



New materials, new methods = new expression in today's sculpture  
by Harriett Turner Wyman

A thesis submitted to the Graduate Faculty in partial fulfillment of the requirements for the degree of  
MASTER OF APPLIED ART  
Montana State University  
© Copyright by Harriett Turner Wyman (1967)

Abstract:

The work presented in this paper is in partial fulfillment of the requirements for the degree of Master of Applied Art at Montana State University in Bozeman, Montana. Current trends in sculpture indicate that more and more artists are using chemically produced synthetics as legitimate media for their work. I feel that this trend will not only continue, but will eventually dominate the sculpture material field of the future. I expect to continue in the academic field, as well as practicing sculpture myself, and therefore felt that a study of these new materials would be both worthwhile and necessary. I have had to use data prepared primarily for industrial use as the criteria for my selection of materials to be used for further consideration. Many other materials could have been included as possibly having future usage in the field of sculpture, but I have had to limit this study to those materials that I felt should be investigated for use at the present time for the sculptor, as well as the student-sculptor.

This paper is not intended to be a scientific discussion of the materials presented, but instead I have tried to present a cross-section of the materials already being marketed with the sculptor in mind.

I selected four different synthetically compounded materials which were subsequently used in experimental projects. Each of these materials could have presented enough comprehensive work for individual thesis projects. I felt, however, that work done on different types of material would give the sculptor some idea as to whether he might like to use this particular media for his own experimental investigation.

I found that these materials presented a challenge. I tried to select a meaningful experiment for each material chosen to be tested. Without exception, I would have liked to further investigate each media.

I feel that I shall, in the future use each of these new materials again, and wholeheartedly recommend an excursion into the field of plastic sculpture to today's sculptor.

NEW MATERIALS, NEW METHODS = NEW EXPRESSION  
IN TODAY'S SCULPTURE

by

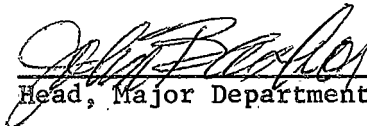
HARRIETT TURNER WYMAN


A thesis submitted to the Graduate Faculty in partial  
fulfillment of the requirements for the degree

of

✓ MASTER OF APPLIED ART

Approved:

  
Head, Major Department

  
Chairman, Examining Committee

  
Graduate Dean

MONTANA STATE UNIVERSITY  
Bozeman, Montana

August, 1967

ACKNOWLEDGEMENT

I wish to take this opportunity to thank those who so graciously gave of their time and effort to help me in the completion of this work.

Mr. Cyril Conrad, Mr. John Geiser, Mr. Lawrence Hayes, and my daughter and son-in-law, Mr. and Mrs. Neal Schantz, for their influential interest which encouraged me to begin the study.

The members of my Graduate Committee: Mr. Charles Hanton, Chairman, Mr. John Bashor, Mr. Robert De Weese, Dr. Harry Hauser, and Mr. John Langenbach. The gentlemen who served pro-tem: Mr. John Geiser, Mr. Jerry Berneche, Mr. Tarmo Watia, Mr. Cyril Conrad, and Mr. Walter Jule.

TABLE OF CONTENTS

	Page
VITA . . . . .	ii
ACKNOWLEDGEMENT . . . . .	iii
LIST OF ILLUSTRATIONS . . . . .	vi
ABSTRACT . . . . .	vii
INTRODUCTION . . . . .	1
INTRODUCTION TO PLASTICS . . . . .	3
CHAPTER I . . . . .	8
THERMOSETTING RESINS . . . . .	8
Epoxy Resin . . . . .	8
Epoxy resin experimental project . . . . .	8
Polyester Resin . . . . .	10
Casting resin . . . . .	11
Casting resin experimental projects . . . . .	11
Laminating polyester resins . . . . .	17
Laminating polyester resin experimental projects . . . . .	18
Putty-glass . . . . .	20
Putty-glass experimental project . . . . .	20
Foamed polyurethane resin . . . . .	22
Foamed polyurethane experimental project . . . . .	22
CHAPTER II . . . . .	24
THERMOPLASTICS . . . . .	24
Acrylics . . . . .	24

	Page
Acrylic experimental project . . . . .	24
CONCLUSIONS . . . . .	27
SUPPLY SOURCES . . . . .	30
LITERATURE CONSULTED . . . . .	32

LIST OF ILLUSTRATIONS

	Page
"Reclining Nude", Epoxy resin experimental project . . . . .	9
"Kinetic Action", Polyester resin casting project . . . . .	14
Closeup of "Kinetic Action", Polyester resin casting project . . . . .	15
"Opposing Forces", Polyester resin casting project . . . . .	16
"Sun Filter", Polyester resin laminating project . . . . .	19
"War Figures", Polyester resin putty-glass project . . . . .	21
"Windblown", Acrylic project . . . . .	26
General view of work displayed at the Thesis Show in the Montana State University Library . . . . .	29

ABSTRACT

The work presented in this paper is in partial fulfillment of the requirements for the degree of Master of Applied Art at Montana State University in Bozeman, Montana.

Current trends in sculpture indicate that more and more artists are using chemically produced synthetics as legitimate media for their work. I feel that this trend will not only continue, but will eventually dominate the sculpture material field of the future.

I expect to continue in the academic field, as well as practicing sculpture myself, and therefore felt that a study of these new materials would be both worthwhile and necessary.

