

Gaia's Glazes

Mysteries of Melting Sea Mud Revealed

by Joan Lederman

ABOUT THE COVERS

Along the Mid-Atlantic Ridge, Eurasian and North American tectonic plates pull apart and collide every once in awhile, both above and below sea level.

Back cover: Volcanic stones from a rift valley in Iceland where sheep are claiming the land. Stoney rectangles had been rock slurry made by cutting rock that had been drilled out of Earth's crust at the Kane Fracture Zone, under 2,000 meters of sea water. During firing the slurry contracted and self-assembled into rectangular shapes.

Front cover: Each section of glaze is a sediment from a place named on the rim, chosen for their complementary chemistries; some are high in carbonate, some rich with silica, some volcanic.

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(unless otherwise noted)



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ACKNOWLEDGMENTS

Since 1970 when we met, Phil Homes, a great potter, teacher and guide, has stretched my mind and my expectations about what I could accomplish. With a few hours of 'face time' we accomplished distant learning using only snail mail and telephone. Surpassing anything I could find anywhere was the letter he wrote me about the firing dynamics of my propane-fueled kiln.

I live in Woods Hole, Massachusetts and work so close to the ocean that I can hear it without looking up. People have been finding me there for decades. The place has supported my health with its soil in which I grow flowers and vegetables, and by the undertow-free swimming area that serves as my gym, playground and church.

I smile for all who have preceded me as tinkerers, visionaries, makers and social entrepreneurs.

Thanks to each contributor of mud, ideas, interviews, articles, educational experiments, editorial assistance, spiritual support and finally—for every dollar exchanged for work I loved making.

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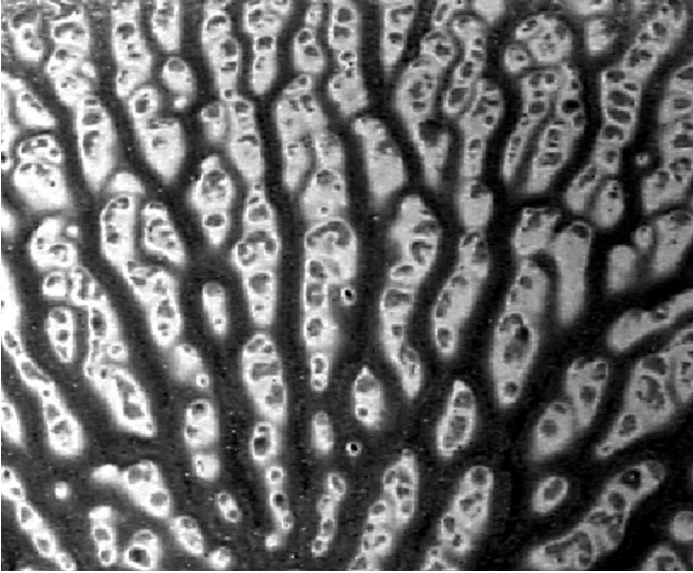
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DRY OCEAN SEDIMENT
Small grainy speckles are foraminifera.



FIRED OCEAN SEDIMENT
Patterns assemble during firing.



CORE SAMPLES—Woods Hole Oceanographic Institution

"The oceans are the memory of the climate system; the atmosphere is the messenger."

—Susan Avery
President & Former Director, WHOI

TO READERS

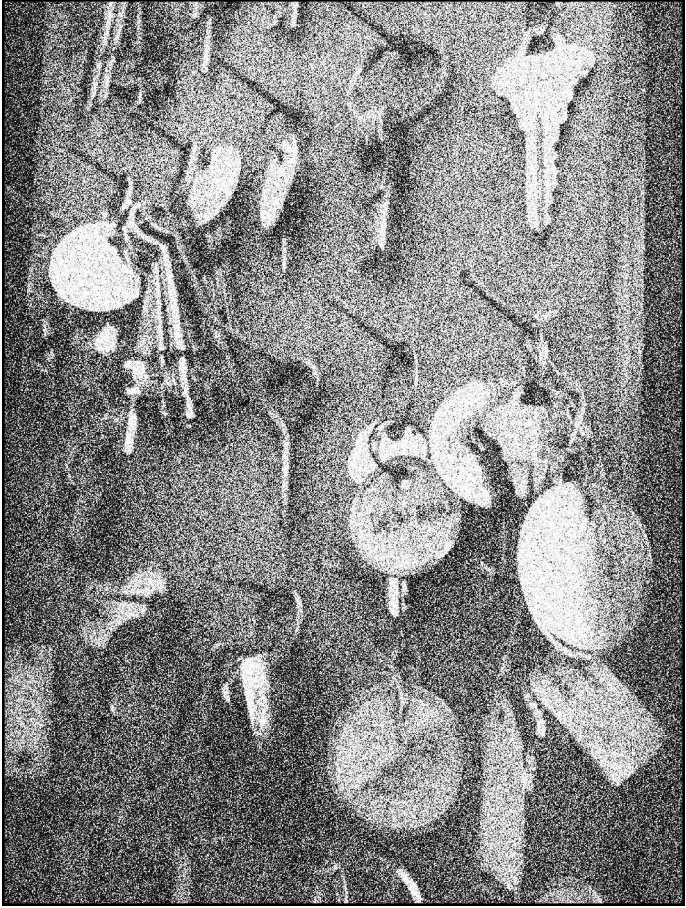
This book tells how I became a person who got a gift of seafloor sediment and then created a life using it. Although someone somewhere else could have done it, I did it—and that probably wouldn't have happened if I hadn't already been a potter living and working by the sea.

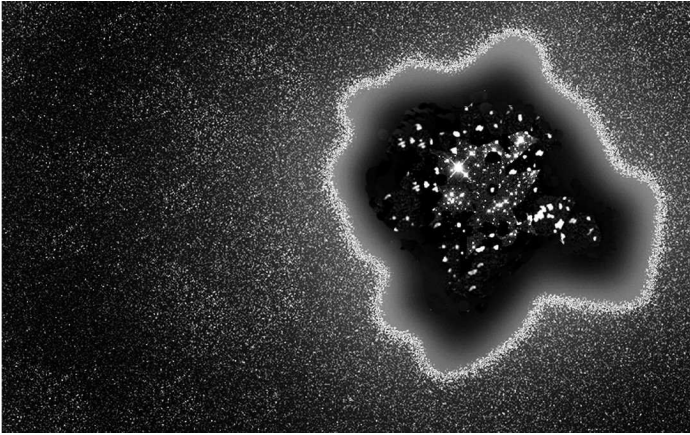
Together with my gas-fired kiln we've transformed samples of the seafloor into ceramic glazes (glassy surfaces)—probably not unlike a molten stage of sea mud cycling within Earth's deeper layers. My collection from varied sources and locations produces varied effects. Some people credit me with starting a new database of what Earth sediments look like when they're fired, and some say I make beautiful objects that advance scientific and ecological literacy.

Always like magic to me, *ocean sediments become glazes* when melted at the right temperature—I don't *make* glazes from them, I only demonstrate that they *are* glazes.

*I try to find the unique nature of each material. So far,
every sample I have does something different.
It's like having a kid and helping it become who it is –
that's what I do with mud!*

What I do is indigenous to *where I am*: Woods Hole, Massachusetts, USA, North America, planet Earth in one or more universes. *How I am* shifts as inevitably as tides and moon cycles. Sometimes I'm focused narrowly (tunnel vision), other times widely (panoramic view)—sometimes vertically (imagining molten core beneath and infinite space above). I zoom in and out on details and interdependent systems, on what is and what could be, on what I feel like doing and the rigors of doing it.





KEYLOCKER DREAM *... from dream to book ...*

I awoke from a dream that clarified the book's structure. I saw chapters as keys that open doors into spaces where darkness brightens from investigating. What I learned as a potter for four decades is how to get from no thing to some thing. From vision to form, spirit to material.

*2010's first edition was about **my** journey and this 2020 edition arises from a **togethering** journey. Since I made my last pot in 2016, I've been surprised each day about who I'm becoming as world calls forth an updating Joan.*

I show up where hearts are open to people of mixed ages, races, gender identities, skillsets and exceptionalities. I lean toward conversations among people whose intentions are honorable, who are change-makers working in communitarian ways. May we become wiser together.

