Illuminated Porcelain Forms

Janet Kellner
ILLUMINATED PORCELAIN FORMS

By

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Fig. 1 - Detail of porcelain grouping from Figure 9.
ACKNOWLEDGEMENTS

For the great many people who contributed to
this work in large ways and small...................

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STUDY IN TRANSLUCENCY
Porcelain has a quality of translucency which is seldom used as a vehicle for illumination.

I was interested in developing this quality into light forms, and upon the suggestion of Robert Schmitz began working with candle lanterns. I threw round pots, turned them upside down, used tools to carve the clay, pins to pierce the surface, and wax resist and a wet sponge to thin certain areas. Aesthetically these lanterns were unpleasant and the heat from the candle was so intense that all the globes cracked. Yet I discovered a great deal about the manipulation of the clay in creating translucency.

After the technical difficulties with the candle globes, I felt that a small incandescent light bulb shielded by a porcelain shell might not cause the problems that I had previously encountered. By using nylon flocking wedged into the clay body I was able to roll very thin sheets of clay that could be handled without tearing. I draped the thin pieces of clay over a bisque mold that was used in conjunction with the mechanical part of a plastic night-light. By using the actual fixture as a mold form, I found it much easier to install the plastic part after the porcelain had been fired. Using the thinning techniques I had employed in the candle globes, I found the porcelain even more sensitive to slight changes than I had first
Fig. 2 -- Night light with luster, sulfate and decal surface decoration. (9 inches in height)

Fig. 3 -- Night light viewed in a darkened room.
imagined. Hairline scratches in the clay, sulfates, lusters, and decals were accentuated when the night lights were lit. I especially enjoyed the subtle water color qualities of the sulfates that softened the light.

At the same time that I was doing these night lights, I became fascinated with fabric that had been soaked in slip and retained it's cloth-like quality after firing. I made a slip using Calgon as a deflocculant since I was told it was suitable as an electrolyte, as it was a water softener. I must have added too much Calgon to the slip for the fired material had a totally glass-like surface and some portions were transparent. Discovering that the Calgon would flux the clay's surface was extremely helpful in later work.

I was more interested in the actual sculptural forms of fiber and slip than in experiments with slips and additions of deflocculants. Therefore, I used a commercially prepared white-burning slip that had a firing range from cone 04 to cone 2. I sewed small muslin bags of three to four inches in height, which I then soaked in slip and stretched over another identical plastic bag filled with perlite. Deflocculated slip contains less water and would have less shrinkage and supposedly help eliminate cracking during drying. I also released perlite from the plastic bag during this time. The only place that cracks appeared was at the stress points where the folds of cloth held a 1.

1. Calgon (Trademark): sodium hexameta phosphate (NaP03)6, commonly called Graham's Salt.
Fig. 4 -- White-burning cone 02-4 commercial slip saturated in muslin bag. The perlite stuffing fused during the firing. Size = (5½ inches in height)
greater concentration of slip. I fired these to cone 2 and when the kiln was opened I was excited. The bags had cracked. There was a fragile beauty in these strange shapes. The fused perlite was caught during its escape from the bag. I could not tell if the splitting was caused by stress in the seams or whether the perlite had expanded and cracked the surface, since it had not burned out as I though it would. I also tested a nylon stocking stuffed with perlite and painted with slip. These stocking shapes were paper thin but on the whole, displayed less cracking than the muslin.

I considered the possibilities of using translucent porcelain and fiberglass bags, so I purchased a commercial porcelain, Bell's cone 6 White Orchid casting slip, and sewed the fiberglass bags. The muslin had been so fragile and I knew that fiberglass would fuse. I hoped it would strengthen the structure. I repeated the same procedure of sewing fiberglass bags, plastic bags and using perlite as a filling. This time there was more surface cracking. Hobart Cowles reminded me that porcelain slip would have more fragility than the slip I had previously used. Upon his recommendations, I tested flint to help cut down the shrinkage, and binders to toughen the clay. Testing from 5 to 25% flint added to the slip, I found some reduction in cracking, but the problem never was solved completely.
I settled on 15% flint as a regular addition to porcelain slip. I experimented with binders such as Polyox, Glutrin, Karo syrup and starch. For my purposes the Karo was best. It made the slip slightly runny so that it would easily spray through the spray gun and did harden the clay. The Polyox is worth mentioning since it turned the slip to a gummy, sticky, and somewhat stretchable clay, which could be a study in itself. Even with the additions of flint and Karo syrup the slip cracked on the bags, but I decided to fire them anyway. I used an electric kiln, fired to cone 2 even though it was a cone 6 slip. Starting these tests at cone 2, I found the forms vitreous and translucent with only a slight slumping, but at cone 6 the forms flattened completely. Interestingly enough, the fiberglass fused and sealed the cracks leaving a solid but still fragile bag. The drapery fiberglass used was heavily textured, a quality I found distracting and the fragility made it impractical. Any of the bags over six inches in height collapsed during the firing cycle, so size was a limitation. I did complete several which were mounted on plexiglas boxes and illuminated with a seven watt, Christmas tree, light bulb.

