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Dance as medicine

Eileen D'Esterno

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DANCE AS MEDICINE

BY
EILEEN D'ESTERNO
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APPROVALS

Chief Advisor : Professor Glen Hintze

Date: 11/12/99

Chief Advisor : Professor Alan Singer

Date: 11/12/99

Chief Advisor : Professor Luvon Sheppard

Date: 11/8/99

Chairperson : Dr. Thomas Lightfoot

Date: 11/12/99

PART I

DANCE AS MEDICINE

THE INTRODUCTION

The purpose of this thesis project has been to express in a sculptural dimension the joy and healing qualities of movement. Movement is our primal language. The very first thing we do upon leaving the womb is to move, to reach for our mother. Movement allows us to express our feelings regardless of the ability to make sound. Infants and toddlers explore the three dimensional world as they reach out to touch, to feel, to experience textures and shapes. They gain confidence as physical beings through ever increasing skills and mobility of the body.

THE JOURNEY

Having spent several years working with deaf children, whose primary means of communication is through physical signing, I know how powerful a simple gesture can be. One needs no lessons to interpret the language of the body, we can perceive on a level much more expansive than common speech. Dance as a medium of expression can be used to communicate joy, freedom, sorrow, even anger. In cultural exchange, dance tells stories, invites the spirits, unites a gathering, dispels differences. When one can can mirror another's movement, a rapport and understanding create a connection on a subconscious level. Whether speaking about a room full of preschool children skipping to a phonograph, a circle of strangers holding hands at a Greek festival, or a professional performing dance corps, there is no doubt that dance imparts health, healing, and an expanded sense of the beauty of life to the participants.

I began studying dance as an undergraduate due to a liberal arts requirement and became addicted to the sense of joy it gave me. I took electives in modern, ballet, jazz, african and social dance, eventually taking modern technique class five days a week, because it made me feel wonderful inside and out. After graduating with a major in Biological Sciences and a minor in Dance, I continued my studies by taking classes with Garth Fagan Dance Theater in Rochester, NY, until it grew into something I was intent upon pursuing as a career. When knee injuries deemed it necessary that I follow a different path, a job with a glass sculptor and some graphics projects at my job with an engineering firm led me to consider travelling into the field of visual arts.

The biology degree, coupled with interest in the healing arts naturally pointed to medical illustration, and I began taking part-time illustration and design classes to fulfill the requirements for acceptance to the Medical Illustration program. It was during this time that I began to experience dance in a different vein, a learning that there was a deeper experience to be had from movement. I was blessed to have a teacher of African dance who imparted not only movements, but also their meanings. In earlier times in Africa, when languages were diverse and varied, a travelling tribe would announce their presence in another peoples' territory through the language of drums, and dancers would precede the group's arrival.

Movements low to the ground with open arms and hands showed humility, and the absence of weapons. Arms raised alternately overhead and toward the ground showed praise and reverence for the sky and earth, and open gestures from the heart indicated generosity of spirit, peacefulness, and giving.

My teacher stressed that these movements were more than just movements, that on that continent prescriptives for those ailing in body or emotion also included the making of music, and dancing. She encouraged all of our class to practice these movements at home, i.e. when you were feeling low, you could use these gestures to throw off the beginnings of a headache, or a heartache, or any sense of being stuck. You could remind yourself, through your body, of your freedom and your divinity. You would remember, through the prayer of the movements, that your presence on this planet is a gift.

This experience, more than any other, has changed the way I view living, moving, and healing. Whether I am taking an aerobics, yoga, ballet, or other dance class, or merely greeting a friend, opening my arms still reminds me that I am opening my heart, both to give and receive. Dance has been my antidepressant, my antidote, my ally.

THE THESIS WORK

I did have inclinations to do my thesis work around the idea of an interactive teaching program for vision improvement, but found that it was a bigger project than I had the time or knowledge to implement. And in exploring the many avenues for artmaking at RIT (due to the presence of talented illustration and crafts professors) I overstepped the timetable for finishing the thesis during the allotted time for the program. I didn't know when I would have the opportunity to be in such a fertile ground of art and craft, or when I might be able to learn all these things in the future. I wanted to take advantage of the present. After all, your thesis should be something you are moved by, and something you heartily want to pursue.

Once I had finished the required classwork for the degree, I accepted an internship in Georgia as a medical/legal illustrator, planning to work on paintings for my thesis on nights and weekends, but I found that the move and the 9 to 5 took up more of my energy than I had imagined. I put off working on thesis paintings. And put them off some more. It came down to asking myself, "What do I love the most and what would I choose to communicate?"

The answer was, of course, dance as a healing art. Since you can't dance your thesis (unless you're in a performing arts program), I chose the next best thing, which was portraying through sculpture the joy of movement.
I hadn't actually done any sculpture at all prior to this, and essentially educated myself, which is what one would aspire to continue to do throughout a lifetime. I found that my background in dance gave the figures an animation that pure academic rendering would not achieve... they seemed to speak to me as I made them, and it felt more like being a choreographer than a sculptor. At this point in time, those works have already been sold, which encourages me to pursue this joyful path. And of course, to continue dancing.

PART TWO
METHODS AND MATERIALS

The Baby Steps

I wanted to learn the process, and to use the most consistent, easiest, and cost effective material. I called a plethora of molding/casting materials companies and had them all send me samples and price lists and whatnot. A number of companies also sent booklets with plenty of educational direction for moldmaking and casting. Information about these companies is listed at the end of this paper.

To become familiar with the mold making process and material before I used it on my 'final' figures, I planned to do a test run on a simple plasticene figure. I was happy to note there was a leftover supply from the previous studio occupant, but the first mold didn't work because the gel had lost its "oomph". Most rubber moldmaking materials have a shelf life of 6 months to a year, which can be shortened by very humid conditions (moisture in the air can easily be absorbed by open containers of mold material, decreasing their bonding effectiveness). The point is, "be fresh!"

The experimental mold that DID work, made from a plasticene model that was destroyed in the process.

Experimental casts made from this mold:

Plain Plaster Cast

Plain Polyester Resin, with "hammered texture" spray paint and oil paint patina

Polyester Resin (with face coat containing 1:1 ratio of powdered bronze) ; oil paint patina

1. PRELIMINARIES

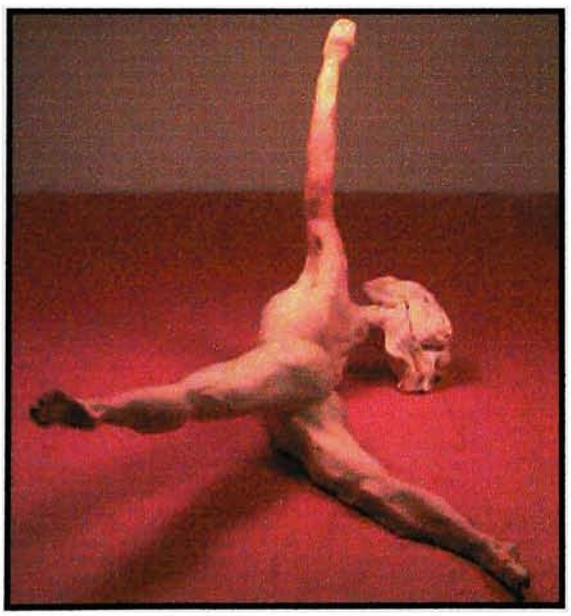
My first models were made with plasticene, which allowed me to quickly create forms, in the manner of gesture sketches. I found that was not getting the level of detail I desired and experimented with different brands (and grades of hardness) of plasticene. I had also decided by this point that it would be a more effective use of my time to create the figures separately from the horizontal planes which I wanted them to be extruding from.

(A note on plasticene, should you choose to use this as your modeling material... more details can be derived by applying isopropyl alcohol to the surface -with finger or q-tip- because it temporarily dries out the surface oils.)

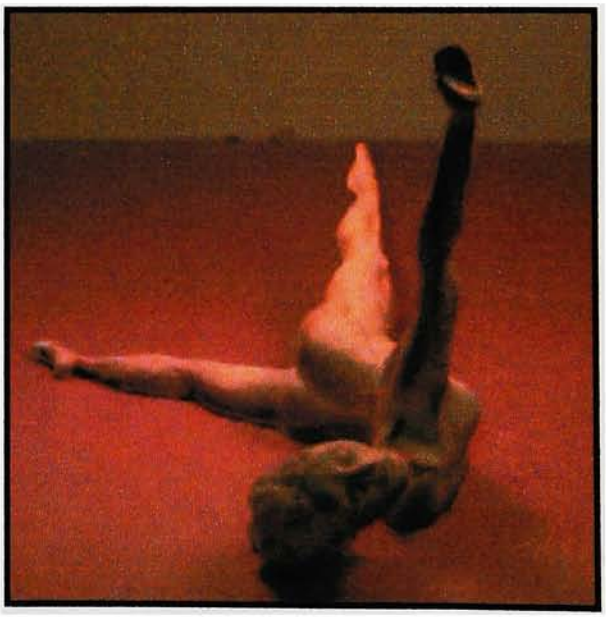
I finally settled on using "Sculpey," a non-organic polymer clay that hardens when baked in a conventional oven. Sculpey allowed me to create more detail than the plasticene did, and the baking only involves 15 minutes for each 1/4 inch of model thickness at 275 degrees. I used 18 gauge wire to make very simple armatures and built up the body figure around the wire. You will find that the thinner parts of the model get darker in color because they are more 'baked', some of the models looked like they were coal miners who worked barefoot.