KEYLOCKER DREAM

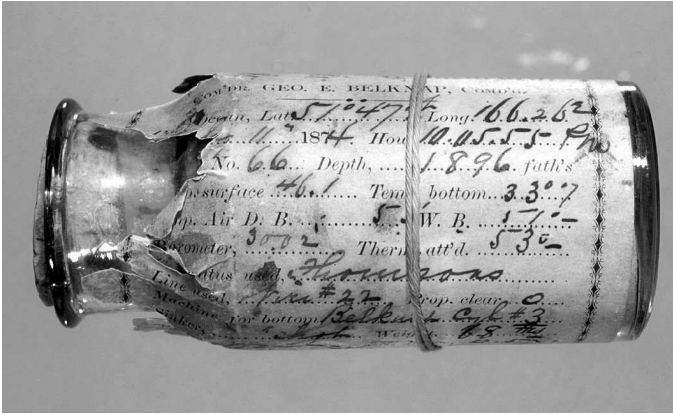
Back to when I awakened from that dream with déjà vu. I reviewed memories from 1974 when I moved into a boathouse by the ocean that's now my studio. Saltwater slosh marks stained the wall in the back, reminding me that hurricanes and high tides come. I'm not in charge of opening or closing nature's gates; I *did* set up shop in a flood plain, willing to accept nature's terms.

If I were afraid of what would encroach, I wouldn't leave doors open in mild weather; I've surprised chipmunks, mice, spiders, cats, dogs and a snake. Once (before locks on the doors), I walked in the front and saw a trio of pubescent girls flee out the back. It's been a popular place. If it were critical to my sense of safety I'd outsmart the weasel that defecates upstairs regularly. But I like being one of many creatures there. Fear of invasion became amusement and calm.

Dream language reminded me that I don't like having lots of keys so I've released these stories for others while freeing myself. Take what you want and leave the rest.

I've come to realize how privileged my life has been so I'm dedicating this edition to all who haven't had their turn yet—may it become their time.

Joan Lederman
February 21, 2020



PROVENANCE—Key to the Past

Provenance is about origins, sources, history and ownership. It became clear how I fit into nature's grand scheme one day as I was drifting in a kayak sprinkling remains of my husband Perry off Woods Hole's Nobska Point in 1995. The ocean was stunningly calm when I put the paddle down, and I drifted, barely moving, watching the last chunks, granules, and powder drop from my hand. In air the ashes fell as they would inside an hourglass but once they hit water they moved more slowly. Watching them mesmerized me. Time and space seemed vast. It dawned on me that I was adding to layers of people and other species that had been there for aeons.

I already knew that a quahog shell fired in my pottery kiln disintegrated into a pile of calcium, vital for living things, so my mind didn't need to stretch far to remember our elemental commonality among life forms. Little did I

PROVENANCE—Key to the Past

know then that these thoughts of lineage and ancestry were preparing me to meet foraminifera shells in the coming year, the soon-to-be foram friends with whom I'd bond. They would lead me to science about Earth in deep time.

Provenance lends value to art and traces geological and archaeological events on maps. I experience it as a resonating buzz, explaining why I was altered when I visited the core archive of the Woods Hole Oceanographic Institution (WHOI) for the first time. In the racks of capped cores, samples of Earth that have been drilled out of the seabed, all marked and labeled for indefinite storage, were stories brought up by people in ships at sea—another world to me.

When I first saw a vial of sediment that had been collected in 1864, labeled with sepia ink describing the provenance of the sediment inside, I felt a strong sense of connection with it, and since then I've become an archivist of sorts. I keep everything that's attached to the sediment samples that come to me: labels, spreadsheets, notes of what people tell me, maps and photos.

I mark buckets of sediment with numbers describing latitude and longitude (lats and longs) of the samples. Gradually geospatial memory forms in my mind, and I can share this with others.

For example, when I glaze with drillings that came out of Earth's crust, I write on the clay before firing, "Drillings into Mid-Atlantic Ridge/23.5°north 45°west/slurry from cut rocks melted."

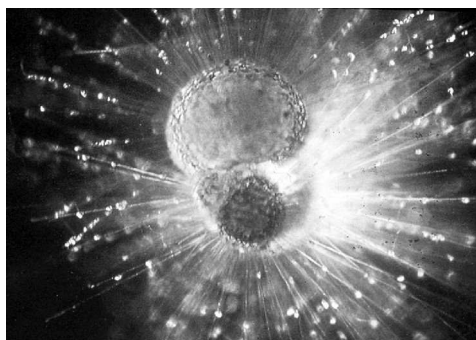
I enjoy watching how this kind of information, when shared, helps people care about a thing. It helps them feel kinship with the flesh of Earth.

When I began writing inscriptions on pots in 1996, seeing words on pots felt weird. First I used metal letters to stamp the clay, and later I started to write with a brush (so people could choose). I watched people vote with their dollars. I tried another test: with two bowls (same shape, same glaze), one with lats and longs at a high price and one with no information at fifty percent less. The mappable piece sold and the other might hang around for years.

I offer keyword clues so people can learn more—they can be an entry point for discovery that leads people in a variety of directions. I realize that some people care and others don't.

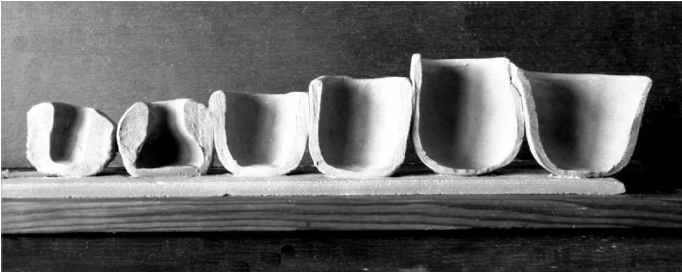
My brother-in-law dismissively said, “Why would I care where it comes from?” while Rina, recipient of a gift/tea set said, “.... while drinking tea from the cups glazed with sediments my 8-year-old son and I look up all the places on his globe.”

Some other people learn as I do: touch, gaze, feel connected, and inquire. Space and time are all a puzzle that I keep putting together.



—Dave Caron





SPIDERS WEAVE & POTTERS THROW— Key to Forming

I was in a tower in the woods at night looking at a spider weaving her web. Her spinnerets drew protein threads from her abdomen in a steady stream. The house light landed on the silken threads in a way that magnified the process as I watched her.

The spider I grew up fearing was now my guide. She was demonstrating how nature's creative flow, bringing up stuff from who-knows-where, builds what will soon be destroyed. Transformation at work—spiders weave, I make pots. It's all in a day's work.

Throwing is the word used for making round objects from soft clay on a rotating wheel. I use a motorized wheel because it speeds up production and conserves my energy. Many people are fascinated when they see clay in the hands of a skilled potter take form as it's thrown.

I struggled to learn how to throw pots. I spent at least five

hours a day almost every day for three months during independent study at Goddard College to fulfill the last course I needed for a teaching certification. I fell in love.

Getting my body and the clay to work together was challenging. To center the clay I attacked it with strength and determination, and failed. My teacher, Phil Homes, put his thumb and forefinger around my wrist and applied his grip gradually and firmly and then backed his hold off gradually and lightly. *Experientially*, I got it. Not domination, but listening worked—I learned to be responsive. Eventually I felt I was in a cycle summed up by a truism among potters, “Who is being made, the potter or the pot?”

I was dealing with clay, but also with regulating pressure between my hands. I strained to tune in to the goings-on between my fingers as I squeezed the clay. It took weeks. I’d push too hard, the wall would tear, or I’d push too lightly and the wall wouldn’t rise. I was trying to corner the clay, knowing that if I did it right, the clay would have no place to go but up. I wasn’t good at doing this but I was committed to trying. Using my head alone to analyze the problem didn’t work, and to this day, I can’t succeed through mental effort alone.

What works is communing with the moving clay and trusting that my hands and the clay will find their way together. Michael Cardew was a British potter who wrote about the role of inside and outside hands during the throwing of a cylinder. For a right-handed person the wheel goes counter-clockwise. The left hand is inside and the right hand is outside. According to Cardew’s thinking, the left hand is the sensing, emotionally present responder and the right hand is the thinking directive manager.

When I’m having an off-centered day I close my eyes and trust muscle memory to get harmony going; materials, body parts, and revolutions per minute of the potter’s

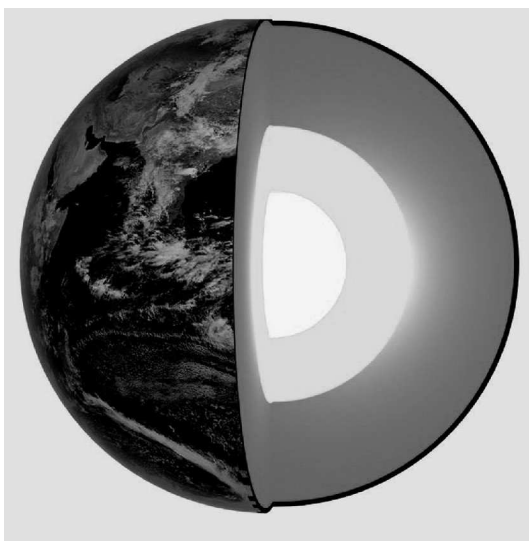
wheel all need to synchronize. For months I made cylinders and cut them in half to examine wall thicknesses. I didn't improve fast and noticed something timid about my touch. Gradually I attained increased levels of confidence and accuracy. Through repetition, I was training my instincts, and finally, once I relaxed, I began to watch my hands do things I didn't know they knew how to do.