I have had to use data prepared primarily for industrial use as the criteria for my selection of materials to be used for further consideration. Many other materials could have been included as possibly having future usage in the field of sculpture, but I have had to limit this study to those materials that I felt should be investigated for use at the present time for the sculptor, as well as the student-sculptor.

This paper is not intended to be a scientific discussion of the materials presented, but instead I have tried to present a cross-section of the materials already being marketed with the sculptor in mind.

I selected four different synthetically compounded materials which were subsequently used in experimental projects. Each of these materials could have presented enough comprehensive work for individual thesis projects. I felt, however, that work done on different types of material would give the sculptor some idea as to whether he might like to use this particular media for his own experimental investigation.

I found that these materials presented a challenge. I tried to select a meaningful experiment for each material chosen to be tested. Without exception, I would have liked to further investigate each media. I feel that I shall, in the future use each of these new materials again, and wholeheartedly recommend an excursion into the field of plastic sculpture to today's sculptor.

## INTRODUCTION

Art galleries and museums are accepting more and more sculpture done in the new materials. Plastics are not really new, but have been newly accepted as legitimate media for sculpture.

The sculptor, while cognizant of the new connotation of the word 'plastic' still initially interprets the word as meaning any substance which is sculptural, or capable of being used, by him, to express his idiom. Thus, to the sculptor, as to no one else, the plasticity of the newly developed, synthetically compounded materials are excitingly important.

Throughout history, industry has taken over the production of products made out of materials which were first introduced by the sculptors of that epoch. Industry reversed this procedure in the field of synthetic materials, however, and first used these man-made materials, before the sculptor discovered their potential.

When the industrialist, during World War II, found that many materials necessary to the war effort were becoming scarce, and often non-obtainable, he began a concerted investigation of synthetically produced, substitute materials. While some of these materials remained 'substitutes', many came to be accepted as new, legitimate materials, possessing workable properties heretofore unimagined. The field of synthetically compounded materials has just been opened up, for the chemist discovers new materials daily, while constantly revamping and improving the materials already being used.

A comprehensive study of all of the materials available today would

be impossible for the layman, however, the artist-supplier has had to do this very job, in order to keep abreast of the materials that might be used by the artist, as well as the craftsman. This preliminary study, by them, has been especially helpful in my study, as I began where they had left off in many instances. When I decided a certain type material seemed to have the properties desirable in the field of sculpture, I found that this material was being marketed by some manufacturer. By correspondence, I was able to obtain this material for my work. Local art dealers were anxious to order any materials that I wanted, for they, too, wanted to know the potential usage of each of these materials.

The sculptor has not been unaware of this silent revolution in the field of sculpture materials. Many are already using these synthetic materials in exciting ways, but many still feel the passee connotation of the word 'plastics' to be a stigma to his artistic creation.

T. R. Newman has done a great deal of research in the field of plastics, and I have found much helpful material on the potential of plastics in a recent publication by this artist-author.

## INTRODUCTION TO PLASTICS

Plastics are defined as substances which can be permanently formed or deformed under external stress or pressure, usually accelerated by the application of heat. The newly created form retains its shape by cooling, chemical action, or the removal of a solvent through evaporation.

Early in the century the artist Moholy-Nagy saw the future of plastics as an art medium, and warned the future artist that he must either take up scientific studies, or wait decades until knowledge about plastics became commonplace. This knowledge is more obtainable today, but is not yet commonplace. That the artist would seek this knowledge, in order to make use of this very versatile group of materials, has proven true, for they are becoming accepted art media. A scientific vocabulary, together with scientific knowledge would be helpful, but a perusal of available materials gives one enough vital information to be able to select a product that seems to have the characteristics that one is looking for to answer a specific need.

The basic component of any plastic is petroleum, gas, coal, sand, water and air. The differences inherent in the various plastic families are based upon the varying formulation of these components. Plastics fall into two general categories; the thermosetting plastics and the thermoplastics. The thermosetting plastics become solid when heated, while the thermoplastics soften when heated and harden while cooling. T. R. Newman, on page twenty-five of her book, Plastics, differentiates these two categories in this manner:

"Cross-linking of the thermosetting plastics holds chains.

of molecules tightly together. As a result, once the polymerization\* is completed and the polymer is hardened, heat will not soften it. The thermosets will not become fluid again if heat is applied but will remain solid up to their decomposition temperature. Clay is an example of a thermosetting material.

The thermoplastics, on the other hand, are made of coiled and long molecules intertwined in a tangled maze. When temperatures are normal, the molecules lie quietly. But once they are heated, the molecules begin to move around and the plastic becomes flexible again. Further melting causes the molecules to slip and slide over one another. The melted plastic becomes fluid. When cooled, the plastic will harden again and will go back to its original shape (this is often called plastic's "memory"). If heating continues, however, the thermoplastic will decompose. Metal is an example of a thermoplastic material. ....The plastic chemist actually takes natural resources apart, breaking them down to their basic molecules and atoms. With these building blocks he uses heat, pressure, or chemical action to cause these building blocks to combine in order to create the new polymer."

From the thermosetting resins I decided to work with epoxy, polyester resins, and urethane resin foam. Urethane resin falls into the thermoplastic category, but in its foam state become thermosetting. Aside from the acrylics, I felt that most of the thermoplastics held little

---

\*Polymerization is the act of combining two or more molecules into a single larger molecule.

interest to the sculptor, at this time, due to the high heat and pressure needed in fabrication. Therefore the experimental work done for this thesis project was with these four compounds: epoxy, polyester resins, urethane resin foam, and acrylics.