As far as tools go, I had an assortment of wooden and metal sculpting tools left over from ceramics class, but honestly, the most frequently used items were a paper clip, an Exacto knife, and my fingers.

Here are two views of the model used as the example in this paper:



High relief model, bottom view



High relief model, top view

A. THE MODEL

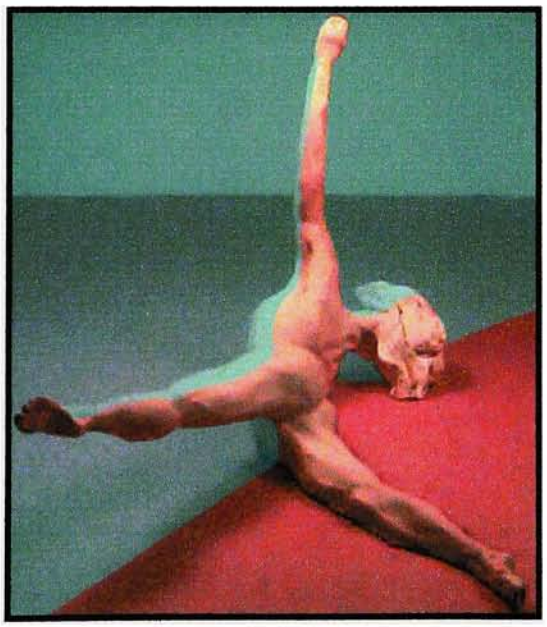
1. PRELIMINARIES

The material your original model is made of will determine what preliminary steps you must take before making a rubber mold. If the material is porous, (ie, plaster or ceramic) you must seal the model so that the rubber cannot penetrate the pores. Several coats of paste wax, allowed to dry and then polished will work well. Plasticene has a high oil content and should not present any problems with molding, but a release agent is still recommended.
Sculpey is a non organic plastic polymer and tends to be a very good surface for molding. It costs about $5.00 for two pounds, less if you buy it in quantity.

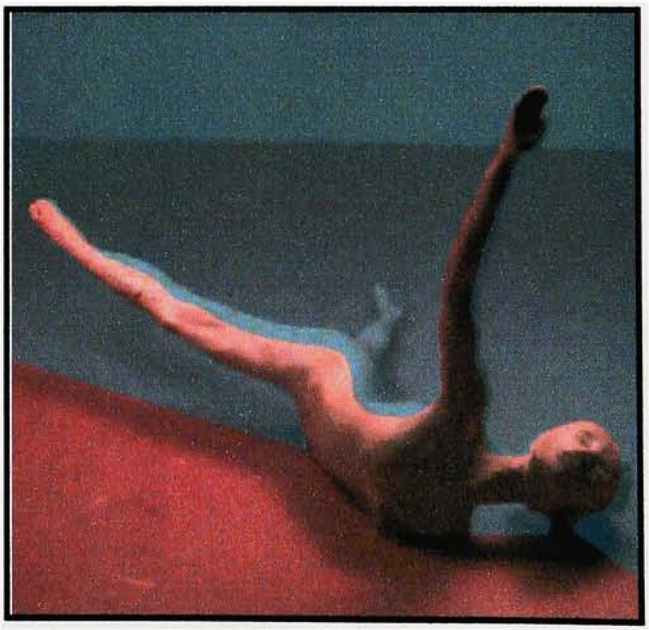
2. DIVINING DIVISIONS

If you have a simple shape, you can make a one piece model and things will be fairly easy for you. I had somewhat complex shapes with deep undercuts, so a one-piece mold was out of the question. You need to choose a pouring point that will allow your casting material to reach all areas, and then create divisions that will allow you to remove the mold as if you are taking off a coat. Since I wanted my pieces to be mounted on plaques, I decided that it would be easier to create the pieces and the bases separately, even though my experimental model had been cast in one solid shape.

I chose a plane from which to mount the figure and decided upon the most effective parting lines, shown here by the blue planes:



Mold parting line,
s shown by blue plane,
bottom view

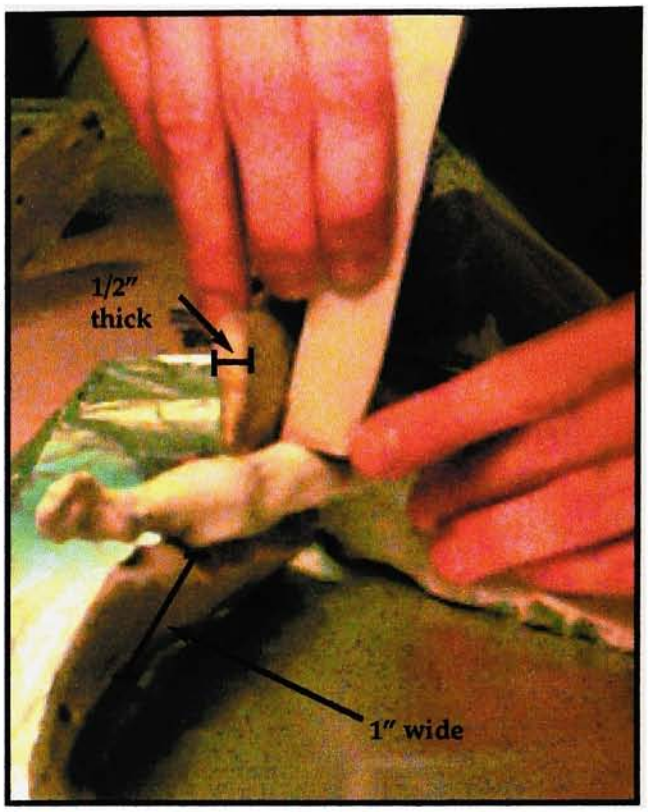


Mold parting lines,
shown by blue plane,
top view

A. THE MODEL

3. SHAPING SHIMS

The shims will form the parting line where the brushed-on blanket mold will open. I created mine using thin (1/2") slabs of plasticene, extending about 1" away from the model. It's important to create a smooth uninterrupted line along the uneven surface of the model, and to have the shim surface perpendicular to the model surface. Spending quality time on this step creates a better mold later, so be diligent. (Note: if your model is made of soft clay, you can use double-folded strips of tinfoil as shims. Just make sure they extend at least 1" perpendicularly away from the model.

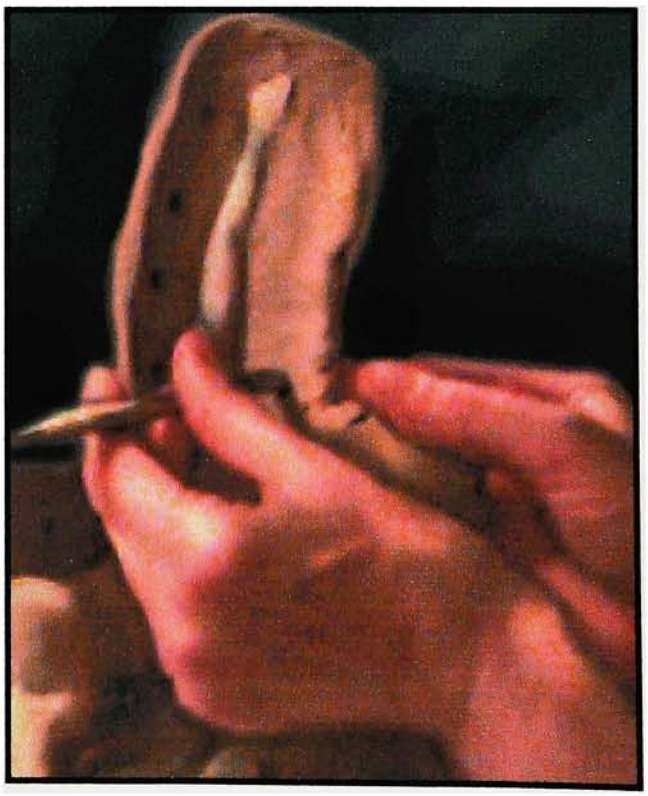


Attaching and sealing clay shims.

A. THE MODEL

4. THE KEY TO KEY INDENTS

Because you will want the separate mold pieces to match exactly, you need to create 'snaps' or keys to orient the soft mold pieces to one another. Making indentations in the clay with something as simple as the handle of your exacto knife will create a reservoir for the first mold half to form a button, which the second mold half will build itself upon.



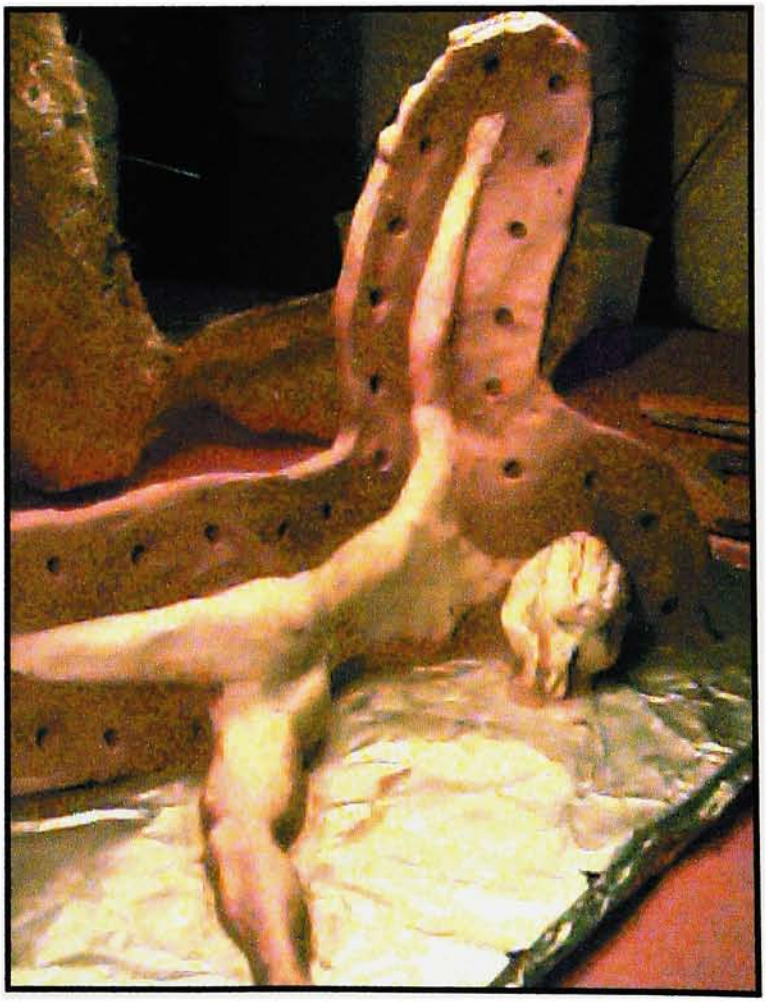
Using Exacto knife handle to make key indents.