SPIDERS WEAVE & POTTERS THROW—Key to Forming



"She discovered that the muds, rich in foraminifera skeletons from ancient eras, spontaneously adopt dendritic formations during the course of firing—a set of splashes within a splash, as it were."

—Martin J. Kemp



ZONE, CENTER & WOBBLE—Key to the Middle

I remember a geospatial concept rooting in my mind when I was a child digging in sand at the beach and people said I'd get to China if I would keep digging. Having little concept of distance, I headed straight to China but soon hit sea level and the limits of my arm. Later, while cutting open balls of cookie dough, I saw what center is, and soon after was visualizing concentric rings around a center just by playing with piles of dough. Some I altered by adding cinnamon, some with cocoa powder.

The concept of Earth as a spinning sphere is still forming in my mind as I digest new information. *Earthquake Sped Earth's Spin*, a *National Geographic News* headline, is one example that caught my attention on March 2, 2010.

A geophysicist estimated that Chile's 8.8 earthquake:

1. Shortened an Earth day by 1.26 millionths of a second.
2. Shifted Earth's figure axis by about three inches. (The figure axis is the imaginary line around which the world's unevenly distributed mass is balancing.)

A seismologist likened Earth to a spinning figure skater holding a rock in one hand. The rotational axis of the skater is down the middle of the body, but the skater's figure axis shifts in the direction of the hand holding the rock. As she pulls her arms in, she rotates faster. The axis and figure axis move toward convergence.

As part of Earth's mass drew in during the quake, the planet began to spin faster. A tectonic plate dove beneath an adjacent plate—called subduction. This can cause earthquakes and volcanic eruptions and, like the skater pulling her arms in toward her body, mass moves in and rpms increase.

I'm able to understand because of past experience spinning objects and myself. As a kid I twirled jacks, spun tops, ran in circles to get dizzy, and pirouetted on toe shoes. In my twenties I tried the Sufi Dervish's whirling. That's when I consciously felt connected to a zenith above me and a nadir below me. I sensed an axis through me into Earth's core as being centered and grounded at the same time.

If you imagine placing your hands on an eccentrically shaped glob of clay that's lubricated with water and spinning fast, your hands will wobble. Then, imagine pushing in sideways, against the centrifugal force of the spinning clay, toward the axis within the center. Imagine you can fast-forward to mastery and, I promise, your hands will have learned to become still while the slippery clay revolves beneath them. The sphere is centered.

Want to feel the axis in the middle?

Imagine you've found a comfortable place for your hands to work together. Now place one finger on the top at the outer edge of the wet slippery rotating ball. Let your finger ride slowly there and as you move it closer to the center of the spinning clay, approaching the axis of rotation, the clay speeds up. Switch your mind to slow-motion. Notice your fingertip transition from moving sideways toward the center—to hovering without moving over the center. In your theoretical mastery now, there's less effort, then no effort. Let your finger drop into the axis and it will be sucked down into the clay, as into a vortex. It's a quiet place of slight friction.

In real-life, as with Earth in process, there are wobbles and eccentricities. We can't always be in a zone like a figure skater revolving too fast to see anything but a blur.

We *can* be centered in our off-centered worlds. I learned to throw a pot that has one side concave and one convex, just by timing my motion with the revolving clay.

My head bobs around when I throw pots. When my hands feel and my eyes see air bubbles and lumps, I accommodate automatically to the asymmetries. It's compatible with an attitude of going with the flow. Logic tells me that if I am off center in synchrony with an off-centered pot—we're centered. It's dynamic symmetry. Katsuyuki Sakazume, a Japanese potter, watched me do this and called it 'potter's wobble.' "It's very, very goooood," Katz said.

There are many ways people experience flow states when thoughts and emotions are energized and aligned with a task at hand. Athletes, psychologists, musicians and many others have words for it; some call it 'the zone.'

ZONE, CENTER & WOBBLE—Key to the Middle

Zoom in, zoom out. Think narrowly and widely about space. Think forward and back in time. Here's a reflection on this capacity in the field of economics and society:

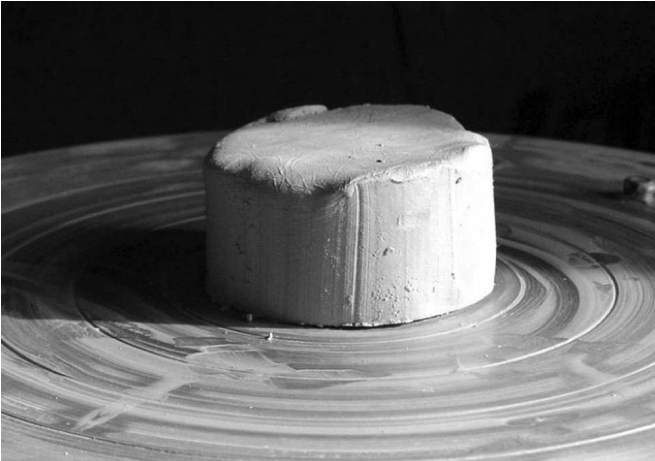
“There are three maladies in America today—short sightedness, tunnel vision, and self-interest.”

—David Walker*

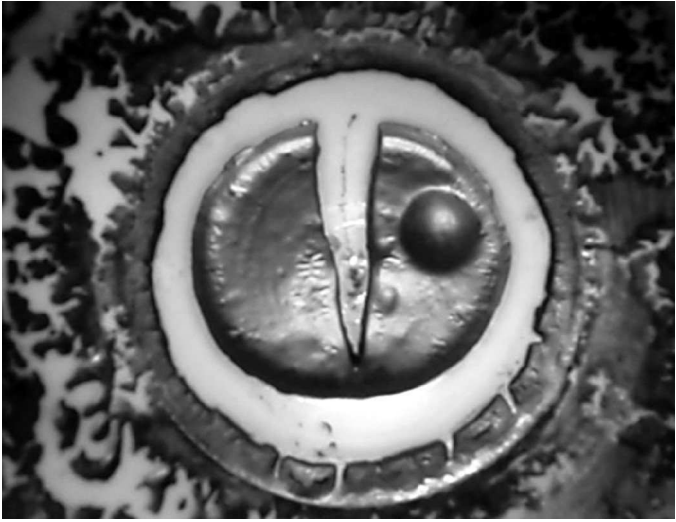
So (hear me laugh), if more people center and spin and go with the flow we'll balance the budget and achieve world peace?

“If at first an idea isn't absurd, there is no hope for it.”

— Albert Einstein



*David Walker was formerly Comptroller General of the U.S. and headed the U.S. Government Accountability Office for almost ten years.



MISTAKES—Key to Transforming

It took 1,330 strikeouts for Babe Ruth to get 714 homeruns.

Clay lends itself to making mess upon mess until something emerges. When people praise me for achievements, I think of the mistakes I'm willing to make—illustrated by the following story about paralyzing perfectionism.

I couldn't make a mug worth firing. In 1970 I worked for six hours a day as an apprentice to potter Jean Patnode. Each day I made mugs and scrapped them because I didn't like them. I fired only three pots during those months of working at the wheel many hours each day.

Soon after, a friend who graduated from architecture school helped me build my own studio and gas kiln. When it was time to fire, I swung the other way; instead of firing nothing, I fired everything. I was ashamed to see what I

MISTAKES—Key to Transforming

produced until what I was learning sidetracked me. I began noticing how glazes look on different clay, in hot spots or cool, oxidized or reduced. I began to learn how it takes a lot of messing up to get things right. I also learned about opinions—things I judged as ugly, other people liked.

I was a beginner at a new craft and life felt like a collection of demands to: make money, get a job, stop smoking, find meaning, get out of this gloomy mood—all self-talk that changed radically after one cathartic experience in 1970.

I was in Beverly Hills, California at a weekend marathon workshop with psychologist Nathaniel Brandon. Forty men and woman sat in a circle, interacting with Dr. Brandon one-to-one while the group witnessed. People who wanted would raise their hand and say, “I want to work.”

