

Stone Carving Explained

A Guide for the Beginner
(and a little help for everyone)

Shane Smith (The Stoneshaper)

Stoneshaper Studio
Owensboro, KY

Copyright ©2000 Shane Michael Smith

Published by
Stoneshaper Studio
3620 Placid Place East
Owensboro, KY 42303

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior written permission of the publisher.

I dedicate this book to my wife Tammy. She's the one that kept everything going while I spent hours carving, setting up my web site, going to school and writing this book. She is a worker, a mother, a wife, a painter, a thinker, a planner and anything else she needs to be. She has dedicated her life to me. Tammy I dedicate this book and my love to you.

Contents

FOREWORD	1
HOW DO I START OUT?	2
WHAT YOU'RE GOING TO SPEND YOUR MONEY ON	2
STONE	2
<i>Availability of carving stone</i>	2
<i>Kinds of stone to carve</i>	2
TOOLS	3
SANDBAGS	4
PERSONAL PROTECTION	4
CARVING BENCH (BANKERS)	6
Make a Banker:	6
INSPIRATIONS	9
GETTING YOUR IDEAS DOWN	10
THE ART OF STONE SCULPTING	11
<i>Maquettes and Models:</i>	12
THE HOW AND WHY OF CARVING	14
<i>Basic Chiseling:</i>	14
MOVING STONE:	14
<i>A pitching tool</i>	15
<i>The point chisel</i>	17
<i>Claw Chisel (pointed toothed):</i>	17
<i>Toothed Chisels (flat toothed):</i>	17
<i>Straight Chisels:</i>	18
<i>Rasps and Rifflers:</i>	18
BRUISING:	19
SANDING:	19
POLISHING	21
MOUNTING YOUR MASTERPIECE.....	22
Mediums for bases	22
EVOLUTION OF A SCULPTURE	24
ON THE MATTER OF STONE	26
<i>Soapstone:</i>	26
Carving:	26
<i>Alabaster:</i>	27
Carving:	27
<i>Limestone:</i>	28
Carving:	29
<i>Marble:</i>	29
Carving:	29
<i>Granite:</i>	30

Carving:	30
<i>Other Stone</i> :	31
MORE ON STONE	32
WHEN IT BREAKS	33
MORE TECHNIQUES AND HINTS	34
TEXTURING:	34
These are some texturing marks left by different tools.	35
SPECIALIZED CHISELS:	36
SPLITTING STONE:	37
LETTERING	38
Powered Lettering:	39
Painting:	40
Gilding:	40
WRAP YOUR Mallet:	43
POWER TOOLS	44
ELECTRIC:	44
<i>Sanders</i>	44
<i>Rotary Grinders</i> :	45
AIR:	45
<i>Compressors</i> :	45
<i>Air hammers</i> :	45
<i>Air Chisels</i> :	46
<i>Die Grinders</i> :	47
<i>Orbital Sanders</i> :	48
CARING FOR YOUR TOOLS	49
Chisels:	49
Rifflers and Files:	50
Air Tools:	50
Electric Tools:	50
WHERE TO GET SUPPLIES	51
STONE ONLY	51
TOOLS, STONE, AND MISC.	52
<i>Tools for the bigger boys</i>	53
SYMPOSIUM CONTACTS	54
<i>STONE WORKSHOPS</i>	54
<i>SYMPOSIUMS OF INTEREST</i>	54
A-D more letters.....	64

How do I thank everyone that has had a part to play in the making of this book? There is my mother & father who never stop believing in me. Larry Maglinger who has spent time to take pictures for me and let me borrow equipment, Eric Peterson <http://www.hammer-chisel.com/> who supplied me with the granite carving section. William (Bill) Kolok <http://www.stonesculptures.org/>, who taught me, critiqued me, became my friend and mentor, and just generally encouraged me. Randalyn Barger who edited me and always has the highest praise for my endeavors. My brother who showed me that it is possible to write a book. There are many, many others that I wish to bless. Those with whom I interact with in my daily life who keep me going.

Foreword



Let me start this book by telling you what I am not. I am not a full-time artist. Indeed, I earn my daily bread making spaghetti sauce. So why write (and more important, why should you read) this book then? I went for 38 years thinking that stone sculpting was something only ancient artists did. Even though I knew my heart yearned for the experience, I did not have the first

inkling of where to start and only by pure coincidence did it happen. Thus, I am writing this for all you souls out there that want to learn how to shape stone. After all, unless you are an accomplished stone sculptor, you will be following in my footsteps and it's always nice to know just what you're going to be stepping in. After the first three years of mostly self-taught stone sculpting (with guidance from friend and mentor William Kolok), I picked up a book on the subject. I discovered that while it told me what to do, it left out a whole plethora of "what not to do's," and of course, I (much to my dismay) ended up doing all of them. After seeing that there was a need for information on stone carving I added the basic steps on my web site but received literally hundreds of requests for more details. The question of where to purchase a book on the subject kept popping up: here it is.

This book is for the beginner, the lover of life, beauty and new challenges. It's for the people who may only finish one sculpture for a loved one or go on to a lifetime in communion with stone. This book is to help you bring out your inner expressions and to teach you how to "TILT." I know I'm getting long-winded here but I'll explain tilting before I let you go. I had finished a sculpture for the center of my mother's labyrinth, which is situated on a hillside. I set it in the ground, leveled the base, stepped back and lo and behold, the sculpture appeared tilted. My mother walked up and noticed the same thing but told me to leave it since it was "RIGHT." She left briefly and I quickly (not being one to leave something I'm unhappy with alone) repositioned it until it, 'looked straight.' When she came back, she noticed the difference and asked me what I had done. I replied, "I tilted it." Her smile disappeared until I explained that being straight did not make it right. Feeling it was right did. Tilting the sculpture made all the difference in the world. Never be afraid to 'tilt' your ideas. Unless your main objective is to sell something quickly, you have only yourself to please. Enjoy yourself; seek the heart of the stone like a child exploring nature. Approach it with wonder and openness to learning and the odds are you'll be as stone-struck as I am.

How do I start out?

That's the million-dollar question. There are a number of ways. I took an art class in college and there was an art student that had finished a piece in stone. It was so beautiful that I had to try it. I bought a stone from the instructor and with tools that he lent me I headed home. Two months later (I had to work in private, as it was a Mother's Day gift for my wife) Mother and Child Reunion was born and I became a stone addict.

So you have all kinds of choices. You can:

- 1) Take an art class in college (not all will have stone carving classes but any sculpture or drawing class will help).
- 2) Ask the local colleges if they are going to have a stone-carving workshop.
- 3) Get a book (how about this one?) on stone carving and use the resources listed at the end of this book to get your supplies.
- 4) Check the web for stone carving symposiums and workshops (I'll list a few at the end of the book). Even though many of these are geared for people just starting out, the workshops tend to be smaller in size and a bit more personal. It helps to have some experience before you attend a larger symposium.

Isn't it great?

What you're going to spend your money on

Stone

Availability of carving stone

Depending on where you live, you can probably find some kind of stone to carve within driving distance. This is what I do to get my limestone. Other stones are available but shipping can hurt the old pocketbook so I would recommend that you try the local schools for stone supplies or information. They often keep a supply on hand for the students and are usually more than happy to sell some. You may also try checking the local monument (gravestone) people. They often have small blocks they cut off the ends of the stone. You can order stone from one of the suppliers at the end of this book. If you keep it less than 70 pounds U.P.S. charges are minimum. Less than a hundred pounds and they will still carry it cheaper than a common carrier (semi). Ship more than a hundred pounds and you will have an eighteen-wheeler pulling up in front of your house, and you (not the driver) will be responsible for unloading it.

Kinds of stone to carve

There are a number of stones that can be carved and you can be sure that someone has tried them all. But, some are better suited for carving. Here are the most common.

- 1) **Soapstone** is available in many different colors but is usually black or dark gray. It polishes to a smooth finish and when scratched leaves a white mark, which makes it easy to texture.

2) **Alabaster** is easy to carve and it is extremely beautiful. It can bruise (see [bruising](#) under [The how and why of carving](#)) and fracture, but it's worth the trouble. This stone is stunning in its beauty with colors like green, red, white, gold, cream and just about everything in between. It often has internal grains and fractures that add to the beauty but increases the breakage factor.

3) **Limestone** (Oolitic, from central Indiana is very good) is a great carving stone and probably the best to start with. It is easy to carve, shows texture well, generally inexpensive, and polishes to a golden brown. While limestone does not take most waxes well, it is one of the best stones for showing details carved into it and is good for outdoor pieces; one of my favorites.

4) **Marble** (Colorado White Yule and Italian Carrara are two of the easiest to work with) is the stone of the Renaissance. I believe that every stone sculptor wants to try this stone at least once to experience the stone of the masters. It's well worth the work involved shaping it but it does help to have a good set of tools since it is a harder stone.

5) **Granite** is very durable and can be polished to a mirror finish. You will need diamond and silicon carbide cutting and grinding tools as well as a lot of sweat.

There are others but these are the ones you will most likely run into.

Tools

These are available from a number of resources and I have listed some (Check the Internet for more). A good set of starter tools is going to cost somewhere around one hundred dollars. This will include a mallet, about seven chisels, and a set of stone rasps (rifflers). **My first seven pieces were made with one of these sets.** Remember this as you peruse through the power tool section thinking there is no way you can afford this stuff. One of the reasons I



started carving stone was because it could be done at home with a minimal initial investment. My tool inventory has grown a bit now. As you can see in the picture, it is easy to accumulate many different tools but you really don't need this much to start.

Sandbags

You MUST have sandbags to support your stone before you start carving. This takes out the vibrations in the stone as you hit it and really is necessary to prevent breakage. Besides, sandbags will eliminate your “chasing.” Chasing is what you will do as the stone scoots across the table when you’re carving it without sandbags. I make mine from old work pants. I cut the legs off and cut them in half at the knees and turn them inside out. I then sew up one end completely and sew the other end half closed. Then I pull the bag right side out through the opening and fill the bag loosely with **white play sand** from the hardware store (construction grade sand tends to sift dirt out through the fabric and get the stone dirty) and then sew the hole up. I have also seen people use hot melt to seal the ends. It seems to work okay. Even if they have holes in the knees you can get four out of a pair of pants. For real quick sandbags, take two plastic bags that your newspaper comes in on a wet day (or maybe bread wrapper bags), double bag them, fill them with sand and slip them into two tubes socks that are also double bagged.



For a large, thin stone you can build a shallow frame and pour in a layer of sand for the stone to lie on.

Very large stones can be put directly on a banker (stone carving bench) or on wooden beams that are laid on the ground.

Personal protection

These are the most important sculpting supplies there are.

Goggles or safety glasses are obtained at your local hardware store. Wrap around goggles offer the best protection against dust and flying chips. It's hard to carve if you can't see.

Hearing protectors will help insure that you will be able to hear your grandchildren and birds later on in life. I prefer the ones that look like earmuffs; they help to keep the dust out of my ears.

Dust masks are a must when grinding and carving stones like soapstone to avoid silicosis. Limestone is not as harmful because a small amount of dust will actually dissolve in the lungs. Don't push it though. Junk in your lungs is no good under any circumstance. Wear your mask anytime there is dust.

Ventilation is needed in a closed place. A window fan drawing out is probably sufficient. Heavy duty grinding should be done out of doors.

Leather gloves, your hands will thank you when you're tired and miss that chisel (it will happen). Vibration dampening gloves are a must when using air chisels or hammers drills and the larger building supply stores now carry inexpensive ones.



Carving Bench (Bankers)



These were all used at Bybee's Limestone Symposium 2000.

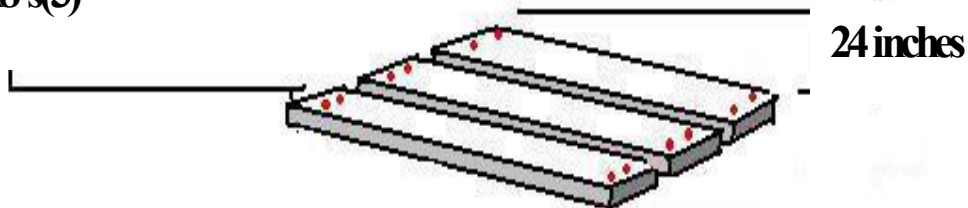


There are many different kinds and shapes of bankers (carving benches). I'll give you the blueprints for one of these in the next few pages, but any **sturdy** bench will work (even $\frac{3}{4}$ " plywood on cinder blocks or on top of a 55-gallon drum). Just try to get it where you are able to walk around it and work on it without constantly bending over or standing on tiptoes. For a stone up to 200 pound this will be between waist and elbow height. The taller your stone is the more you'll have to fudge on it. Notice the short benches in the middle picture. These can be used both for stepping on to get higher or sitting on to get lower. It's very easy to get yourself in a bind and not even notice. You'll be concentrating on working, go to straighten up after an hour, and OUCH! Make it as easy on yourself as you can. Work at the right height and stretch every once in a while.

Make a Banker:

To start off, cut your boards for the top (C on page 8) off at 24 inches using any of the combinations I have listed in the first picture.

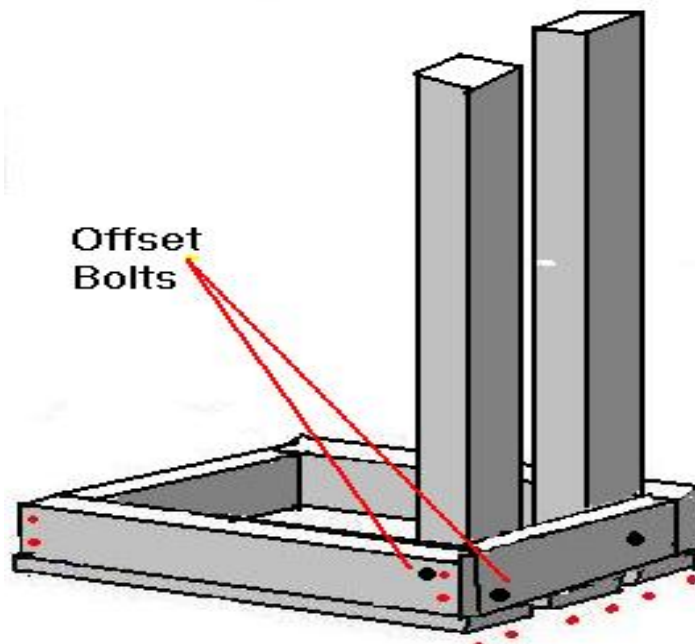
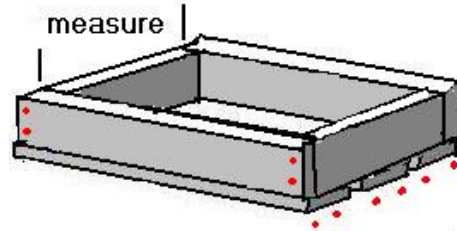
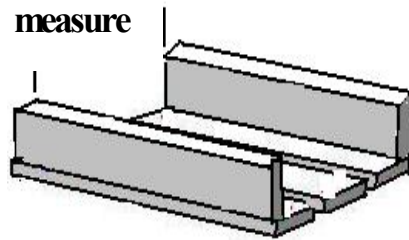
**2x4's(6) or 2x6's(4)
or 2x8's(3)**

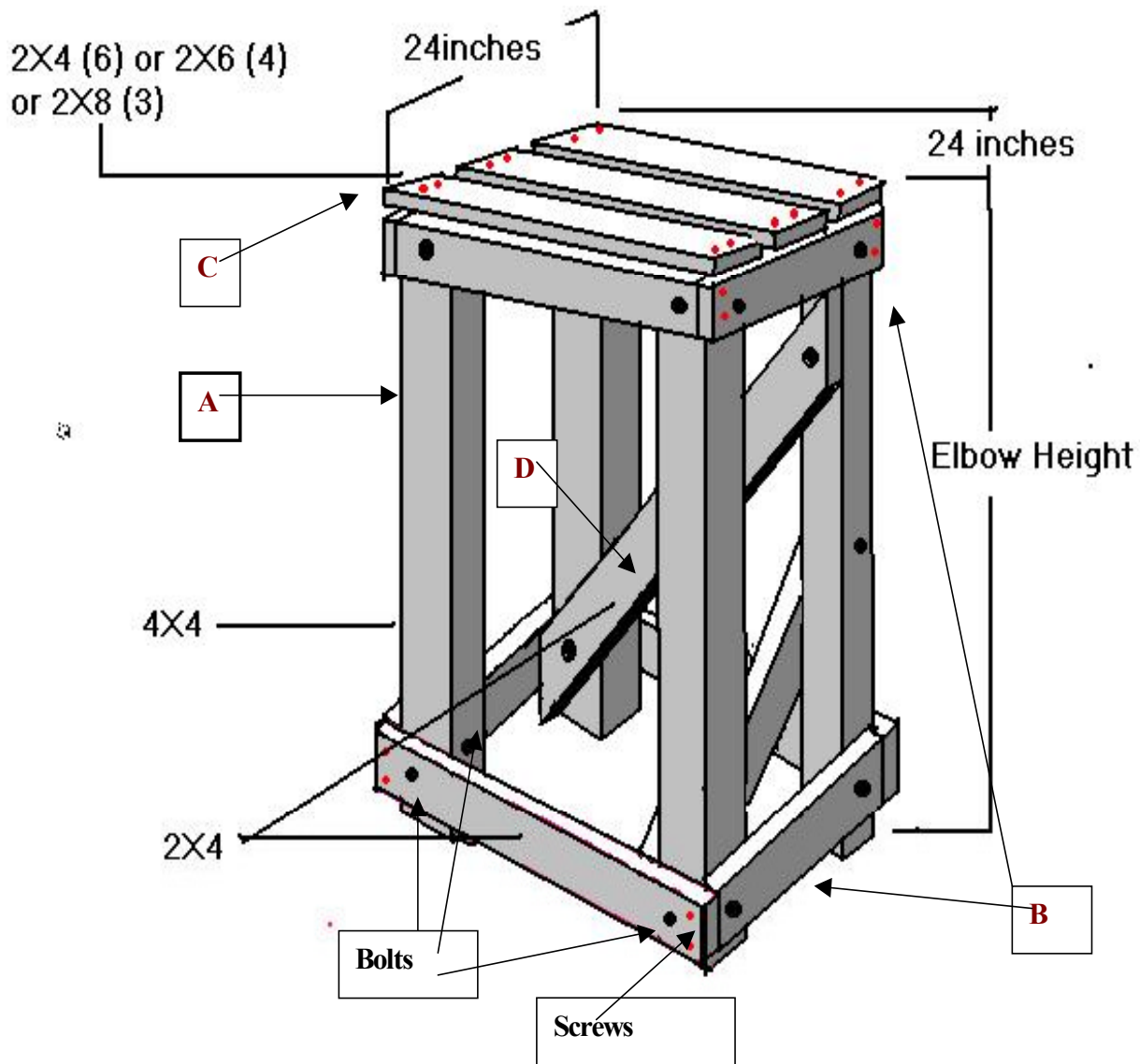


Take your 2X4s (B on page 8) and cut four pieces off at 24 inches length. Take two of them and lay them on top of the end boards you have cut for the top and measure the space between them with all of the top boards laid together and touching. This is going to be the length for the other four boards. Cut them at this length.