A. THE MODEL

4. SEALING THE EDGES

Using plasticene, make sure that there are no spaces between the edge of the model and the mounting surface. Think of the caulking around a bathtub or windowpane. Without this step, rubber will find its way under the model and make for a confusing demolding process.

Here the model is ready for molding. Note that the shims have key indents, are clean and smooth, perpendicular to model, and all edges are sealed to the base.



A. THE MODEL

5. A MOLD'S BEST FRIEND : SPRAY RELEASE

Since the rubber likes to get into every little space it can, you want to make sure you will be able to remove it from the model. With a material like Sculpey (which is a plastic polymer) there is very little 'sticking', but a spray release will ensure easy de-molding.

If you are using any kind of porous material (like clay models) you will need to give it several coats of paste wax or shellac, letting it dry thoroughly between coats, and finally a coat or two of spray release. I used a release made specifically for the rubber I was using, "Polytek 2300", it costs about $8 for a 12 oz spray can that will last through many molds.

Spraying release agent onto the model and shims.

Once you spray it on, you can work it into the crevices with a clean china bristle brush. I kept a small 1/2 in. brush taped to the can and used it only for the release agent. It is important to give the release at least 15-20 minutes to dry before you go to the next step.

B. THE SOFT MOLD

2. Part One of a Two Part Mold

1. MATERIALS

Standard polyurethane rubber comes in two parts that react with one another upon mixing. You'll want to have your part 'A' and part 'B' pre-measured in equal volumes ahead of time. It is imperative that you keep the measuring cups for the two parts separate, because just a little bit of one will make the entire container of the other ineffective. Plastic cups don't cost much, better to toss your cups after you use them.

A one ounce measure of Part A and Part B.

I used translucent plastic cups that had indented lines as a part of their manufacture, so it was easy to get exact amounts. Rubber gloves, a stirring stick, and a disposable china bristle brush should be on hand, and remember to wear 'work' clothes... that rubber stuff doesn't come off!

2. Part One of a Two Part Mold

2. MIXING THE RUBBER

The most effective mix of rubber components is adding THICK to thin, in this case, Part "A" to Part "B". Be sure to scrape out as much of A as possible to retain your volume ratio.


ADDING "A" TO "B"


THE COLOR CHANGE

Stir gently so as not to get too many air bubbles in the mix, and scrape the sides of the cup as you stir. Unmixed component will make a weak spot in the mold, and it can easily tear there. The material starts out looking like dark honey, and within a minute begins to attain a milky quality. You don't want to spend too much time mixing, because once the color change starts, it gets thick very quickly.

B. THE SOFT MOLD

2. Part One of a Two Part Mold

3. SMOOTH AND THIN -THE FIRST COAT-

Using a disposable china bristle brush, cover the entire exposed model, working the air bubbles out of the rubber by going over them with the brush. Since this is a thin coat, it will be fairly easy to see where the bubbles are. Your goal is to create a smooth, continuous surface coat. Be certain that you work the rubber into the key indents that you made in the shims, as they will help 'lock' the separate mold halves together later. Work quickly and steadily, as the material thickens within a 5-minute period.

Applying the first coat of rubber.

NOTE:
Allow 90 minutes for the first coat to cure, before you apply the second coat!!!

It is possible to allow 2 or 3 days in between coats if time is a problem, but it's better to accomplish one complete mold piece within a 24 or 48 hour period.

B. THE SOFT MOLD

2. Part One of a Two Part Mold

4. COURTING CABOSIL -THE SECOND COAT-

"Cabosil" is a brand name for anhydrous fumed silica. Also known as 'Aerosil', it is used as a thickening agent for the rubber. (Think of cornstarch and gravy) I made my first couple of molds without it, and they were not very effective, because the thinner rubber will drip, and it is difficult to have a consistently strong mold. The Cabosil is very light and very fluffy, and you will want to wear a dust mask while mixing it in, as it liberates itself into the air very easily.

WHEN YOU ARE READY TO APPLY THE SECOND COAT...
Follow the same rules for the first coat (equal volumes, clean tools, gloves...)

Mixing parts A and B

AND THEN....
Once you have mixed A and B together thoroughly, you should add a volume of Cabosil equal or greater than the total volume of the mix.
(i.e. 3 oz A + 3 oz B = 6oz total mix.
Therefore use 6 oz volume of Cabosil.)

Use a container that allows you to mix vigorously .
I used a 16 oz cup to mix up a 6 oz batch.
The Cabosil will fluff around a lot, and it will appear that nothing is happening, but keep stirring. At this point, air bubbles don't matter much because the density of the mix will either squash them out, or hold them in place, and if you made your first coat correctly, bubbles in any additional coats will not affect the integrity of the mold surface.

Adding Cabosil

Most of the Cabosil is mixed in, and the mixture is thickening.

When its the consistency of sour cream, it's ready to use....

B. THE SOFT MOLD

2. Part One of a Two Part Mold

5. EXTRA STRENGTH - ADDITIONAL COATS

Three coats will ensure a long-lasting and stable mold. For larger molds, four may occasionally be necessary. Follow the same procedure for mixing the Cabosil into the rubber and apply to the model, being sure to coat evenly and fill key indents. DON'T RUSH! Allow 90 minutes between coats.

This is actually the third coat of the SECOND half of the mold, (you are viewing the model from the top/chest area) You get the idea.

NOTE: Before you actually APPLY the LASTcoat, make sure you read step **B.2**.6., below.

2. Part One of a Two Part Mold

6. KEYS FOR ORIENTATION TO MOTHER MOLD

One step I learned about <u>after</u> doing all these models was that a much more effective cast is created if the soft mold can 'lock into' the harder "mother mold". You can achieve this by adding 'buttons' to your model prior to your last coat of thickened rubber. These may be cast very simply at the same time as the first coat, using the excess rubber. Plasticene with indents makes a fine form for these simple buttons. While the second coat is setting, attach the buttons. The third coat will ensure their inclusion in the structural form of the soft mold.

B. THE SOFT MOLD

3. Part Two of a Two Part Mold

1. REMOVING THE SHIMS
2. REPEAT STEPS 2.1-2.5 AS ABOVE.

(MODEL PREP: Clean away all residual plasticene.
SPRAY RELEASE: Be sure to coat remainder of exposed model, (including newly created rubber flanges) with spray release. Allow at least 15 minutes to dry before application of first coat of rubber.)

Applying spray release to model and rubber flanges (after removal of clay shims.)

3. FIRST COAT, SECOND SIDE
   Follow the same guidelines as in B.1-3, above.
4. ADDITIONAL STRENGTHENING COATS USING CABOSIL
   Follow guidelines outlined in B 4-5.

Third coat of rubber, second half of the soft mold, top/chest view.

C. MAKING THE MOTHER MOLD

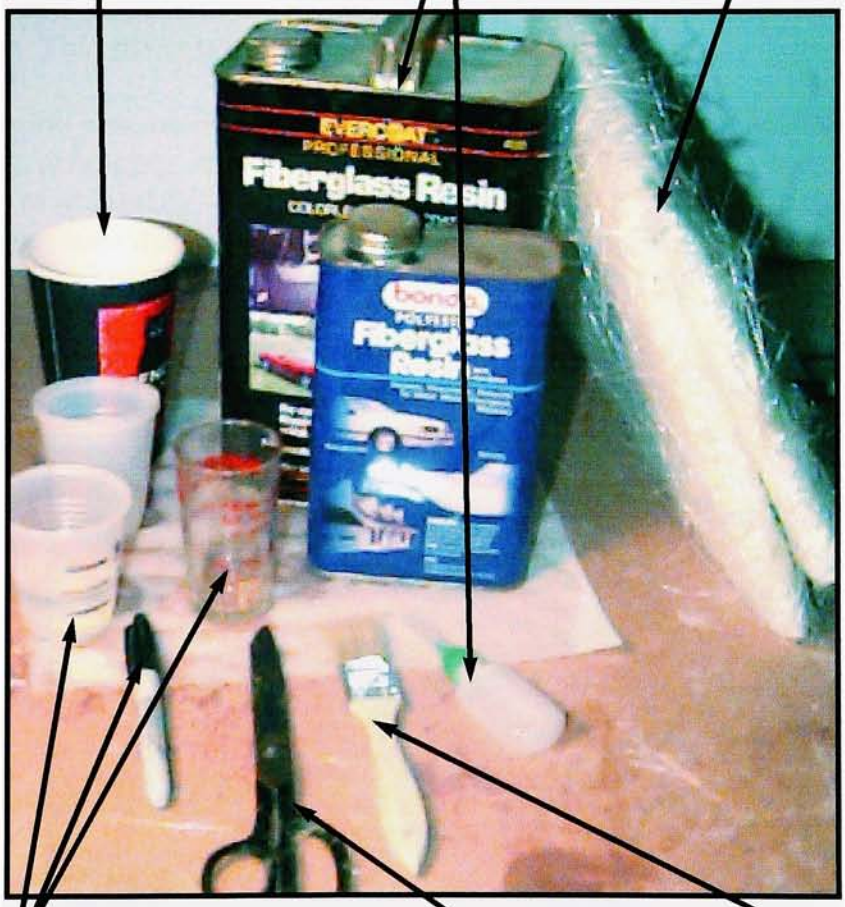
The hard outer shell that will support the rubber mold while the casting material is hardening is called the 'mother' mold, because it cradles and holds the soft mold. The amount of material you will need depends upon the size of the soft molds you have made. One gallon of fiberglass resin made ten 2-part mother molds.

