating unity of shape, proportions, and general scale.
Another advantage of stoneware dinnerware is that it is a good insulator and that it reacts in much the same way that a vacuum bottle does. Stoneware dinnerware is also an asset to the housewife in that it is more durable and resists direct shock much more readily than does most common china. Testing to this effect was done by using stoneware plates and common china ones. The plates used were subjected to the normal strain of kitchen use. The pieces were also dropped and in each case the stoneware did not chip or break as easily as the common china did.

II. LIMITATIONS

One of the limitations of using pottery dinnerware is the weight and storage, especially of a large set. In order to keep its reassuring strength and sense of permanent durability the user must be willing to lift a little more weight when setting the table, cleaning away after meals, washing the dishes or storing the bowls, plates, saucers, cups, and other articles necessary for the service of food and drink.

In making the dinnerware the limitations of the clay and glazes had to be considered. Each piece presents its own structural problems, such as handles for the cups, spouts for pouring vessels, and lids and handles for the serving pieces. Shrinkage and warping are a constant hindrance to easy production; this is particularly noticeable
in the larger plates and platters. Until after the final firing of each piece no one can be sure that it will exactly match with its counterparts.

Even tests that enable potters to determine final results with a certain degree of accuracy do not always come out the same. While some critics advocate considerable leeway in size, shape, and color, feeling that the resulting variety is more attractive than perfect reproductions which can become too monotonous. These variations must be kept within fractional bounds or the too obvious lack of control will be most uncomfortable to contemplate and to use. Pablo Picasso's painted ceramics may be expressive as single art forms but eating from a whole table set exclusively with his designs would be an unsettling experience. It might even prove deleterious to the taste and digestion of the food, no matter how excellently that food had been chosen and prepared.
CHAPTER III

HISTORY

Man has needed and still needs pottery vessels for eating and drinking, for storing foods and goods, for experimenting in technical fields, and for washing and bathing. He needs insulators, bricks, and tiles, and in our own progressive time it is taken for granted that these will be supplied by the contemporary industrial setup.

Pottery has been and will always be dependent upon the raw materials and their reactions to heat. The abundant clay resources of China made it seem natural that China would excel in pottery. The potter cannot create new ingredients. He can only become more familiar with chemical laws governing the old. New developments in pottery came about from the earliest civilizations by experience gained through intelligent curiosity, resulting in a more thorough knowledge of materials. Important to the potter was that, with an increase of knowledge of materials, there was an increased efficiency of machines such as the change from hand-built wares to wheel-thrown and from open fire to controlled heat kilns.

Fragments of pottery have been associated with the sites of human dwelling places from earliest times. In fact, these sherds have been one of the chief aids to the archeologist in
the assignment of cultural independently in a number of places, rather than to have spread from a point of origin. This does not seem strange, for nothing would be more natural than to put the ever-present clay onto baskets for cooking over an open fire or to form this plastic material into such vessels.

Until recent times, ever since pots were made by hand or on the wheel, all forms invented by the potters were closely related to the maker's hands. Rims, bellies, spouts, and necks showed distinctly that the hand of the potter had been decisive in figuring out those forms.¹ A spout of a pitcher had a specific form, that unabstract line form because it was actually discovered through the fingers and not abstractly, as a theoretical concept of the brain but through the contact of fingers with the material.

Not only in the details has the hand always been responsible and creative, but the whole forms reflect more or less honestly the bodily character of the maker: a healthy potter with strong hands makes a sturdy rim and powerful bellies on his pots. One with more delicate hands and smaller proportions makes his spouts and rims narrower; the feet and bellies of his pots are more delicate. One with more than average dexterity of the hands makes elaborate, extravagant forms with more

subtly differentiated lids and spouts. And simple souls with simple movements, all in all, make simple pots.

Thus, more than any other craft there is in pottery a direct and primary relation between the hands and the form. This is an intimate contact that cannot be eliminated without taking away the most essential quality from the end product. An imaginative pot copied by even a highly skilled worker who did not invent it himself can be only like a duplicate or a copy at best.