Epoxy is a thermosetting resin product with almost limitless promise in the sculptural field. Its weatherability make it ideal for exterior work, while its light weight make it acceptable for large sculptures. It is quite expensive now, but has been used a great deal, in spite of this, because of its ability to accept additive fillers which not only extend the epoxy, but also create exciting finishes. Powders of different metals give metal-like sculptures. However, textures are possible with this material that are impossible in cast or welded metal sculptures.

The polyester resins can be divided into three general categories; casting resins, laminating resins, and putty glass. Although all of the polyester resins are virtually identical in composition, control of the catalytic element and the additives result in working properties that answer specific requirements.

Casting resins are used to form an object by pouring the catalyzed resin into a mold. Objects may be embedded in the castings if desired. These resins are compounded to be extremely clear. A meticulously refined product gives one-hundred percent clarity that does not distort in thick castings, but where less clarity is acceptable, a less expensive casting resin may be utilized.

The laminating resins are formulated to stay soft in the air, thus allowing complete bondage of subsequent coats of resin. The final coat

is made air-drying by the addition of a special catalyst to the resin.

Putty-glass has a thixotropic material added, which makes it thick enough to be applied to vertical surfaces.

Urethane resin foam is an exciting new sculptural material. It is formed, as are all the plastic foams, by the addition of gas or air into the cells of the plastic while it is being manufactured. A product, which is catalyzed and foams while the artist is forming his sculpture, is being marketed, while sheets and blocks of the already-foamed urethane resin are more usually obtainable. This foaming while sculpting process opens a new facet of the art to sculptors. I was unable to obtain the product, but feel sure that it will soon be available locally.

Acrylics, as Lucite and Plexiglass have been used for many years with splendid results. They are perfectly clear, and machine extremely well. However, a new type material has recently been marketed by Grumbacher, Inc. of New York. This utilizes a syrup consistency acrylic with marble dust, which dries to a hardness that can be machined or carved. It will also accept additives, and it was this property that I investigated.

NAME	AVAILABLE FORMS	MOLDING QUALITIES	MACHINING QUALITIES	SCULPTURE POTENTIAL
<u>THERMOSETTING RESINS</u>				
Epoxy	Molding compounds Liquid resins Foamed blocks Adhesives Coatings	Good	Unfilled epoxy is good Filled epoxy is poor	Almost limitless shows great promise Adheres to a great many surfaces
Polyester resins	Liquids Dry powders Pre-mixed molding compounds Cast sheets Rods & tubes	Very good	Good	Exceedingly versatile Almost limitless potential Needs little or no heat Can be catalyzed at room temperature Properties vary according to manner with which mixed 1. Styrene-based polyester 2. Acrylic-based polyester
Polyurethane (urethane)	Liquid & solids Foams: Slabs, sheets blocks 2 & 3 package system for on the job mixing a. open cell foam-in place (flexible) b. closed cell (rigid)	Good to excellent	Fair	Excellent for both subtractive and additive methods
<u>THERMOPLASTICS</u>				
Acrylics (methyl methacrylate)	Rigid sheets Rods & tubes Molding powders Syrup & liquid	Excellent	Fair, for cast acrylics Excellent	Excellent potential as machined forms One form used as a modeling paste <sup>1/</sup>

<sup>1/</sup> Newman, Thelma, R. Plastic as an Art Form

## CHAPTER I

### THERMOSETTING RESINS

#### Epoxy Resin

The first experimental project in the thermosetting resin group was with epoxy resin. This product is extremely light weight when polymerized, had excellent weatherability, and accepts additive fillers with good results. Epoxy resin and polyester resin have similar properties. They may be used similarly, with almost identical results. Epoxy is used when shrinkage must be kept minimal, or where better water resistance is required. Epoxy, however, is more expensive and tends to be less clear than the polyesters. Fillers are used to make the resin less costly, or to improve its physical properties such as hardness, stiffness, or impact strength. The Fiberlay Company markets an epoxy resin called Epotuf. I used this product in my work, using aluminum powder as the additive filler. This may be used over a regular armature in an additive process, or used as an overcoating to a less stable material, such as one constructed of plaster. This coating renders the finished statue impervious to dampness and weathering, thus prolonging its life span. The finish can be made to resemble any metal that has been used as an additive. Many interesting textures may be obtained, using various tools on the surface, either while applying the epoxy mixture, or immediately thereafter.

#### Epoxy resin experimental project

My epoxy experimental project was a reclining nude statue. An



"Reclining Nude", Epoxy resin experimental project

armature was constructed of welded rods to form the general shape of the finished statue. This was covered by successive coats of plaster until the form was realized. When the plaster was cured, the surface was completely finished, using plaster rasps and sandpaper. The epoxy coating was prepared by adding aluminum powder to the resin, keeping below the forty-percent powder to resin as directed by the manufacturer. The epoxy resin was catalyzed and applied to the statue. I used an ordinary teaspoon to smooth the resin coating after it had been applied with a rubber kitchen scraper. This gave an interesting finish, which I patinaed later using paste wax, to which ground color had been added.

I think this product is very versatile, and has great potential in sculpture, as well as in classroom projects. A very fine prepared product called Sculpt-Metal is available that simplifies use.

#### Polyester Resin

The resins used in art work are from the unsaturated polyester resin group, as distinguished from the saturated types used in the manufacture of cloth fibers, such as Dacron. The unsaturated polyester resins are extremely versatile, and can be chemically formulated to meet many and diversified requirements. The artist is offered several different formulations of polyester resin, and should be familiar with the individual properties of these products. Basically these resins fall into four different categories according to their potential use. These general groups are: the casting resins, those for lamination work, putty glass,

and the foamed varieties. Each has distinct characteristics and uses. Those I selected were marketed by the Fiberlay company.