1. MATERIALS:

THICK PAPER MIX CUPS (or tin cans.) Don't use the small plastic mixing cups! They will be dissolved by the resin after 5 minutes or so, and will leak all over your work surface!

STANDARD FIBERGLASS RESIN AND HARDENER
a product used for boat repair, purchased at hardware stores at approximately $20-25/gallon. (the hardener is included with the resin)

FIBERGLASS MAT
(available from Polytek, ~$23.00 for 3 square yds)



A. DISPOSABLE MEASURING CUPS... created by using an accurate ounce measure with water. Transfer water to clear or translucent plastic cups one ounce at a time, and mark volume amounts with permanent ink. Be sure to dry newly-created measure thoroughly!!!

HEAVY DUTY SCISSORS
(to cut fiberglass mat)

DISPOSABLE CHINA BRISTLE BRUSHES
(at <u>least</u> one for each piece of mother mold)

<u>NOT PICTURED:</u>
<u>(but very important!)</u>
<u>RUBBER GLOVES!!!!</u>

C. MAKING THE MOTHER MOLD

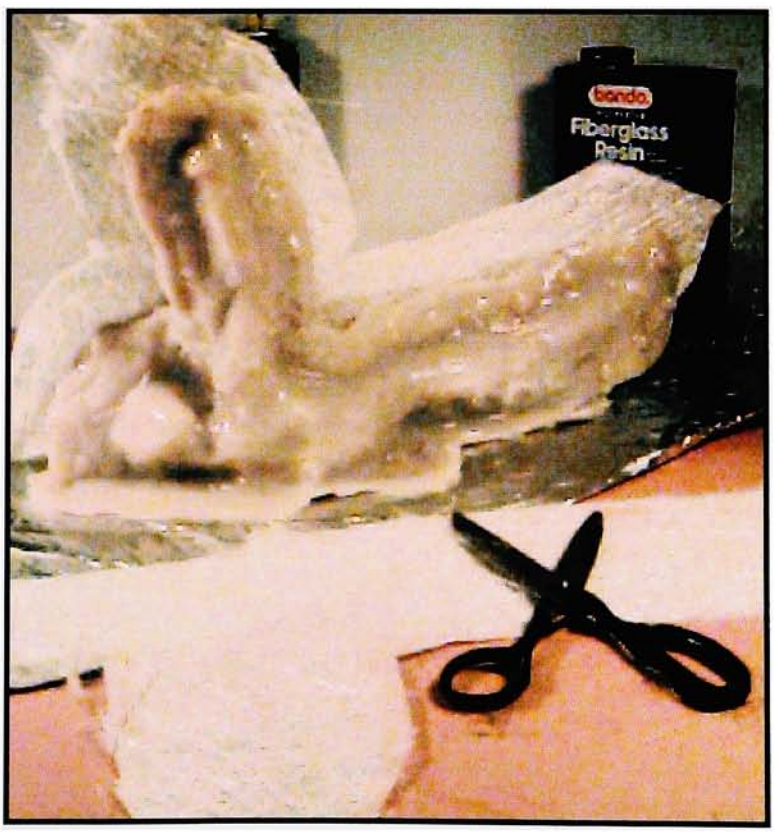
There are a number of materials you can use to make a solid mold shell that will help the soft rubber peel-away mold keep its shape. Plaster, plastic polymers, and fiberglass resin are all options. I chose the fiberglass resin because it's not as messy or space-consuming as plaster, it sets up very quickly and it's available at any local hardware store.

2. SETUP:

You might want to perform this step outdoors, weather permitting, as the fumes generated are not especially healthy. If you can't do this, be sure you have adequate ventilation. Since the fiberglass resin WILL distort the mold if allowed prolonged direct interaction while curing, it is important to protect the rubber. I used ordinary cooking oil spray to liberally coat the outside of the soft mold before applying the mother mold materials.

Create a disposable working surface by covering area with plastic or newspaper. That fiberglass resin is impossible to clean off!!!

Imagine you are making a coat, and cut the fiberglass mat into manageable pieces, arranging them on one half of the model. Leave a 'seam allowance' of at least 3/4" beyond the rubber flanges of the soft mold. You will want to make sure there is at least 2" of hard mother mold around your 'pouring' surface, as this will support the mold.



Rubber mold over model with fiberglass mat tacked to the back.

C. MAKING THE MOTHER MOLD

3. PROCESS

The directions on most cans will tell you to spread some on the mat (or cloth) first and then apply the cloth, but if you follow this procedure, it will be setting up by the time you get it all coated. The most effective method is to have the mat fixed into place ahead of time. A helpful tip is to mix up a small amount (say, one ounce) of the resin and use this to 'tack down' the pieces of fiberglass mat prior to final application of the
hardening resin.

SIDE ONE: Most resins will have specific instructions on the package, as far as the ratio of hardener/resin. It is best to use small amounts, as it does tend to set up quickly. If you do not get the entire side coated with the first batch, don't worry because it bonds to itself quite well.

The brand I used specified a ratio of 12 drops of hardener per ounce of resin. I worked with 3 ounce batches at a time, and 2 batches were needed for each side of the model.

After donning my rubber gloves, I measured out 3 ounces and transferred it to a thicker cup. (This is an important thing to do! Thinking I would save time, I measured out 4 batches of 3 ounces each, and by the time I was halfway through applying the first batch, the others were leaking all over the place. Much to my dismay, the resin had eaten a hole in the bottom of each cup!)

I carefully counted out 36 drops directly into the measured resin, stirred for about one minute, and began applying the resin mixture to the mat with a disposable brush. You only have about 5 to 7 minutes working time before the resin begins to set up, so don't get too persnickety: Just apply an even coat to the mat, (it does soak in nicely) being sure that the 3/4" overlap remains dry as much as possible. This will be trimmed later so you can avoid sharp edges that might damage the mold (or your skin! Remember, the strands in that fiberGLASS mat are GLASS!). The fiberglass mat mother mold should be set up in an hour, but wait at least two hours before you begin to form the other half of the mold. It does generate some heat as it is curing, don't be alarmed.

C. MAKING THE MOTHER MOLD

SIDE TWO

Leaving the first side in place, spray the remainder of the soft rubber mold and the exposed edge of the hard mother mold with cooking oil and follow the same steps to create the second side.

Here are the two sides of the mother mold (looking not unlike artistic taco shells!)
The pouring surface is against the tinfoil.

(Uneven edges of the mother mold are due to the variations in thickness of the soft mold's flanges.)

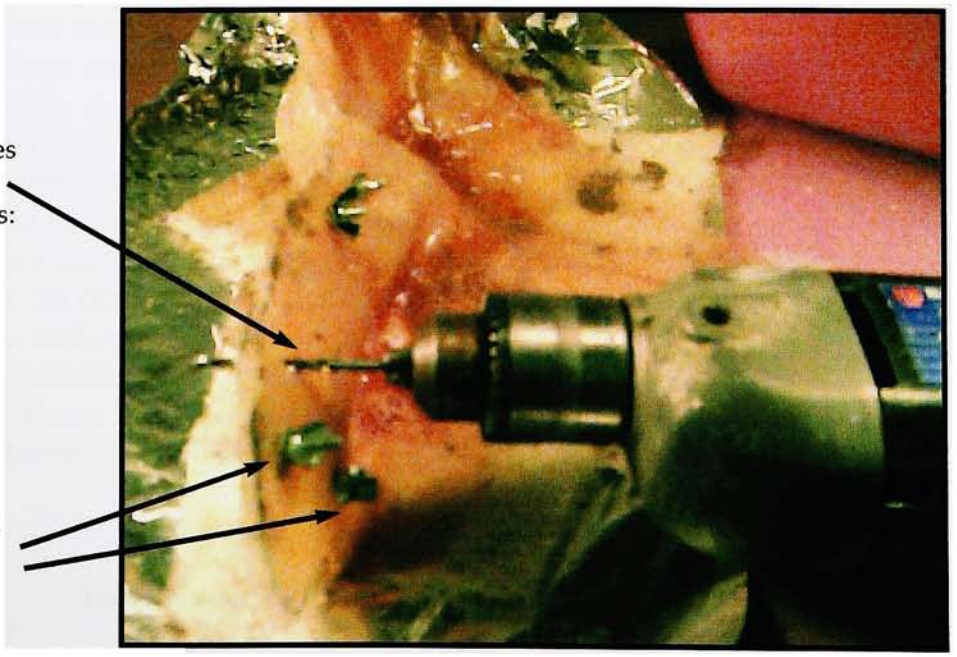
C. MAKING THE MOTHER MOLD

PROVIDING STABILITY

Since your mother mold is made to support your soft rubber mold, it needs to hold together while you pour the casting material. Having observed the methods of a few local moldmakers, I drilled holes in the flanges and then used screws and wing nuts to secure the two halves of the mold together.