In these fine distinctions pottery becomes an art as well as a useful field of craftsmanship. Subtle matters of personal choice, of selectivity for emphasis and the presence of uniquely individual rhythms can raise the making of earthen vessels to the significance of art forms.
CHAPTER IV

CLAY

Earthenware and stoneware clays were both included in the preliminary studies of possible designs for pottery dinnerware. The first studies involved throwing plates, bowls, cups, and saucers using the earthenware and stoneware clays in combination with 10, or with 15, or 20 per cent of thirty-to eighty-mesh grog. These plates were thrown ten inches in diameter. With the different clay, three of which were earthenware and three of stoneware; the shrinkage and warpage were noted in the green state, and again after bisque firing at cone 05, 1925-40°F Fahrenheit, and finally in the glaze firing, cone 05 for earthenware and cone 7, 2264-2300°F Fahrenheit for stoneware.

There was noticeably more warping in the earthenware, but it was the stoneware that showed the most shrinkage. Earthenware pieces are more likely to break because they are not fired high enough to vitrify and when they are fired higher they lose their shape by bloating and sagging. Also, earthenware chips and breaks more rapidly than stoneware when in everyday use. After many tests were made it was decided that stoneware clay would be used with additions of grog.
Grog is used in stoneware bodies to open the structure of the clay, to lessen the shrinkage warping and to facilitate drying. Grog is granulated ground clay which has already been fired. It may be made from any type of clay but for stoneware, grog made from a refractory clay should be used.

Besides making the clay body easier to dry and fire, it also makes the clay body more workable. Grog seems to act as a back-bone to the clay, making it hold its shape better, especially in the later stages of throwing when the clay becomes quite wet and soft.

Grog may be added to stoneware in amounts ranging from only a few per cent up to 30 per cent or even more. For throwing, the usual amount is from 10 to 20 per cent. Grog put through a thirty mesh screen is likely to have very fine particles and dust. Grog particles smaller than one-hundred mesh have an adverse effect on clay plasticity.¹ The particle size between thirty and eighty mesh gives the best results; it gives a dense packing and maximum strength to the body. Grog normally gives a rough texture to the clay except in thrown ware where the particles of grog lie just below the surface.

Stoneware is clay that has been fired to the point of vitrification making the clay dense and nonabsorbent. True stoneware, which contains natural stoneware clay or is fluxed

by feldspar action, has an extensive firing range of four to five cones. This range gives stoneware the latitude not obtainable in any other clay and makes it more satisfactory for dinnerware, especially in plate and platter construction. The process of vitrification involves the formation of a glassy structure within the body of the clay, so that mature stoneware is tied together and made relatively compact and nonporous.

The character of stoneware, besides being nonabsorbent and leakproof, is exceptionally hard and durable. Stoneware is virtually abrasion-proof and is more resistant to breaking by impact shock than earthenware. Another fact that makes stoneware better suited for dinnerware is that it is more resistant to heat shock, making it suitable even for oven cooking, such as casseroles.

Shrinkage tests were made with stoneware clay with additions of grog in 5 per cent additions. Then tests were made using an additional 10 per cent of grog, and an additional 15 per cent. For least shrinkage and best workability 10 per cent of the thirty to eighty mesh grog was found to be the best. This gave maximum strength to the body.
CHAPTER V

THROWING MOLD

After throwing several plates it was noticed that these were varying in size. Thus, another problem arose. The solution seemed to lie in making some type of mold. A simple casting mold was considered but after trying this it was discovered that the surface texture was not the same as in the thrown ware.

A throwing mold seemed the only feasible solution; so work on such a mold was begun. This type of mold is made by first throwing the bottom side of the plate. The clay is then allowed to set until leather hard. A cottle of linoleum strip is placed around the wheel and thrown plate. This is secured to the wheel with a piece of inner tube or wire. Next, the space between the potter's wheel and the cottle is sealed with clay. Then plaster is mixed and poured over the model. This is allowed to set. The cottle is then removed, and the sharp edge of the plaster mold is beveled with a steel trimming tool to minimize chipping. The mold is then taken off the wheel and the clay model removed. The mold is then set out to dry for at least a day before any attempt is made to use it.