I needed alternatives. I wanted to create larger, more interesting and more durable shapes. I came across some non-reticulated, urethane foam (1/8 inch thick) that had been given to me by a student. This thin sheeting was
used to pack delicate instruments. I sewed and tested it the way I had the other materials. I noticed it stretched as I pulled it over the bag mold and I had difficulty poking holes in it with my fingers. There was no cracking apparent in the drying. The foam seemed to contract as the porcelain slip contracted. Needless to say I was excited and proceeded to fire it. It held together excellently.

After a month of searching, I found the foam and began sewing like mad. This time the forms were different. Most were from 10 to 18 inches tall and resembled asparagus stalks, having more exaggerated bulbous tops. As I was pulling these over the plastic forms I was poking too many holes in the surface. Larry Livolsi suggested using the air compressor to blow-up the bags. With the help of Ian Calvert, we constructed a Y-shaped hose unit. One of the hoses went into the bag shape and the other into the spray gun. Using a plastic bag tied over the hose, I pulled the slip-saturated foam over the plastic and turned on the air. To prevent the balloon from exploding, I pierced the plastic and a steady stream of air maintained the expanded shape. I also sprayed slip onto the surface to secure a stronger form. The bags dried with no apparent cracking and the surface was almost as hard as a bisque pot. The day before my firing I sprayed the surfaces with Calgon and water, using 20 ml. of Calgon to 100 ml. of water. I had been getting a satin matte surface on other bags sprayed with this solution.
Fig. 5 -- Illuminated porcelain bag forms, using cone 6 commercial slip on a fiberglass bag, with Calgon solution sprayed surface, fired to cone 2. (5 inches in height)

Fig. 6 -- Series of three illuminated porcelain bag forms, using cone 6 commercial slip on a fiberglass bag, with Calgon solution sprayed surface fired to cone 2. (4 to 6 inches in height)
Stacking the 16 cubic foot, Alpine kiln proved to be an interesting experience. I propped many of the pieces up with soft fire brick and stuffed others with Fibrefrax, a Carborundum Corporation product used for insulating kilns. After the cone 2 oxidation firing, I opened the door of the kiln to find every piece lying in a pile on the shelf. As I sorted through the wreckage, I found several bulbs that were still intact despite their drop to the floor. The seams were split, exposing the interior wall of clay that resembled the texture of the foam. As I examined the shards, I realized that hairline cracks must have occurred, and without the support of fiberglass the structure crumbled. I did save a few that were in recognizable pieces to photograph as a record of my tests.

At that point I felt the only alternative was to combine foam and fiberglass. There was a possibility the foam with its elastic quality and the fiberglass with its fusion could work together. My new sewn forms were foam with a fiberglass liner. Again I soaked the bags, blew them up, sprayed slip and fired them in an electric kiln. I chose the electric kiln thinking that the radiant heat would not be as hard on the pieces as the direct flame of the gas kiln had been. The fiberglass held up, but the foam pulled away and looked like peeling paint. Despite their fragility, I kept several of the forms that pleased me.

By the end of the summer, the test pieces that I had
saved didn't seem of much use to me. Looking through the book *Nature As Designer* by Butel Bager for inspiration, I began to sketch plant-like forms. Using hand-building techniques and wheel throwing, I constructed porcelain and earthenware tree trunk shapes. One particular piece was thrown in sections with porcelain and resembled a horn. Others were coil constructed earthenware bases that bloated and split apart in the firing. The recycled earthenware I used was over-vitrified at cone 5 and should have been fired at a lower temperature. I left a pattern of holes in these trunk-like bases since I intended to use metal tubing as branches and to cap each branch with a light bulb and shade. Suzanne Halvorson had suggested using vegetable shapes as shades. The idea appealed to me and I made plaster molds of every strange squash I could find. The thin porcelain shades were exciting and I could envision these all working together. However I decided not to pursue these forms because of the whole range of electrical problems inherent in my designs.