A.
Drilling holes in mother mold flanges:

B.
Securing flanges with machine screws and wing nuts:



E. PREPARING TO CAST

1. DEMOLDING :
Remove the two halves of the mother mold and carefully separate the soft rubber mold from the model.

Removing the soft rubber mold from the original model.

E. PREPARING TO CAST

2. CLEANING AND CARE OF RUBBER MOLD

Your rubber mold may be used over again a number of times, especially if you take good care of it. Wash it with lukewarm soapy water and be sure that all plasticene residue is cleaned away. Depending upon what you use to cast, you may or may not need a release agent (for the INSIDE of the mold). Plaster and similar materials (including the Forton MG that I used) don't require any special release, though a rinse with 1% Ivory Liquid detergent and water is said to make things easier. I tried it, both with and without having the mold wet, and it didn't seem to make much of a difference. Of course, if you get into using plastics and resins, you will definitely want to ask the manufacturers about release agents.

3. REASSEMBLY

Join the soft mold parts together so that the keys and indents created 'snap' together. Assemble the hard mother mold shell on the outside of this and fasten with screws and wingnuts (or rubber bands) and create a stable arrangement for pouring. I was able to use empty milk crates to support the molds by the 2" margin around the pouring plane, but in a few cases I had to use 1"x1" wood strips propped between the boxes.

The fully assembled mold.

E. PREPARING TO CAST

4. CASTING : VOLUMETRIC MEASUREMENTS

It was necessary to estimate the amount of volume of casting slurry that would be used for each figure to be cast, in order to purchase the proper amount of raw materials necessary for this project. The FortonMG literature estimates that 3 pounds of slurry (the completely mixed casting material) would cover one square foot at a depth of 3/8".

This translates to 12"x12"x3/8" = $54"^3$ per (3 lbs) slurry.

I calculated the volume of slurry needed for each figure by determining the volume of each piece.

Each figure had started as 1.5 one pound blocks of Sculpey,
whose dimensions were 1.5"x3"x6" = $27"^3$ x 1.5 = $41"^3$ (~2 lbs per figure)
Each base was to be 13"x13"x3/4", = $126"^3$
Figure + Base = $167"^3$(~10 lbs. slurry per figure + base)
10 Figures + 10 Bases = ~100 lbs slurry necessary.

I originally planned to cast 10 figures, and 10 bases to attach the figures to. During the process of casting my experimental piece, I decided against casting the bases due to time, space, and logistics. I add this comment because these calculations determined how much material I needed to buy. The FortonMG is sold in a small starter kit ($49.00,) which makes about 33 lbs. of bronze slurry, and a larger 'sculptor's kit' ($116.00,) which makes up to 190 lbs. of bronze slurry. The price break for the larger kit made the wisest economic choice, and provided me with raw materials for future work.

The FortonMG casting method is used for architectural and art castings and produces strong and long lasting casts if you follow the methods outlined in their publications. It is necessary to have a triple beam gram scale, as the proportions are very exacting and need to be figured in gram ratios.

I determined that I needed to purchase enough bronze to make at least 20 pounds of slurry, using the FortonMG recipe, and since bronze powder is sold in 2, 10, or 20 lb cans, I went for the 10 pound can. $57.00 from Polytek.

Powdered Bronze	15 lbs.	10 lbs.
VF812	7 lbs.	4.66 lbs.
Resin	1 lb.	.66 lb.
Hardener	22 grams	22 grams
FGR95 (an additional ingredient, purchased from a local ceramics supply company)	10 lbs.	6.67 lbs.
TOTAL LBS. SLURRY	33	22

E. PREPARING TO CAST

5. WEIGHING OUT INGREDIENTS

I don't have pictures for this part of the paper because I did the castings w I did decide to invest some money in an instructional video manufactured by the company that makes FortonMG, which was a wise move. The video gave me tips that weren't in the literature, and it was extremely helpful to watch the process from beginning to end.

I premeasured the dry mix containing the bronze powder, resin, FGR95, and hardener using the gram scale. In a separate container, I weighed out the proper ratio of the VF812 (a milky liquid.) Gram amounts were determined by multiplying the number of ounces by 28.35.

MATERIAL	LBS.	OUNCES	GRAMS
Bronze	15.0	240.0	6,804.0
FGR95	10.0	160.0	4,536.0
Resin	1.0	16.0	453.6
Hardener	(22g)	(22g)	22.0
Dry Mix weight	~26.0	~416.0	11,815.6
VF812	7.0	112.0	3,175.2
Total weight of slurry	~33.0	~528.0	14,990.8

Therefore, the ratio of dry mix to VF812 $= \frac{11{,}815.6\ g}{3{,}175.2\ g} = 3.7212$

This means, for every unit of VF812, I would add 3.7212 times that amount to obtain the proper mix of FortonMG for casting.

Since I'd estimated that I would use about 2 pounds of slurry per sculpture, I would need (32 oz*28.35) g or 907.2 g total slurry mix, to cast one sculpture.

Harkening back to 9th grade algebra, we get:

$$\frac{907.2\ g \text{ desired amt. slurry}}{14{,}990.8g \text{ actual total slurry}} = \frac{(?)\ g \text{ needed amt. VF812}}{3{,}175.2g \text{ actual total VF812}}$$

... (907.2)*(3,175.2) = (14,990.8)*(?)

(2880541.4) = (14,990.8)*(?)

(192.15g) = ? = amount of VF812 necessary for ~2 lbs slurry.

Therefore, (192.15)*(3.72) = 715g Dry Mix necessary for ~2 lbs slurry.

Remember, when you are weighing ingredients, always use clean dry equipment, tare out your measuring cups, and to add the total needed to the tare wt.

6. CASTING

This is really almost the easiest part of the process. Think of making jello molds. Then add a few necessary steps. You can also use the Forton mix with aggregates (i.e. sand) to produce stone-like castings, or plain gysum (the FGR95) to produce paintable castings. I used 16 ounce yogurt containers to combine the materials, with a hand held drill and the turbomixer attachment. A less expensive mixing attachment can be obtained from hardware stores or ceramic supply houses.

The ingredients should be mixed thoroughly for at least a full minute, and then poured through a straining device. I used a 12" diameter plastic flower pot that I cut the bottom out of and stapled a circular piece of window screen to it. Straining the mixture will reduce the air bubbles that have been mixed in. I poured the mixture from a 6-12" distance to further break down suspended air bubbles, and filled the mold. (A more economical method when filling a larger mold would involve creating a 'face coat' of approximately 1/16"-1/8" depth of the bronze mixture and reinforcing this with a slurry containing chopped glass fiber without bronze powder. Information about this process is included in the FortonMG literature, but my figures were too small to implement this process.)

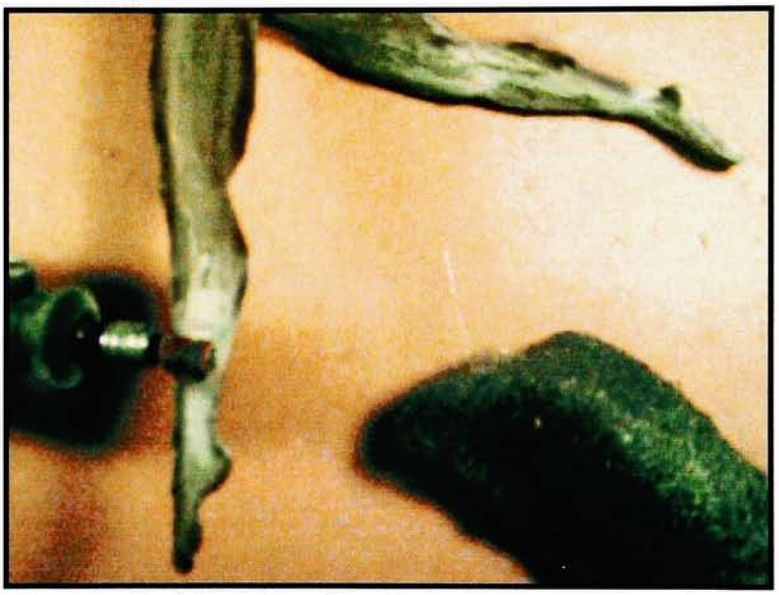
Once the cast had cured to a 'green' stage (between 30-45 minutes- when it is the consistency of frozen butter, where pushing in with a fingernail will leave a slight dent) I used an Exacto knife to trim excess material from the outer edges of the mold, drawing the knife blade toward the casting, rather than outward toward the mold edges. I removed the outer and inner molds after one hour, when testing with a fingernail did not leave an impression. It is very important to be gentle at this stage, as the cast is still delicate and breakable. It will have the appearance of aged chocolate.

Removing the soft rubber mold from the final casting.

At this point, flashing (the excess material that may have seeped through the parting lines of the mold) may be removed with an Exacto knife. Some molds had more leakage than others, probably due to tightening the mother mold screws too much, which distorted the parting lines of the soft mold. The piece will continue to dry and harden once removed from the mold, and will lighten in color somewhat. It becomes increasingly more difficult to trim larger flashings, so do as much trimming as you can as soon after demolding as possible.