Take your boards and screw them together as shown, kind of like a box. Red dots show where screws should be put. Nails can be used but will loosen as time goes by so it's worth the extra effort to put in screws.

Now you can cut your 4X4's (A on page 8) off at somewhere between the height of your waist and the height of your elbows. Bolt the legs onto the top using stove bolts or regular bolts about 6 inches long with washers. Offset them slightly to avoid hitting the bolts that are going in the other side of the legs. Then put on the remaining (B) boards that you have cut, close to what will be the bottom of the legs and temporarily hold them in place with screws. Now measure the lengths you will need to make the two braces (D on page 8). Hold them in place and mark the angles that you need to cut on their ends. Once they are cut, bolt them in place along with the bottom boards. Finish putting in screws where the red dots are and you are ready to use your banker.





LUMBER: 24ft of 2x4, 16ft of 4x4, and one of the following, 12ft of 2x4, 8ft of 2x6 or 6ft of 2x8

hardware: 20- 6in x 3/8in stove bolts, 20- 3/8in washers, 20- 3/8in nuts, 50- 2&1/4in no.8 wood screws

A banker of this size and strength is good for about a 200-pound stone. For bigger stones use bigger boards and shorter legs.

You're just about ready. All you need now is an idea!

INSPIRATIONS

What shape is your piece going to take? This can be a major roadblock, and it happens to all of us. From the other artists I talk to, I gather that it's about the same for us all. That is, we work on a piece for days, all inspired. Then you finish and, NOW WHAT? This is a perfect example of life. The real fun in life is not accomplishing something, it's working toward its achievement. It's using our brains and muscles and insights and gut feelings to overcome and compromise and alter until we end up somewhere. Where is this somewhere? Is it a place to stop and be happy? Nope. It's just the starting place for the next step. So don't worry what the end product will look like. It's all the learning and striving that makes us happy so just get started.

People constantly ask me, "Where do you get your inspirations?" I believe that all inspirations come from God. I feel that God gave us art so that we would have a means to experience the act of creation ourselves and to be able to have an expression for our thoughts and to add beauty to his world. Many of my sculptures are expressions of my emotions: Empathy for the plights of women (BALANCED), Admiration of their spirit (FREEBIRD), Music (HARPIST IN THE LOBBY OF THE MARRIOTT), The ocean (BORN OF THE EARTH, AND OF THE WIND, AND OF THE WATER). Some came to life while I was just making shapes on paper. Some were not preconceived at all but just took shape as I carved the stone. Trust that everything will come out all right. It may turn out different from what you first thought it would be. Mine often do, but they always turn out better. In using your abilities and insights to work out problems and work with the character of the stone you add new dimensions and possibilities that never would have occurred to you otherwise. Let the chips fly and your spirit SOAR!

Birth of a Mermaid

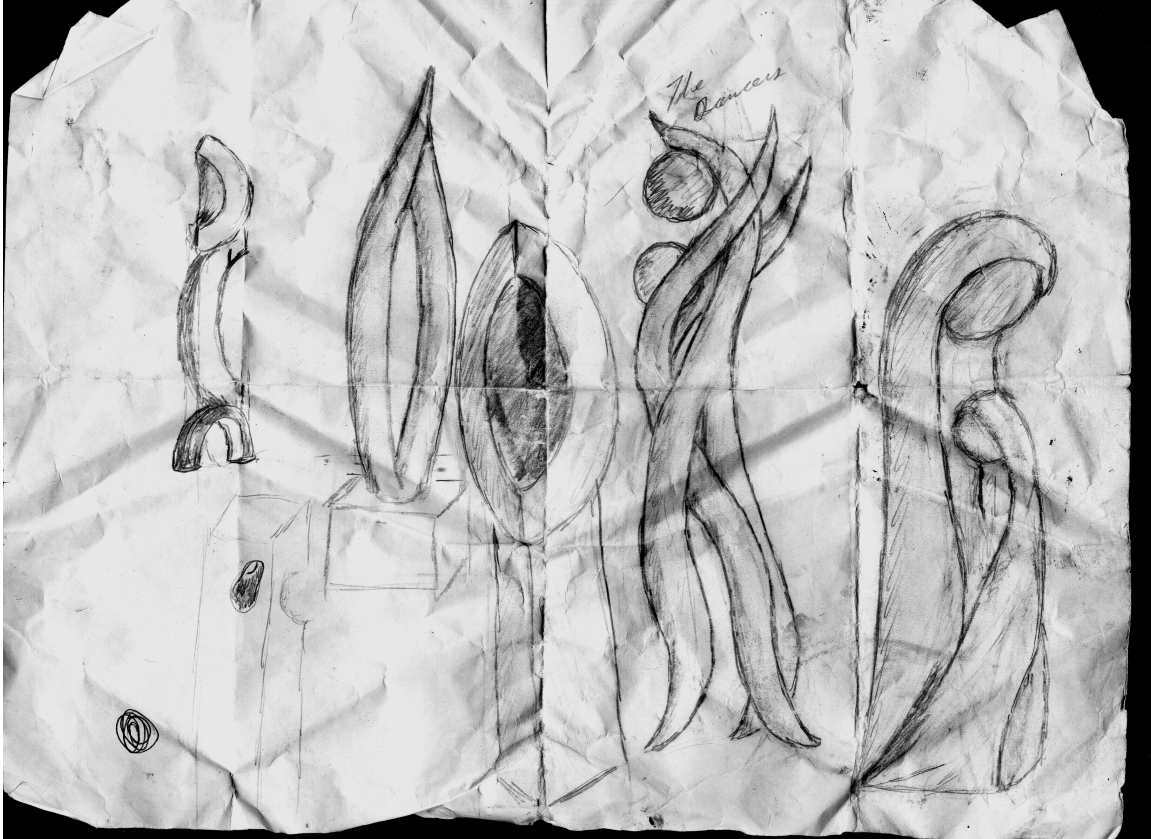
Are mermaids real, can penguins fly,
is that blue paint across the sky?
Do dogs talk, do fiddler crabs play,
does the sun chase the moon
or does night follow day?
Can you count all the grains of sand if you try real hard,
or maybe, perhaps, light a new star?
Can you dance with a duck, ride a red toad?
Do fairies live in flowers, along the side of the road?
Are these too many questions, or do I ask too few?
Can you tell right now what I should do?

Close your eyes my child, and the answers you seek,
a dragon will bring to you in your sleep.

To all my friends, *Shane Smith*

Getting your ideas down

We all have ideas and inspirations that come to us out of the blue; and like dreams they can disappear just as fast. So you have to be ready to jot down SOMETHING that will recall it to you later. Many times there are things that really move me to express them in some way. When this happens I grab whatever I can to get it down before I forget it. I have drawers that are full of these drawings and sketches. I may never carve many of them but they are there if I run across the perfect piece of stone to match them. You don't have to be a great painter to do this, just make it clear enough to remember what it was that inspired you.



Many times this was on a scrap piece of paper that I carried around in my pocket like the one above.

My roomy at the Bybee Symposium always kept a notebook handy. Not only for drawings but also notes about his thoughts and accomplishments. He put in things he learned and things that had turned out not so good. It looked like a really good way to keep track of his progress and goals over the years. If you get one and make it your journal, not only will it help you and be a keepsake, but when you are famous it will be worth a fortune (after you are dead of course).

The art of stone sculpting

First, I love negative spaces. For me, the holes in a sculpture say as much as the rock that is left. What makes a good sculpture? I am not going to try to teach you about art. To say that my concepts of art are correct is to say that yours are incorrect. Each artist searches for expression of his or her soul and each artist's soul is unique. We must all search for our own path. I can only tell you some of the things that are important to me and maybe you will gain something from it that you can make your own.

I tend to strive for "airy," art. A lofty goal, seeing as stone is earth-bound and solid. Holes and spaces tend to lead the observer around to find out what is on the other side. Looking through a rock is something out of the ordinary; not usually found in nature.

Secondly, I love curves. Flowing, sweeping twisted curves. Some stone artists work in a blocky style trying to preserve the nature of the medium. I am not concerned with this; I like curves.

Third, come sharp edges. Incorporating sharp edges into an otherwise flowing sculpture can add contrast and can often serve as a stopping point for an otherwise endless curve.

Fourth, well...this is the hard one to explain. This is putting feeling into my art. It's kind of a combination of love of the stone, internal emotion and immersing myself in the act of creation. This requires you to have faith in the stone and yourself. Have faith even when you think you have screwed up, even when the stone breaks. It'll be okay, keep trying, you'll get there.

My mentor told me once to stay away from lines and to stick with shapes. For the most part this has been good advice. Lines on small sculptures are easily overlooked and usually add little value to it. However, I got a chance to see some large (very large) works done by Dale Enochs in which he had covered vast areas of stone with lines. On a stone of this size they took on an etched quality. Dale works mostly in limestone, which lends itself to showing lines well, and he has the equipment to handle these monolithic stones. For most of us it will be much smaller stone and it's best to leave lines out.

Shapes on the other hand, are what sculptures are all about; especially stone ones. Shapes make your viewers want to reach out and feel them. They can sense that part of the experience lies beyond the eyes and can be fulfilled only by the physical act of touching. In this the artist is to be envied, for we are intimate with the stone. Often as I near the completion I will simply let my hands explore the stone with my eyes closed. Like a blind person, I will build a shape in my mind from the touching to find out if it is as pleasing to experience it this way as it is with my sight.

Oh yes, while we are on the subject of change, don't be afraid to change a sculpture that just, 'is not working.' When I say change, I mean CHANGE. Take a drill and punch a few holes in it. Round off a couple of corners. Cut off the top. Sometimes we just get stuck on a dead end street and need a new direction. Bill Kolok tells his students that, "If it's not right, it's wrong." This means that if you are carving a face and the dimensions are all wrong, you start back into it and remove more stone. If you have the hair and body perfect, chances are that you will have to also change them, as the face gets smaller. Is it worth it? You had better believe it. More than one sculptor has made the mistake of perfecting one aspect, only to find that it no longer fits in with the rest of the piece. The easiest way to avoid this is to stop ever once in a while and walk away. Go get an ice cream or something. When you come back, look at it as if you're seeing it for the first time. Look at it from all angles, from near and far, bright light and dim. Coming back and seeing your sculpture in a different way will give you new perspectives and ideas. Working as close as we do to the stone, we begin to picture it in the separate sections that we work on instead of as a whole. Look to see if that part you just finished leads you to explore the rest of the piece. If it just stands out and ignores the rest of the piece it might not be as beautiful as you first thought. You will be working in 3-D and all aspects need to work with

each other. One of the best things about having a mentor is that they can confirm what we already know but hate to admit, that it needs more work.



Plaster Model

Maquettes and Models:

These are ‘mock-ups.’ Small models of what the sculptor wants to carve. They serve to give you the feel and three-dimensional relationship of the future piece. What do you model from? You can have someone model (if it’s a figure) or you can make a model of a drawing or even of your thoughts. This can be done with clay, plaster, wood, stone and papier-mâché. You name it; you can use it. Of course most of them will have to be scaled bigger as you carve, but with some mediums (clay especially) you can make them life size and copy from them. From the old masters through today’s artists, this method has been used to insure that everything comes out perfect.

To create a maquette, pick your material and make your model. For me that’s it. I pretty much just eyeball it after that. For busts and figures that have to be accurate you will probably want to get the model as close as possible to real life. Sometimes as the size increases you’ll find that what looked good small does not work as well in a larger version. Always be ready and willing to adjust your inspiration to accept new directions. I’ll say it again, new challenges as you work will almost always bring changes for the better in what you first thought was a perfect conception.

Bill has discovered that a block of clay (or the type of Styrofoam that florists use to hold flowers) that is roughly the same dimensions (in miniature) of the stone is good to use. This will allow you to take away material in much the same way as with the stone. Thin slabs of Styrofoam can be glued together to get the thickness you need.

To use a measuring method, measure the model on its widest side and then measure your stone at its widest width. Divide the one number by the other to see what you get. Say your model is 3 inches wide and your stone is 2 feet wide. 24 inches (2 feet) divided by 3 inches is 8. So every measurement on the model will have to be multiplied by 8. Now you have to make sure all the other sides are large enough. Measure height and depth of model and (in this case) multiply by 8 and see if your stone is tall and deep enough. If its not you’ll have to adjust the number. Say that it’s plenty deep enough but while your model is 7 inches tall (7 multiplied by 8 is 56 inches) your stone is only 52 inches tall. You have to refigure your multiplier. Leaving a little stone on top for good measure we take 51 and divide by 7 to get 7.3 (approximately). You can now multiply all model measurements by this to get the dimensions for the stone’s measurements. Make sure you use the same multiplier for all the measurements. If you have different ones for each side, your sculpture is going to come out mighty lopsided.

Old masters and many carvers today use a *pointing instrument* to transfer the exact measurements from a plaster or clay life-sized model over to stone. If you get a real close look at some of the old sculptures you can see hundreds of tiny pinpricks of the surface of the stone. This is where the needle that transferred the distance touched it. The device is still available and used where exacting stone removal is needed.

In lieu of this tool I suggest that you on ahead and *temporarily* make the base a rectangular shape to scale, regardless of what the final shape will be. Then you can put a



straight edge up from the base of the maquette and measure the distance from the straight edge to the feature you want. Then you can do the same on the sculpture, taking away the stone until the measurement turns out right.

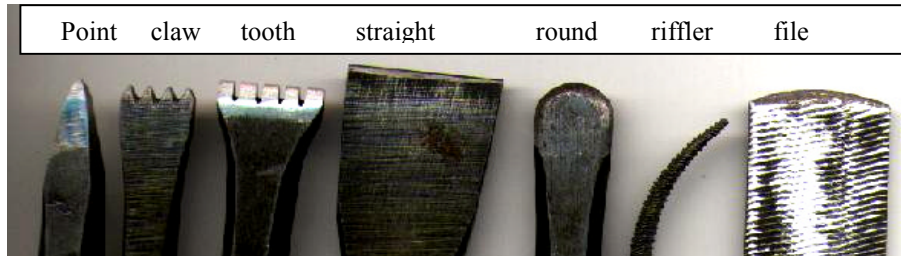
Calipers are two long claw-like arms connected at one end by something that allows them to move in and out. These can be obtained at many art and hardware stores, or you can make your own. They allow a quick check from a life-sized model to the sculpture by positioning them on the part you want to check and then checking the same part on the sculpture. They can also be used to check for roundness.



There is another method I have used. John James Audubon used it to paint the birds that he killed. This was to lay a small grid over the bird and another one over paper. It does not matter what size difference the grids are as long as the same number of boxes in the rows and column are used. This is a bit harder to do with stone than with paper but it can be done. This is the method I used when I first carved “Birds in Flight” in wood. I made a grid to fit it and then made a smaller one to fit the stone I was using. By carving away until the curves and sides were the same within the corresponding grid I was able to replicate it. I used to have pictures of the grids but I must have deleted them somewhere along the way. The grids were frames made of 1x2s and the grid lines were of twine stapled in place.

The how and why of carving

This is general hand carving. In later chapters I'll get into more specific details on hand, air and power tools and their uses on stone.



