1972

Polystyrene and Urethane Foams in Sculpture

Victor C. Connor
Eastern Illinois University

PAPER CERTIFICATE #2

TO: Graduate Degree Candidates who have written formal theses.

SUBJECT: Permission to reproduce theses.

The University Library is receiving a number of requests from other institutions asking permission to reproduce dissertations for inclusion in their library holdings. Although no copyright laws are involved, we feel that professional courtesy demands that permission be obtained from the author before we allow theses to be copied.

Please sign one of the following statements:

Booth Library of Eastern Illinois University has my permission to lend my thesis to a reputable college or university for the purpose of copying it for inclusion in that institution's library or research holdings.

July 24, 1972
Date

I respectfully request Booth Library of Eastern Illinois University not allow my thesis be reproduced because __________

Date

Author

pdm

POLYSTYRENE AND URETHANE

FOAMS IN SCULPTURE

(TITLE)

BY

VICTOR C. CONNOR

THESIS

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF

Master of Arts

IN THE GRADUATE SCHOOL, EASTERN ILLINOIS UNIVERSITY
CHARLESTON, ILLINOIS

1972
YEAR

I HEREBY RECOMMEND THIS THESIS BE ACCEPTED AS FULFILLING THIS PART OF THE GRADUATE DEGREE ABOVE

July 24, 1972
DATE

JULY 24/72
DATE

PAPER CERTIFICATE #2

TO: Graduate Degree Candidates who have written formal theses.

SUBJECT: Permission to reproduce theses.

The University Library is receiving a number of requests from other institutions asking permission to reproduce dissertations for inclusion in their library holdings. Although no copyright laws are involved, we feel that professional courtesy demands that permission be obtained from the author before we allow theses to be copied.

Please sign one of the following statements:

Booth Library of Eastern Illinois University has my permission to lend my thesis to a reputable college or university for the purpose of copying it for inclusion in that institution's library or research holdings.

____________________ Date

____________________ Author

I respectfully request Booth Library of Eastern Illinois University not allow my thesis be reproduced because ____________________

____

____

____________________ Date

____________________ Author

pdm

TABLE OF CONTENTS

PREFACE

The primary purpose of this paper is to familiarize other interested sculptors with urethane and polystyrene foam plastics. Certain aspects of form as it is related to the material are also included. It should be stressed that the discussions of form, including the working-approach I use, are of a personal nature and are not designed to influence anyone. I shall stress the relationship of material and form but will be the first to recognize the mass of influences that affect other artists including myself.

INTRODUCTION

The field of cellular plastics came about as a by-product of already existing plastics. While trying to eliminate porosity in resin, cellular plastics evolved by simply controlling what scientists had previously sought to eliminate.

Development of urethane foams go back to the 1930's; their use was related to construction in aircraft and shipping due to the lightness and strength of the material. A flexible version of urethane foam was also in use at this time for cushioning in car seats and furniture.

Epoxy foams did not develope until about 1949, and their use was similar to that of the urethanes in both aircraft and shipping. A few years earlier (during World War II) urea-formaldehyde foams were developed by the Germans for the purpose of thermal insulation. Foams in the United States at this time were used to float food and ammunition to shore during amphibious operations.

World War II also brought about vinyls, but the blowing agents used with this type of foam were too toxic for commercial use; however, non-toxic

agents were finally developed about 1950. Cellulose acetate and polyethylene foams also developed as a result of the war. In general it might be said that after World War II the United States took what Germany had learned and improved upon it.

Commercial production of extruded polystyrene in the United States began in 1944; however, expandable polystyrene was not developed until 1952 and again in Germany. The United States' variety of expandable polystyrene was not commercially available until 1954.

Silicone foams appeared commercially in 1952 and in powdered form about 1953; these required a high degree of heat to form and to cure, and they reached a maximum density of 10 pounds to the cubic foot.[1]

There are nine basic types of foamed or cellular plastics. They may be listed as: cellulose acetate, epoxy, phenol-formaldehyde, urea-formaldehyde, polyethylene, silicone, vinyl, polystyrene, and urethane.[2] The important thing to remember is that all plastics can be foamed, the difference in the two forms of the material being the addition of air or gas to form a cellular structure or foam.