There were a few pieces that broke coming out of the mold (the thinner areas like the wrists and ankles) but Forton binds to itself easily, and repairs are possible when you mix a small paste of the dry mix with a few drops of VF812. Apply the paste to both of the broken surfaces and build it up around the outside of the break, as you can sand it down later without a problem. You can also use the paste to fill in irregularities in the surface that may have resulted from air bubbles in the mix.

After the pieces had hardened, I used a Dremel tool to smooth and shape the areas that had been repaired and where the flashing had been removed.

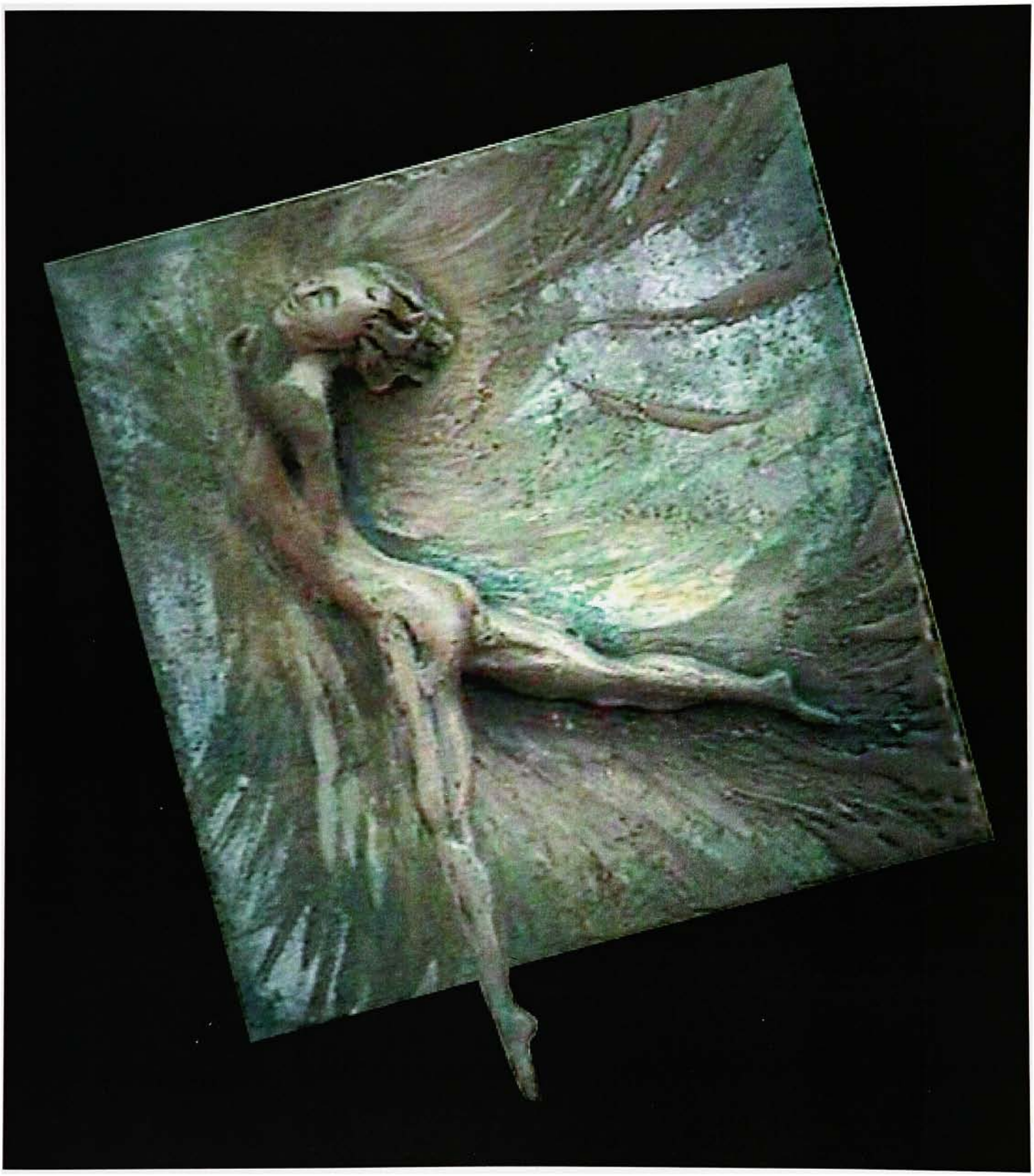


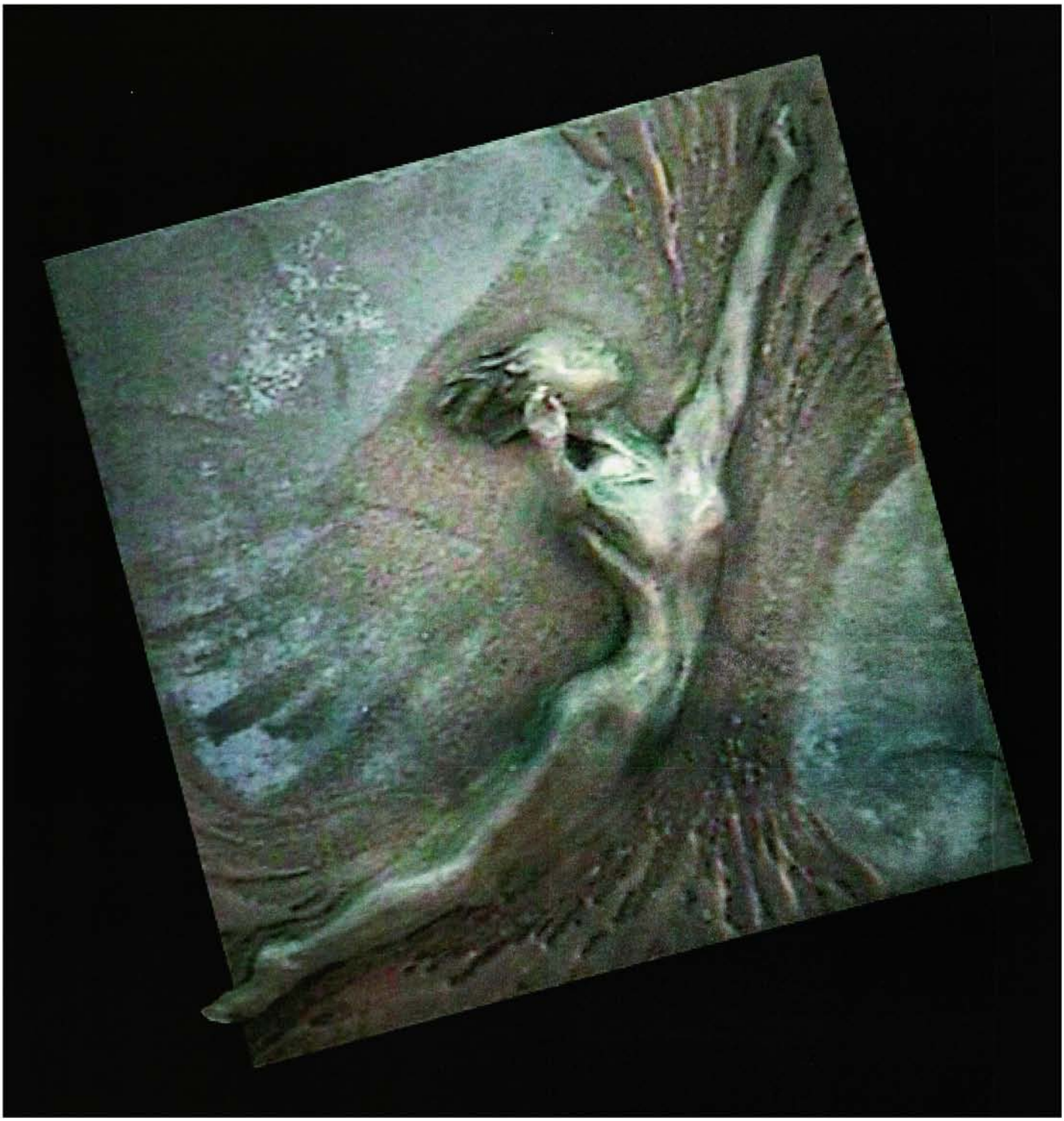
Trimming flashing and sanding down repairs with dremel tool.