These are what the different basic chisels look like in a starter set. I have shown them in the order you will probably use them along with a riffler and a file.

Basic Chiseling:

What is the best way to hold a chisel? Mostly in an overhand style for a hand chisel and always with an air chisel. However, when I am doing detail work I feel like I have more control when I stick my little finger underneath the chisel. I do not really know why, but it feels better to me. Try both ways and use what you like.



Many people do not realize that when you use a chisel you never look at the end that gets hit. Instead you should focus on the cutting end. I know it's scary to trust your brain to line up the swinging mallet with something you are not looking at: but trust me, it works. You will reduce those knuckle busters to almost nil once you get the hang of it. Plus you now have the advantage of seeing exactly what the cutting point of the chisel is doing to your sculpture.

Moving Stone:

Carving the actual piece is exciting, ONCE you have the bulk of the unwanted stone removed. The faster you accomplish this, the happier you'll be. This is not really an issue with a stone under 100 pounds, but it quickly becomes important as the stone gets bigger. The first step is roughing out the stone. This is where the majority of the stone is removed. If a stone is small enough, or has an interesting shape that you want to enhance, you can start shaping right off with chisels. With large stones this is a lesson in futility and another approach is needed. If the stone is large, removal is done with a heavy chisel called a pitching tool or offset.



A pitching tool

This is a must for taking off large amounts of stone. It is used on surfaces that have a good, flat edge to seat it against. It can be used two different ways; to remove corners and edges or in conjunction with strafing cuts. You will notice that the edge is slanted. To use this tool you will hold it with the edge flat against the stone. This will cause the chisel to be at an angle to the stone. You want this to angle towards the outside of the stone so that when you strike, it will direct the force downward and outward. The further back the tool is from the edge, the more stone you will remove. Be careful not to try and remove too much at one time. With practice you will learn how much you can remove for the size mallet and strength you have.

If you need to remove stone down the side of the stone you can make strafing cuts with a power tool such as an angle-grinder or circular saw with either a masonry blade or a diamond edged cutting blade on it. Make cuts along the side of the stone three to five inches apart (the bigger your mallet and pitching tool, the bigger the cuts can be). Strike off the first layer and it will leave you open to the ledge on the second. Strike off the second and you have access to the third, and so on. You can repeat this time and again on the same side to remove stone back to where you need it.

You will notice the side grinder only allows you to go so deep before you hit the body of the grinder and have to stop. For a 9 1/2" blade that I use I can go about 3" deep.

In the picture to the right I have just struck off stone to the first cut. In the next picture I am removing stone from the second cut.

A word of caution, wear safety glasses, dust mask and hearing protectors. These are a necessity and can be purchased at minimum cost at most hardware stores.

One major point here, when you take a swing at a stone, try to make sure something comes off. When a chip of stone is removed most of the force used in getting it free is released with the stone. If you whack at the stone and try to take off too much, or bury the chisel in the stone, none of it will come off when you hit it. All of the force you have just imparted into it stays in the stone instead of coming off with the chips. This force will cause small fractures in the stone to weaken and possibly cause a break later on. As you go further in your carving you will notice that matching chisel width to mallet size for the type stone you are working on is important. Too large a chisel size can cause unwanted breakage in some stones. Too large a mallet for the chisel will cause unnecessary fatigue. Too small a mallet for the stone and chisel is probably the worst. The chisel will bounce on the stone. Chips of the right size will not be removed and the stone and





chisel will ring when you hit them, showing that unnecessary vibrations are being imparted to the stone. The harder the stone and the bigger the chisel, the bigger the mallet needs to be. For my pitching tool (about three inches across) I use a nine-pound hand-sledge. This makes sure that when I hit it; stone flies. Just make sure you miss your thumb!



In the picture above I am taking the stone off from the side as the depth of the ledge makes it hard to position the chisel correctly on the top. The completed cut is about 1-½ feet tall and 3 inches in. All removed in about five minutes counting the time it took to plug in the grinder and make the cuts. With a point chisel this could have taken hours. Since this is a rather thin stone, I could have done the same thing (in about a minute) without making the cuts, but making the cuts gave me more control over the stone. This can be done along the side of a stone much thicker than this one with almost the same results. The difference is that since the stone will be too thick to remove a ledge from the side. You will have to move the chisel out a little each time to be able to hit it. This results in stair-stepping it as you go down. That's okay; you just go back over it again to remove more. Oh, please do not hit the stone directly with the mallet hoping to take off a large section. I've done it and

it's a good way to ruin a good stone. The force just isn't applied where it's needed.

Now that the outline of the piece is developed we go to the *point chisel*, which is the first chisel in the picture at the beginning of this chapter.

The point chisel

The point chisel is held at about a 45-degree angle to the stone. This will vary according to the hardness of the stone. The harder the stone, the steeper the angle has to be. Don't try to take out too much stone at a time. The object here is to score a line in stone with the first pass. Successive passes will make the line deeper. Make additional lines about 1 to 1.5 inches apart. Then make more lines in a crosshatch pattern. This leaves squares of stone that can be easily



knocked off with a chisel. Often as you make the lines deeper the squares will fall off as you go by them. As you make the lines and remove stone it should start to take on a shape.

People starting out have a tendency to try and skip the point in favor of what looks more like a traditional chisel. You can do this but it will just take more time to get to the same place.

Don't just follow the contours of the stone since all that will happen is the stone will get smaller and smaller. Instead try to accentuate the stone. Make the low points a lot lower while leaving the high points high. I have observed in the art classes I've attended that this is very hard for some people to do. Do not be afraid to go for it. It is only a rock UNTIL you shape it. You can only make it better than what it started out as.

Point chisels are not the best tools for making holes in stone (although I did use one that way on my first sculpture). Instead use a star bit (get at your hardware store) to do it by hand or better yet, use a drill with a masonry bit to get the hole started. If you use a point chisel to dig a hole, you are taking a chance on wedging the tip in the stone. This will probably break the tip off, bruise or break the stone and generally cause your jaw to drop in amazement because it did just what I said it would (remember, these are my footsteps you are following). For a large hole you drill several small holes close together around the circumference with a drill. Then you can use a chisel to remove the thin layers between them.

Claw Chisel (pointed toothed):

After the shape has been roughed out you use the next chisel (called a claw chisel) to further refine the shape and to remove the lines left by the point. This is where things get exciting; the stone is taking shape.

Make sure you remove all the lines left by the point chisel. The best way to tell if you've done this is to carve against the grain of the lines you carved before (if possible). If you follow along the lines made by the point chisel it will be hard to tell when they've been removed.

Claws come in all sorts of sizes and shapes: from two-toothed ones that are 1/8in. wide to multi-toothed ones many inches in width. Generally, the wider the chisel and the bigger the teeth, the more impact it is going to impart on the stone. Nice wide chisels with a large number of teeth are great in conjunction with an air chisel and when used on wide areas on stone. Most of us do not start on stone that big. You will more than likely use a three or four-toothed chisel about 1/2 in. wide.

Toothed Chisels (flat toothed):

Once you have removed the lines left by the point and have roughed out the shape using the claw you can use the *toothed chisel* (third in the picture) to remove the lines left by the

claw. See what's happening? Each step is designed to further smooth the stone. For marble it is very important to follow these steps. For the softer stones such as soapstone you may skip back and forth as seems best. For example, on soapstone I sometimes go from the point right to the toothed.

After each session with a particular chisel you can wet the stone if you like. This will remove the stone dust and allow you to see if there are any lines left from a previous chisel.

Straight Chisels:

Now the straight chisel comes into play. These come in a variety of shapes and sizes. There are flat ones, curved ones, bull-nosed ones and many more. This is the chisel that will save you a lot of work later if done right. The smooth chisel is used to remove the lines of the toothed chisel ONLY. If you try to remove stone with it you will chip off pieces and the surface will not be smooth (This CAN be a desirable effect if you want to texture stone this way, experiment on a scrap piece to see what happens). Hold it on the stone with firm pressure and make good follow through strokes with your mallet. This seems to allow the chisel to smooth the stone without knocking out little pieces of stone that leave small holes you will have to work out later. Remember you are not really removing stone here; you are just smoothing out the wrinkles.

What do you do with a chisel? You hit it with a mallet, right? Not always, there are times when it is better to just push it along by hand. When I get delicate features close to being finished I



often just slide the chisel along by hand. A sharp chisel can smooth out & define features that could be damaged by even the soft impact when using a neoprene mallet. Simply make a handle to slip over the end of the chisel out of a piece of wood (drilling a hole halfway into a wooden ball works well) or use a piece of thick leather to protect your hand. Then while you hold the end lightly against the stone, push it forward with the other hand. To make the tapered end of the bottom chisel fit better, I drilled part way into the ball with one sized bit and then drilled deeper with a smaller bit. This lets it seat down into the ball firmly with fewer wobbles. Some air chisels come with caps that also allow you to use a mallet on them (top of the picture).

Rasps and Rifflers:

The reason chisels will save you work is because the next tool to use is a *rasp* or a *riffler*. These are used to smooth out the final chisel marks and to access places that the chisels are



unsuitable for. They are not for removing large amounts of stone although inexperienced carvers often use them this way instead of learning how to use chisels correctly. They come in all shapes and sizes. These tools are designed to work in one direction only (forward) and a "seesaw action" will only wear you out and cause your tool to dull prematurely. Rasps have larger teeth and are used to remove more stone than rifflers and the marks left by them are sometimes desirable from the texturing standpoint. Texturing can also be done with rifflers for a finer type of finish.

Next comes the file. One of my favorites is available at any hardware store as a wood rasp (4-way). It has course and fine teeth, flat



and rounded sides. I have worn a couple of them out but they are inexpensive and are excellent on stone. Use the file to remove the rasp or riffler marks. Files are really good on marble but tend to clog up on alabaster, soapstone and other softer stones so you'll have to clean them more often. I usually skip filing on these and just go to sanding.

Bruising:

At this time you will want to wet your piece and look for white spots in the stone. These may be *bruises* (where the stone crystals are crushed) and can only be removed by chiseling or rasping deeper into the stone, which may force you to change the shape. When you locate them, mark them with a pencil so you can find them again once the stone has dried. Otherwise they just seem to disappear, until you polish it. Making sure that you do not hold the chisel at too sharp an angle will help to eliminate these. Never use a magic marker or similar pen with inks or dyes in them. I did this once and found out that the color had bled several centimeters into the stone. I could not remove enough stone at that place so there remains a permanent blue smear; use a pencil.



Sanding:

Now comes the not so fun part, sanding. This can take quite a bit of time but don't give up. The results will be worth it. At this point its well to remember that the quality of your finished sculpture is directly related to the time and work you put in it. My mentor William Kolok told me when I was working on my first stone that one of the differences between a craft and art is the care an artist puts into his/her work. He admonished me to get out all the scratches and bruises and to finish even the hard-to-reach spots that no one sees. Of course there are many



times that you will want to leave the stone rough and textured but your viewers will recognize that, even as they'll recognize stuff that is not supposed to be there.

Start with course grade (100 grit) silicon carbide (wet and dry) sandpaper (3-M has a good paper and you can get it at building supply stores). Sandpaper made with diamond dust as grit is the best but it is about \$20.00 for a small sheet. Next, go to 150 grit, 220 grit, 320 grit, 400 grit... until it's the smoothness you desire. I have gone up to 1600 grit to get the desired finish. I have also stayed with 100-grit paper for the texturing it gives. Sometimes a high gloss is not what looks the best, so experiment and see what happens. When sanding, make sure you remove all scratches left by the previous paper or when you go to the next finer grit you may not be able to (or at the very least it will take much more work). Once you get to the 150 grit (with soapstone and alabaster you may have to start with the 100 grit) it is best to use wet sanding. Get a pan of water, dip the paper in it (you have to have waterproof sandpaper) and sand. It's even better if you can put the sculpture in a pan of water. As the paper gets clogged, wash it and the stone off and repeat. The water keeps the paper from clogging up. Change the water frequently and always when you go to finer grit since the water will contain the courser grit and will keep scratching the stone. For big stones I just keep a watering hose handy. On fairly flat and easy to get to places, sanding can be done with a variety of electric or air tools. Keep electric ones away from the water unless they are specifically designed for that use. Another plus to the water is that it will give you an idea of what the stone will look like when polished and allow you see bruises.

How about those hard to reach places?

There are going to be places that you can't reach easily with your hands. What I do is take a small dowel rod and trim it down where there is a flat, chisel-like end on it (clay shaping tools work too). I then cut small strips of sandpaper and loop it over the end of the rod. By holding each end of the strip I can keep it in place while I sand. Remember that you'll be sanding with a much smaller area so it will wear out faster and you'll have to dip it in the water much more often to keep it from getting clogged.



Need absolutely flat places?

Take a flat piece of wood or sanding block (hardware store) and wrap your sandpaper around it. This is good for getting in corners too. It also helps to wrap the sandpaper around a piece of thin wood (like a tongue depressor) or a piece of flexible plastic when sanding. This adds rigidity to the paper, which will help smooth out those bedding lines. If you use only finger pressure on a stone with pronounced bedding you will tend to remove more in-between the lines (where it is softer) and leave ridges.

Another trick of sculptors is to use sanding sticks. These are made of silicon carbide and are used like sandpaper on the harder stones to even out all the small bumps and valleys that can occur. They can be purchased but I made mine out of a whetstone for a knife. I cut it into usable pieces with a side grinder (with the stone held firmly in a vise) and then ground it to curve some edges. It has both fine and medium grit



sides and worked out great. It cost about the same as buying the real thing but I was in a hurry to get some to use on my first marble piece and didn't want to wait to have it shipped to me.

Polishing

Now that the sanding is done there are a number of steps you can take. Some people buy rouge, which is available through some of the suppliers I have listed and use a buffing wheel on a drill or a rotary tool to apply it. If you do this, keep that wheel separate from your final buffing wheel. Since these wheels are made of fabric they tend to hold the



medium you are using in them. Rouge is applied by holding the stick lightly against the spinning wheel. Then the wheel (with the rouge now on it) is moved lightly over the stone. Keep it moving at all times. After the sanding or rouge, wash the stone off thoroughly, making sure it is thoroughly dry before waxing. Some stones dry quickly and some like limestone can take a day or two. You can then apply a wax, also available through suppliers or use a wood floor wax made from Carnauba wax. Carnauba is a hard wax and seems to do well. Rub it with your fingers until some of it melts on them and then rub it into the stone. Try to rub it vigorously enough to warm the stone and allow the wax to penetrate. If the stone is cold (and small enough) you may put it in your oven on warm. **Don't** cook it; just warm it. After applying the wax, buff it with a buffing wheel (guess where you get that from?) or hand buff it with lint-free cloth (cloth diapers work well for this). Be careful when using power buffers, you don't want to press too hard. A light pressure is fine and make sure you keep moving it around, don't hold it in one place. I get great pleasure in hand buffing if I have the time. There is something special about feeling the stone warm up in your hands and seeing the shine come out as you work.

Limestone can be installed outside with no wax, but if you leave it inside and desire to wax it only one brand of wax that I have found will work well. It is available only through stone suppliers. The brand name is **Akemi stone polishing fluid 2012**. This is a liquid that you wipe on and then buff. It works well on many stones but make sure you have adequate ventilation when using it, as the fumes are bad while drying. If an outdoor piece is going to be subjected to quite a bit of acid rain and pollution, you can purchase a clear concrete sealer from building supply stores that works well to protect your sculpture from the elements. Another trick that I used when I was finishing a limestone sculpture was to spray it with a clear semi-gloss acrylic spray. This gave it a protective coating (indoors only) without changing the stone a darker shade, as wax will do.

Marble takes an additional step. After sanding and rouge (if used) you have to seal the surface. This is done either with oxalic acid (order it from the local drug store) or with tin oxide (available from art suppliers). I use the acid. Dissolve it in warm water until no more will dissolve. Use something like a rough piece of felt and rub the surface with it. **WEAR**

RUBBER GLOVES AND GLASSES, this is an acid that will attack organic matter including your skin or eyes. Also make sure you have good ventilation, as the fumes are harmful to breathe. It literally melts the surface crystals together to seal the marble. Wash off after a few minutes with water, let dry completely, then use the wax of your choice. Tin oxide also works but it takes a lot of rubbing to achieve the same effect. It takes more effort but is less dangerous to use. If a marble sculpture is going to be left outside you can just sand up to 400 grit, treat with acid or tin oxide, and it's ready.

One more thing; when using your drill to polish the now almost finished piece, hold it with both hands and watch to make sure spinning metal parts do not come into contact with the stone. That toothed chuck just loves to eat a groove out right where it can do the most damage (this is one place you most definitely *do not* want to follow in my footsteps!).

Mounting your masterpiece

Mediums for bases



You can use any material that is solid enough to support your sculpture. Not all sculptures require a base. If you decide to mount your piece, it is best worked on before you are completely finished with sanding, as it requires handling and drilling the stone. When you get the stone firmly shaped out and decide how you want it to stand, you will have to decide what kind of base to mount it on. Some people go with a basic square or rectangular base. These are fine but can have a neutral feel. For me, a base should complement the sculpture without drawing attention to itself, and I have spent many worrisome hours deciding on the best one.