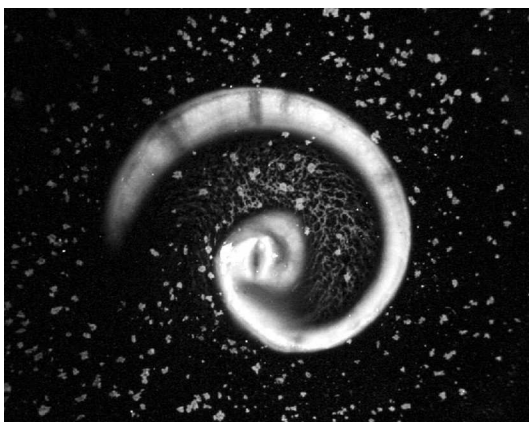
“I want to work,” I said. “Once I was a child who loved to draw and now I don’t know where that child in me is.”

Dr. Brandon directed me to stand in front of each person, look into their eyes and say three times, “I love to make mistakes.” Try saying that 120 times!

I kept saying it in different ways. I became animated with discovery, which is after all what mistakes* are about. I learned to accept failure, not fear it. Now I welcome learning opportunities and adventure along with occasional embarrassment. Perfection isn’t the goal, the journey’s the goal, and once I accepted that no ideal job, house, pot, or spouse awaited me, I began doing things more joyfully.

I replaced 'have-to' with 'choose-to.' Must I do this? Who says I must do it? If I choose to do this, why? I began to choose more consciously and sometimes I felt free.

*Not recommended for surgeons or airplane pilots, except when they're using simulation equipment.



COMPOST—Key to Recycling

Strictly speaking, because the sediment I get from the science community isn't useful to them and is abandoned, when I create new products with muds—I'm recycling. That was never my goal. I was just playing with fire, and outcomes led me on.

“Waste not, want not.” —WNWN—WiN WiN.

Not that I can boast of managing energy well by using scrap marine materials (and their stories) as glazes. But potential is there; a team including mechanically inclined creators with an entrepreneurial attitude could use escaped kiln heat well. I do recycle most water, since there are no drains because there is no plumbing in the studio spaces—the mud labs, where I work. My definition of aesthetic elegance includes transforming materials—whether it's wind into electricity, a seesaw rocked by children into pumped water, mud into glaze, or kitchen scraps into compost.

Firing clay and composting kitchen and garden surplus are ways I participate in alchemy. Turning compost and finding red worms moving like busy pink spaghetti under the surface, as they do in late spring, makes me smile. The promise of good yields from plants that will grow in the compost (future) and satisfaction of knowing that one quart of worms I bought eight years ago (past) is still bearing offspring—both are cheery thoughts. In the winter, frozen compost is not so cheery, when I get impatient with doubts if the system will survive. Fallow stages challenge my faith, when I can't see evidence of the process at work by poking or peeking. But I can tend the pile. I can dump material in, hoping circumstances will, once again, favor the synergy and I can circulate air at the right moment during thaws. Frozen compost and a cooling kiln require no action.

I've wondered if my creativity is like a gambling addiction. Just one more material to test, one more story to tell, one more person to meet; every once in a while there's a big win! The firing produces an artifact of staggering beauty, an eloquent allegory, or a big price tag. Maybe there's promise of an invitation or some recognition that what I'm doing actually benefits society. Compulsively, a thought recurs, what will the residue of my efforts fertilize? The worms are probably free of thinking that thought.

In the last firing I added gold flakes to a pot and discovered, even after firing to 2,345° Fahrenheit, that they still look like gold. Now I want to try a bigger sample—extra gold chunks, anyone?

When I'm pessimistic I do worst-case scenario thinking; I relax by imagining compost bins in various stages of decomposition and recomposition all over the yard, and my job is to scavenge around town with a wheelbarrow collecting what others don't want. Those, and growing sprouts as a primary food source, are retirement fantasies.



ERGONOMICS—Key to Sustaining Cross Train, Diversify & Burn Good Fuel

I learn by watching and listening to athletes, babies and toddlers, physical therapists, yoga teachers, dancers, old people, blind people, carpenters and everyone who's working on an attitude or illness that limits them. Dunya, a movement meditation 'guru' said, "When I come to pain in my body I slow down and find another doorway in." That helps implement the use-it-or-lose-it principle.

My work is physical. Injuries teach me that I'm stretchy more than I'm strong. I wear out from too much repetition. Running doesn't work for me any better than swimming in the Atlantic Ocean in November, though I love to do both. Cross training works, and it requires adjusting to seasons and age. I manage work sessions as if they're training sessions in a gym—with a warm up, some aerobic conditioning, strength training, building to intensity, and a cool down.

Summed up are a few principles followed by a magic trick:

- Use a big body part instead of a little one when possible.
- Contract what's tight to exhaust it so it can relax.
- If you work asymmetrically, devise an activity to balance.
- Keep exercise paraphernalia around—use your workspace as a gym and playground.
- Close your eyes, shift from visual to tactile concentration.
- Use an exercise ball for symmetry and general toning.
- Dance (fluid, slow motion works) so rhythmic motion reveals damage and gives an opportunity to tend, and enjoy.
- Use heat and cold therapeutically on joints and soft tissue.
- Pay attention to your breath and visualize air and light where you feel stiffness or pain.
- Forget efficiency in the short term in favor of maintaining health in the long term.

I got so immersed in concentration that I forgot to breathe deeply enough to align my thought with matter in space. Judith Isaacs, a teacher of the Alexander Technique, had her hands on my head while I was throwing a pot. "Your head is floating up off the top of your spine, your back is lengthening and widening, you're balanced on your sit bones, and you're exhaling.... " It seemed like magic. I call it grace, would some people call it prayer? The clay wall rose effortlessly from my hands as I exhaled!

WOW! The clay knows how to move better than I know how to tell it to move. That was an epiphany. How can I control that? It happens most when I drink lots of water and eat appropriately for each activity. Regulating a human body is like building heat in a kiln by mixing fuel and air. Excess fuel or inadequate air produces smoke (fat) or heat (effective motion).

Summer is best for indigenous living: walk and eat wild foods. Lentil and other sprouts are always good. A favorite axiom is: Eat fish—swim like a fish. Are you what you eat? Would I get anything done without caffeine? Is chocolate food or is it medicine?



OLD STONES—Key to Clays

I've looked up definitions of clay many times and have seen diagrams of its particle structures—even magnified animation videos. It all interests me, and what I remember is that clays form over long periods of time by gradual weathering of rocks. People with careers in geology, soil science, chemistry and geotechnical engineering distinguish clays and silts by grain size or by their plastic properties. Being a potter I'm tuned in to both particle size and plasticity.

Practically driven, here I'll focus on what I've spent thousands of hours touching. I can't generate words fast enough to describe the variety of clays Earth has produced with time, but let's acknowledge that particular clays behave differently depending on composition, moisture content, weather and temperature conditions, aging process, as well as how refined or unrefined they are before they're processed for sale by ceramic suppliers.

What I buy are called clay bodies: measured batches of dry-mixed powders that have been combined with water, mixed again, and then pugged. A pug mill is a machine that homogenizes (using a stainless steel worm gear), de-airs (using a vacuum pump) and extrudes clay into a cylinder that is then packed in a plastic bag and stored. Each recipe is designed to mature at a specific temperature range. I use at least five different clay bodies, sometimes separately or mixed together, depending on what I'll make next.

My stash includes:

1. Basic light stoneware clay: good for small functional objects like mugs and bowls because it's a light color and is resistant to edge chipping. I struggle to coax this clay to swell into large things but its density is great for capturing visual detail of lines and grooves—it carves well. It imparts warm color to glaze and allows a glaze's character to show.
2. General-use stoneware clay: darker and contains more varied particle sizes than #1—good for raising up tall and opening wide. It's forgiving: It tolerates quasi-approximate touch without wobbling and deforming. It doesn't entrap air bubbles easily, it carves decently and imparts warm color to glazes. Firing it in a reducing atmosphere (oxygen-starved) can allow metallic oxides to overwhelm glaze character by darkening colors, so sometimes I apply light stoneware slip (creamy liquid clay) to a surface when the clay has dried somewhat, but is still moist and firm. Applying slip at the leather-hard stage is good because the clays shrink compatibly.
3. Sculpture clay: coarse, contains a lot of grog and maybe silica sand (the supplier keeps recipes secret). Grog is powdered clay that's been fired once, and has shrunk. Grog gives walls an internal armature that makes building large things possible. Grog's particles are sharp, so fine sticky particles attach well to them. If you imagine building two stone walls of the same three-foot height and one has only small stones and the other has mostly big stones (that's the grog) with little ones filling the spaces, you might

understand the purpose of this sculpture body. It's abrasive to skin and nails.

4. Porcelain is refined stoneware: it's white, carves well, and is so impressionable that it shows bamboo pores, fingerprints, chatter patterns, and other history of toolmarks. Glaze colors show well, and its smooth texture usually makes the final glassy surface look and feel smooth too.