There are two techniques that can be used in throwing in this type of mold, one is to center the mold on the wheel
head, take thoroughly wedged clay, center it in the mold as is done in regular throwing and then shape the clay into the mold from that step. This process works well and the excess of the clay is then trimmed off. But there is one drawback to this method, which is that the water being used in throwing the plate may saturate the mold and thus prolong the drying time of the plate. The other method, which worked much better, was to take the well-wedged clay, roll it out in a sheet like pie dough, place it in the mold and then proceed with the throwing. The clay in this process is pressed into the mold and still gives the concentricity of thrown ware but does not take nearly so long to become leather hard because the mold is dry. The latter method of doing the same task produced better plates with less work and time.

After the plate was removed from the mold in its leather hard state, it had to be trimmed. It was decided to make a special tool to do this job efficiently and accurately. The tool was made from a piece of brass six inches long, bent two inches from one end and twisted about thirty degrees left. A "U" notch was then filed in the top left corner and the tool sharpened. This tool trims and forms the lip of the plate.
CHAPTER VI

FUNCTION AND FORM

All pots, according to the most broad-minded theory, are functional. Even those that are supposed to be purely decorative function as decorations. To solve the problem of use and practical function in reasonable relation to the material is the next step to good pottery. All potters want to make handles that fit well into the hand, lids that do not fall off or slide around, spouts that pour without dripping, decent cups that permit pleasurable drinking and workable saucers. One finds that usefulness and function-alism are important subjects of thought for the potter. These problems, however, can be solved with a normal amount of intelligence and do not require any special human emotion or wisdom. They require from the potter only perseverance and a somewhat mechanical turn of mind, plus the will to be satisfied with only the best solution for whatever functional problem exists.

But function also has its definite refinements, something that is more than the rough solving of a technical problem. It is not enough for a spout of a teapot to pour; it must pour just the right amount and not a watering can's coarse jet, perhaps two inches in diameter, that floods the
cup and the carpet. It must also pour at the right angle as would be naturally expected when pouring into a teacup.\(^1\) The spout should start at some special part of the belly, usually rather low for a teapot, so that the pot can be easily emptied. And the end of the spout should be high enough not to spill if the pot is tilted slightly in carrying.

The fine difference in the treatment of functional problems needs more than the ability to solve functional problems in general. Something is needed that transcends techniques and function and that carries over into the form. Pots are made of many details, each of which has equally unlimited possibilities; handles, spouts and lids are the test pieces for ingenuity and initiative and the skill of the potter. Different objects will require different solutions and those again will develop into more delicate and diversified forms.

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CHAPTER VII

GLAZES

A glaze is a continuous adherent layer of glass, or glass and crystals, on the surface of a ceramic body.¹ It is an important part of pottery in that it is the glaze surface that will meet the eye and be subject to handling.

The glaze calculated for the dinnerware was compounded of feldspar, colanite, whiting, zinc oxide, barium carbonate, kaolin, flint, and opacifier, and tin oxide. (See Figure 1, page 20.) This basic formula was fired to cone 7 on test tiles and test pots using various colorants. The ingredients used in the color tests were tin oxide to produce a matt white, and iron oxide, in different percentages to color the glaze from yellow to red-brown. One to 3 per cent nickel oxide produced a gray-brown varying in intensity, and manganese dioxide made the glaze violet. Three per cent black copper oxide with 3 per cent tin oxide in the base glaze created a very pale blue-green. Three per cent red copper gave a metallic green. Another colorant used was cobalt. Even in such small percentages as one-half of one per cent, the resulting glaze was an intense blue.

Body and those of the glaze. This intermediate layer determines it forms an intermediate layer between the properties of the layer between the glaze and body is important:

Layer of glaze.

Therefore the glaze intermediates react and fuse to form a thin film that works and is needed to prevent the piece from sticking to the kiln shelf. During the firing, the ware should be cleaned so the piece may be fired without stilts and to submerge the piece completely. After baking the foot should be removed from the top. This method of application requires enough glaze is needed to plate and the glaze method was preferred. In this method, the glaze is good for tall or closed shapes but for plates, the pouring method is the best method. The pouring method requires enough glaze to pour into a blague pot, fill it completely, and then pour it out into a blague pot again in order to leave a thin layer on the inner surface. The pouring and dipping methods a good deal of glaze

In the glazes the raw materials are suspended in water.

Base for decoration.