Wood is one of the easiest to use while stone and metal are also favorites. Ready-made stone bases may be purchased from most of the suppliers that I have listed if you don't want to make one. Metal ones can be made if you are handy with a welder or pay a machine shop to make it. I hate paying more for a base than the stone costs so I make mine from wood or stone.



When you have the base shaped out, position the stone on it and mark around the stone on the base with a pencil. Drill a hole (or holes if the sculpture is big enough) in the base of the sculpture. I use a tool purchased from **Sears®** for this. It is a small portable device and your drill (3/8in. without the chuck attached) mounts to the top of it and the chuck is mounted underneath. You set the tool's base flat on the stone and it makes sure you drill it straight. If the base of the stone is too small you can attach a piece of thin wood board with a hole in it for the bit to pass through. This will let it sit on a smaller area than the manufacturer provided for. After the hole (two if possible) is in the stone, position a piece of paper on it. Mark the outline of the stone and punch out the holes. Put this paper on the base, line up the

outlines and mark the position of the holes. Using the drill tool, drill out the holes in the base. This will ensure proper alignment of the holes.

For a small sculpture you can use a 3/8in. wooden dowel. Cut it to fit in the holes and epoxy it in. I have come to favor metal studs (stainless steel made to screw into wood on one end) for a number of reasons. They are strong and I can use nuts to hold the base on. A couple of times I have changed the base that I first used. Cutting off a base and drilling out the stud is a pain. Now after the holes are drilled in the base, I flip it over and with a 3/4in. wood bit, I drill down about 1/2in. This creates a space in the bottom that allows me to install a washer and nut on the stud, much like trophies are mounted. I buy the studs at a hardware store; the threads also help to give the epoxy something to hold to. Make sure you clean the hole of all stone dust before you glue it.

After the base is made, cut a piece of felt to fit it that has adhesive on one side and stick it on the bottom to protect your furniture.

Colors for the base are up to you but generally I have found that a light colored base for dark sculptures and dark bases for light colored sculptures work best. Remember the color and shape of the base should accentuate the sculpture, not draw attention from it.

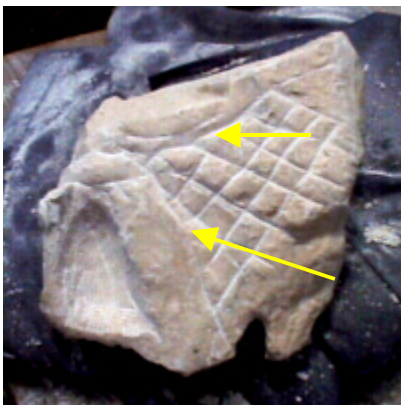
As you can see, only your taste and imagination limit the shape of your base.



Evolution of a Sculpture



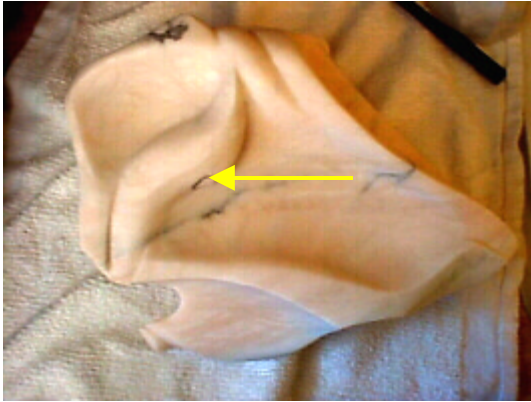
These pictures show how to deepen parts of the stone while leaving a shape behind. Notice that I use the shape of the rough stone and simply accentuate the features.



See the yellow arrows in the second picture? These are cuts designed to protect portions of the stone that you do not want to disappear unexpectedly. By keeping a line where you want the stone removal to stop, you will prevent pieces from breaking off when you don't want them to. Keeping the line deeper than the rest of the lines you will protect portions you do not want removed. Cool, HUH? On the same picture you also see the cross-hatching that is the trademark of the point chisel.



Here is the stone after the point chisel has finished its work. The marks in it are some point and some claw marks.



Here is the stone after the rifflers and with some sanding done. The arrow points to a pencil mark that I have marked a bruise with. This helps to remind you where they are.



Here's the finished stone (zipped right through the sanding and polishing didn't we?). I kept almost every feature of the original stone but enhanced and highlighted them. Unexpected delights are always popping up, like the ridge along the top. While the rest of the piece is pink, this is a silky white. So I carved away the stone where it changed colors to help it stand out. It's at this point that Bill wanted me to tell you to, "Carve to the form, not to color." Although I was lucky enough to be able to take advantage of the white streak, I did not plan the sculpture around it. Shape the stone from the heart, not by trying to follow variations in the stone.

The base was made from a separate piece and was shaped with a side grinder and a belt sander. The stone had a natural

indentation in it so I fashioned a "hump" on the base to fit in it. I then drilled my holes, put a small piece of felt between the two pieces to keep them from rubbing together and put them together with the stud and nut arraignment.

One of the tricks in mounting a piece like this is to find the point of balance. There is little or no strain on the mount with it perched like this. In the picture of "FREEBIRD" at the end of the last section, the stone is balanced so that it would stand on its own off the base (although it would tip over easily). Once I had it mounted I didn't have to worry about it breaking off from strain.

On the Matter of Stone

Now we talk a little about the stone itself. What kind do you want to use? Are there any special techniques for a certain stone? If you are just starting to carve, Indiana Limestone is a good bet. If you are doing a single piece for a friend and will never do another one you will probably go with alabaster or soapstone. Each has its benefits and problems.

Soapstone:

Soapstone is one of the softest of the carving stones. It comes from many parts of the world and in many colors although the most common seems to be black. I have heard that some contain asbestos but all that I have run across being sold as carving stone have been tested and found safe. If you're not sure, ask for a copy of the testing. Even though soapstone may be free of asbestos, most are composed of talc. When you carve this stone the amount of fine dust that is created is impressive. When breathed into the lungs it can cause damage and silicosis (a coating and hardening of the lungs). Wear breathing masks at all times.

Carving:

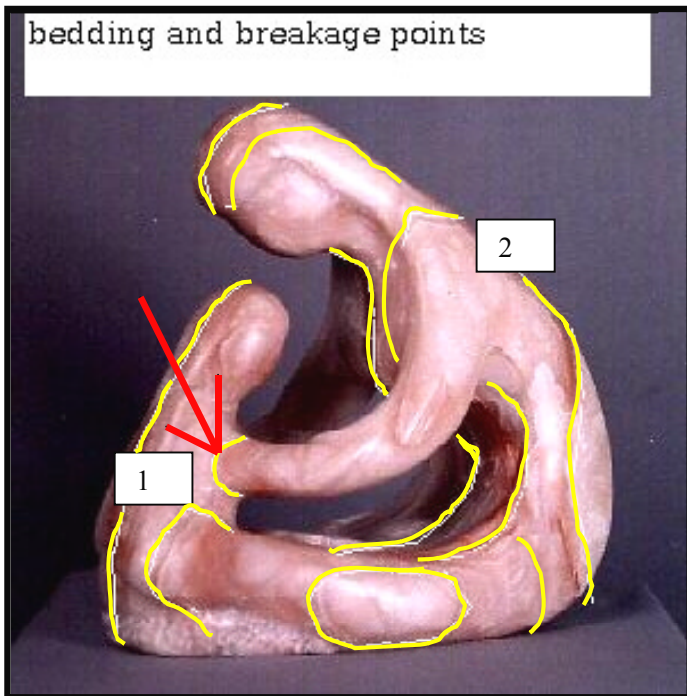
Because many types of soapstone are soft, they can be carved with a number of inexpensive tools. Economy quality chisels and rifflers, rasps and even pocketknives can be used. These were done using only a riffler and a pocketknife.



Inexpensive chisels can be bought at a number of places listed under resources. Cheap rasps can be purchased at discount stores, tool auctions or just about any hardware store. Even sandpaper can be used to remove quite a bit of this stone.

Although you should not try to get the details too delicate, the stone holds together quite well. Once polished, any scratch will show up as a white line. Even though you have to be careful in handling it, this works out great for texturing. You can put in hair and all kinds of details. For examples of soapstone carving check out the web, it will give you some idea of what can be done. Breakage is common in this type of stone so be very careful and examine it first for telltale signs of fractures or *bedding*¹, which will usually show up as darker lines in the stone.

¹ The bedding of the stone is a reference to how the stone was layered in its formation. Sedimentary stone has very noticeable layers while others may be harder to detect. Like the grain in wood, the stone is easier to split along the layers and must be taken into account when determining the orientation of the stone in the sculpture.



Alabaster:

Okay, here's the beautiful stuff. This stone comes in a rainbow of colors--and troubles. Not that it's not worth it, but you have to be careful. The fractures and colors in the bedding, which makes this a stone of beauty, can also make it a pain in the rear. Here I've outlined the bedding layers and pointed to a potential break point (1). It is at a bedding point, has crystalline intrusions between the layers and has a marked color change. It did crack too; but I was watching for it. Before it had a chance to break off the arm entirely at (2), I sluiced some super glue into it. This holds it steady and is not detectable. I was able to gently finish working on the arm and finished the piece. If I had not been

aware of the possibility of a problem I would have ended up with an one-armed lady! It would not quite have been a Venus de Milo. One tendency you might have when carving this stone is to carve it by following the colors instead of sculpting a form. It's much better when the colors flow in and out of a piece instead of being the reason for the form. Carve to form: not to color.

Alabaster is not suited for outside weather. This stone will actually dissolve when left in water for a period of time. It quickly becomes dull and the extremes of hot and cold lead to breakage.

Carving:



Before starting on a piece or shortly after you have it roughed out, wet the stone and locate the bedding lines. They will appear as a boundary between different colors or as changes in the texture of the stone itself. Once you locate these, treat them gently. Carve with the grain instead of against it. This keeps you from actually knocking the different strata apart. If the texture of the stone looks different (like crystals in the stone) you can bet it won't take much to break it, so you can use grinders, files or whatever just so long as there is no impact on it. Next, you might use a different chisel. I will use a point chisel on alabaster only when I'm removing large amounts of stone. **After that I put aside the point and use thin, sharp, two-toothed claw and toothed chisels 1/8" and 1/4" wide.** Why? Simply because the force of the impact is concentrated on a very small area of the stone. With less stone to remove and with more force being imparted to it, the force will dissipate in the removed stone. Otherwise the force is transferred to the main body of the stone where it causes vibrations that will weaken it. These chisels also resist the inclination of a point chisel to dig in enough to act as a wedge, which can help to split a stone apart at the seams. Rasps and rifflers remove stone well but files tend to clog up quickly.

Bruises can go quite deep so try not to hold your chisel at too sharp an angle and do not let the point dig in to where the force of the hit is not removing enough stone. Anytime your chisel is working it is bruising the stone. If done correctly, most of the bruising will be removed with the stone and what is left will be shallow enough to remove without excessive work or digging.

On the previous page is a piece in alabaster that had so many intrusions that I did very little carving with a chisel. Instead I used a grinding wheel mounted to a drill. Even using this precaution I chipped some pieces off while hand sanding and had to reshape a couple of points. The black lines were much harder than the stone and had almost no adhesion to the stone. When you find lines such as these in the last two pictures you'll have to be very careful. Either use a grinder or use a very small chisel to reduce the area of impact on the surface. One of my favorite chisels for stone like this is a 1/8" two-toothed chisel. It removes stone without undue stress or impact on it. A grinder is your best choice since it has no impact to "shock" the stone and cause it to crack. So why chisel on any stone at all? Chiseling is a much faster, cleaner and more controllable way to remove stone than grinding. Chisel what you can in a stone like this; grind the rest.

As a rule, alabaster does not texture well. It always seems to look dirty when textured. Plan on making your sculpture without texturing or lines carved in it. Make it with *shapes* (this is really the best for most sculptures) and be prepared to polish it from one end to the other.

Air chisels are out, except on large pieces of this stone. The impact from these can ruin the stone unless you are using a small model made for delicate work. Grinders, sanders, rotary tools and others of their ilk are all fine. Try to keep the impact forces down on alabaster.

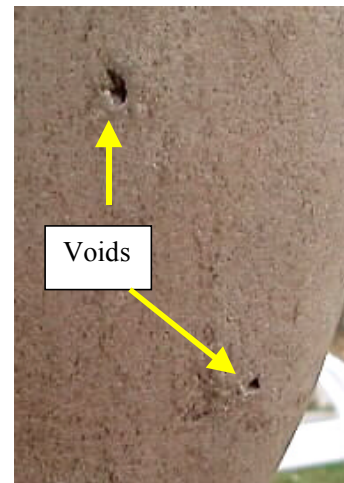


Limestone:

In my opinion this is the best starting stone. It is a very uniform stone; having less problems with bedding breaks and fractures. It does have *bedding* as part of its structure as it is a sedimentary stone. But in smaller pieces this can be ignored and in larger pieces a little preplanning will get you around most problems associated with this type of situation. It can usually be acquired at a reasonable cost (depends where you live). It's hard to bruise. It can be worked without the better tools that marble requires. It textures well. It weathers well outside. Limestone can also be salvaged from old buildings, windowsills, door fronts and porches. HOWEVER, there are many different kinds of limestone. Some are so hard as to make carving them a chore.

Some are so soft that they break easily. Indiana (Oolitic) limestone is considered one of the best and is used in everything from the National Cathedral in Washington D.C. and buildings in England, to our

humble sculptures. It is not harmful to breath (Don't push it! Use your mask!). It doesn't take most waxes well, but Akemi No. 2012 (available at supply houses) does a good job on limestone and other stones as well. Follow the instructions! Wear rubber gloves and have plenty of ventilation. This wax smells as bad as being downwind from a hog farm and will make you much more light-headed.



Carving:

Carving is pretty much as I have outlined in the “How and Why of Carving,” section. With its uniform texture you can go in any direction you want with ease. You may hit some spots where there is a small void or a piece of “glass” crystal imbedded in the stone. These are things that are in the nature of the stone and they have to be dealt with. Sometimes you will be left with a small hole or hard crystal protruding that you cannot carve out without changing the shape of the piece. This is stone and things like that happen. Although you can mix up some epoxy and stone dust as described in the, “When it Breaks,” chapter to fill in small holes, I usually bow to the nature of the stone and leave it alone. The way this stone takes texturing is great. It shows up well and has good color contrast to the stone. See [texturing](#) later in this book.



Marble:

There are many different kinds of marble (surprised?) with a full range of hardness. *Italian Carrera* is one of the finest to carve. It comes in translucent, pure white statuary, white with gray streaks as well as other combinations. *Colorado's white Yule Marble* is a favorite of many people in the U.S.A. since it can be obtained in any size block you can handle and is easy (for marble) to carve with either hand or power tools. *Tennessee's black marble* is a very hard stone and is more suitable with grinders and diamond tools than chisels. *Georgia and Alabama's white marble* can be carved but is still hard on the cheaper chisels. However, with its large, glassy crystals it polishes up to a mirror finish. There are many, many others around the country that I have not had contact with. If you run across some you want to try, go for it. Even if you decide that a particular stone takes too much work to carve you most likely will finish the one piece and have a great sculpture to show for it. Try to stay away from old stones that have been lying above ground since your great-great granddaddy was a kid in overalls. They

will have weathering cracks in the surface that can run quite deep and (I'm not sure why) the first couple of inches are going to be very hard to carve. I have picked up pieces of marble and limestone that had prolonged weathering and had to remove the outside stone to a depth of two inches before I reached good carving stone. If you get some free and want to try it, be aware of this and don't get discouraged by the outside hardness. Keep at it until you reach the good stuff.

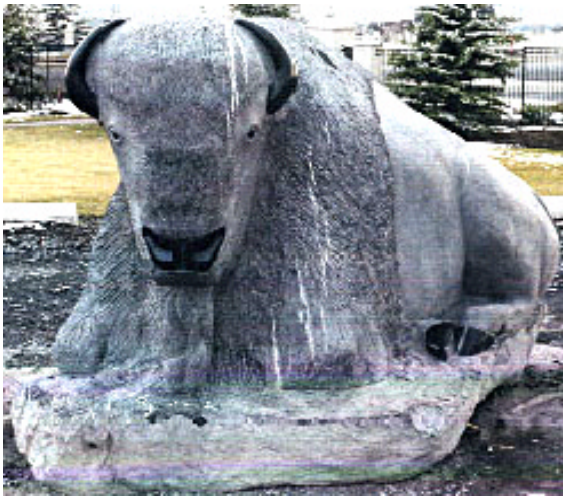
Carving:

One of the most used chisels on this stone to remove unwanted bulk is a *cape chisel*. This is used to sort of “peel” off the layers of the grain (bedding). Marble chisels are usually thicker at the cutting end and the better ones have carbide tipped ends. I have used both hand and air tools in working with marble. Regular hand tools will work for a softer marble like *Carrera* but are not really suited for the harder stuff. Air tools are a great help; as are rotary grinders for the small detail work. Use your chisels in the order I outlined earlier. This is important as bruising happens very easily and can go very deep into marble. You will have to look close to find them before you polish. If you do find some afterwards, merely sand through the wax layer, remove the bruise, and wax that spot again. If you cannot remove them without

unacceptably changing the shape of your sculpture you might have to chalk it up to experience and live with it (or give it away as a present).