I use another porcelain because light can shine through its walls after firing. Translucency happens when the clay moves toward being glass in the firing—warping and slumping can be a side effect. The thinner the clay wall, the easier it is to lose a piece in process. I need to be super-tuned and dexterous when I throw this because translucency increases as walls thin. Both porcelains crack easily when wet clay is added to dryer clay—as with handles.

Most of my time touching clay I'm in a wordless state, but there are some common words for all its stages: sloppy, soupy, sticky, cracked, powdered, chunky, air floated, plastic, leather hard, greenware, slip. There are plenty of technical terms you'll find if you inquire, and when firing enters the picture, there are words like sintered, vitrified and many more describing transitions of clay into glass.

I like entering the geologist's realm, where volcanic basalts make glass fibers called Pele's Hair—they appear when particles of molten magma are thrown into the air and spun out by wind. Similar are Pele's Tears, a geological term for solidified lava drops formed when airborne particles of molten material fuse into drops of volcanic glass. What happens at spewing vents and other sites that hint at what's inside the inferno of Gaia's kiln is sacred to me.

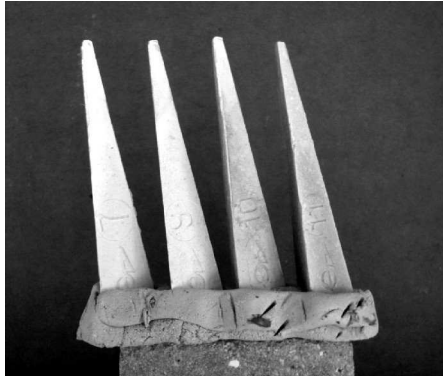
I've seen many scientists' eyes roll when I speak of her (Earth) breathing, bleeding, pulsing, yet, there's no denying that she's a living system, like ourselves.

*"Fire brings forth nature in her radiance."
—I Ching*



BELOW: pyrometric cones before firing.
RIGHT: pyrometric cones after firing.

Pyrometric cones are industrially made visual indicators of the effect both time and temperature have on clay. Potters put them where they can be seen through a spyhole during firing. I fire to Cone 10—about 2,340° Fahrenheit or 1,282° Celsius.





FIRING—Key to Expertise

The last kiln I built was the third—all were downdraft designs. Its four Venturi burners entered the kiln to make a spiral vortex of gas. The heat rose naturally in the chamber, was pulled down into a central hole (8 inches x 8 inches) and entered a tunnel under the floor, where gases exited to the chimney. The kiln had a sprung arch roof and burned liquid propane. (It's currently an unplumbed relic in a state of decay.)

The chamber is enclosed by walls that are an eleven-inch sandwich, laid dry. Two courses of hard brick are the bread enclosing filling of insulating firebrick. Hard bricks came from the Brooklyn Navy Yard and some I scrounged from a hospital boiler at Otis Air Force Base. These dense bricks absorb heat and withstand weather. For insulation on the roof I trowled castable refractory and poured vermiculite (mica expanded by steam, 'popcorn') from a friend's attic.

I spent as little money as possible and accomplished what I could myself. I hired people (or bartered with them) for welding, pouring the concrete slab, building the roof, and gas pipe fitting.

No matter how many times I tried with adjustments of chimney, stacking, forced air or none, it took 18 to 24 hours to fire, using as much as 150 gallons of propane. Beautiful results would have justified the costs but I rarely had any. Now I can admit it was a bad idea.

I can also admit that using proven designs can be a smart way to go. Now I have the courage to see how ineffectual my judgment sometimes is. I have a better sense of humor today. I'm better today at admitting when I'm wrong. I'm better at knowing what I don't know, but back then I tried to be superwoman. Hear me laugh! (Well I *can* laugh now that I use another kiln that Jim Bailey* built and that works really well.)

Back to the kiln story: I had a 250-gallon gas tank that the propane company wanted to replace with a smaller one because I didn't fire often enough. I knew the kiln needed a big tank to get enough surface area for vaporization during cold weather or the pressure and volume would drop and BTU's wouldn't accumulate in the chamber faster than they escaped through the walls. Sustainability. Sometimes wind downdrafting through the chimney pushed flames out the burner ports. I watched as weather sucked air in and blew air out—an alternating pulse back and forth in the chimney. In some weather it was hard to get the temperature to rise during the latter stages of firing, when heat escaped faster than it accumulated in the chamber.

Flames backed out the ports that were intended to entrain air with gas and pull fuel *into* the chamber. I was tuned to this as much as I was powerless to make it work well—but I kept trying. Surely an expert could help, I thought, and my

troubles with the propane company led me to someone who had worked with gas in the army and had authority with safety codes, gas permits, and trouble-shooting gas issues on Cape Cod. Let's call him Joe.

Joe became an ally who listened to my troubles taming the monster. He took the burners and regulator off and had gas fitters refurbish them. He added quick-disconnects so I could bring the burners indoors to protect them from salt spray during the many months when I didn't use them.

I was ready to try firing again with new hope that Joe had succeeded at his rescue mission. I deferred to his certainty and fired the kiln with no gas-restricting regulator. *Sock that gas in there! Crank it up!* I charged ahead confidently and soon experienced that when gas can't get enough air to burn at the source and in the chamber, it will seek air where it's available. Gas requires space to burn, so flames lengthened towards an air source that was—DUH, above the chimney in the great outdoors. So the whole chimney began glowing, flue tiles hotter than ever—orange hot, and making cracking sounds. I watched them begin to ignite the wood roof. I had a hose but feared that water would send incandescent shards flying—I didn't want to ignite brush, tree limbs and other stuff, so I called the fire department. They shut down the kiln and reported the event to the building inspector, who condemned the kiln until the chimney was replaced.

Joe was more surprised than I was. I had known in my heart it wasn't going to work. In fact, I had a written letter from my only teacher, Phil Homes, telling me exactly what I needed to know (in principle) to anticipate the outcome I got. I had consulted every book I could find. Even though I repeatedly read Phil's letter, and it was better than any book I have ever found, the truth of it all didn't sink in.

I tried bargaining with natural laws!

What self-sabotaging denial and pride kept me from admitting truth? And off I went again. I need more air and more insulation. I'll blow air in the burner ports, cement fiber insulation to inside walls and roof, and buy a digital pyrometer to report when the kiln gains or loses heat.



The next firing with the digital pyrometer inserted into a spy hole gave me a temperature readout (I never had that before—I only had pyrometric cones and they don't show declining temperature—once melted they can't stand back up). It was fascinating to get direct feedback in this way (scientifically), especially after having used charts for telling temperature by visually discerning colors (not so accurate, but used by my forebears): *'first visible,' then dull to bright reds, orange to bright orange to yellow, white, and finally blue white.*

Above about 1,700 degrees Fahrenheit numbers dropped, proving that adding gas could cool the kiln. (Not good, and so counter-intuitive.) Knowing exactly when temperature went up and down was the reliable constant I needed. Guesswork became data as I watched the gizmo's red numbers sequence up and down—they were helping me piece together everything I had witnessed for years—corroborating other facts such as sounds of muffled lazy yellow flames, carbon deposits on bricks, and pungent smells in my nose. If there was not enough air to burn the fuel in the chamber and I added more fuel, I cooled the kiln. Yep!

Some excess fuel is a good thing for developing effects like iron speckling, glazes crystalizing, and red colors coming from otherwise green copper glazes. Regulating kiln atmosphere (inextricably related to outdoor atmosphere) is as much a part of this art form as writing with a brush is. Once I had the missing tool, the digital pyrometer, I could regulate the atmosphere to pulse between oxidizing and neutral, reducing and neutral. I could find a delicate hovering balance—I could encourage energy to accumulate with less waste. Finally, I was beginning to see the light.

Once I could surrender some stubborn attitudes I could progress. These are a few mental breakthroughs:

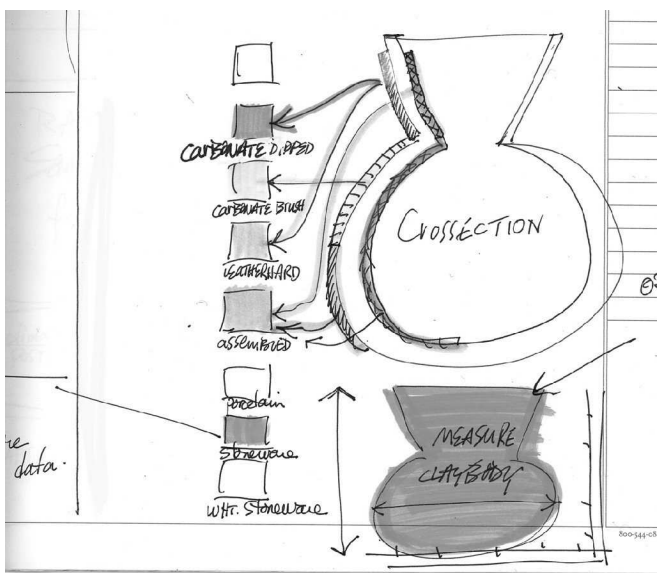
1. Working scientifically was for scientists—I wasn't good at science. *Now I realize I can work scientifically to become a better artist.*
2. I could learn what I needed to know by myself—ie. visually reading temperature by color. Now I see how unrealistic it is to develop such skills (in a reasonable time frame) without sharing observations and dialogue with an experienced master who can guide me.
3. I thought I could succeed without investing money in equipment. It was time to think long and short term and prioritize. I needed to calculate real costs and make decisions based on them.
4. I wanted to groove in a safe haven with clay and nature—sorry. If I want to play I need to pay; if I want to survive in a high-tech career, I need to balance it with some high-tech. I continually need to make peace with choosing what technological advancements will help me survive and thrive in a post-Google world.