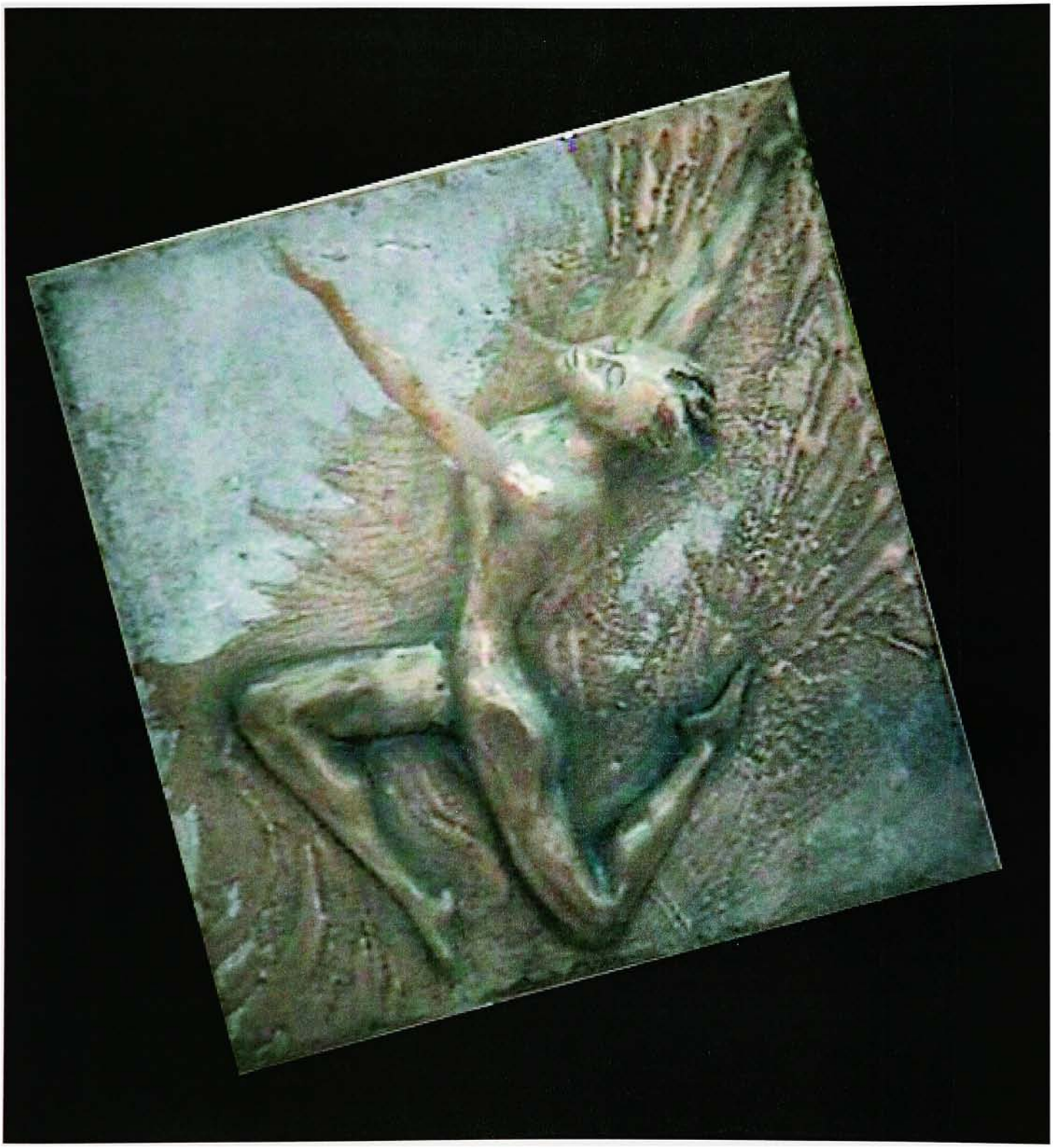
Once I'd cast all the figures, I used a grinding wheel in a local glass studio to smooth the irregularities on the backs, in order to have a good contact surface to glue the pieces to the ceramic bases. I prepared the bases from 13"x13" imported Italian floor tiles that I'd purchased from Home Depot. My favorite store! I attached wood strips 1/2" x1"x8" to the backs in order to be able to hang the work later. After that glue had set, I used the FortonMG/bronze mix to create aura-like emanations from the outlined edges where each figure was to attach to the base. The FortonMG bonded very well to the ceramic, and built up nicely to provide textural swirls.

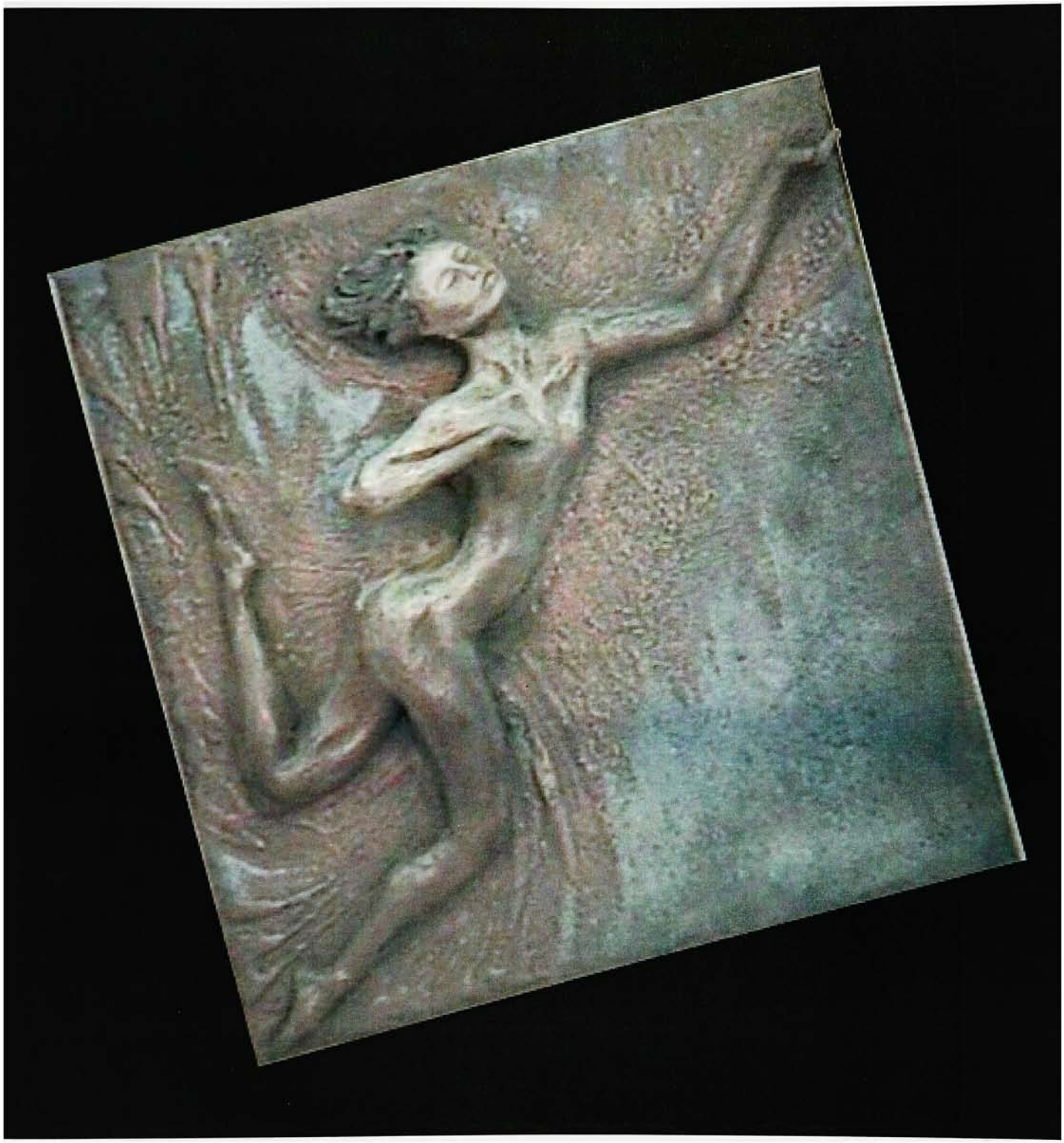
After gluing the figures to the bases, I used more of the FortonMG/bronze mix to fill the spaces where the edge of the figure met the tile, in order to give the impression that the figure was emerging from the tile. Metaphorically leaping from two dimensions into three, academically liberating themselves. At this point I applied a mixture of oil paint to serve as a patina, bringing out the details of the surfaces and adding depth to the overall visual effect of the pieces. Once the oil paint was dry, I used steel wool to buff the bronze surfaces, bringing out the metallic highlights, and did a final finish with a buffing wheel attached to a hand drill to achieve maximum shine on the high points.