Granite:

This is the stone I know least about so most of what I tell you has been passed to me through other artists I have met on the Internet. By far the greatest numbers of granite carvers that I have come in contact with are from Canada and I want to thank Eric Peterson www.hammer-chisel.com for his insight, pictures and help in this. I know that there are others all over the world; it just seems that is where the greatest number of them live. Possibly because the glaciers left boulders of it just waiting to be carved and the Canadian people aren't ones to let such an opportunity pass. Most granite is the gray-black type that is typical. One artist wrote me that where she lived the granite was black with red quartz crystals in it. There is pink-grained granite called *Rock of Ages Granite* from Barre, VT that is used for many monuments and sculptures. Like the other stones, granites comes in many different levels of hardness and if you come across some you'll just have to try it and see what happens.



Carving:

These hints and picture are from Eric Peterson with his permission to use them. So how do you carve granite (like the 10,000 lbs. Buffalo to the left)? There are a few different ways, but they all take a key ingredient-big energy. Only with this you will succeed. One way is by pulverizing the crystals, using an air hammer and LOTS of stamina. Beautiful and interesting sculptures can be made in this fashion but that is a lot of powder. I know a guy that uses this method and his work is awesome but it takes too much time for me. I think it is important to use the shape of the stone; it cuts down on the toiling. I start by

using feathers and wedges to take away the bulk. Granite drills and splits easily. This will save a lot of time. I then use my heavy 2-inch carbide-tipped pitching chisel to knock away any of the edges. I then attack with much vigor using any good carbide tipped point chisel to further shape the stone. I tell people to hit your chisel as hard as you can without hurting yourself. After some practice a safe and very powerful blow can be achieved removing a chip each time. Granite doesn't bruise, SO BE BRUTAL. Then go to a 7 inch segmented diamond blade with the appropriate grinder. It is very important to buy a blade specific for granite. The matrix surrounding the diamonds should be soft if cutting hard stone. If you have the right blade, always using water, the blade will last a long time. You go ahead as usual and make parallel cuts as deep as you prefer. Then chisel from the side 1/2 inch from the surface to remove the waste. I then use my chisel on a diagonal almost straight into the stone. This prevents it from going too deep when you first knock out your parallel cuts. As you get closer to the correct depth make your parallel cuts MUCH closer together. I smooth my stone with a diamond cup wheel. A company in Austria "Tyrolit" makes a 4-inch silicon carbide wheel that will then take up to 220 grit - they are cheap and they work well. Then I use diamond pads with a slow speed grinder and water. With your lower grits do not linger in one place while polishing - heating up the crystals will shatter them and your polish will be ugly. As for the detail I use a Fordem with a Mizzey and Craytex wheels, which you can pick up at jewelry supply stores. They are 1-inch wheels. The Mizzey wheels are cheap and they eat granite. Much detail is possible. Craytex wheels will then give you a polish up to about 500 grit. From there I cut 1 inch circles from my worn out diamond pads and Velcro them to a disc and run them on my Fordem or die grinder always using water. You can also carve granite and quartzite using the heat from oxyacetylene

torch. Put a high heat flame close to the stone and the crystals just spit off. You can use some water to help the process. This method is not good for detail but gives an interesting sort of primitive look to sculpture.

Other Stone:

Some of the other stones that I have heard of people using are basalt, dolomite, serpentine, travertine, quartz, sandstone, obsidian, and slate. Of these stones I get the most requests for help in the working of sandstone. Which is no surprise since it is just about everywhere in the U.S. and is almost the exclusive stone where I live. The problem with sandstone is that it is made up of quartz crystals held together by a bonding material. As easy as some of it is to crumble you would think it would be easy to carve. WRONG, when the chisel hits those crystals one or two things happen (and usually both at the same time). The chisel dulls immediately and the crystals shatter sending out thousands of miniature shards of glass (just like asbestos), which you breathe into your lungs. After I had carved my first piece out of alabaster, I ran out in my backyard all excited, looking for stones to carve. I figured that since my whole county is made of sandstone that would be the stone to use (you know, CHEAP). Wrong again! A friend who's a carver gave me a piece of sandstone and an old point chisel and said, "Try it." The chisel bounced off the stone without making much of a mark and it dulled the chisel. I talked to another carver who did a piece in sandstone using carbide tipped air chisels. He said that the sand fragments would quickly erode the metal holding the tips in place. At a rate of one every other day (at twenty-three dollars a chisel) this is expensive. Unless you are very dedicated to wearing protection equipment of a high enough quality to prevent damage to your skin, eyes and lungs AND you have a high budget for tools; forget the sandstone.

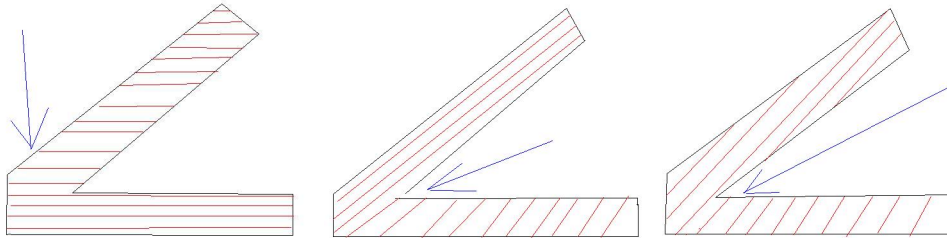
More on stone

Here are some things to look at before you start chipping away at your masterpiece. What is your stone like? No stone is a perfect uniform block of material. There will be fractures, layers, intrusions of foreign materials and voids. Knowing what you have can go a long way toward keeping you happy.

The bedding of the stone can be crucial in a sculpture that has unsupported features, such as an arm, sticking out. In the picture below the bedding follows the blue lines, sort of like a layered cake on its side.



The stone will be easier to take material off of along these lines. If you have ever whittled you know it is easier to shave away wood along the grain than going across it. Keep this in mind as you remove stone.



Here are some different orientations of bedding. While this is an exaggerated drawing for stone and while I hope you don't try something like this, you can see where the stone is likely to break. The first stone is weakest in the arm. The second is weakest in the vertex and the third, while it's probably the best option is weakest in the base.

When it breaks

We all hate this, but it happens. Quite often when you see a piece that is part of “The artist’s collection - not for sale,” it has been repaired and not deemed saleable. So what do you do about it? It depends on the break and the stone. You will be able to see the repair no matter how good you do it, but if done with some forethought it can appear a more natural aspect of the stone. Bill Kolok tells his students that, “Breaks are nature’s way of improving your design.” Plus it gives you a chance to complete two sculptures instead of just one. Consider living with the break instead of repairing it. If you just can’t, here’s what you do.

If the break follows the grain or bedding of the stone and has not lost pieces around the edge of the break I will just repair it as is without dressing up the broken edge. This has the end effect of blending it in with the grain of the stone. To do this, take a clear epoxy or better yet some polyester adhesive made for this (available through some of the suppliers listed later). To match colors you either mix in some coloring paste (purchased at the same places) or take some of the fine dust from the stone you are working on and mix it in with the glue prior to applying it to the sculpture (or both). I find that mixing dust in the paste often darkens it to a deeper tone than the original stone. Hopefully it will look like a bedding line.

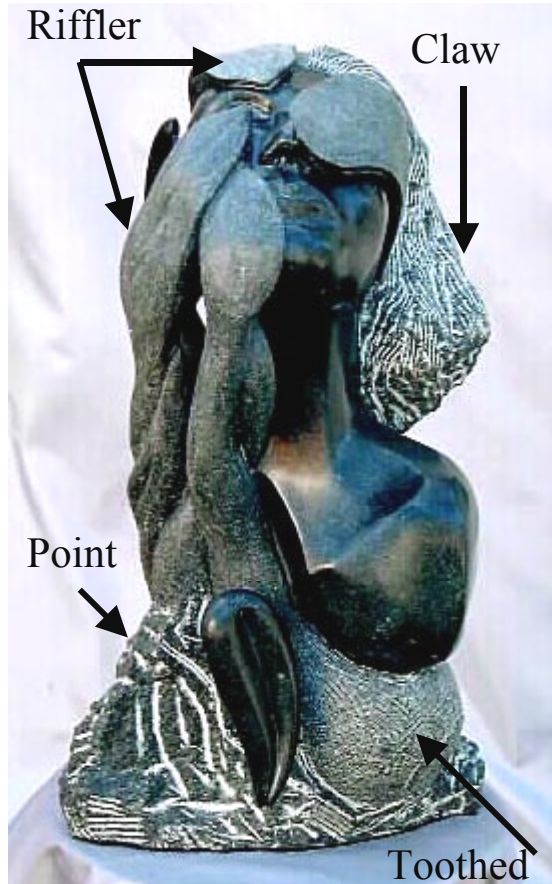
Take your two pieces and drill a hole (or holes if there is enough room) in one of them. Take a piece of paper and lay it over the area and make a rubbing of it with a pencil. Now flip the paper over and lay it on the other piece. Line it up and mark where you need to drill the holes in it. Make the holes a little big. They are probably not going to be lined up perfect and you don’t want to find it won’t fit together after you’ve applied the glue. Clean the dust out of the holes, add glue in the holes and insert your studs. Now quickly coat one whole side with the epoxy. You do not want a real thick layer but you do want enough to fill in all the voids around the edge. Press the halves together firmly to push out excess paste and hold until it sets up.

If the edge has lost pieces out of it you may have to dress it up before gluing. Cut off the necessary amount to get a clean edge on each piece. I use an electric belt sander to make sure I get the edges flat. You can also use a large flat file to dress up the edge. Try putting the pieces together to see how they will look. You may have to use the sander to remove more stone to get the angles right. Drill and glue and you are ready to go. I do not like this method as much as it leaves a perfectly straight line that does not normally occur in nature.

The glued portion will not sand evenly with rest of the piece, as it will be harder than the stone. I usually sand down the stone and then take a razor blade to trim the glue down even to the stone’s surface.

More Techniques and Hints

Texturing:



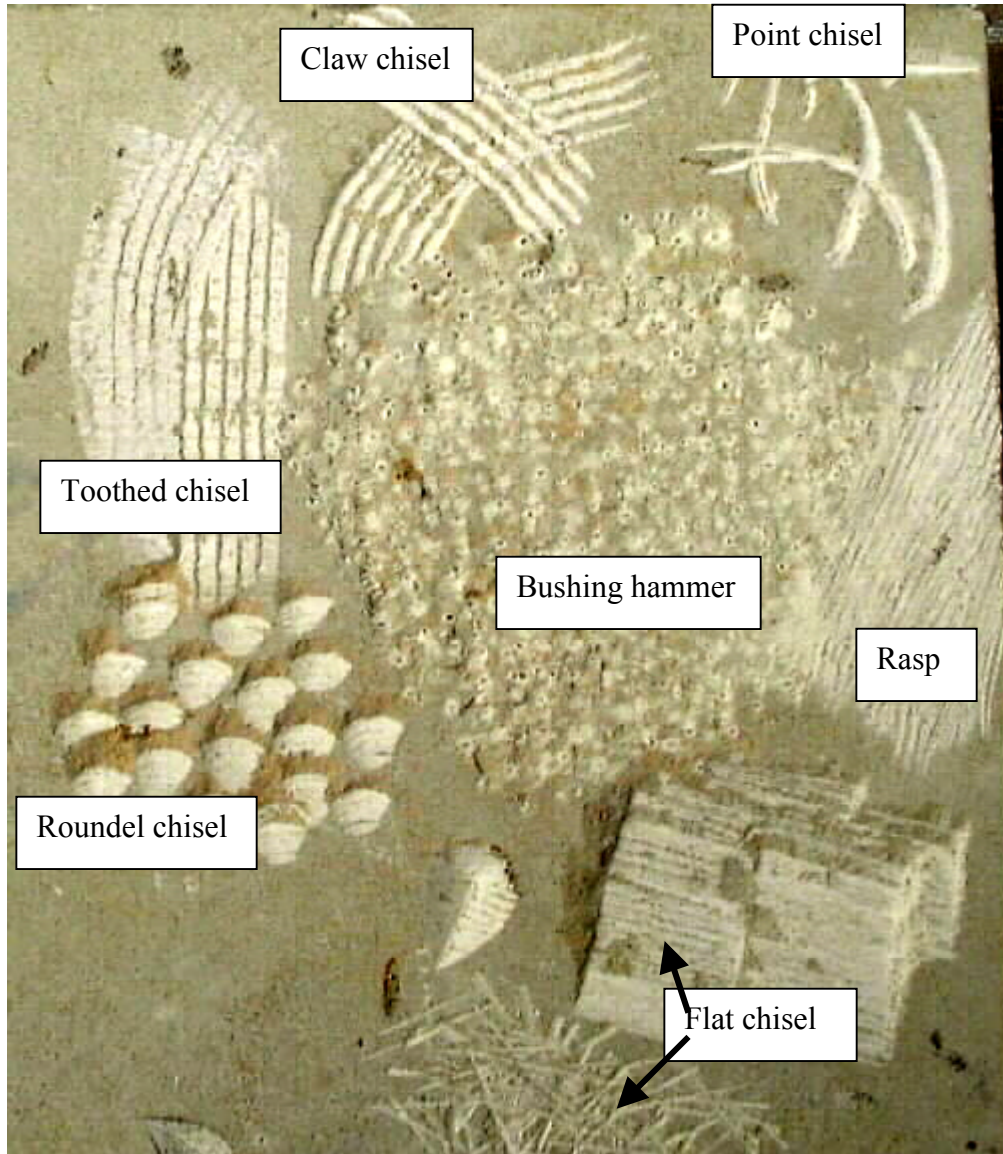
There are times when you do not want the surface of the stone to be smooth and there are a variety of ways to texture the surface. In the picture on the left you can see a number of different techniques on the same piece. The hair in the back is done with a *claw chisel* and the left bottom was done using a *point chisel*. The lobe at the bottom right was finished with a *toothed chisel*. The vines and leaves rising up and covering the face were textured with a *riffler*. The rest was sanded and polished as normal. The different textures give a striking contrast to the different structures in the sculpture. It also helps to define, or undefined features. In the case of the lobe on the bottom right, I knew this was going to be on public display in my hometown and the showing of a bare breast in view of children is really unacceptable here. So the texturing added a “tilt” to the piece. People knew that it was a breast but you could see them trying to work it out to where it was something else. I got away with it, and they left happy knowing it was an “abstract,” piece.

Just about any tool you have can be used for texturing, even metal meat tenderizing mallets! But there are tools made just for this, like the *bushing hammer* pictured below. Experiment, if you don’t like it, change

it. I can’t count the number of times that I started to finish a surface, even to the point of waxing it, only to go back and change. There is no way I can recommend the “BEST” way of doing this Experience is the only way to start recognizing what you want to do; just like jumping into the water is the only way to learn how to swim.



These are some texturing marks left by different tools.



Holding a flat chisel straight up and tapping it while allowing it to rotate around created the texturing marks at the bottom of the picture.

EXPERIMENT!

Specialized chisels:

Angle chisels: These are straight bladed chisels that are set at an angle. They are used to get into places where it is awkward using a regular chisel and also double as lettering chisels when used with an air hammer.

Gouges: These are specialized chisels that you may not use often but are great to have when you need them. They are used for making grooves and when flipped over they are used to leave ridges. They are great when making high relief elements such as leaves and stems. They come in a variety of widths and curvatures but two or three of the smaller ones will cover most of the uses. The cute guy at the right was roughed out using only gouges.



Bushing and Frosting chisels: These have many sharp points or blades and are used for texturing. When using them, hold them loosely and let them rotate around to get a random pattern. The courser the teeth, the more pronounced the texturing.

Carver's Drill: These are chisels that are used to drill a hole in stone. Most effective as air chisels, they are allowed to rotate around as you create a hole and because of their small width can double as carving chisels for fine work.

Lettering chisels: These are exactly what you think they are. They some of those tools that you can get by without but which make the job easier, especially if you're going to be doing quite a bit of lettering.

Corners and edges: These take a little extra care. If you work your chisel toward the sharp edge of the stone you will more than likely also take off the whole edge. I have learned from experience that this will cause you to either: 1) grab your head and moan, 2) cuss fluently and stomp around, 3) stand in silent amazement at your stupidity, 4) give up stone carving and become a florist. So always start at the tip of the edge or corner and work towards the thicker stone. This is also a good idea when putting any kind of pressure on it, as in using a riffler or sanding.