Plastic Foam Characteristics

> "Cellular plastics are available in two types: closed cell, where each individual cell is a completely enclosed void, and open cell, where the cells are interconnecting as in a sponge."[3]

The cell structure is formed by what is generally termed as a blowing agent. There are seven basic ways in which cell structure is formed:

"1. Air is whipped into a suspension or solution of the plastic, which is then hardened by heat or catalytic action or both;
2. A gas is dissolved in the mix and expands when pressure is reduced;
3. A liquid component of the mix is volatilized by heat;
4. Water produced in an exothermic chemical reaction is volatilized within the mass by the heat of reaction;
5. Carbon dioxide gas is produced within the mass by chemical reaction;
6. A gas, such as nitrogen, is liberated within the mass by thermal decomposition of a chemical blowing agent;
7. Tiny beads of thermosetting resin, hollow or expandable by heat, are incorporated in a plastic mix."[4]

Foamed plastics now range in density from .1 to 60 pounds per cubic foot, the higher density foams being comparable to stone in terms of workability for the artist. Foams of varying types are also available in flexible forms; however, this paper concerns itself only with rigid foams and specifically polystyrene and urethane. Foams can be purchased commercially in block, slab, board, tape, liquid, spray, and pre-molded forms.

Major Uses

One of the primary uses of foamed plastics is for insulation. Nearly everyone is familiar with "styrofoam" coolers; the same or similar foam is used in commercial freezer units. Foam is also used to retain heat, but the level of heat must be below the melting point of the plastic. The insulation properties of foam are also used in sound and electrical insulation.

As mentioned above, rigid foams are used in aircraft and ship construction because of their great strength in relationship to their light weight. Foams are also being more widely used in building construction for ceilings as well as for insulation purposes. Foam is also widely used because of its floatation properties. Small boats, house boats, and life jackets are common commercial items that

take advantage of this property of foam. Perhaps the most common use of plastic foams is for packing; this may involve pre-molded shapes or loose beads or strands. Most foams at low density absorb impact and return to their natural state, making them ideal for this purpose. Pre-molded shapes are also being widely used for display purposes.

POLYSTYRENE FOAM

Polystyrene foams are inexpensive plastics available in large quantities. A wide range of blowing agents make this foam highly suitable for commercial production. It is commonly referred to as "styrofoam", which is the trade name given to this type of plastic by its developer the Dow Chemical Company. Styrene resins were first discovered in England about 1839, but high costs of production prevented further development. It was about one hundred years later, in 1937, when the Dow Chemical Company began to produce styrene resins commercially.[5]

There are two basic types of polystyrene foams; they may be classified as either extruded or expanded. The process for extruded polystyrene is simple in theory. Polystyrene solids are melted with heat and pressure in the presence of a gas or blowing agent. When the molten liquid, with the blowing agent present, is released from the pressure the blowing agent (gas) expands forming cells. These cells will continue to grow until atmospheric pressure is reached. Increasing or reducing the amount of pressure and varying the blowing agent used gives this product a wide range of densities.[6]

The expanded or molded process for making

polystyrene is also simple in theory. Small resin beads containing a blowing agent are exposed to heat and pressure (steam) much the same as in the extruded method. In this case, however, the gas expands under heat, and the beads fuse forming a cellular structure. Expanded polystyrene is not economically produced at higher densities; extruded polystyrene is substituted when higher density foams are needed.

The physical properties of both types of polystyrene are similar. Both are closed-cell, thermoplastic material, thermoplastic meaning that when heated there is no chemical change, only physical; they are both low in thermal conduction and are highly water resistant. The major fault of this material is its low resistance to solvents. Esters, ketones, aromatic solvents, and halogenated hydrocarbons are all true solvents for polystyrene products, but kerosene, mineral spirits, and gasoline, though not true solvents, will etch the surface of this material. Another problem that is frequently encountered is the yellowing or bleaching of the foam's color by ultraviolet light. The weather resistance of polystyrene itself is poor, but covering the surface of the material with latex paint or asphalt coatings gives it long-term durability.

Another problem that may affect the artist when using foam materials is its fragile nature; the foam surface is easily dented at low densities. This problem can be solved by covering the surface with various materials such as resins,putties, and so on. It is the lightness in weight found in low density foams which attracts the artist as well as building contractors, that is, lightness as compared to relative tensil strength.

These two types of foam (expanded and extruded polystyrene) are usually available in board form at local lumber yards, either in stock or through a catalogue. They may also be purchased in log or plank form. Polystyrene is readily available to the artist, and the tools for working with it are relatively simple and inexpensive.

The most obvious tool for working with this material is the saw, and it does saw quite easily. Polystyrene, "styrofoam", can also be modeled with wood rasps or wood files. The most interesting tool is the "hot-wire" tool, and the name of the tool is very descriptive as to its nature. It is simply a heat resisting wire with an electrical current passing through it; the heat of the wire is enough to melt the polystyrene. This particular tool, as well as other variations, can be purchased

or made in a workshop. For certain purposes a soldering gun might also be an effective tool.