### Casting resin

The polyester resins used in casting are made to cure slowly, so that the heat given off in the hardening process will not build up to the point to cause distortion, warping or shrinkage. These products are usually manufactured crystal-clear to facilitate true color retention when pigmented. The cost rises in direct proportion to the clearness of the casting resin, and therefore it is important to study the desirability of this property when selecting the resin to be used, as several grades of clearness are offered, from super-clear with one-hundred percent crystal clearness to the less expensive pinkish or greenish shades.

### Casting resin experimental projects

Two methods of casting were used in this medium, direct molding, and molding with a conventional closed-mold.

In the first experiment, that of direct molding, I chose to fabricate a stained-glass type panel. I designed this panel to incorporate several different experimental techniques. I wished to investigate molding transparent bas-relief areas, which, together with thin-poured chips of plastic material would be treated with a new glass-stain being marketed. I added chips and pieces of regular Cathedral stained glass to compare the two different kinds of color in this type work.

A mold was prepared from damp potter's clay. The bottom of the mold

would ultimately be the raised areas of the finished panel, so the design had to be worked in reverse. All sections of the relief areas were encompassed into this one mold, carefully fitted together like a jig-saw puzzle. I made some heavily sanded slip to line sections of the mold hoping to obtain some interesting textural effects. Advance preparation was essential, as the cast had to be taken while the clay remained damp, or cracks in the drying clay would make the mold unusable.

I catalyzed the resin according to the directions on the can, although some sections of my mold were almost three inches deep. Ordinarily one adjusts the catalyst, using less catalyst for thick casting, as the heat build-up in the curing process becomes so great that the material will crack and craze. I felt that this cracking might give added interest to this sculptured piece, so kept the catalyst-resin mixture the same as for regular thickness casting.

The catalyzed resin was poured into a large plastic bottle with a spout, to facilitate pouring the resin into the small, intricate sections of the mold. The heat produced by the chemical reaction of the catalyst and the resin was very apparent at this time, and the fumes given off by the action were very disagreeable.

The clay mold was removed and the cast pieces were separated and stained, using blending colors on each piece. I did not want them to represent traditional stained glass, but to be attractive in their own right. The sand-slip textural quality, together with the applied color gave these cast-resin pieces a very attractive appearance. These shapes were then placed upon a sheet of plastic film, which would serve as the

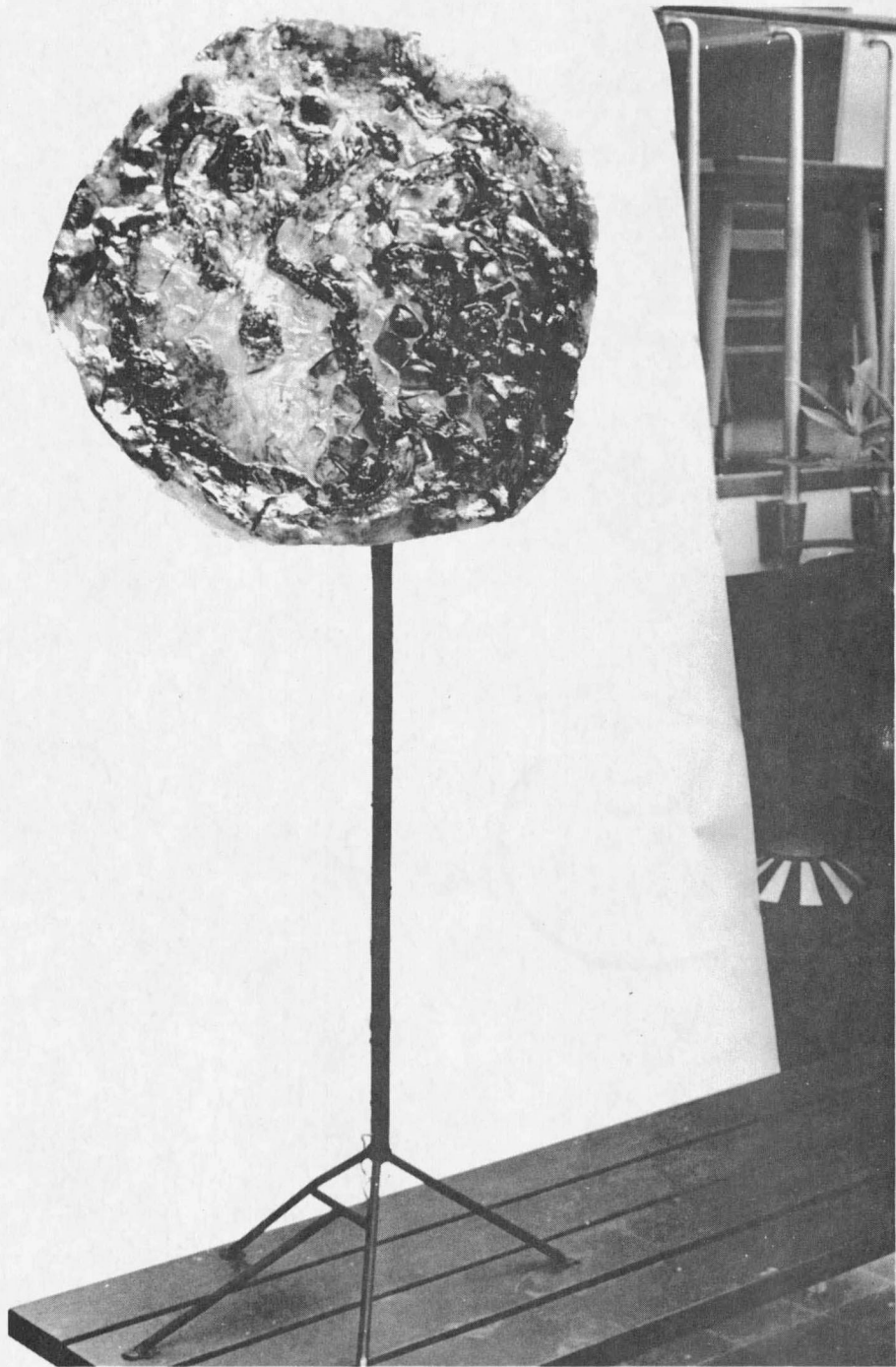
base of the final casting mold. The mold was completed by adding a low wall of damp potter's clay to completely surround the pour-area. The design was then completed by placing the chips and pieces of stained glass, along with the experimental glass-stained plastic pieces, between the cast shapes as previously planned.