Splitting Stone:



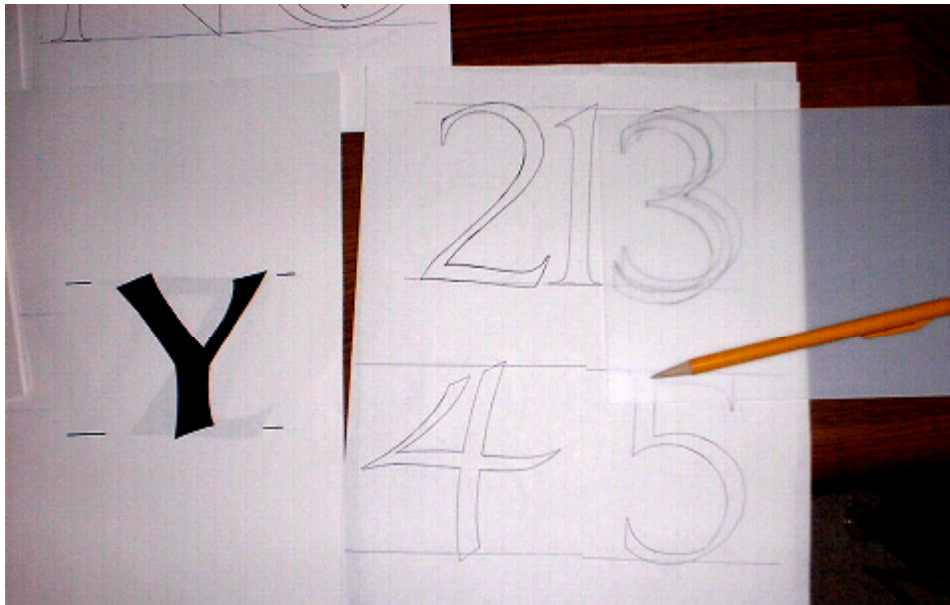
When splitting with feathers and wedges or using the pitching tool the stone will break along the path of least resistance. Sometimes it goes where you want, but sometimes it will follow the bed of the stone. When

drilling to split stone, try to drill your holes in a straight line and as straight downward as possible to a depth that will allow you to set the feathers in. When drilling large holes in stone it helps to have a *hammer drill*. This type of drill vibrates the bit down into the hole while it's turning. This helps the work to go faster. The holes do not need to go all the way through the stone. Trust me, you can split a stone several feet thick with holes a few inches deep. Hold the feathers about $\frac{3}{4}$ of the way in (do not let them fall in the hole) and insert the wedge. The size of the wedge set and how far apart the holes are will be determined by the size of the stone. Generally, about 1 foot apart with feathers fitting in a 1- $\frac{1}{4}$ in. hole for a large stone; closer and smaller holes for smaller stones. Once you have all the sets in, start at one side and lightly tap them one at a time, going down the line. Try to tap them all with the same force. When you get to the end, go back and start again at the beginning. You should start to notice the sets starting to, "ring," as you tap them. They are building up tremendous force at this point although it may not seem like it. After you make a few passes...pop, the stone suddenly splits. It's really quite awesome. This works because stone does not give or bend. When it has to move, it breaks.

LETTERING

Okay, here is something that is handy to know yet many stone artists rarely use. This is a simple procedure and, if done with care, can look good with a minimum of practice. To start out, your needs are simple, letters of your choice (these can be printed off of your computer at the end of this book), plastic to make stencils out of, a pencil, a sharp² chisel and a light mallet or pipe³.

If you're an accomplished calligrapher, you can draw your own letters on the stone. If you're like me and can hardly draw a straight line you can use stencils. Get the letters you want and trace them on the stenciling plastic (a thin, translucent, styrene sheet).



Then using a sharp razor knife, scribe the lines you've drawn and break the plastic on the scribed lines. They should pop out without too much trouble. Don't worry if your stencils are not perfect. You'll be taking care of any crooked lines as you carve. If your letters have a middle piece (like a D) be sure to leave a couple of little connecting pieces of styrene to keep it in place).

What kind of things are you going to letter? Just about any kind of stone or slate will do. Old school blackboard is a prime subject. I have seen some wonderful work done on blackboard where letters and flowers were carved out and then painted or gilded. The black background really sets it off.

After you get your letters placed where you want them, trace them out with a pencil. Take your chisel and score a line down the middle to guide you. Starting at the points of the letters, work your way toward the thickest part. This will keep you from "blowing out" the

² For granite lettering, the chisel needs to be dulled slightly. After sharpening, *lightly* run the edge across the sharpening stone a couple of times to dull it. Then turn your chisel sideways and remove the sharp corners. This will keep it from breaking off as you chip at the stone.

³ A piece of 1" or 1 1/4" galvanized pipe about 10" long works very well as a mallet for stones softer than granite. If more weight is needed you may seal the ends of the pipe with something like rags and put rocks or other ballast inside.



stone at a delicate end. Deepen the lines working alternately on both sides to keep the groove in the center of the letter. Take your time and don't try to remove too much stone at once. In the first picture you see that I worked one section of the number first. Next I'll work upward from there and downward from the other end. When the letter has a flat edge you'll again work from each corner as in the picture above.

Hold your chisel at about a 45-degree angle. This will give you the depth you need. You'll notice that it gets deeper where the lines are further apart. This gives it varying shades when light is shining upon it, which makes it more interesting to look at. While you are carving be careful not to *undercut* the other side. You want the edge of the chisel to just meet the other side not dig into it. This is one of the hardest parts about it. Oh, when tracing out your letters don't space them evenly apart. Some letters like A and R will have to be put closer together, sometimes even touching each other. Trace them out on a piece of paper first, then step back and see how they look.

Powered Lettering:

This is not too different. Once you have your letters traced, use a small gouge and take the stone out down the center of the letter. Then using an *angle chisel*, work the sides down the same way as you did by hand. This takes good control of the chisel and air hammer, but practice makes perfect. You can also make your letters deeper this way. Does deeper look

better? It depends; for painting and gilding I would say no. With plain letters in a stone like limestone it does help to bring the shadows out. It's your call.

Painting:

Painting is a great way to show off your work. It works for different types of stone and is really nice on black slate (blackboard). It is also easier to paint on slate since the paint will not soak in if you get some over the edge. You merely sand it off when you're done, leaving very clean looking letters. To paint the letters in other stone, first use a good oil base sealer before you paint it. This will keep it from bleeding into the stone. Use a good quality art brush with a chisel end. Start from the inside of the letter and work it up the sides being careful not to slosh it over the edge. As always you should practice on a scrap piece first as I have done here.



Gilding:

Sometimes you are going to want to gild your letters or designs. This is done with gold, aluminum or copper sheets and can be obtained at a hobby store or by ordering. These usually come in packets of twenty-five and are either loose leafed or bonded to tissue paper. They can come plain or colored with designs. The bonded are easier to use, especially when the design is



at an angle, because you can hold on to the paper while applying the gilding. However, if you acquire some plain sheets, take wax paper and lay it on top of the gold sheet while it is still on the stack. “Iron,” it by gently rubbing it with your hand and it will adhere to the sheet. Transfer it to your work and apply as you would the bonded gold (this is not the best way, try to get the bonded sheets).



Applying Sizing

You are going to need a few tools, mainly a couple of good art-quality paintbrushes, a cutting board and a knife to transfer and cut the gilding. The first brush is used to paint and apply sizing to the design. The second is to press gilding that is not bonded into place. A note here, never touch the brush that will press the gilding into place. The oil from your fingers will transfer to the brush and then to the gilding, which can keep it from bonding well to the sizing or cause the gold to adhere to the bristles.

First you will need to seal the stone with a sealer made for that purpose or with oil-based primer. Try to get yellow for gold, brown for copper, etc. This will help to hide any places where the gilding may come off years down the road. Properly

applied, gilding should last about twenty years.

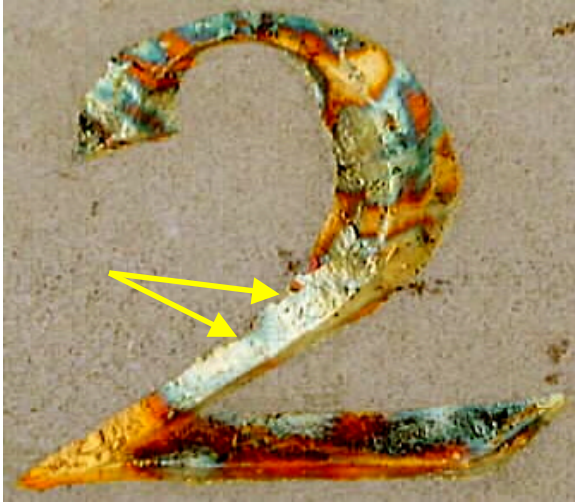
As in painting letters, start applying the primer from the bottom out. Working the paint up towards the surface while being careful not to goop it over the sides onto the stone. Once this is dried you can apply the sizing (read the instructions to determine the time needed for curing).



When gilding letters you may want to cut your sheets into strips to make them easier to handle. A cutting board is used when trimming sheets. These can be bought or hand made using foam rubber and a cloth used for drying cars after washing them. To make one, cut a square of board, staple on a piece of foam rubber, pull the cloth tight over them and staple underneath. There can be no breeze blowing while transferring gilding as the sheets are incredibly thin and light (gold can be hammered to a thickness of one molecule). If you need to, you can put the pad in a cardboard box that has one side removed, allowing you to work inside. The knife to cut and transfer it can again be purchased or made using a pastry knife that is sharpened slightly on one edge (see picture above). Do not touch the knife blade with your fingers for the same reasons you do not touch the applying brush.

Lift the gilding from the stack with the knife and transfer it to the pad. **Gently** cut the gilding with the knife and again lift the piece with the knife and transfer to the stone to be gilded and use your brush to apply it. Press down with the brush at the bottom of the design

first and then work towards the top. To get all the way down into the groove it may help to gild one side of your letter at a time. Once you have it in place you can press it in more firmly. With bonded sheets you can do this with your fingers, with plain sheets use a clean cloth. If a spot is left without leaf, simply repress on top of the spot. The gilding should stick to the area. If you wait too long to apply the gilding or for some reason it doesn't stick you will have to reapply the sizing to the spot and try again.



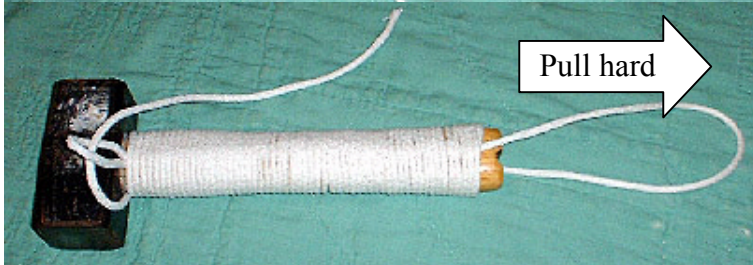
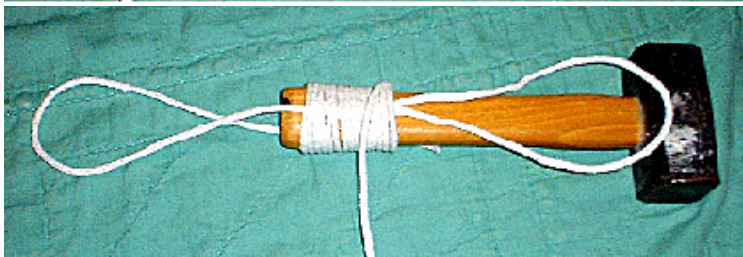
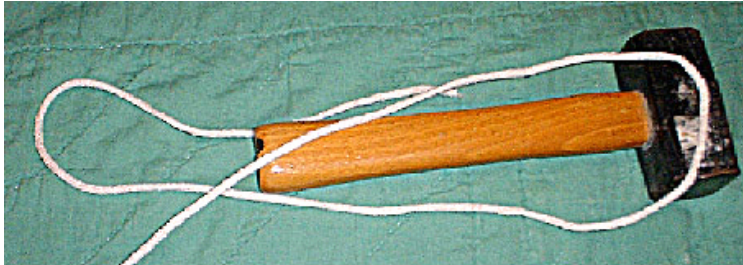
This gold gilding is called variegated because of the variations in color that are present. They are available in several colors such as black, red, green and others.

The edges are rough on this example because the stone is a practice piece and has a rough surface. If it had been for real I would have sanded the surface smooth first. You can see where the gold did not stick. The sizing would have to be reapplied and the gold touched up.

There is a coating available that will help protect the gilding but it is only really needed when gilding with aluminum or copper (to keep them from tarnishing).

Wrap your mallet:

I guess Italians have small hands. I say this because every mallet I have tried has had a bad case of “spaghetti handle.” Between being too skinny and the slick varnished finish on them, they get downright hard to hang on to. My friend Bill Kolok has come up with a wonderful solution, wrapping the handles with a cotton cord. The cotton helps to absorb sweat and maintains a good gripping surface while increasing the overall diameter of the handle.



First cut or grind a groove in the bottom of your mallet handle. Take braided (not twisted) 1/8" to 1/16" diameter cotton cord and lay it out as shown in

the first picture. Leave plenty of extra slack in the loops. While holding the loops in place on either side of the groove start wrapping a small distance from the bottom of the handle and working towards the head.

Wrap it tightly and with each round firmly touching the one before it. After the first couple inches leave out the end of the rope (picture three). Wrap almost to the head and cut off leaving about six inches, which

you pass through the upper loop. Grab the bottom loop and pull hard until the top loop draws tight on the cord going through it. Give this cord a tug to tighten it and then pull REALLY HARD on the bottom loop until the top loop has gone under the

wrapping at least two inches. Turn the mallet over and pull on the loose end you left sticking out and pull it tight while making sure the cord lands in the groove you cut. Cut off excess cord from the ends and your new handles are ready.

Power Tools

If you get into bigger stones you may want to go with some POWER; or you may not. If you do, don't worry that you are not doing it like Michelangelo. You know "*au natural*." I don't know about you but I do not have twenty understudies doing all the grunt work for me and I like to finish my pieces (Michelangelo left many of what he started unfinished). So time to spend some more money!

Electric:

Sanders



Belt
Sander

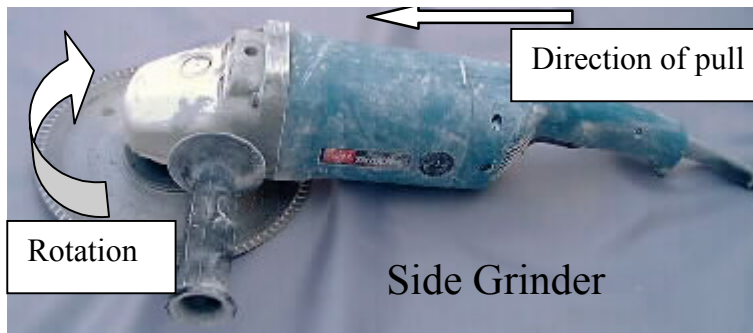
Sanders like this one are a great help on flat surfaces and can be used to help shape the softer stones. The dust bag on the back helps to keep smog down. There are many different lengths and widths. The longer and wider the paper is, the better for sanding flat areas, but the more they cost, so strike a balance when buying one.



Circular Saw

This is a regular **circular saw** with a masonry blade on it. It is used to make cuts for splitting a stone or cutting strafing lines in the stone when using a pitching tool. Lots of dust will be kicked up when using this one so put on the dust masks.

Side Grinder: This baby is really the Cat's Meow (how old do I have to be to remember THAT phrase?) for helping to remove, cut or grind stone. It's a side grinder and usually comes in 4-½, 7 or 9-½ inch blade sizes. The 4-½ inch is small and used often in carving or grinding the sculpture. The 7-inch is used most often for mass stone removal. These can be used with a composite masonry blade like the one on the circular saw above or with a diamond edged blade (mounted on it in the picture on the next page). The blade guard (not shown) **MUST** be used with the masonry blade as they can literally fly apart and it's a good idea to use it all the time. With the right blade, these are used to make cuts, shape and grind just about any material. Care



must be taken to hold and use these machines correctly to prevent an accident. My grinder has a clockwise rotation as shown by the arrow. When cutting stone using the right side, the grinder pulls away from me if it gets hung or jumps out of the groove. If I were left-handed and put the handle on

the other side, the grinder would be trying to eat me for lunch. These things take way too long to stop if you get into trouble. Treat it with respect and common sense and it will be one of your favorite tools.



Rotary Grinders:

Now we get into the smaller grinders like Dremel®, Foredom® and Suhner®. These come in a vast assortment of styles and abilities. Dremel is on the light

side both in power and cost. It is available almost anywhere and is a heck of a tool within its range. The bits you will need for it are the tungsten carbide type. Foredom and Suhner are heavy-duty motors that operate a flexible shaft to which you attach various bits and working handles. These are much more suited for stone removable and many people rely on them. I tend to stay away from this type of tool except for very intricate work for the simple reason that they remove very little stone for the dust they create. But when you really need them (like when polishing the horns of a granite buffalo) they are lifesavers.

Air:

Why go with air? Air tools are lighter, smaller, have fewer moving parts to wear out and can be fixed easier when they do. The speed at which they run is more controllable. They are usually cheaper and come in a greater variety. For the lucky people who have air compressors, there are a number of tools that help out. There are grinders (although these use a lot of air and need a good size compressor to keep them going), die grinders, drills, sanders; almost anything that can be brought electric and a few that can't.

Compressors:

What kind and size do you need? A five horsepower with a sixty-gallon tank will handle most needs (chisels, die grinders). The smaller pull-around types can be used but they are going to run constantly and may starve your tool for air. While this will not damage your tool, it will not have as much power. It may also overwork your compressor, leading to a shortened lifespan for it. If you use heavy-duty air tools, like grinders and buffers, you may have to go above a five horse to get all the air you need. Pressure is not as important as the CFM (cubic feet per minute). Pressure is secondary to volume in keeping the tool running correctly.