Another valuable tool based on the same principle as the hot-wire tool (heat) is the hand torch. Polystyrene can be welded and melted with this tool quite easily. Depending upon the desired effect, various other tools can be used; it depends largely on the artist's imagination.

At this point certain safety factors should be mentioned. Ventilation is important when using "styrofoam", especially when burning, due to the fact that the fumes are highly toxic. Perhaps not so obvious a danger are the fine particles of dust formed when rasping or sawing this material. Plastics are resistant to body fluids, and if particles are inhaled they will collect and remain in the lungs. Wearing a mask is a simple way to prevent this danger.

URETHANE FOAM

The basic reaction producing urethane was discovered in 1848, but it took a century to perfect the reactions used today. Urethane foams are now well established in many industrial nations, and their growth potential in terms of other countries and further diversified formulas remains great.

In general, urethane foams are formed by the combination of two elements (polyols and diisocyanates) and a catalyst. The chemical formulas are rather complex, but basically two reactions occur. The first reaction involves the diisocyanates combining with the polyol, and the second reaction involves the generation of a gas or blowing agent. It is the heat of the first reaction that causes the gas to volatilize. Blowing agents cover a wide range in urethane foams and may be as simple as water, which during reaction gives off carbon dioxide gas.

Urethanes are of a closed-cell nature in the uncut state, and they possess excellent physical properties, even greater than those of polystyrene. It may also be said that the higher the density of this foam the greater the mechanical properties, such as strength and water resistance. Increasing the density, however, will lessen the effectiveness of thermal insulation, allowing heat to pass through

the solid. A density from 1 to 3 pounds per cubic foot is most effective for insulation purposes. Increasing density also increases water resistance, but at the same time, lessens the floatation property of the material.

The urethane foams surpass polystyrenes in resistance to chemicals and solvents. They are tougher and more mar resistant, even fungi resistant, and they are much more suited to exterior use. The same problem with ultraviolet light is present in urethane as in polystyrene, but again, exterior paints provide adequate protection.

The urethanes and polystyrenes are in commercial competition with each other. Polystyrene is the cheaper of the two foams, but ease of application makes the urethane equally attractive.

The urethanes are available to the artist in two basic forms, the "one shot" method and the "prepolymer" method.[7] The "one shot" method involves a polyol and isonate, water, and of course a catalyst. These components are all mixed simultaneously and are allowed to foam. The "prepolymer" method consists of a mixture of a polyol and an isonate called the "prepolymer" to which the catalyst is added.

Commercially urethanes are available in several

forms. Batch mixing is perhaps the most economically affordable to the artist. Basically all that is needed to batch mix is a suitable container, a mechanical stirrer, and something in which to measure the proportions of the liquids. The primary difficulty of this method lies in the control of the reaction which transpires quite rapidly. Also there is a certain amount of waste involved due to the container retaining much of the foam. Errors in measurement and mixing may also cause irregularity in cell structure. All of the disadvantages of the batch mixing method are solved by machine mixing. This method is very costly to the individual, and the imperfections of the batch mixing method can be used by the creative artist.

Another method, spraying, allows one to work on a vertical surface and in relatively thin layers. This method is used commercially for insulation, inside, outside, and underneath buildings. One of two basic types of spray guns can be used with this method. External mixing guns have separate valves which cause the two components to mix in midair and then foam on the surface which is being sprayed. Internal mixing guns mix the liquids in a chamber before leaving the gun, their advantage being a more complete mixing and maximum expansion factor in the

foam.

Urethane foams are also available in board and block forms, but they are not as commonly found as polystyrene. Most urethane products must be ordered.

Urethane foams like polystyrene foams handle quite easily for the artist with saws and rasps; they may be sanded by simply rubbing one piece of foam against another. Unlike polystyrene, heat treatments do not work well on the urethane foams, and organic surfaces are not easily created by this method. Batch mixing and allowing the urethane to foam freely gives the artist the organic surface he needs.

There is again the problem of fine particles of plastic dust in the air resulting from sawing or rasping, and a mask should be worn. Proper ventilation should also be available due to the fact that some blowing agents are highly toxic.

POLYSTYRENE AND URETHANE FOAMS IN SCULPTURE

The potential for using cellular foam plastics in sculpture was apparent from almost the beginning; it was lightweight (hauling would be relatively easy), and it could be easily cut and sanded. The method of sculpting with the hot-wire tool was apparent, but the extent of its potential was not known until the completion of the first element of the series "Positive,Negative".