The resin was then catalyzed, and poured around each piece, taking care to extract any bubbles that formed at the edges of the pieces. I found that the glass-stain bled into the resin, evidently being dissolved by the resin. This was not unattractive. The stained glass chips became almost transparent, while the thicker pieces kept their color-tone, thus giving many shades of each color used.

When the panel was completely cured, the clay wall was removed, and the plastic sheet was peeled off the panel, which was subsequently mounted in a plastic dome, which contained lights wired to blink intermittently. This was mounted on a welded stand. The kinetic effect heightens the beauty of the panel.

I think that the total effect is very rich and effective, and that the finished panel could not have been done in any other medium open to the sculptor.

The second experiment with casting resin was a dual-figure sculpture. The figures were first modeled in clay, then covered with plaster to form molds. When the molds were thoroughly dry, the interiors were generously coated with paste wax. A liquid mold-releasing agent was then painted on. This mold-release is a separator or parting agent which coats the surface to prevent the plaster from sticking to the casting resin by forming film



"Kinetic Action", Polyester resin casting project



Closeup of "Kinetic Action", Polyester resin casting project



"Opposing Forces", Polyester resin casting project

similar to cellophane. The mold was put together with damp potter's clay in the joint. More clay was pressed into the exterior joining, as the resin will leak through the most minute opening. The mold was wired tightly together, and placed securely on a firm surface.

The resin was slightly under-catalyzed, to retard the curing time, and thus prevent cracks and crazing which occurs from the heat produced during polymerization. The mold was poured full, and allowed to stand until firm. The casts were removed from the molds, and washed with soap and water to remove any release agent that might be left on the resin. It was then lightly sanded and covered with a light coat of finish-coat resin catalyzed to dry with no tackiness. The finished figures have a semi-transparency that gives them an extra dimension, as it seemingly brings the opposite side into focus.

#### Laminating polyester resins

Lamination superimposes layers of resin impregnated with fillers which bond together to form a single piece. The filler is a strengthening material, often glass-cloth manufactured for this purpose. Glass-cloth\* may be obtained in varying weights, from approximately four to eleven ounces per yard, the heavier weights producing exceptionally hard material. These fabrics tend to vanish in the lamination, giving practically transparent laminations. Almost any strengthening material could be used, keeping in mind that it will be completely visible in the

---

\*Glass-cloth, or Fiberglass, is a material of spun, woven, matted, or chopped fibers of glass made by spinning melted glass into filaments.