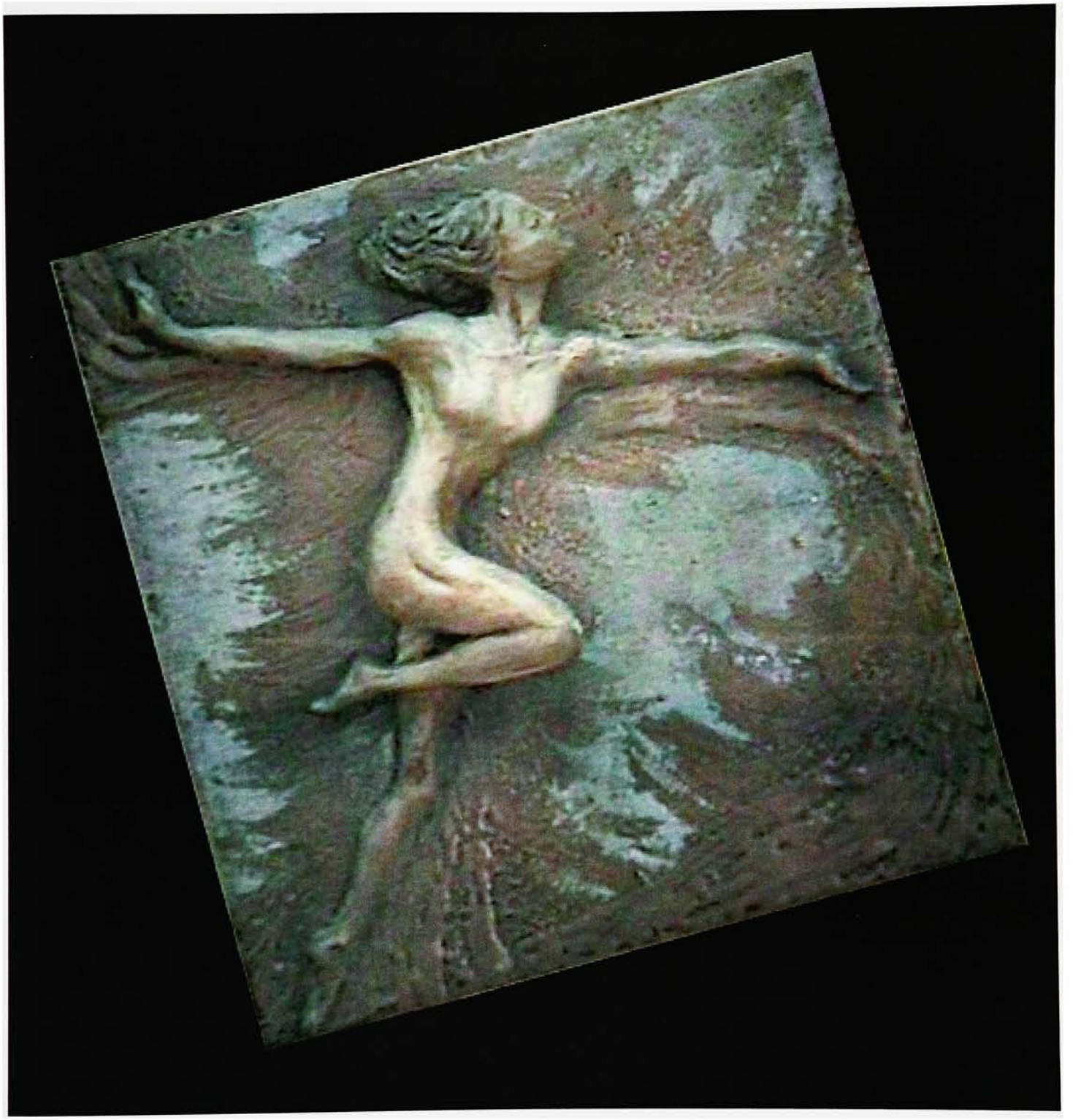
THE WORK

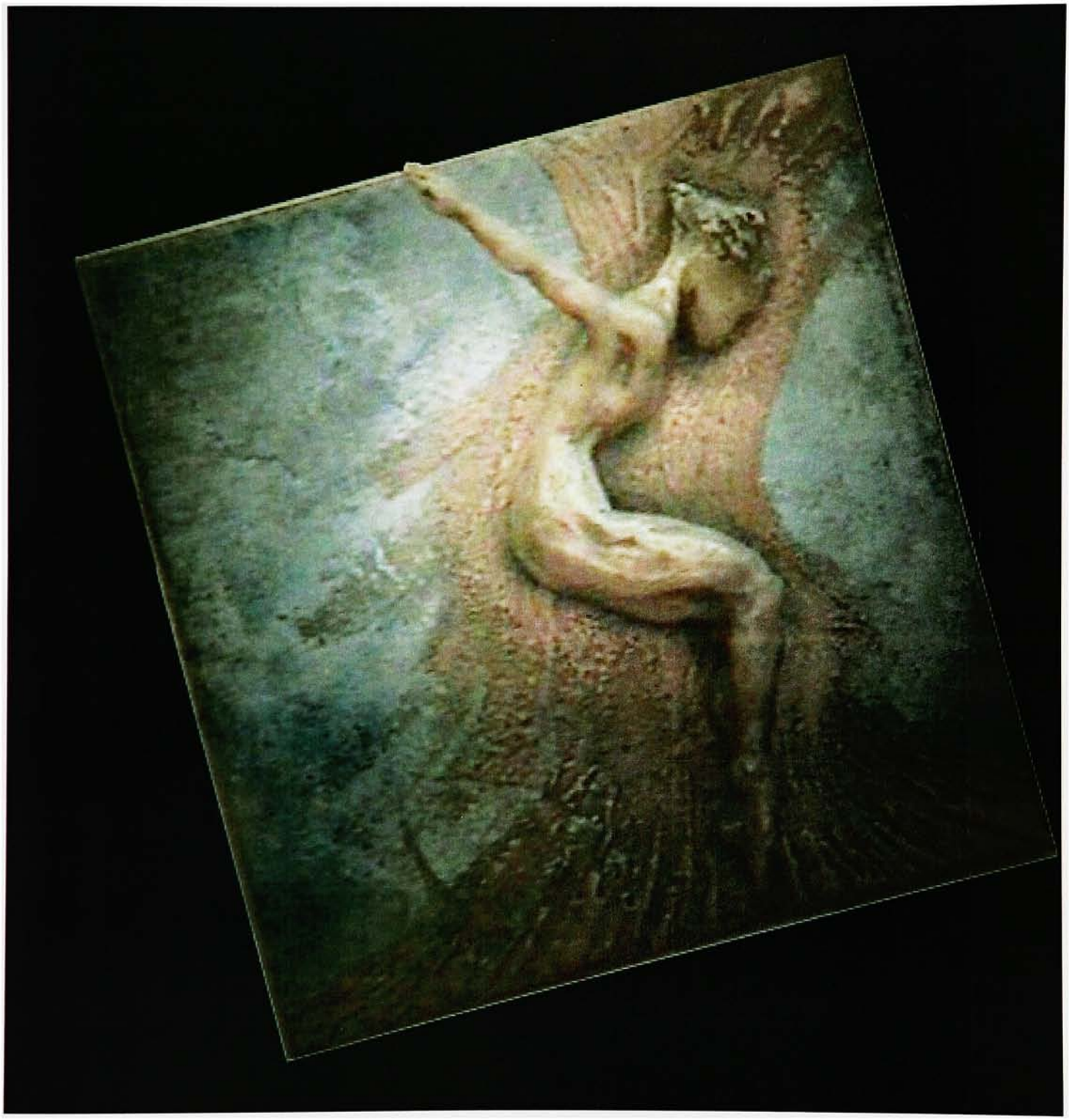












On a final note, I thought it would be helpful to include some informations about... COSTS:

PLASTIC CUPS, PAPER TOWELS, ALUMINUM FOIL, MISCELLANEOUS	15.00
RUBBER GLOVES (BOX OF 100)	10.00
CHINA BRISTLE BRUSHES	20.00
PLASTICENE	12.00
SCULPEY (24 lbs.)	75.00*
PLASTER	10.00
POL-EASE 2300 SPRAY, 12 OZ CAN*	8.25*
POLYTEK 40 , 16 LBS	80.00
AEROSIL, 10 LBS.*	56.18*
FIBERGLASS MAT, 3 SQ. YDS	23.00
FIBERGLASS RESIN/HARDENER	25.00
BALL CONSULTING VIDEO*	44.00*
TURBO MIXER*	41.00*
FORTON MG*	116.00*
FGR 95 50 LBS*	35.31*
BRONZE POWDER	78.50
OIL PAINT FOR PATINA	10.00
CERAMIC TILES FOR BASES	30.00
EPOXY, WIRE, SCREWS, WINGNUTS	20.00
	~$710.00

Items marked with an asterisk are those which I will use in the future, the materials bought in bulk for economy's sake. The turbo mixer was an investment that will last as long as I own the heavy duty

Much gratitude to my studio assistant, Booboo.
A joyful peeping deconstructionist at heart,
she personifies chaos theory in action, and kept me on my toes.

RESOURCES:

Almost all the information needed to complete this project was learned from the informational brochures sent by the materials suppliers. Since I wanted to get input from professional sculptors and moldmakers, I looked up "Bronze" in the yellow pages, and went to visit a moldmaker, David Johnson, who was in the business of making molds and casts for other artists' original works. He invited me to the studio and answered a lot of questions, in addition to selling me 3 pounds of bronze powder to do my expermental pieces, while waiting for the larger shipment.

He also referred me to his mentor/prior employer, Martin Dawe, who is a professional working sculptor with a number of prominent public and corporate works in the Atlanta area. Martin does his own work as well as accepting commissions from both the private and public sector, and has a beautiful working studio with several employees and student interns. He also teaches sculpture classes in his studio twice a year.

Other helpful tips came from Bruce Weinkle, the previous occupant of my studio/living space. Bruce has been working in the animation / claymation field in Oregon with Will Vinton Studios for several years now, and honestly, it was his left-behind unfinished works that inspired me to work in three dimensions.

David Johnson Studios
660 Langford Drive NW
Norcross, GA 30071
404-424-6090

Martin Dawe
Cherry Lion Studios
933A Watkins St. NW
Atlanta, GA 30318
404-607-9602

Bruce E.Weinkle
The Victorian #307
2255 W. Burnside
Portland, OR 97210
503-464-0203

Materials for Molding/Casting (I would suggest calling all these companies and requesting as many goodies as they can send!)

Polytek Development Corp
55 Hilton St.
Easton, PA 18042
610-559-8620

Polytek has a large and varied line of materials for both moldmaking and casting. Also sell powdered bronze. Special pricing for educational institutions and first time buyers. The 60 page catalog has accurate and easily understood process information. They will also send, free of charge, a quarterly newsletter with new information, techniques, and special interest stories.Will send cured samples upon request.

Ball Consulting, Limited
Suite 201, 338 14th St.
Ambridge, PA 15003
800-225-2673

Ball Consulting is the source supplier of FortonMG and necessary materials to implement this system. Also supply copper, bronze, nickel, and silver powdered metals. Instructional info sent with inquiries. Will send cured samples upon request. No discounts.

Synair Corporation
2003 Amnicola Hwy.
Chattanooga, TN 37406
800-251-7642

Synair is another good source of rubber moldmaking materials and casting materials. They also sell light and dark bronze powder, and include some 'how to' info with sales material. They will send cured samples if you request them.

Johnson Atelier
50 Princeton-Hightstown Rd.
Suite L
Princeton Junction, NJ 08550
800-732-7203

A sculpture & casting supply company, with a dizzying array of things for sale. Some helpful information included in handout form.