White glaze was chosen because it would be a suitable color for decoration. In test after test this glaze produced a smooth opaque white. After testing the colored glazes on plates, it was decided to discard all of them except the thin oxide white.
whether the glaze fits the clay body or not. When the glaze is subjected to the heat of the kiln, it combines with the alumina and silica of the clay body to unify them.

The main purpose of the glaze is to provide a surface that is hard, nonabsorbent, and easily cleaned. Absorbency in stoneware is not of great concern because the clay when fired at 2300° Fahrenheit becomes vitreous. A glaze on stoneware is essential for a smooth surface because as the name of the clay implies, the surface is much like stone in texture and structure. Even with glaze on stoneware clay the quality of the clay should not be lost but subtly show through making a most pleasant ware to touch as well as see.
### GLAZE SYMBOL: 35-S-4 C/7

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- 10% Tin Oxide 37.8

#### FIGURE 1

GLAZE FORMULA
CHAPTER VIII

DESIGN

It is acknowledged that the best solution of any formal problem is that which best allows the function to be fulfilled. But there are limitless variations and unlimited avenues a designer may take to accomplish a unique and individual piece of work. In the design of pottery dinnerware this ability for variety was proven.

It was first considered what dinnerware pieces were wanted. Of course, the everyday pieces such as plates, cups, saucers and small bowls were needed. Serving pieces decided upon were a large bowl, a small one, and three serving platters, as well as a soup turine and a casserole.

In all of these pieces, individuality of design plays an important part. The plates are coup shaped but without a definite foot ring which makes these plates different in profile than many commercial types and very pleasant to the eye. The cups were managed in a completely different manner. They were designed with slightly concave walls and tall feet to give an air of elegance when used with the coup saucers. The serving pieces varied in forms from the coup plate to the tall footed casserole. The variations within the pieces are tied together by the use of concave and convex curves in profile.
PLATE 2

CONTRAST - COUP SHAPE AND CONCAVE WALL
The decoration of the dinnerware, too, involved an extensive study of designs and methods of design application. The design chosen for the set can be found on the top of Figure 2, page 25. Alternative designs are below. Methods of application were experimented with too, the majolca, sgraffito, slip trail and free brush with engobe gave the best results on the pattern chosen, as well as the alternatives.

The dinnerware and its design were made to emphasize the contemporary interest on subtle textural interest instead of an applied decoration that might detract from the basic form. The ability of the design to be strong as well as to be comparatively unnoticeable must be stressed, making the set reserved in simplicity and acceptable in any contemporary setting.
FIGURE 2

SELECTED AND ALTERNATIVE DESIGNS
CHAPTER IX

SUMMARY

The design and execution of twelve place settings for dinnerware, with seven pieces in each setting, was the problem. Each of these seven pieces comprising a plate, a cup, a saucer, a salad plate, a dessert plate, a soup or cereal bowl and an individual casserole had to be designed so it would harmonize with all the others interchangeably.

Differences between commercial and handmade ware were studied and various solutions to the difficulties of designing a contemporary line were encountered. Some commercial examples seemed too strictly utilitarian. Others tried so hard to appear original that they presented uncomfortable features in use. While all critics agree that, whatever shapes or colors or decorations might be chosen, the pottery should be kept practical. They also agree that the virtues of hand built pieces should be both apparent and subtle.

Earthenware and stoneware clays were both tried as possible solutions to the problem. The stoneware was decided on because it vitrifies and forms a better bond between the clay and glaze. Stoneware is also harder and more durable than earthenware and its surfaces can be made as attractive as those of earthenware. Through the use of grog in the clay the clay body was made more porous. This also made it possible to
obtain the extra latitude needed for throwing unsupported
extensions in plates and platters. Intensive studies of glaz-
ing and throwing molds were also made so that a certain degree
of accuracy could be maintained. Working models of the ware
were made and tests were based on these. From the tests the
eighty-four pieces needed for the set were done. Coordinate
serving pieces completed the set.

These experiments were conducted in the pottery rooms
of the Drake Art Department with the helpful advice of other
graduate students and two art teachers. The references for
the paper came from the Drake University Library, the Omaha
University Library and the Library at the Des Moines Art
Center. A trip to the Boystown ceramic department in Boys-
town, Nebraska, was made in search of different clays and to
study their studio setup. Reference books were also obtained
from Professors Fairbanks and McDougal.
BIBLIOGRAPHY
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