"POSITIVE, NEGATIVE"

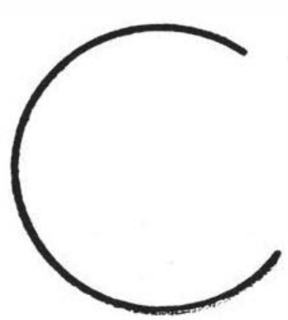
"POSITIVE, NEGATIVE," SERIES

The procedure involved in each peice of this series is simple, but the sculptural possibilities in terms of form alone are infinite. Each element of the series began by lamination of the basic block form. The next step was to cut out the basic inner form on the band saw; it was then a matter of modeling the surface with the hot-wire tool. After the definition of the inner form, it was simply replaced in the block and glued into place.

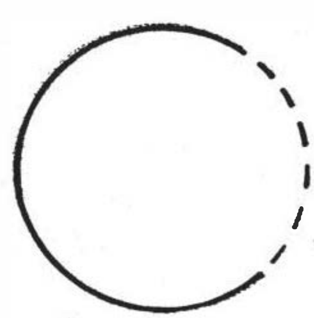
At this time the inherent blue color of the foam began to create problems. Comments were made to the effect that this same form would be enhanced if it were a bronze casting. At this point in time, the artist was inclined to agree with this line of thought and proceeded to paint the form with white latex. This covering served to protect the surface from ultraviolet rays, but essentially what had been done was to deny the natural color of the material by painting the form white. This was resolved as being better than denying the form by casting it in bronze. Obviously the form presented was not of a cast nature; rather it was fabricated, and the presence of the lamination lines and a clean surface added to this factor. The emphasis of this piece, in terms of the use of foam plastics, lies in the

form; that is, the form is inherent in the foam, and the color has been altered so that the form can be better understood.

At this point it becomes necessary to define several terms involved in these sculptural forms. Positive space is of course a tangible sculptural piece (what one can touch and feel); negative space involves the intangible space surrounding the sculptural form. Difficulties arise with the concept of "positive-negative" space. "Positive-negative" space consists of both positive and negative space but is actually neither of them. Another term for "positive-negative" space might be "active" space, spatial areas that are involved in the sculptural form rather than passive in their presence. Through the principle of closure, some otherwise referred to negative areas of space become trapped in the sculptural form. Closure can be defined as the tendency of the human eye to complete an incomplete exsisting shape or form. A simplified example is diagramed below:



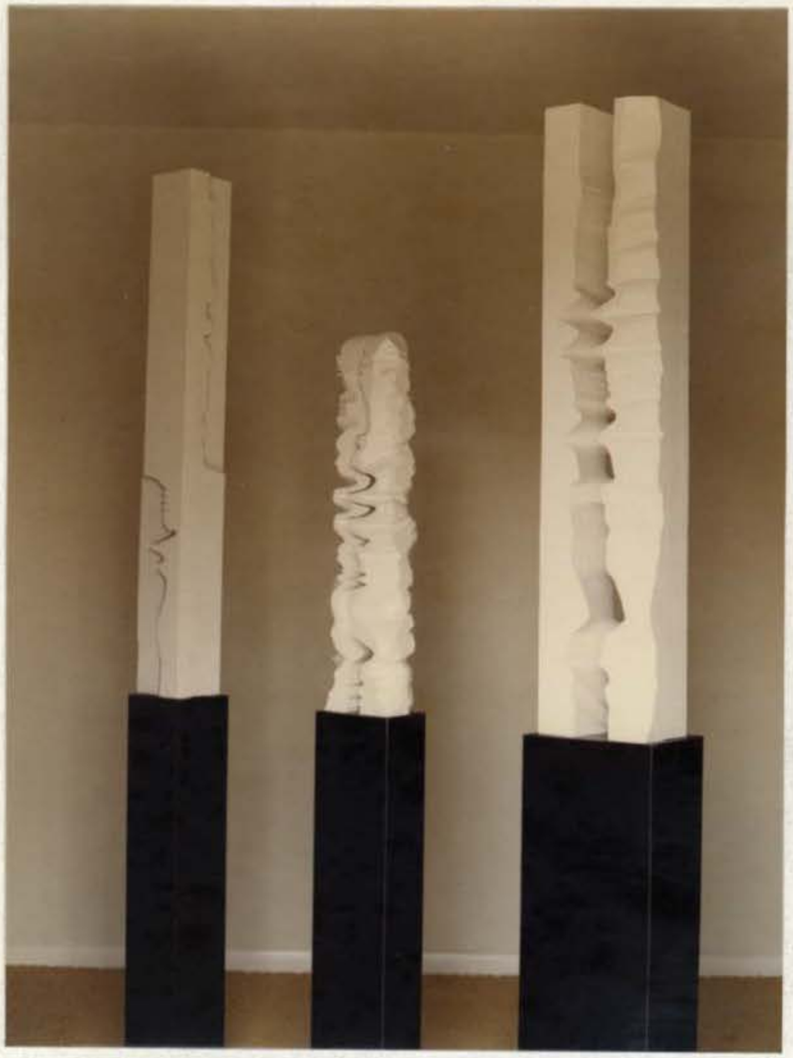
OPEN SHAPE



CLOSURE EFFECT

To a certain degree, the series "Positive, Negative" involves closure and "positive-negative" space but not to the extent of the column series.

"COLUMNS I, II, AND III"



"COLUMNS I, II, AND III"

The column series is an attempt to exploit the closure effect to the point where the positive-negative or active space is actually the sculptural form.

The procedure again started with the lamination of sheets of extruded polystyrene from the Dow Chemical Company and cutting the outer block form on the band saw. The next step was to split the column with the hot-wire tool and seperate the

halves; white latex was again used as a protective covering and for shadow effect.

Something should perhaps be said about the bases used in this series. There are actually two bases included in each element of the series. The black boxes can be described as the functional bases in each of the forms; functional in the sense that they serve to support the pieces. Also included in each piece is a sculptural base, or that portion of the piece which contains the sculptural form. If the sculptural form is indeed considered to be the active space created by the element of closure, then the outer column in a sense serves as a containing element for the form, thus the sculptural base. This must be considered in light of a working-approach for the artist. To be more descriptive, the active space is the form; the column confines and defines that form and is the sculptural base. The black base is functional in that it supports the piece. This is not to say that each of the elements is entirely seperate; certainly none could exist without the other, but each possesses qualities different from the other. The functional bases (the black columns) in this case are involved in emphasizing the column, and the form would take on a different quality if it were removed. It is a

part of the piece and so on. As a last word on bases in terms of the working-approach of the artist, the resting place of any piece (floor, wall, etc.) is also a functional base. Carrying this approach to the extreme, each of the pieces in this series has two functional bases as well as a sculptural base.

Having gone so far as to include walls in the catagory of functional bases, the sculptor is led to another area, the wall piece.

"BLOSSOM"

The procedure involved in "Blossom" is again simple and basic in terms of using the medium for sculpture. Extruded polystyrene is flash or flame retardant; that is, it will not sustain a flame. The material does, however, melt easily with a hand torch and can be welded. The piece began by cutting blocks of polystyrene, which had been laminated with resin glue, with the hot-wire tool.

"BLOSSOM"

These pieces were then welded together into the basic form. Further treatment was added to the surface by heating and melting. No color effect other than heat is present on the foam itself; however, the aluminum piece attached is painted with spray enamel.

The form in the case of "Blossom" is perhaps not as important as the method used. Sculpture is often spontaneous in conception, but is not normally thought of as spontaneous in creation. The freedom involved in a piece of this nature sets it apart from previous works and leads to others of a similar spontaneity.

"OUTSIDE CORNER #1"

"OUTSIDE CORNER #1"

The outside corner is an interesting problem; the intersection of two walls can be an imposing force to conquer. The rigid vertical line formed by the intersecting walls is compounded in the case of the outside corner by the unusual circumstances. It is possible while viewing one wall of the corner that the other wall may not be visible. The problem is one of flow in the form, and the

right angle is difficult to flatten out in a short distance. The procedure involved in forming "Outside Corner #1" is similar to that of "Blossom", which has been elaborated above. The pseudo-organic nature of the form helps to continue the flow around the corner as well as destroy the rigid vertical line formed by the intersection.

"INSIDE CORNER #1"

A similar problem found in the outside corner is present with the inside corner, but the viewing angle is greatly decreased. The outside corner offers a two hundred seventy degree viewing angle, while the inside corner offers only a ninty degree view, thus making the transition from one wall to the other less complex. Though similar in terms of the harsh vertical line created by the intersection

"INSIDE CORNER #1"

of two walls, the spatial relationship in the inside corner is quite different than that of the outside corner. In the case of the inside corner, the space surrounding the piece is of a confining nature. The outside corner, on the other hand, is not nearly as confining as the inside corner. All forms of wall sculpture are more confining than free standing sculpture in terms of space. The most confining of these forms is the inside corner.