I decided to take an ordinary clay box, push holes in the sides and then force thin sheets of clay through the openings from the inside. I began with porcelain boxes, earthenware and raku. After I had fired the earthenware in sawdust and the porcelain to cone 10, the difference in shrinkage was so vast that the porcelain inserts did not cover the holes even though shrinkage had been considered.
I had wanted to work with two different clay bodies using the contrasting elements of each. I found some contrast in using Jane Peiser's additions for colored porcelain.

All the colors, except green, were translucent when the colorants were used with the Cornell porcelain. The glazed portions of these colored clays combined with light, presented a vivid image. Glazing was not essential in determining translucency.
Fig. 7 -- Porcelain box, sulfate surface decoration with clay on clay applique, fired to cone 10 with Marcie's Clear Glaze. (12 inches in height)

Fig. 8 -- Boxes with colored clay puffed top, pink (16 inches in height), lavender (9½ inches in height) and white (9 inches in height) fired to cone 10 using Marcie's Clear Glaze
RESOLUTION OF FORMS
Fig. 9 -- Porcelain shapes using urethane foam forms impregnated with commercial cone 6 slip and sprayed with Calgon solution and fired to cone 2. The base is uncooked tapioca adhered to the surface. (16 inches in height)

Fig. 10 -- Detail of Figure 9, the texture of the foam is evident in the interior of the piece on the right.
Fig. 11 -- Porcelain structures using urethane foam lined with fiberglass, then soaked with commercial cone 6 slip, sprayed with Calgon solution and fired to cone 2. Stuffed quilted muslin is used around the base of the clay forms. (13 inches in height)

Fig. 12 -- Detail of Figure 11.
While I had foam bag pieces still hiding on my shelves and the horn-shaped forms gathering dust in the corner, Tom Kekic came to see me. He ignored my recent boxes, and examined the foam shapes recommending that these become part of environments inside plastic boxes. Rather than putting the light inside the clay, the light could be directed from underneath each assemblage. I gathered all the bags together and designed clear plexiglass boxes that would fit into black plastic bases.

The very first foam asparagus shapes were glued to the base with silicone glue and at the suggestion of Nina Gaby, I used tapioca to build up the floor around the grouping which is illuminated by two miniature fluorescent lamps.

Each group presented different problems. The combination foam and fiberglass family seemed to fit into a muslin quilt with small cloth puffs growing around the porcelain. The cloth and clay have much the same warm color when illuminated. Using fluorescent lights which are cool burning helped eliminate the need for ventilation in the base.

Another collage of clay that had been sprayed with Calgon and sulfates demanded a satin base to complement the satin surface of the piece. With each environment I could not help alluding to images of similar cloth shapes growing around the clay.
Armadillo Pillow is a fond name for a piece that is simply mounted on a mirror. The clay has cracked into scale-like shapes which are supported by delicate fibers of glass.

The porcelain horn-shaped forms were still demanding some consideration. Luckily I had not thrown these away when the original idea had not worked. A thin sheet of porcelain formed into a puff and fit into the top of the horn solved one problem. Later clear cast resin extrusions were inserted into the existing holes. A light in the top and one on the smoky plexiglas base completed the form. Since I used incandescent lights in these pieces, I was concerned about heat build up. The pieces were tested for heat during eight to twelve hour cycles with no apparent problems except that the clay became quite warm to the touch.

Selecting the three boxes to represent this study was more difficult than I had thought. The construction of the proper bases was the problem. Two of the porcelain boxes have soft bases of vinyl stuffed with pillow stuffing and the third has no visible base. I am not entirely pleased with these solutions and feel the need for further consideration of them in the future.
Fig. 13 -- Collage of fiberglass and foam shapes that were saturated with commercial cone 6 porcelain slip sprayed with Calgon solution and sulfates, and fired to cone 2. The base is creamy white and green satin-stuffed pillow forms. (8 inches in height)

Fig. 14 -- Detail of Figure 13.
Fig. 15 -- Armadillo Pillow is fiberglass cloth saturated with commercial cone 6 porcelain slip and sprayed with Calgon solution and sulfates, then fired to cone 2. The piece is reflected in the mirror base. (7 inches in height)

Fig. 16 -- Detail of Figure 15. The texture of the fiberglass is visible in the cracks.
Fig. 17 -- Urethane foam was impregnated with cone 6 commercial porcelain slip and sprayed with Calgon solution, then fired to cone 2 (7 inches in height).