Air hammers:

This is one of the most sought after carving tools. Most of them use the same size chisel shank (thank goodness!) so you can buy the gun one place and chisels at another with no problem. Mine was purchased from Trow & Holden under the Barre name. Which size should you purchase first? Knew you were going to ask that. For general carving work on limestone and softer and with chisels no wider than about 1 inch, a $\frac{3}{4}$ inch bore with a short stroke is

about the right size. For harder stones or when using wide chisels (1 ½ inch up) a 1 or 1 ¼ inch bore with a long stroke should be used. Remember that if your hammer is overpowered you can cut down the air, but if you are underpowered you are plumb out of luck. I have also seen people use a “pistol grip” style that is common in automotive work and is available at low cost (much lower) at most hardware stores. The disadvantage is that they are much less maneuverable than their carving cousins. They may not have the best stroke/power for stone and may only have a few months warranty. These are probably more suited for carving a large outdoor sculpture than a coffee table piece.

Air Chisels:

You will find many different shapes and sizes of these when you open a catalog. Which ones you buy will be, in part, determined by the stone you are going to carve. Stay with the carbide tipped chisels. The lasting edges on these make it possible to go very long periods between sharpening sessions when used on any stone softer than marble and are really needed on marble or granite.

Generally you will need a Flat Chisel, a round-nosed Point chisel, a Toothed Chisel, a couple of different sized Gouges, and a Bushing or Frosting chisel. For limestone and softer there are some shapes that perform very well. There is a chisel made for just about any application, but if you think of a new design there are companies that will make them to order.

Limestone specials: These are some air chisels made by Bybee Stone Tools. They are great for limestone and softer stones. The first two are gouges. The third and last are made for



quick stone removal and the fourth one is a point chisel.

You will notice that most air chisels have large shanks. These allow you to control the chisel tilt as it boogies across your rock.

For marbles and granites, all the chisels will have to be suitable for use with these harder stones and for marble a Cape chisel will be added to the collection.

Using air chisels is a bit of a different experience compared to using hand chisels. With a regular chisel you place it where you want it at the angle you want it at. You then strike it with a mallet with varying degrees of force. As your hand works its way up the chisel you reposition everything and then do it all over again.

With air, the hammer hand has everything to do with chisel angle, direction and force. Your chisel hand has to hold it firmly on the stone, twist it as needed, guide the tip back and forth for placement and keep a hold on it. Grasp the chisel in a hand-over hold; place the tip firmly on the stone. As you apply the air power, pull the chisel along with the hand holding it. This will keep your hand low on the chisel where it needs to be; otherwise you will have to stop every few seconds to reposition your hand. It's strange and you may feel like you are doing the carving with the chisel hand and are just guiding it with the hammer hand; almost the opposite of doing it by muscle power.

Have I scared you yet? I hope not, you shouldn't be. You learned how to walk, talk, ride a bicycle, drive a car; you'll do fine. Practice and patience are the key words here. This is one of those things that require "body memory." You know, the thing that steers the car; rolls down a window; lights a cigarette and shifts gears all at the same time your brain is wondering what to pick up for dinner.

Okay, the hammer body is usually held close to the back end where the air hose connects (ignore the groove in the front that LOOKS like you should



have your hand there). There is no on/off other than maybe a valve on the air hose. See that little air exhaust hole near the back? As you carve you can cover this hole to regulate the airflow. This is mainly done when you are positioning the chisel for a new cut. It helps to start off smooth. Just cover the hole with a finger and squeeze. The vibrations will slow down or stop. If the hammer stops don't panic, lightly jab the chisel butt into the hammer, it will start up again.

How much air should you be using? I keep the regulator turned down to about 35 PSI most of the time. This gives me enough power to carve but keeps the chisel from jumping around too much. It also helps when I want to slow down the air at the exhaust hole. Too much pressure and you will not be able to slow the air down without really straining your fingers.

All together now: Insert the chisel into the hammer at an angle while steadying it by touching the hammer with your thumb. A finger or thumb of the other hand is partially covering the exhaust hole to slow down the vibrations. Keep the chisel pulled slightly out to keep it from jumping around. Position the chisel on the stone and start to apply the hammer while pulling on the chisel with the holding hand. After it gets underway, release finger pressure from the exhaust hole and proceed with full force. Keep a good steady pressure going on the hammer and be ready to adjust angles and pressures quickly. Things happen fast with an air chisel and you have to anticipate your next move in order to keep from taking off more stone than you intended. *It'll all come with practice.*



Die Grinders:

These are small, high-speed grinders that really spin but usually do not have a lot of power. They make up for this by turning anywhere from 18,000 to 22,000 rpm. Used with carbide bits they can be used for intricate detail work or just to get a spot cleaned up that you can't get to with a riffler.



Orbital Sanders:

These are available in air and electric and are very good for finer sanding both on flat surfaces and on gentle curves. The pad operates in a rotating pattern that helps to keep it from digging in as a belt sander can do.



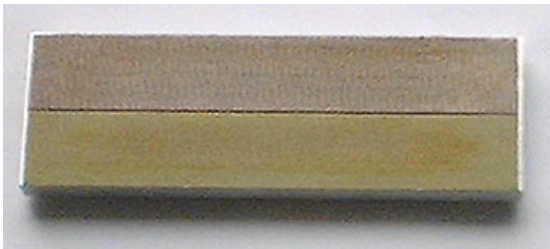
Caring For Your Tools

Now that you have all this money tied up in tools (have you told your spouse HOW much?) you need to take a little time to keep them in good shape. It doesn't take much and your tools will perform better (less work for you in the long run).

Chisels:

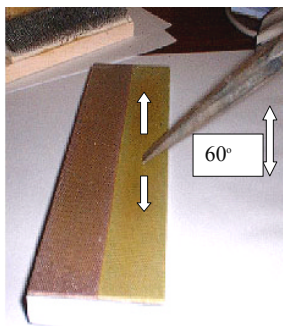
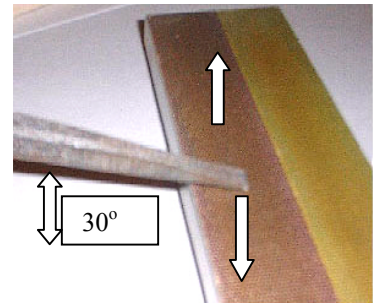
These are the mainstays of your collection so keeping them in prime condition is to your best interest. This consists of cleaning the stone off of them after use, oiling them from time to time and keeping them sharp.

Cleaning the stone dust off of them will help keep them from rusting, as the dust will retain moisture. Oiling them lightly from time to time with lightweight machine oil like 3-M® is necessary to help in rust prevention.



Keeping them sharp takes a little more time and needs a few extra tools. To accomplish this by hand it is best to get a diamond whetstone. Here is one made by 3-M® (#N40) but there are many others on the market (take a trip to the hardware store). This one has both course and fine strips on it. The maker of this stone says that you HAVE to use

water while sharpening (you do on most diamond sandpaper). To sharpen, hold the chisel at about 30-degree angle and to move the chisel side to side as shown by the arrows. This will give you a nice thin blade. Next it needs the edge tapered more. So hold it at about a 60-degree angle and move it back and forth until you have a sharp edge.

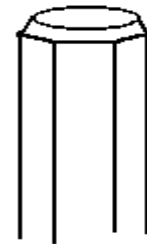


For electric grinders there are *green stones* available that do a great job on sharpening chisels. You can order them from many of the suppliers in the back of this book. Go slowly, taking off a little metal at a time and letting it cool off. If you get the tip too hot it will change the temper of the metal and scrap your investment. Do not dip carbide tipped chisels in water to cool them faster (you can do this with regular steel chisels). I'm not sure what it does but it will void the warranty on the chisel so it must be bad. After any sharpening process allow the

chisel to sit for a few hours before you use it. This allows the metal to readjust to the different strains that are now on it and help to prevent chipping of the blade you have so carefully crafted.

Carbide-tipped chisels are very hard and consequently very brittle and subject to breakage from a sudden impact. Do not worry about your mallet doing damage but if you drop one on a hard surface or strike it against something harder than itself you will probably break it.

Now look at the other end of the chisel. As you carve you will notice that the end tends to flatten out or *mushroom*. This can lead to chunks of metal flying off the end as you strike it. At best it will shorten the life of your chisel: at worst you'll, "put your eye out." What you want here is to remove any metal sticking out over the edge of the chisel body. After you've removed the



overlap grind a bevel (see drawing) around the top. This will help to keep future mushrooming to a minimum.

Rifflers and Files:

About all you need to do for these is to clean the dust out of them and oil them.

The tool for this is a *file card*. You can get them at any hardware store for a few dollars.



They have a face full of short stiff wires and are used to clean out the grooves in files and rifflers.

The steel that rifflers are made out of is very brittle and prone to rust. If you drop one or put too much pressure on one it may snap off part of it (go back and look at mine on page 18). If it is going to be awhile between uses you will want to oil them just like your chisels. If you worry about getting the oil on your piece the next time you need them, roll them in some stone dust (you'll have plenty around) and then make a few swipes across a scrap piece of stone before you apply them to your sculpture.

Air Tools:

What can I say? Clean and oil them regularly. Put around three drops of air tool oil into the air inlet side of the tool at the end of the day. Try to keep contaminants out of the inlet between uses and try to keep water from collecting in the lines.

Oh, do not use the oil as you come close to finishing your sculpture. The oil does blow out in fine particles that will stain the stone, no big deal if your going to remove it, but plays heck with a surface you are (or were) done with. You may have to let it run a little dry for a few days.

Electric Tools:

See those air vents on the sides of the tools? This is where air goes in to cool the motors. That's also where dust gets in to ruin them. You can help by blowing air through them while they are running at the end of the day. This will remove accumulated dust that can cause the motor to run hot. You'll be surprised at just how much dust gets in there.

On all your tools: Keep them reasonable clean and preferably in some type of canvas (not plastic) tool carrier with individual pockets for each tool. This keeps the chisels and especially the rifflers from roughing each other up. Unlike plastic, the canvas will breathe and help keep them from rusting.

Where to get supplies

Stone Only

Colorado Alabaster Supply

An alabaster with swirls pink, very nice.
<http://www.coloradoalabaster.com/>
Creamy with streaks of pink nice fine crystals

Smith Camp Alabaster

Cody Bell
Turkey, Texas 79261
C/O Cody Bell
806-423-1276
Mobil
806-346-7566
E-mail codybell@caprock-spur.com

Art City

for stone out west, 1-800-490-0746 31 Peking St. Ventura, CA. 93001

New World Stone

Virginia Soapstone for carving or pre-shaped for items like tabletops.
Route 800 and Alberene Loop
Schuler, VA. 22969
Tel. 804-831-1051/ Fax 804-831-3432
www.newworldstone.com
E-mail nwsc@rlc.net

For the soapstone crazy people in Canada
Thorgrimson Stoneheart Inc. will get you some good carving soapstone with no asbestos in it. Medium gray with black lines through it.
E-mail stoneart@kenora.com

For the soapstoners
Inverness Soapstone 1434 Dairy Rd Charlottesville, VA 1-800-373-6352
Tennessee marble.
<http://www.tnmarble.com/>

Good news from the lady Lianne for you peoples down under.
The info for the Limestone quarry is: David Mitchell Ltd, PO Box 180, Attunga, NSW 2345 Australia. Phone (02) 67695501 Fax: (02) 67695707 Contact: Mr. Paul Keane- Marketing Manager. They generally only sell in large quantities but you can visit the quarry to choose your pieces.
You will also find quarry information on a great site listing all minerals and metals available in New South Wales ~<http://www.minerals.nsw.gov.au/> (This is the New South Wales Department of Mineral Resources site).

Tools, stone, and misc.

Pronto Tools

These guys have put together a nice selection of tools for the beginner from a lot of the places I have listed here. Their catalog is well put together to keep it from being confusing for the beginner.

1-805-648-5432 Fax 805-648-1295
31 Peking St.
Ventura, CA 93001

Bybee Stone Tools

1-800-876-3058 <http://www.bybeestone.com/>

They will make any kind of air chisel for limestone that you will need. Bybee's will also sell special order cut limestone and have a great annual carving symposium.

Trow and Holden

45 South Main St. Barre, VT 05641

A good place to get air tools and some hand tools. Have a lifetime warranty on most of their stuff and will custom make chisels to your specs. Highly recommended.

1-800-451-4349 in VT. Call 1-802-476-7221

Johnson Atelier

E-mail sculptor@stonedivision.com 609-890-2777 (NJ)

Montoya /MAS International, Inc

<http://www.montoyasculpture.com/>

They are now under new management, have a great variety and seem eager to help the customer.

Order: 1-800-682-8665

Stone Sculptors Supplies and Studio

P.O. Box 27656

San Diego, CA, 92128

tel: (760) 489-1424 fax: (760) 489-1624

web site <http://www.stonesculptorssupplies.com/>

Flatlanders Sculpture Supply

1-800-234-4591 (MI.)

Alec Tiranti Limited.

This one is in London, England. They have some unique and useful chisels but watch out for the rise in cost due to money exchange, tariffs and shipping.

London shop: 27 Warren St., London, W1P 5DG

Tel & fax: 0171 636 8565

Okay, Here's one for Belgium

His address: **Marcoflex N.V.** tell: 032/ 02 460 6500

Fax: 032/02 460 63 06

Romeinse Stwg. 794

1780 Wommel

Belgium.

The Compleat Sculptor, Inc.
<http://www.sculpt.com/catalog>
1-800-9sculpt

I haven't ordered anything from these people but their online catalog and prices look good

Tools for the bigger boys.

Braxton-Bragg Corp.
6031 Tazewell Pike Knoxville, TN 379918
1-800-575-4401 Fax 1-800-915-5501
All the right power tools for the tough stuff.

GranQuartz
is another supplier for the heavy jobs.
1-800-458-6222 <http://www.granquartz.com/>
They have a number of locations so check out the web or call them to find the nearest you.

Last of all, to get any stone or tool you may want; order Stone World magazine. Write Stone World PO Box 3224 Northbrook IL 60065-3224 or 650 S Clark St. Chicago IL 60605-9609

Symposium Contacts

STONE WORKSHOPS

These are usually smaller and good for both the beginner and the experienced carvers. This one I've talked about a lot in the book and I recommend him for alabaster, soapstone and limestone instruction. Besides, you might see me there helping out.

William Kolok

2104 Sheridan Place
Owensboro, KY 42301
270 685-1312
bill@kolok.net

Sharon Gainsburg Studio

605 Broadway
Long Branch, New Jersey 07740
732-870-2710
shadav@prodigy.net

SYMPOSIUMS OF INTEREST

Artspace Valdicastello Italy/Usa?

US Elsie Wood (303)545-0007

<http://www.marbleworkshop.com/>

marblwks@versilia.toscana.it **Anderson Ranch Center**

Snowmass Colorado (970)923-3181

www.andersonranch.org

ISC

International Scult Conference

Houston Tx (609)689-1051.

ISC e-mail hs2000@sculpture.org

Marble Inst. of Colorado

(MARBLE/marble XII)

Marble, Colorado (303) 297-1429

<http://www.marbleinst.org/>

e-mail madandmat@home.com

Pietrasanta Marble Carving Studio

Italy US Jill Sablosky. (203)315-6242

SouthwestStone Carving Symposium

Jemez Springs N.M.

(505)829-3588

Studio Seven

Vermont (802) 865-2620

www.stonecarvingstudio7.com



The Carving Studio

West Rutland Vermont

<http://www.carvingstudio.com/>

The Sculpture Works

The Sculpture Works 2925 Rufina

Court Santa Fe NM 87501

(505) 474-0288

e- mail [William Woodward](mailto:William.Woodward)

**ByBee's Limestone
Symposium**

Sponsored by the Bloomington Area
Arts Council, Indiana, U.S.A. and the
Bybee Stone Co.

<http://www.artlives.org/>

(Bloomington Area Arts Council) 1-
812-334-3100 (John Waldron Center)

The Drill Hand Portland

Dorset DT5 1BW UK

(44) 01305 826 736 (44) 0181

341 6742 e-mail pst@earthling.net

www.learningstone.net

Oh yeah, one more thing, stone
dust will make your hair fall out. At
least that's the excuse I use.