KILN USED SINCE 1997

A peek from one side shows the stacking area that, during firing, is rolled into place within the chamber (the empty space under the arch in the photo).

Note, only one course of insulating firebrick is used in the walls, an amount that is enough for the kiln to meet safety codes. Also note: fuel-burning kilns (gas, oil, wood, sawdust, old-tires ...) offer opportunities for adjusting the atmosphere to be oxidized or reduced. On the other hand, electric kilns are intended *only* for oxidizing.



RECORD KEEPING—Key to Glazing

If you want to differentiate the abilities and goals of scientists and artists, compare their methods and outcomes. A scientist's experiment might not be considered reliable until another scientist has replicated the results. Reproducibility is crucial to science in ways I barely understand (because that hasn't been my goal), but I do understand what it's like to aim for control of materials and methods. Beyond that, I seek serendipity and revelation.

Several scientifically-minded people have advised me. A consistency engineer offered his services. A climate researcher suggested that I count how many foraminifera shells I apply per square inch of sediment glaze. A biologist suggested I limit myself to using five different glazes. I knew there were measurements I could monitor. I could use a glaze hydrometer to measure liquid density and an oxygen probe to measure kiln atmosphere during firing.

I could shoot time-lapse photos of glazing. I could track outside temperature and humidity and correlate those numbers with kiln heat gain, gas gauge readouts, and damper adjustments. I could manage clay consistency by purchasing a lifetime supply (made at one time with materials mined from the same places).

Not unresponsive to scientists' advice, I've often thought how the process could be improved if a team, rather than just I, were doing this. It's too much for me, *alone*, to lead, finance, and adapt to my workspace and methods.

I tried some controls, especially firing charts, and what I soon learned was that I can't (or don't) access kept records as fast as I can retrieve what my brain stores, if I'm focused when I observe. You're not likely to see me taking any notes (other than mental ones) while I glaze, yet several people who've seen my workspaces comment that I work very scientifically. In some ways, yes I do. I inquire, set up experiments, develop techniques for acquiring new knowledge, and accumulate data based on observing, evaluating and recording what I test. BUT.

A quick review of my glazing history demonstrates that, when possible, I avoid weighing, measuring, buying arcane equipment, learning chemistry, or heeding advice to limit the number of materials I use. I'm sure laboratory techniques would be enhancing but for now, my ignorance is bliss (that's a white lie). Trial and error is how I do it. Let this not sound simple! Sometimes the phone will ring and I can hardly get to the part of my brain that uses words.

The way I work forces me to develop habits of mind that are useful for managing chaos and complex thought with increasing effectiveness. I'd say my success rate has improved from about 30% in 1997 to about 87% in 2009. I'm measuring success by what people agree is beautiful. Wow—some measurement, huh! Yet, it's amazing how

sometimes almost every person resonates alike at seeing the same object—I think that they recognize eloquent truth embodied in the object. (*These are the ones it might behoove science to consider studying or replicating.*)

My intuition (defined as high-speed intellect) works best for recall when I focus intensely and trust memory. Taking notes is distracting and always proves that I can't write fast enough.

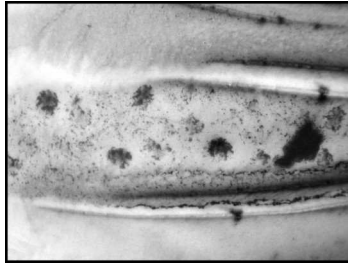
As the number of materials I use increases, my mental agility increases. I bond with materials by concentrating and by memorizing their visual identities at various stages—being present with them is a way I love them. If I maintain attention, I remember stored data well and can decide things faster than my mind can track chains of logic.

I call it contingency thinking when I visualize what each glaze might do in a range of temperatures and atmospheres, on concave or convex surfaces, and how calligraphic writing will survive when the glazes flow. I think on multiple—sometimes parallel—tracks. If this, then that; if this, then that. I project likelihoods as my livelihood.

READING GLAZES: The most crucial (and delightful) time for observing well is after a firing when I'm unstacking the still-warm pots. I look at things in daylight and direct sun. I watch warm glazes contract—crystals tighten and colors change as they adjust to room temperature air. I can hear glazes crackle as they shrink against the clay. Sometimes I stare at crystals, looking through a jeweler's loupe. I relax my eyes and become absorbing like a sponge.

When I see on an entirely different scale, from a birds-eye view, a small ceramic rivulet looks like a migration of people on hilly terrain. I've sensed iron lumps in a clay wall erupt into the glaze, as oxygen-starved beasts. I've

enjoyed the easy slide of hot glaze on smooth porcelain compared to the same glaze passing over bumpy stoneware. These are visual vignettes I never forget. Sometimes I photograph details by using a macro setting on a digital camera and then, when they're on my computer screen, I zoom in and in. That's usually when I sense a strong correlation between what happens in the kiln, and what happens in Earth, seeing the planet as a spinning kiln.



Notes I take:

- Sometimes—weight or volume of clay for different shapes.
- Rarely—the kinds of clay mixed for different objects.
- Rarely—if I glaze leather hard clay or after the first firing.
- Always—notes on weather and stacking, which effect circulation in the kiln.
- Usually—_inches of space the sliding damper leaves open to the chimney.
- Rarely—sequence of glaze application (when several are used on one piece, which I commonly do).
- Occasionally—interpretations about fired outcomes.
- Sometimes—ideas for duplicating best results.
- Commonly—how placement of an object in the kiln resulted in an unusual outcome.
- Usually—inventory for pricing purposes.
- Always—sediments I use and their coordinates plus other narrative about them.

How I record:

- Labeled diagrams.
- Handwritten lists.
- Photographs after glazing and before firing.
- Spreadsheets, if needed for business inventory.
- Always—firing logs.

Equipment and tools I use to record:

- Ruler and scale: for some clay shapes.
- Finger: for liquid density.
- Pressure gauges: pounds per square inch of gas.
- Digital pyrometer: degrees Fahrenheit.
- Pyrometric cones: the industrially produced clay pyramids that help me decide when to turn off the kiln.

NOTE: The only time I ever have a computer in my studio is to back up images from my camera after a cycle of manufacturing is complete. By that I mean after shaping, drying, bisque-firing, glazing and glaze-firing a load of maybe a hundred pieces. Then the kiln room becomes a photo office. That's when the potter and the geek join forces to record for communicating and marketing.

Out come cameras, lights, backdrop, window coverings, jerry-rigged tripods and a laptop plus an external hard drive for storing images of the newborns. After shooting almost everything from multiple angles, I price, measure, and catalogue pieces before using Photoshop to assemble them into photo collages with descriptions. Then I upload them to my business website.

The reward pulling me forward and keeping me on task is the urge to touch clay again, especially after having seen all the new results, which seem to tickle open spaces in my mind that then flash into images of what might be.

If an evaluator were 'on staff,' this would be the time to use assessment rubrics and set up standards for the next manufacturing cycle, based on results from this one.



48 One workbench during the glazing process—a coordinated event.



BUSINESS PLAN—Key to Implementing

Why a business plan? Not only did I need to earn a living, but I needed to earn more money than ever, since my husband Perry had died a year earlier. Our daughter Rayna was twelve years old and I was sole support for us, our house, my workplace, *and I was infatuated with sediment from the ocean floor!* I couldn't imagine working more or harder. I needed to work smarter. Fear was kicking me in the butt while passion was pulling me forward—I was becoming an entrepreneur without knowing what the title meant.

Business planning, like writing a mission statement, was unthinkable at first. Resistance in me screamed, “No, NO—not me, not ever, I can't.” A moderating inner voice said, “Do it.” I sought help from a consultant who worked for an economic development organization on Cape Cod, and is paid to help small businesses. He said he wouldn't

speak with me until I had written a proper business plan. He gave me a form to use.