Fig. 18 -- Another view of Figure 17.
Fig. 19 -- Porcelain horn-shaped bases and puffed tops. Cast plastic extends from the holes in the porcelain and each piece stands on a smokey plexiglas box. Fired to cone 10, bases glazed with Marcie's Clear Glaze and puff tops left unglazed. (33 inches in height)

Fig. 20 -- Porcelain boxes with Marcie's Clear Glaze fired to cone 10. The bases are vinyl cushions stuffed with pillow stuffing. (6 inches and 10 inches in height)
In the summer (1975) Howard Shapiro, a visiting instructor at R.I.T., gave us the problem of constructing clay baskets. I attempted a large (22 inch) wheel-built basket. I had planned to complete it with a neon handle. I thinned the inside of the pot to form canals opposite one another that would conduct the neon tubing to the transformer in the base. The canals would hopefully be translucent and one would be able to see the neon through the walls of the clay. Unfortunately the glaze crawled and holes in the bottom sealed by excess glaze pooling in the bottom. The neon-lighted basket is a problem I still wish to solve.

Large forms in porcelain with neon present a real challenge to me.

Neon's flexibility and cool burning qualities provoke a multitude of ideas. When the problems of containing light in the combination clay-foam sculpture is resolved, neon will be the perfect complement to the forms.

As a result of my work in illuminated sculptures, I have discovered some challenges for the future.

I would like to explore the possibilities of illuminated wall plaques and resolve the effective use of colored clays in conjunction with light.

The thesis involvement has shown me that the results are not the end but only stimulus for the future.
IDEAS FOR THE FUTURE
Cornell Porcelain Cone 9-10

Grolleg China Clay...........55 pounds
Flint..........................12 pounds
Custer Feldspar...............20 pounds
Pyrophyllite..................13 pounds

Jane Peiser's additions for colored clays

pink.........................8% commercial pink stain
  (Standard Ceramic Co.)
yellow.......................8% commercial Naples yellow stain
  (Standard Ceramic Co.)
  (yellow only in oxidation)
green.......................½% green chrome oxide
blue.........................½% to 1% cobalt carbonate
  or 2.3% blue stain
  (Standard Ceramic Co.)
lavender....................5% pink stain and ½% cobalt carbonate

Sulfates - grams added to 100 cc. cool water

cobalt sulfate..............42.26 grams
copper sulfate...............25.00 grams
chromium sulfate...........12.35 grams
iron sulfate...............32.90 grams
manganous sulfate...........67.76 grams
nickel chloride.............42.46 grams
potassium bichromate........60.00 to 75.00 grams
Marcie's Clear Glaze Cone 9-10 (better at 10)

Cornwall Stone..................20 grams
Spodumene.......................18 grams
Dolomite.........................20 grams
Edgar Plastic Kaolin............10 grams
Georgia Kaolin...................10 grams
Flint.............................25 grams
Frit 3191.........................5 grams

White Orchid Porcelain Slip - Cone 6

Bell Ceramics
P.O. Box 697
Clermont, Florida 32711

To purchase in quantity

Dollman Ceramic Supplies
663 Walden Avenue
Buffalo, New York
Phone: (716) 894-0084

Glutrin: Robeson Processing Company
Erie, Pennsylvania

Polyox: Union Carbide Corporation
Chemicals & Plastics
270 Park Avenue
New York, N.Y. 10017

Buffalo Office: (716) 837-6450
Nylon flocking: Craft Service
337 University Avenue
Rochester, New York 14607
Phone: 325-5547

Fiberglass: (cloth and chopped strand)
Penfield Chemical Products
64 Whitney Road
Penfield, New York
Phone: 586-5461

Plexiglas boxes: (made according to specifications)
Wards Plastic Center Incorporated
556 Lyell Avenue
Rochester, New York
Phone: 458-3227

Glaze stains: Standard Ceramic Supply Company
P. O. Box 4435
Pittsburgh, Pennsylvania 15205

Calgon - Test by volume Surface Quality
10 ml Calgon to 100 ml water - slight gloss
20 ml Calgon to 100 ml water - satin matte
30 ml Calgon to 100 ml water - high gloss

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BIBLIOGRAPHY