The procedure is again the welding of polystyrene with a hand torch. In "Inside Corner #1" the flowing form and organic nature of the lesser forms are again used to conquer the space. The final surface is painted with white spray paint, bringing out some of the finer surface textures.

"AMERICAN CHRISTMAS HOLIDAY"

"AMERICAN CHRISTMAS HOLIDAY"

"American Christmas Holiday" is an inside corner piece but with a different approach than that of "Inside Corner #1". This piece goes back to previous forms that dealt with active space.

The procedure involved lamination of polystyrene sheets forming the larger of the basic block forms, and a urethane cube was used for the smaller block

form. The block forms were then glued together. Development of the active space took place by two methods, rasping and melting with a hand torch. After forming, the entire piece was painted with white latex in order to protect it from harmful solvents. The piece was then flocked red and blue, and the white area was painted with spray enamel.

The piece itself is again an attempt to disrupt the corner space. The rigid block forms or sculptural bases do this to a certain extent, and the form or active space (defined by the white area) is,as in other corner pieces, organic and flowing. Color is also a factor in this piece as well as a textural effect of flocking. All of these elements combine in an effort to relax, even destroy, the harsh intersection of the corner.

"JUNKYARD WITH SNOW"

"JUNKYARD WITH SNOW"

"Junkyard with Snow" is a seperation from previous works in material as well as form. Originally designed for the wall, it also works well as a floor piece, and, as large walls are hard to find, it is also more practical when displayed on the floor.

Urethane foam was used to create this piece; it is quite simple in design and form eventhough the lesser forms and organic textures make it seem highly complex. The basic form was laid out with cardboard boxes, blankets, and plastic drapes;

urethane foam was then sprayed on the form. Varying degrees of textures were arrived at by changing the amount of pressure on the spray gun. Many of the super-organic textures were gotten by allowing the foam to expand freely with virtually no pressure. Similar results can be obtained by batch mixing and by what is commonly referred to as free-foaming. This simply means that the foam is not confined, as in a mold, and is allowed to expand naturally.

After foaming, the piece was cut into smaller sections with a hand saw for transporting purposes. The final treatment was a great deal of spray painting with white exterior latex.

This piece was designed around the material

Detail "JUNKYARD WITH SNOW"

from which it was made. The super-organic textures obtained by using urethane foam required a simplistic over all form so that the piece would hold together. The simple form, large size, and super-organic lesser forms and textures are the contrasts which make this piece.

"OBADIAH'S STONE"

The piece "Obadiah's Stone" involves yet another technique in foam sculpture. The form was cut from a laminated block of urethane foam with a rasp. The form was then covered with wood putty, adding strength. The wood putty surface was then covered with resin glue, and aluminum foil was laid on it. After the glue had set a burnisher was used to flatten the surface of the foil to the underlying

"OBADIAH'S STONE"

form. Next the foil was spray painted with black enamel, and the surface was highlighted with steel wool. The final covering on the piece is varnish.

The form in this piece approaches minimal style, relying upon very few lines and contours to define itself. This contrasts with the surface which is quite active. The significance of this piece lies in its contrast of form with the previous work "Junkyard with Snow". The material with which the sculptor works dictates certain limits. The versatility of the foam material allows a wide variation of form and gives the artist an extreme range of contrasts with which to work.

"DEPENDENT FORMS"

"DEPENDENT FORMS"

"Dependent Forms" was developed by lamination of extruded polystyrene foam sheets. The cube form was first shaped with a rasp, and the organic explosion was added by welding with a hand torch. Some of the more crisp lines in the organic portion of the form were developed with the hot-wire tool. Wood putty was added to the cube for protective purposes. Next white latex was used to seal the