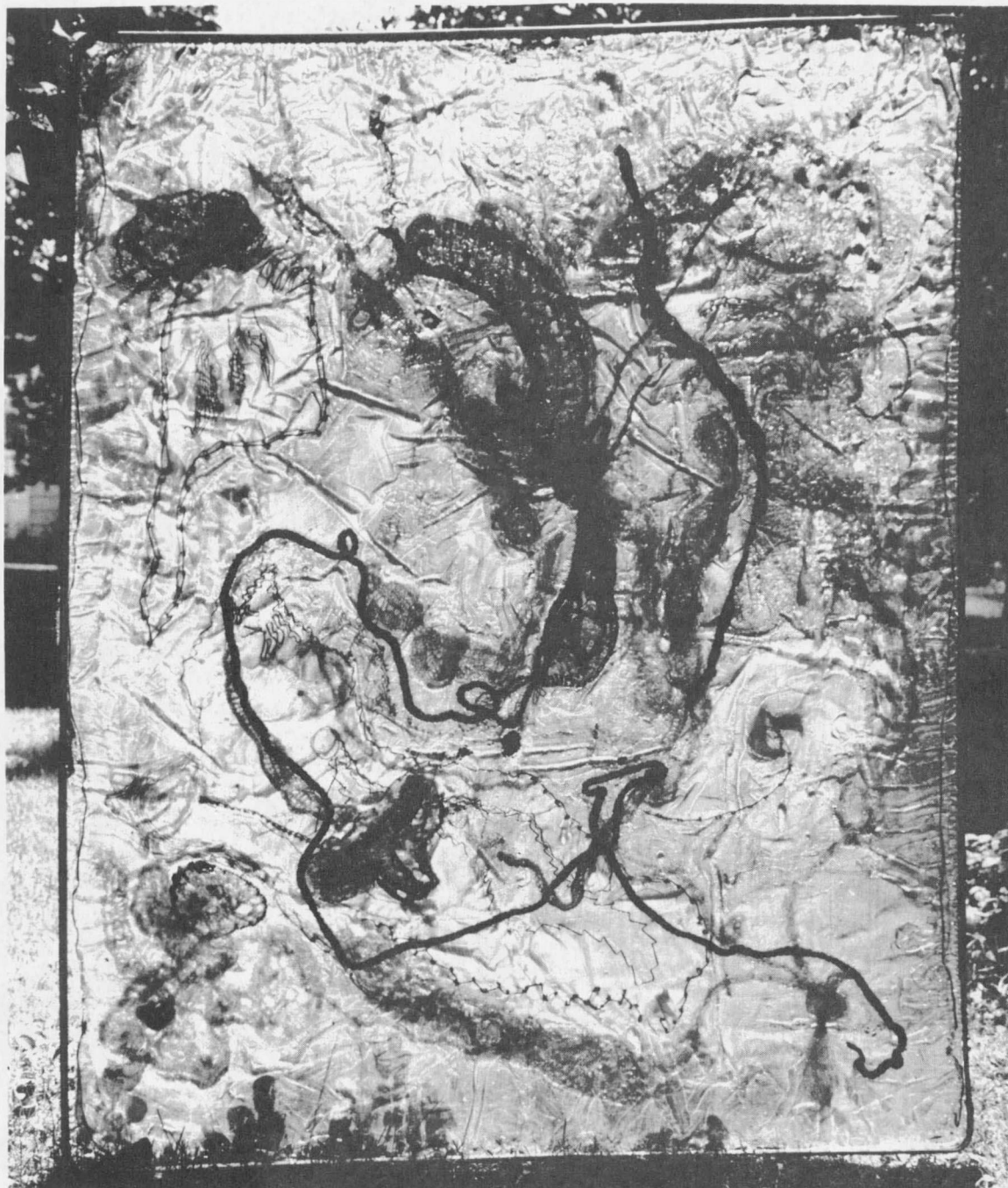
finished piece unless pigmented color is added to the plastic to color it, and thus cause opacity in the laminate.

Almost any open mold can be used as a laminating mold. If it is to be a three dimensional sculpture, care must be exercised to assure lamination of the mold sections together.

#### Laminating polyester resin experimental projects

The ability of laminations to transmit light was utilized in this project. I decided to use fine linen theatrical gauze approximately 45" x 60" for my base, upon which I appliqued cloth and crocheted shapes, together with embroidered sections, in order to obtain every degree of opacity and transparency possible. I was interested in the effect of the resin upon the different fibers and weights of materials.

A masonite sheet covered with a sheet of plastic was used as the base of the laminating mold, which was edged with damp potter's clay. A light coat of properly catalyzed laminating resin was poured onto the sheet plastic lined mold, upon which the needlework panel, which was to serve as the reinforcing agent, was carefully placed. Another light coat of catalyzed resin was poured over the panel, and left to polymerize. A coat of finish-resin was brushed over the entire panel to render it free of tackiness. When this was completely dry, the panel was reversed on the mold, and the reverse side was brushed with the finish coat. The panel was mounted in a frame to be used as a room-divider. It is very attractive with sunlight filtering through the needlework panel.



"Sun Filter", Polyester resin laminating project

Putty-glass (Polyester resin with a thixotropic additive\*)

Putty-glass is a very versatile form of polyester resin formed by adding a thixotropic filler to the resin. This product is gel-like when at rest, while fluid when agitated, which renders it able to resist the pull of gravity, thus producing a resin capable of vertical application. Its ability to be used in successive color layers, without undue diffusion of one color into another, is unusual in resins, and gives the product new dimension.