Writing the business plan proved to be a useful next step. As I wrote from a blank mind, vague vision became clearer, one word at a time. I felt like my spider friend, as I pulled idea threads from darkness. It also felt similar to shaping an amorphous pile of clay into something recognizable and functional. I was producing a word document.

Business Plan, Section One asked me to describe my vision for the business:

- What service or product will my business provide?
- Is there a real need for my product or service?
- Is there a market?
- Describe customers in terms of geographic, demographic, and psychographic.
- What's my marketing plan?
- Who are the potential customers?
- Why will they buy from me?
- How will I reach my potential customers?
- What is the potential size of my market?
- What sales and distribution channels will I use?
- Describe competition.
- What do I offer that's unique?
- What's the business structure—sole proprietorship, partnership, LLC, corporation?
- What are my operating procedures?
- Who are my personnel?
- What insurance needs will I have?
- What is my sales plan?
- How will I price my products and services?
- What is happening in the local economy?
- Will I be affected by the national or global economy?
- How can I demonstrate that my business will succeed?

I got through that part. The next section was primarily financial. The only parts I could complete were about equipment, supplies and location; those were pretty shaky.

Business Plan, Section Two:

- Capital equipment and location: how much space would I need?
- Is there space for expansion? What will it cost?
- What renovations are required? How much will they cost?
- How much parking will I need?
- Will I be visible from a main street? Is the zoning okay?
- Supply list.
- Who will my suppliers be?
- What payment terms will they give me?
- Will my suppliers be in business as my business grows?
- Are there alternative suppliers?
- Loan applications.
- Balance sheet.
- Breakeven analysis.
- Pro-forma income projections (profit & loss statements).
- Three-year summary.
- Detail by month, first year.
- Detail by quarters, second and third years.
- Assumptions upon which projections were based.
- Pro-forma cash flow.

I lacked basics: no lease for my rented studio, no assurance that I'd get more marine sediments, no public exposure—not even an official address or proper zoning. I could easily find other deterrents to business-as-usual. I had no credit history because I had borrowed no money, and my current income was from a few hours of janitor work a week. My past tax returns had been filed jointly with my husband, and showed that my pottery income was only from teaching children during summers, which I could no longer afford to do.

Business Plan, Section Three:

- Tax returns of principals for last three years.
- Copy of lease or purchase agreement for work space.
- Copy of licenses and other legal documents.
- Copy of resumes of all principals.
- Copies of letters of intent from suppliers, etc.

I could not project numbers that described a viable business. There was too much absent information. According to usual criteria for successful businesses, I had proved that what I was about to try would most likely fail.

As much as I was terrified to move forward with so few answers, I had a gut instinct that something rewarding awaited. The process of writing the plan clarified my thinking and helped me prioritize for years to come.

I sent off a copy of my numberless business plan for review. At our face-to-face appointment the business advisor said, "This is the best business plan that ever crossed my desk."

Wow! Now I wonder if he was new to the job, but then I reveled in the compliment. In my mind was an image of gulls coasting on wind gusts. (They soar without even flapping their wings.) For a few minutes I was lifted into a thought surge—*I have reason to think I can do this!*



COMPETITION—Key to Differentiating

I usually do my best when I'm not outwardly focused on goals. I grew up with more aversion than attraction to competition, although I realize that competing can bring people to new heights of achievement. Team sports are a great example, and so are other group efforts that show how people can accomplish things together that they never could do alone.

With me-as-potter, I've been awed admiring work made by ancestors and comrades of other cultures, as well as sometimes my own. Ancient work has, occasionally caused me to feel paralyzed in the face of aesthetic integrity I'll never achieve; there is solace when I'm drenched in humility. Sometimes I've tried to emulate what inspires me, but I realize I can't match sensibilities from past cultures, when I live in this culture.

Occasionally, I imitate. I was relieved hearing a statement attributed to Picasso, “I don’t mind imitating other people, it’s when I start imitating myself that I begin to worry.” Those words allow me to be influenced by others’ work. It feels natural for me to want to duplicate what I’m touched by, if I’m inspired. I realize that when I’ve tried to duplicate a shape made by another person, my uniqueness flares up. As I try harder I learn more. I learn to honor others’ work while wrestling with the difficulty of memorizing and repeating it. My analytical focus sharpens as I compare the two. My awareness of every subtlety increases. When I use tools to measure I realize the *je ne sais quoi*, the *I-don't-know-what-ness*, that distinguishes one maker from another; it’s an intangible spirit that mingles among clay particles.

Envyng others’ work transforms my work. Every attempted imitation bonds me with the other. I become more of a potter in an archetypal sense. Unknown craftspeople from early history repeatedly made (sometimes for generations) similar bowls, jars, urns—I’m happy to be one of them.

I like making utilitarian artifacts that are clay canvases for geological stories. Using marine sediments and their provenance gives me a niche that suits how I care to tell stories about Earth, or even better—how I get out of the way and let the stories of Earth tell themselves.

The one time Charley Hollister spoke with me before he died, (I thought of him as a salt-water cowboy—he was an influential geologist/pioneer of deep-sea sediment dynamics), he was in my studio looking at pots while shooting off questions and comments.

He turned to me and asked, “How are you gonna keep the competition away?” Maybe he saw me shrugging my shoulders because he answered his own question. “Just

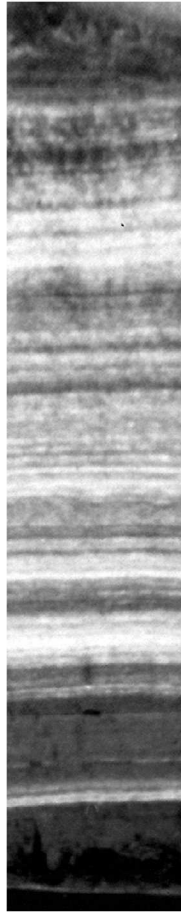
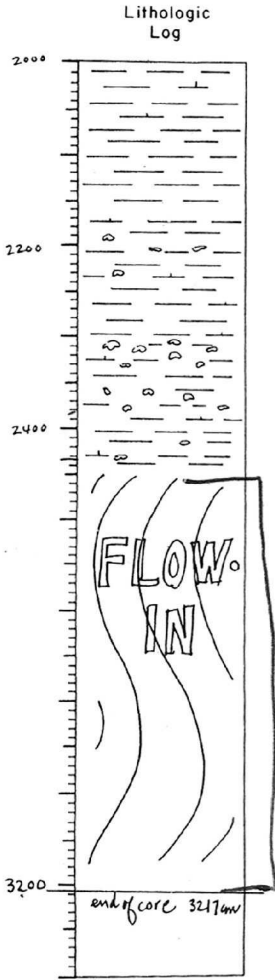
keep movin' and don't look back!" That does characterize my modus operandi, but it wasn't a consciously decided strategy—it's just what happens when I awake each day and proceed to do what seems like the next best step.

*“Wanderer, there is no path,
you lay a path in walking.”*

— Antonio Machado



CORE ISSUE—Key to the Stash



LEFT: diagram by a WHOI geologist describing a core sample with "flow-in," an area of disturbed stratification.

RIGHT: photo of sediment layers from the anoxic Black Sea.



CORE ISSUES—Key to the Stash

“How do you get materials?” is a recurring question I hear, especially since the economic recession of 2008. I wonder if the question really is: how can I get materials? Many people have contacted me with questions: some who have friends and relatives who are potters, others who work in science and took ceramics courses in college, and still others who tried using sediments as glazes. I don’t know much about the way samples get around. I do know (because someone from WHOI’s information office told me) that after I began showing my work publicly they got many calls from potters requesting samples.

Contrary to what some people assume, I didn’t use personal connections to get marine seafloor samples. It was the other way around; by getting samples and using them, I began to meet people. Here’s the scoop:

Chris Griner, who I barely knew, was a crane operator on the deck of Research Vessel *Oceanus* when he had the idea to bring me a bucket of surplus mud that had been retrieved with a box core, one kind of equipment used for collecting stratified sediment. In July 1996, when extra sediment was in a five-gallon bucket about to be thrown back into the sea, Chris intercepted it. Later, I asked him what went through his mind when he saw the sediment about to be dumped overboard. Chris replied simply, “I couldn’t stand to see all that good mud go to waste.”

I never had a single thought about sediment on the ocean floor until the moment I opened the bucket and took some into my hands.

When I first touched it I understood why Chris thought of it as a forming clay—it was dense and malleable. Neither of us thought of it as a glaze. When he arrived with it my kiln was on, so I (always curious about what materials will do when they're heated) put a walnut-sized glob into a spy hole. When the firing was completed and the kiln opened, I discovered that the mud had melted (a photo of it is on the book's back cover). Since then I've always been pulled along by hunches. I was excited to have mud from 4,500 meters down through the water—the material had charisma, so I began asking questions, sought more materials, and tried to determine if early outcomes were typical or simply anomalies.