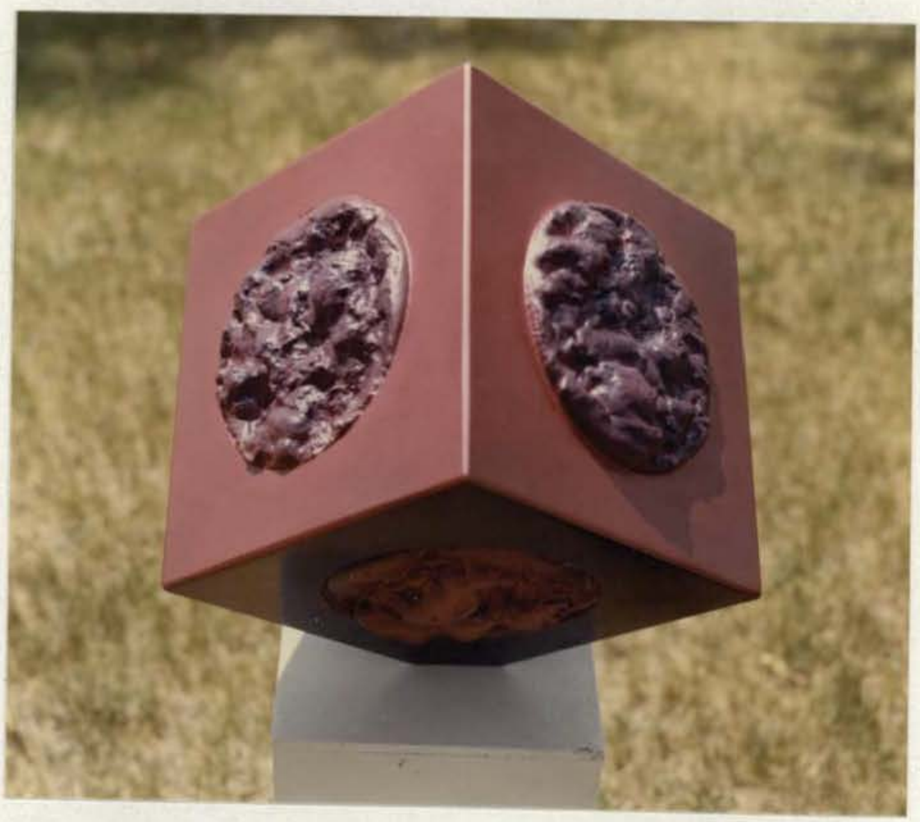
piece from harmful solvents. The final stages of development involved filling and sanding to prepare the surface for painting.

This piece again takes advantage of the high contrast between geometric and organic forms. The versatile nature of the foam is again expressed.

In addition, the form is concerned with active space. In terms of a working-approach for the artist, the green cube portion of the piece serves as a portion of the base to project the active space. This is not to say that the cube is not part of the sculpture; it is, but from a working standpoint its primary purpose is to create the open area. The relationship between the working-approach and the final result may not always be clear to the viewer, but it is important in a better understanding of the sculpture. For a person to say that he likes a sculptor's work is one thing; for him to understand it is quite another. Ideally a better understanding of the artist's working-approach will increase the viewer's appreciation for the piece itself.

"JEWEL BOX #2"

Contrasts were again the basis for the development of the piece "Jewel Box #2". The procedure involved the making of six sides of the cube from particle board then mitering and piercing each side with a circle. Batch mixed foam was then allowed to expand out of the circular openings before the box was put together. The finishing touches involved filling, sanding, masking, and spraying the piece.



"JEWEL BOX #2"

The entire cube was first painted grape; the deep bluish-purple was arrived at by over-spraying a transparent blue.

As stated above, the piece deals with contrast. The over all form is geometric and radially symetrical, but foam pushing out from the inside of the cube adds a highly organic contrast. The coloring pattern is also used for further emphasis. This sculpture approaches the severity of minimal form. Only the eruption of the foam, giving an organic quality and contrast, keeps it from becoming pure and minimal in style.

"MOON-CALF"

"MOON-CALF"

"Moon-Calf" is similar in approach to "Jewel Box #2". In this sculpture the procedure was to first build the box from particle board then allow foam to expand inside the cavity. Control of the foam material was made less difficult by using a series of small amounts of liquid foam rather than trying to fill the entire cavity in one pouring.

After construction of the form, filling and sanding prepared the surface for painting. The entire piece was first painted brown; then a series of stripes were masked off around the open cavity. Green was then sprayed over the geometric portion of the form and was allowed to highlight the organic cavity. The piece was then masked off so that the cavity could be painted. A light mist of white was used on the organic surface, and finally a light coat of orange was applied.

Like the previously discussed form, "Moon-Calf" approaches minimal style; it is bilaterally symetrical, but the organic area results in a contrast that reduces this effect.

This sculpture is also the most obvious attempt by the artist at defining an active space. The oval opening is intended to be completed by the viewer's eye through the element of closure, hopefully setting this area of space apart from the negative space surrounding the form.