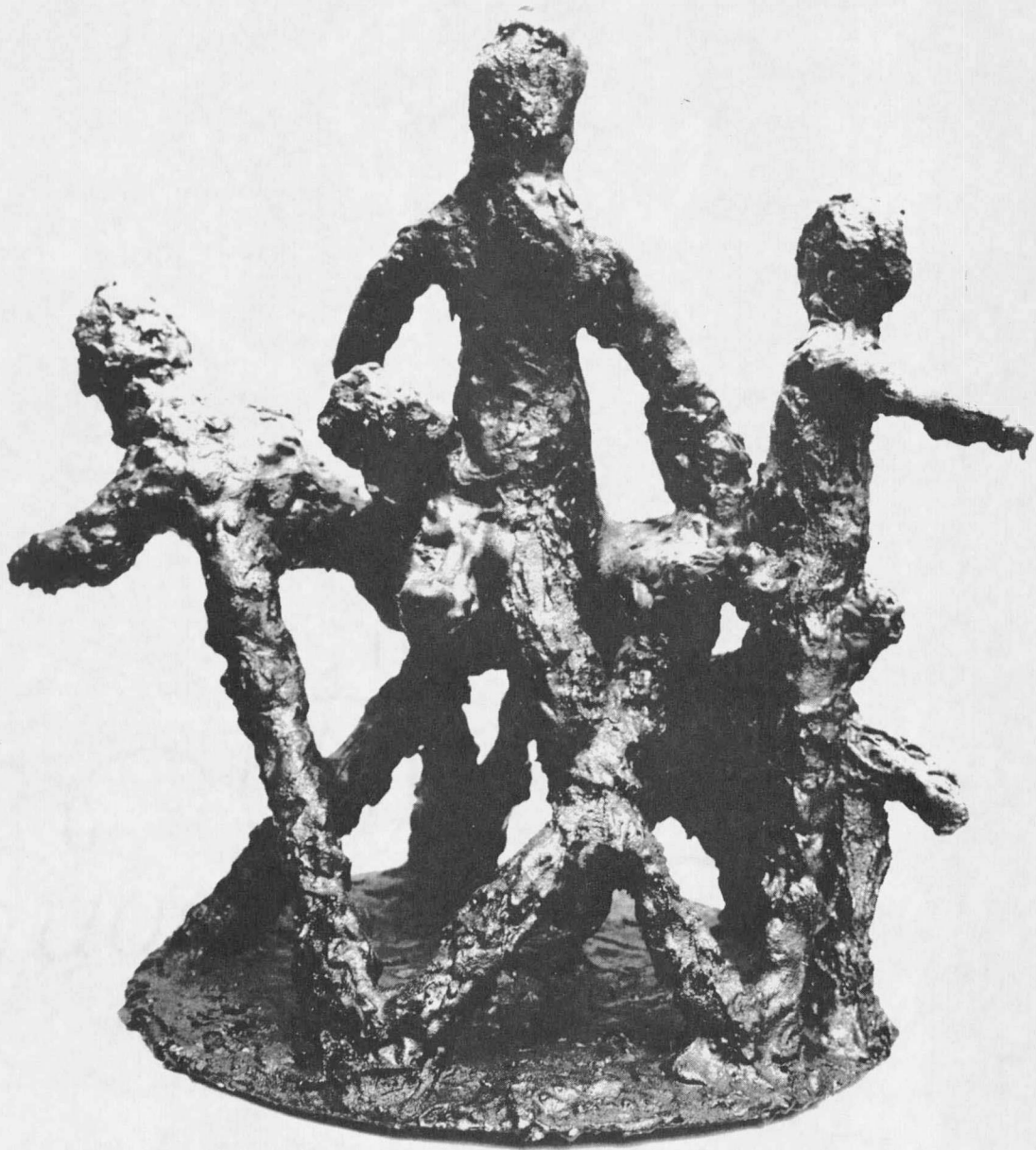
Many companies now market thixotropic compounds, while others sell varied fillers to be utilized into regular resins. These fillers vary with the desired results, but ordinary china clay or very finely divided silica make satisfactory thixotropic additives. Obviously, the type and amount of additive will effect the innate properties of the basic resin in direct proportion to the additive, and this fact must be considered when deciding upon the amount of catalyst to be used.

Putty glass experimental project

Using ordinary coat-wire, I constructed an armature depicting a group of figures, which were then wound with white-glue impregnated cloth strips. These were built up as desired, and then given a final coat of the putty-glass, which had been extended with fine beach sand and black pigmented color. The finished texture was appropriate to the

---

\*Thixotropic additive: materials added to resin to produce a product that can be applied to vertical surfaces.



"War Figures", Polyester resin putty-glass project

theme of the statue.

### Foamed Polyurethane Resin

Although urethane resin is considered a thermoplastic resin, the foamed varieties are thermosetting resins. Each plastic has its own innate characteristics. Additives change the possible usages of each material. Urethane foams are produced, as are all foamed plastics, by the addition of air, or other gasses, during the manufacturing process. The air filled cells expand the basic material. Each foamed plastic carries the identity of the parent product, therefore many different types emerge. Foamed plastics offer the sculpture a material that can be carved with simple woodworking tools yet result in a finished product that rivals marble. It is foamed in many different densities, the denser the material, the more nearly it seems to reflect the qualities of marble. The less dense materials, are less expensive, and are usually used for practice work or classroom sculpture. The densities range from two pounds per cubic foot up to as much as sixty pounds per cubic foot.

### Foamed polyurethane experimental project

I selected three densities of urethane foam to experiment with; two pounds per cubic foot, four pounds per cubic foot, and six pounds per cubic foot. My work was experimental with this product, and no effort was made to complete a finished sculpture in this case. I first worked on the two pounds density, and found it very easily carved, with the added advantage of ease of repair. White glue will adhere sections

together, which are not visible when the finish has been added. This faculty was true of each density. The next small abstract figure was carved from the four pounds density urethane foam. I found this weight more easily detailed and finished, while the six pounds density was especially fine grained, and more easily worked. The two pounds urethane foam is considered classroom quality, while the four and six pounds foams are for more professional usage. I am interested in making a large sculpture from the more dense urethane foams. They are very expensive at this time, and precautions must be taken because of their toxic qualities.

## CHAPTER II

### THERMOPLASTICS

#### Acrylics

Acrylics, in the form of crystal-clear materials, such as Lucite and Plexiglass, have been utilized by sculptors for many years with exciting light transmission an integral component of the sculpture. A recently introduced product is the diametric opposite of these products, as it is an opaque artist's paste, marketed by M. Grumbacher, Inc. I was interested in this product because it is formulated with fine marble dust, and dries into a tough, resilient mass which is virtually indestructable. This acrylic paste bonds to almost any type armature, and can be used with filler additives.

#### Acrylic experimental project

The ability of the Grumbacher acrylic paste to bind together additive materials was utilized in this experimental work. I decided to do a full-scale figure using an acrylic paste-mache mixture over a heavy armature.

This armature was constructed over one-inch pipes set into a heavy wood base. Hardware cloth was wired to the pipe framework, using screening to fill in the smaller areas. The acrylic-mache was made by adding one quart of the prepared paste to about two-thirds of a bucket of warm water. This was pretty well filled with small bits of light cardboard, and left for about a half-day before applying to the armature.