May peace, love and a
continuing love for creating always
be yours and may your thumbs be
forever clear of the mallet. *Shane
Smith*

2309

TOP

1547

TOP

A

B

D

8

9

C

TOP

工

工

工

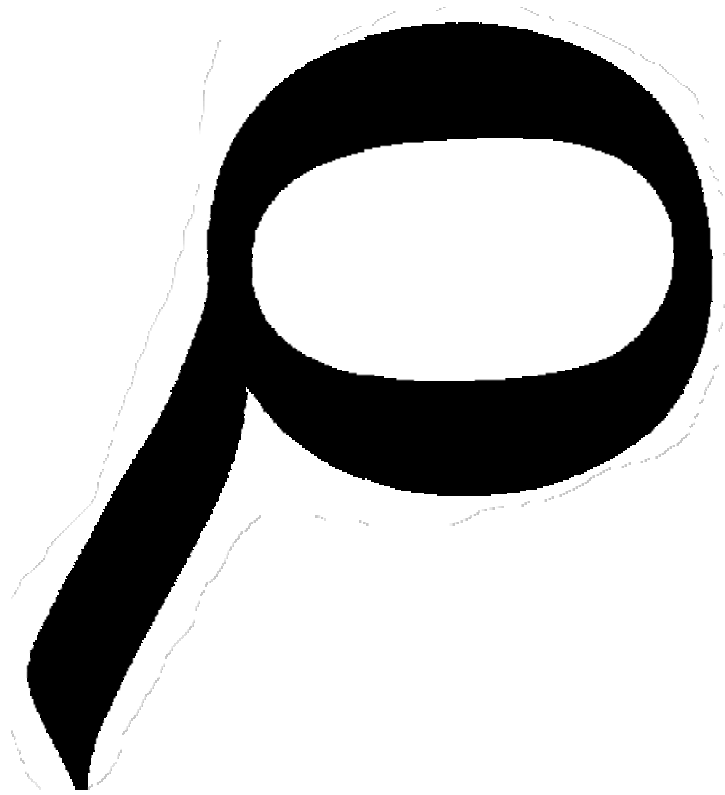
工

U
K
H

TOP

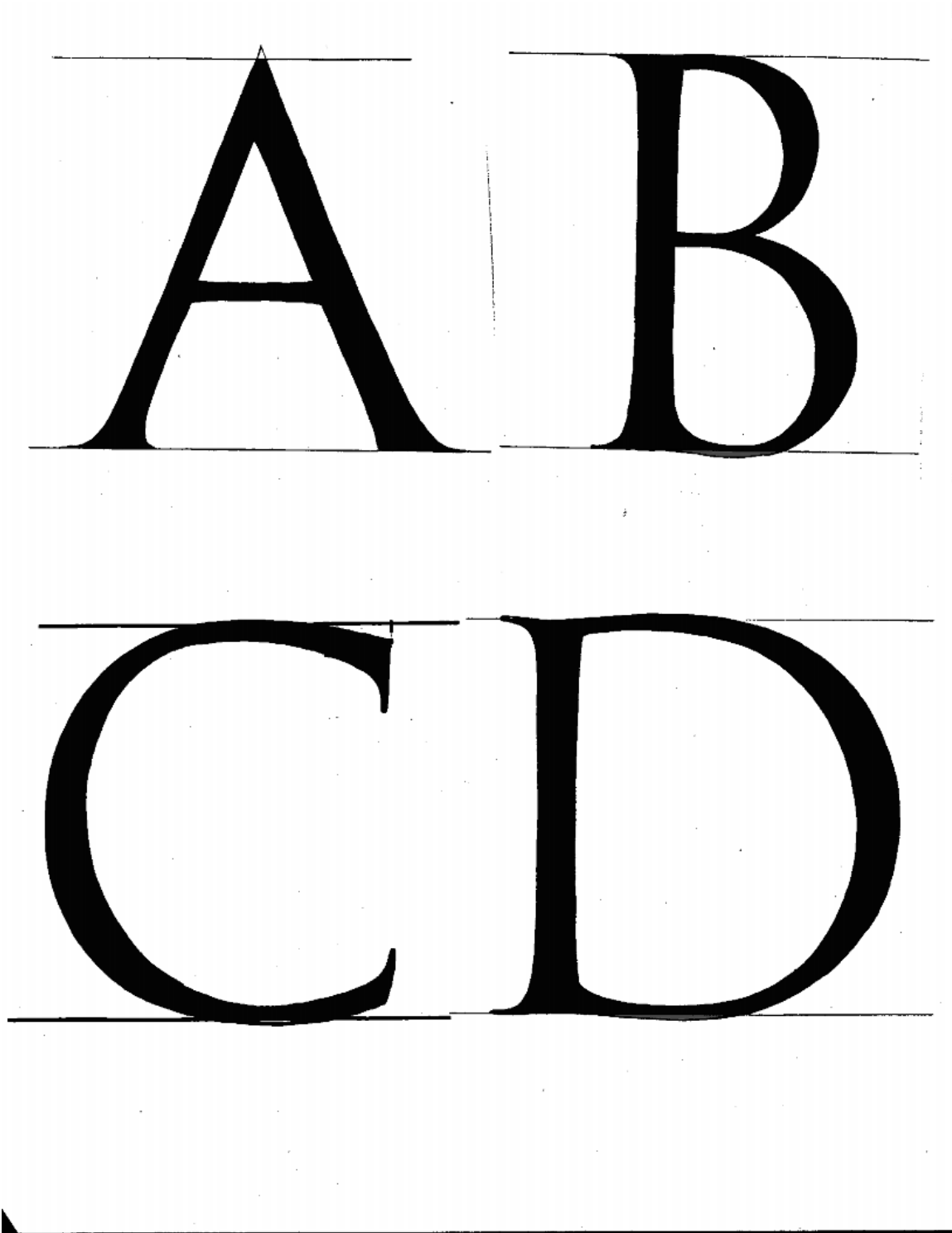
Z
K
W

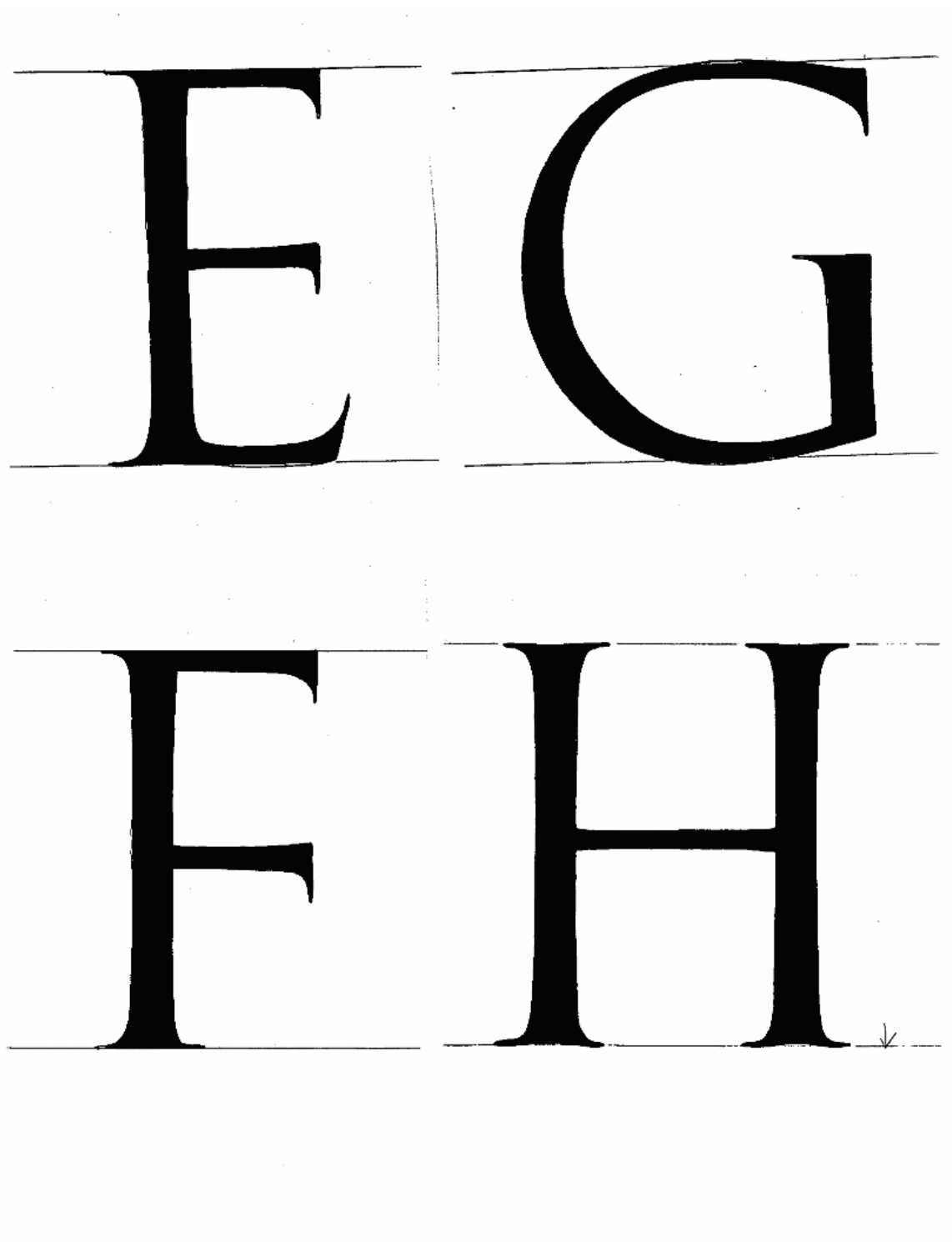
POSTERS

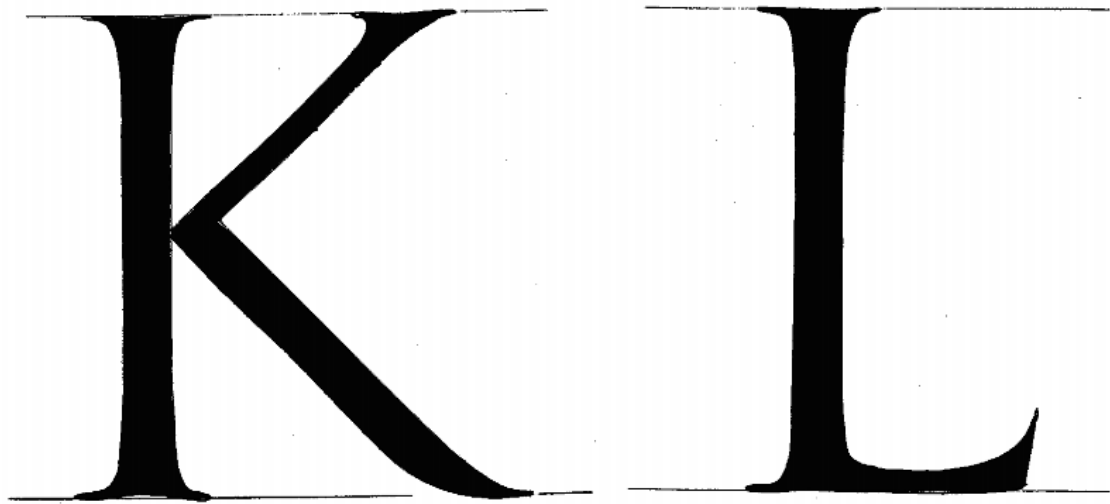
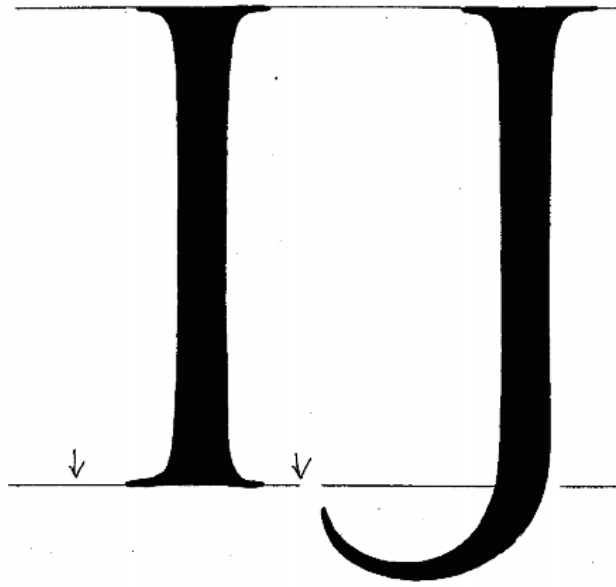


W
V
X
U
Y

A-D more letters







M

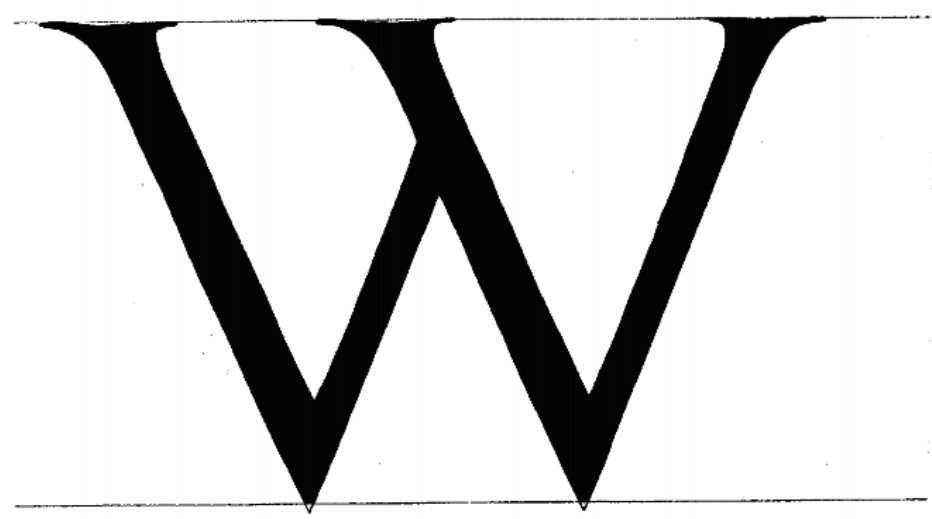
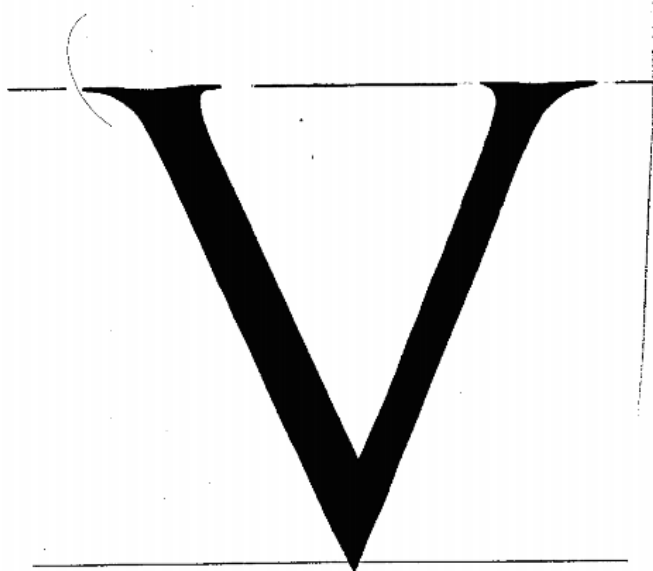
NO

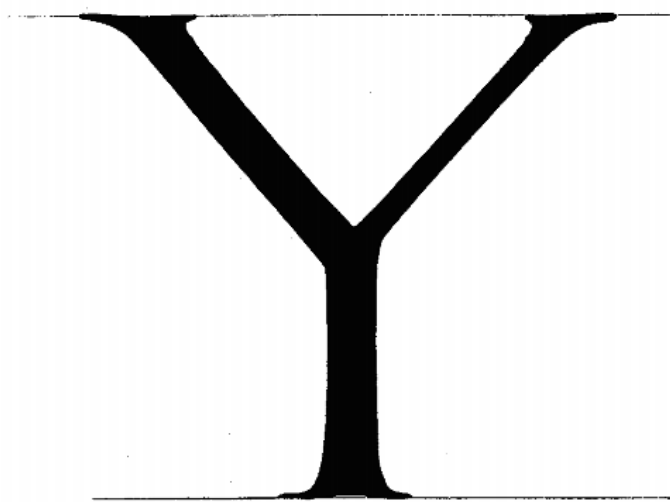
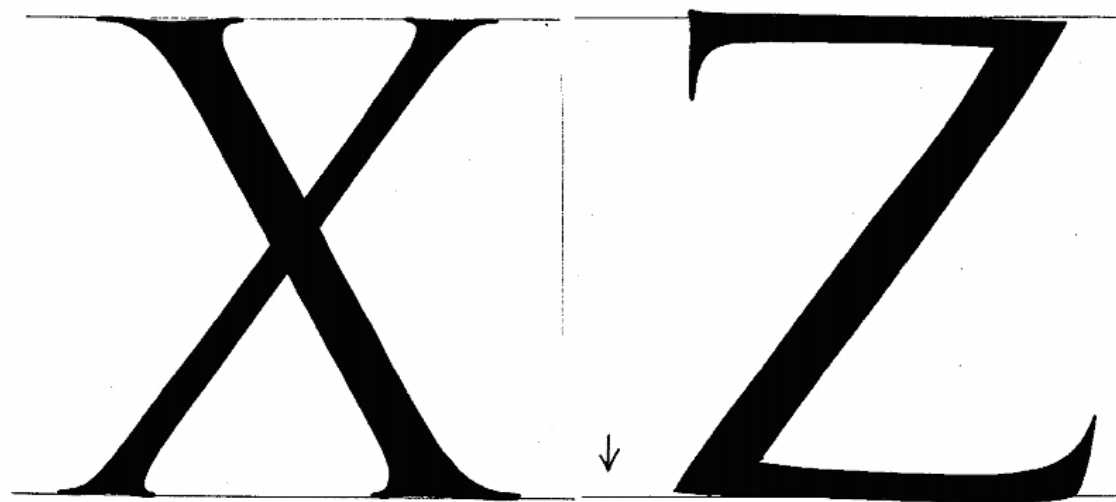
P R

Q

R S

U T





2 1 3

4 5

SIX

6

7

NINE

8

9