"MZIMA"

The sculpture "Mzima" was formed partially by a process known as resin "lay-up". This involved the masking off of areas on a pane of glass (in this case sides, tops, and bottoms of columns) and putting down a mold release. Laminating resin was then brushed on and was allowed to set. The next step was to lay fiberglass cloth into the same areas and flow on more resin. After building up a thickness of approximately an eighth of an inch, the sections of the columns were removed from the

"MZIMA"

glass. All edges were then ground to approximately a 45 degree angle. The sides of the boxes were put together with masking tape, and resin was used to fuse them together; the same method was used on the top and bottom of each column. The outside seams of the columns were filled with resin and filed; the finishing touch consisted of several coats of blue spray enamel.

With the columns completed, the next step was to construct from cardboard two columns of the same size on which the organic form was created. Paper towels and masking tape were fastened to the cardboard columns defining the basic form of the piece. Batch mixed foam was then poured in a series of small amounts over the towel and tape armature. The foam was allowed to cure for 24 hours then was sprayed with a mist of white enamel. The foam was removed from the cardboard and was glued in place on the resin columns.

The form "Mzima" is similar to previous pieces in terms of contrast between the geometric and organic. It seems, however, to be less minimal in style than either "Jewel Box #2" or "Moon-Calf"; the organic section of the sculpture is proportionately larger and more powerful and is not involved with active space.

CONCLUSION

Conclusion is a very difficult concept for many artists to deal with, myself included. The paper is concluded, and I can highly recommend the use of foam plastics in sculptural form. Plastic foams lend themselves to many traditional forms of sculpture; they can be carved, rasped, sanded, and welded. Their major advantage lies in these traditional forms in combination or contrast with the peculiar aspects of the material, such as the organic nature of free-foamed urethanes. The fact is I have only scratched the surface of a large rock; probably all of the artists working in all types of plastics feel the same about their fields. The cultural lag between the technological aspects of plastics and what the general public knows is great, and several generations may be needed to bridge this gap. As an artist I see myself as somehow beginning to bridge this gap, realizing that some form of cultural lag will always exist. Whether or not I will see the present gap close is not nearly as important as the fact that it will happen.

FOOTNOTES

[1] Plastics Engineering Handbook of the Society of the Plastics Industry, Incorporated, 3rd. ed., (Reinhold Publishing Corporation, New York; Chapman & Hall; Ltd. London, 1960), pp. 137-38.

[2] Thelma R. Newman, Plastics as an Art Form, (Chilton Company; Philadelphia, 1969), p. 39.

[3] J. Harry Dubois, Plastics, (Reinhold Publishing Corporation; New York, 1967), p. 113.

[4] Plastics Engineering Handbook of the Society of the Plastics Industry, Incorporated, op. cit., p. 136.

[5] J. H. Dubois, Plastics, (American Technical Society, Publishers; Chicago, 1944), p. 106.

[6] Architectural Research on Structural Potential of Foam Plastics, 2nd. ed., (Architectural Research Laboratory, University of Michigan; Ann Arbor, 1966), p. 3.29 .

[7] Plastics Engineering Handbook of the Society of the Plastics Industry, Incorporated, op. cit., p. 172.

BIBLIOGRAPHY

Architectural Research on Structural Potential of Foam Plastics. 2nd. ed., Ann Arbor: Architectural Research Laboratory, University of Michigan, 1966.

Clarke, Geoffrey, Stroud Cornock, A Sculptor's Manual. New York: Reinhold Publishing Corporation, 1968.

Dubois, J. H., Plastics. Chicago: American Technical Society, 1944.

Dubois, J. H., Plastics. New York: Reinhold Publishing Corporation, 1967.

Ferrigno, T. H., Rigid Plastic Foams. 2nd. ed., New York: Reinhold Publishing Corporation, 1967.

Gait, A. J., E. G. Hancock, Plastics and Synthetic Rubbers. New York: Pergamon Press, 1970.

Guilfoyle, Rodger J., ed., "Free-Flowing Foam", Industrial Design. Vol. 18, May 1971, p. 44.

Mills, John W., The Technique of Casting for Sculpture. New York: Reinhold Publishing Corporation, 1967.

Newman, Thelma R., Plastics as an Art Form. Philadelphia: Chilton Company, 1964.

Plastics Engineering Handbook. 3rd. ed., New York: Reinhold Publishing Corporation, 1960.

Redfarn, C. A., A Guide to Plastics. New York: Philosophical Library, 1958.

Rosen, Harold J., "Plastic Resins", Progressive Architecture. January 1971, p. 44.

Simonds, Herbert R., Concise Guide to Plastics. New York: Reinhold Publishing Corporation, 1957.

Swanson, Robert S., Plastics Technology. Bloomington: McKnight and McKnight Publishing Company, 1965.

COLOR PLATES

Photography

by

David Mobley
Sullivan, Illinois