Before applying the acrylic-mache, I worked it well with my hands. The armature was covered with a light coating of the mache, roughly applied in order to leave a good base for the subsequent coats. These later coats were built up to model the figure as desired, using the last coat to convey the final texture, which was to be very rough. This last coat had Hyplar color additive which was overcoated with a mixture of the Hyplar varnish medium mixed with the color. The finished statue is lightweight, yet strong.



"Windblown", Acrylic Project

## CONCLUSIONS

The artist-sculptor seeks new materials that will reflect the modern approach to artistic expression. In the materials of industry are many new materials that have potential for artistic manipulation, and today's sculptor is challenged to try each new form that is produced by the chemist. Each must experiment in order to find materials that might answer his need. By pooling experimental data much time is saved. I have spent much time in accumulating information, and I hope this will save repetitive study for others. I have assumed that technical data was unnecessary in this study, for chemists keep the new materials stable, and therefore we may assume that what we find true today will continue to be factual.

I do not think that the new materials will completely replace the old aesthetically proven materials, such as marble, wood, and bronze. We shall continue to appreciate these materials for their innate beauty, which so truly reflects the sculptor's art. However, I do find many new materials that have characteristics that the sculptor has never had a chance to use. I especially feel the polyurethane foams, both those that are foamed in place, and those carved from already foamed pieces are excellent reflective materials. They may be coated with materials that render them impervious to the elements, and thus usable under most conditions. The resins produce sculptures that are as aesthetically reflective as other sculpture materials. These are so very light weight that they can be used in places that heavier materials would be impossible to use.

Today's world moves with speed in every facet of life. This is true

of the artist, as well as other men. The old traditional materials were the materials of a craftsman with almost unlimited time. Modern man is much more interested in multiple expressions of his art than in one time-consuming work of art. Therefore, the speed with which the new materials can be manipulated may be a deciding factor in their choice for a sculpture.

Today's artist often wishes to impose form and/or color into space. He requires materials that readily accept his desired forms and colors. Today's materials are wonderful foils for this type expression. Those which form as they are being manipulated are exciting media. The idea emerges while the material is being created, which adds another dimension to the art of creation of sculpture.

When the first artists used the man-made materials, they were considered daring, and perhaps foolish, for at this time, these materials were truly considered "substitutes" of traditional materials. Today we realize the potential of these new materials for their own inherent qualities, which often encompass their ability to have no particular quality. The past stigma has been overcome, and the sculptor is free to experiment with them as he will. Much is to be gained by the use of the many new materials produced by today's industry, for they are judged by their artistic transmission alone.

I again urge the sculptor of today to adventure into the field of plastics, for a new dimension in the art is now being opened to him.



General view of work displayed at the Thesis Show in the  
Montana State University Library

## SUPPLY SOURCES

The sculptor should check art-supply stores in his vicinity, as new materials, under new trade names, are being marketed. I would, however, like to give a few supply sources.

### EPOXY

DER 332      The Dow Chemical Company  
Midland, Michigan 48640

Epotuf      The Fiberlay Company  
1158 Fairview North  
Seattle, Washington 98109

Marblette    The Marblette Corporation  
31-37 30th Street  
Long Island City, New York 11100

### POLYESTER RESIN

#### Fiberlay Resins

Casting

Laminating

Putty-glass

The Fiberlay Company  
1158 Fairview North  
Seattle, Washington 98109

Poly-Dec Company, Incorporated  
P. O. Box 541, Bergen Point Station  
Bayonne, New Jersey 07002

Sculpture House  
38 East 30th Street  
New York, New York 10016

### POLYURETHANE FOAM

#### Polyurethane 92-342

Reichold Chemicals, Inc.  
525 North Broadway  
White Plains, New York 10600

Sculpture House  
38 East 30th Street  
New York, New York 10016

ACRYLICS

Hyplar Modeling Paste

M. Grumbacher, Inc.  
768 Madison Avenue  
New York, New York 10000

## LITERATURE CONSULTED

### BOOKS

- Hunter, Sam. Modern American Painting and Sculpture. New York: Dell Publishing Company, 1959.
- Read, Herbert. A Concise History of Modern Sculpture. New York: Frederick A. Praeger, 1964.
- Light, Fred. Sculpture 19th and 20th Centuries. Greenwich, Connecticut: New York Graphic Society.
- Newman, Thelma R. Plastics as an Art Form. Philadelphia: Chilton Books, 1964.
- Schlenoff, Norman. Art in the Modern World. New York: Grosset and Dunlap, Inc., 1965.
- Wilenski, R. H. The Meaning of Modern Sculpture. Boston: Beacon Press, 1961.

### TECHNICAL JOURNALS

- Dow Diamond Magazine #4. Contemporary Medium for Contemporary Art. Vol. 27:25-27, 1964.
- Dow Diamond Magazine #1. Novel Way to Sculpt. Vol. 29, 1966.
- du Pont Magazine. New Medium for Modern Art. November-December, 1964.
- Fiberlay Craftsman. Descriptive Catalogue of the Fiberlay Corp.
- Sculpture House. Descriptive folders and catalogues.

MONTANA STATE UNIVERSITY LIBRARIES  
3 1762 10022721 2

N378  
W983  
cop.2

Wyman, H.T.  
New materials, new  
methods = new expres-  
sion in today's scul-  
ture

NAME AND ADDRESS  
JAN 20 1977  
TIM KREIBER  
617 NORTH H

N378  
W983  
cop.2