I learned that getting more sediment would not be easy. I tried to meet people and learn 'the ropes;' I was totally naive about ocean research. The quick sum of what I learned is that, because of the nature of funding and agreements with government agencies, WHOI could not schedule any collections of materials for me, but they could share samples of sediments that were not appropriate for science projects. Once I understood that, I stopped asking for samples. Now I get enough without asking. As years

passed I heard from a few people who tried to get samples for themselves. One man sent me a “requisition form” he had downloaded from a website of some core archive. I had never seen the formal procedure that scientists use to get seafloor samples until this one. The man asked me, “How should I fill in line seventeen?” I had no idea, nor did I hear from him again.

Recently, a Turkish woman who was writing a thesis about my work for a glaze chemistry course, asked me how she could get samples to try. Knowing I’d get bogged down in customs issues if I tried to send her some, I asked around and learned that one archive has samples they call “residuals.” These samples, useless to science, can be made available, if a committee approves the request for them.

I have wondered if samples can be available for bonafide projects that further science education, and if so, what the conditions might be. It seems reasonable that if funding for ships and people to collect marine materials is also attached to the idea that it should benefit society and advance understanding of oceans—why not?

I know very little about the chains of people, transport, and communication that are involved when a sample is offered to me. I’d like to know but have shied away from asking. I’m reluctant to interrupt people who are working. I refrain from publishing details about sources of materials—there may be some privacy issues.

I had a brief chat in 1998 with two WHOI administrators. One asked, “Do you want an exclusive?” I answered, “No.” I hoped “yes” but felt clear on principle that if I get a gift, I don’t make conditions for the giver of the gift, conditions always seem inappropriate. On that day I was asked by WHOI’s representatives not to sell the materials. I agreed.

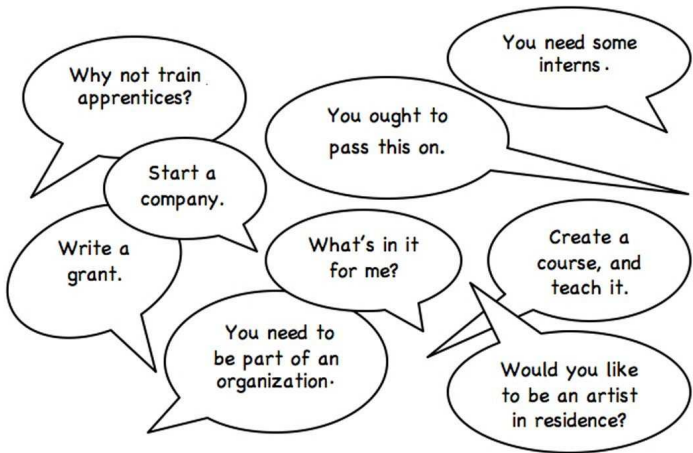
I do say thank you a lot, and *I feel it even more.*

CORE ISSUES—Key to the Stash



LOCKED CORES—they're old glass ones!

Lamont-Doherty Earth Observatory
Deep-Sea Sample Repository



DEALS—Key to Dialogue

I've been thinking about the future of my work for many years. I'm needled by a sense of trajectory towards something that's beyond my ability to do alone. I get requests and suggestions to do things that I can't even imagine doing because I lack money, time, ability, knowledge or motivation. Ideas can be easy to have and fun to share but tough to implement.

Deals are supposed to lead to action that makes things happen. Let's make a deal: I can offer experience, skills, and vision but not space or equipment. I can offer the ideas in this book and maybe some time to see if they match up with your ideas or assets. If you have money, or if you're an institution and want to write a grant to do something with me, maybe we can deal. If you offer me an artist-in-residency we might be able to make a deal if the compensation and scheduling work. If you ask me to have

DEALS—Key to Dialogue

a show at your school, but don't tell me anything about the terms, it won't happen. If you're a gallery and want my work on consignment but won't work with artists who have prices on their websites—we can't make a deal because I sell from my website.

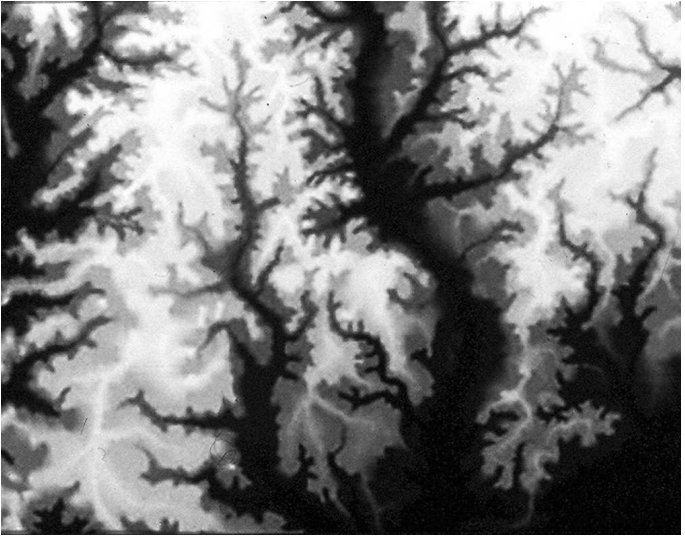
These are examples of issues, conditions and exchanges aimed to cinch a deal or determine that it won't happen.

Dealing often involves money, an empowering form of exchange. Most of us need some. Being the head of a one-person company, I make deals with myself all the time, preferring to:

- Say no or yes, raise questions—be straight.
- Investigate inner conflicts and tensions early.
- Offer transparency, but it can't be feigned.
- Get and give good data, when possible.
- Define and respect priorities.
- Keep things simple – don't complicate, stall, or tease.
- Ask for more time if it's needed.
- Mind my own business and accept what I can't change.

What do I know? Not much about how money works in non-profit and for-profit organizations where people get salaries. Not much about grants or being funded by government agencies. I know that before teaching, someone needs to: organize, schedule, create suitable space, finance operations, and promote. I know how to be a pay-as-you-go person who does creative work without anyone's authorizing it. I minimize financial risk by avoiding debt and not asking people to fund my dreams. Will that change?

Writing that question unlocked a space in my mind to think—is there someone who wants to fund dreams that include me, what my work is about, or what I propose? Might thoughts here be a tipping point for other people's ideas?



PARTNERSHIPS—Key to Synergy

One day I was picking through vegetables at the market and chatting with a neighbor when something I said about organizational development work and collaboration caused him to scoff at me, “What do you know about that, you’re an artist who works alone!”

A reasonable assumption, but actually, I work among a widely scattered group of cohorts and friends who are co-evolving. We speak or meet regularly or rarely, continually caring for each other, even after deaths. A few moments with a person can affect me for a lifetime. People who challenge me shape me. People who back me up help me move forward.

When an obstacle stops an idea from becoming a real outcome, even one slight mind-shift can connect dots, and new configurations appear. Fresh ideas, if viable and

PARTNERSHIPS—Key to Synergy

timely, can accelerate change. I never know whether radically new or comfortably familiar thoughts will favor birthing an idea that many sectors of society agree is needed. And I can rarely predict timing.

In 1996 when I began using sediments, there were clearer distinctions between art and science than there are now. Bridges uniting these fields are becoming more common and boundaries are becoming vague. I think *beyond* art and science because separating them is a struggle for my brain. I see them merging via nature's truths and, if we understand the forces of nature better, maybe we'll live more peacefully with them.

I heard that science is an explanation and art an expression of the same reality. When I look at maps and graphs I scan them for patterns, as a scientist probably does; whether they're about finance, climate, ocean salinity, or politics, we all bring a unique and potentially valuable viewpoint when we pay attention and risk being remarkable people working *together*.

In 2009, I created and dispersed a timeline projecting a ten-year scenario for a science-studio/art-laboratory where ceramic change of marine materials by both artists and scientists might be explored. Here, kilns would amplify samples in the way microscopes do. The lab/studio could provide space for geological modeling. The lab/studio would be available to many different kinds of user groups, coordinate and communicate results to a large public, provide professional development for teachers, and offer support to others who might want to create similar labs in their communities.

Whether it's my self-centered agenda or an idea for something that will advance culture is a real question. I hypothesize that scientists using the materials and the process I use could advance science in ways no one's thought of, but

I can't take it further alone—scientists and educators will prove, disprove, or ignore it. Maybe I've done what there is to do that's useful to society, or maybe I've barely begun. *If there's a next phase, I'll be working with a team.*

People look to creators for leadership. I've been hearing calls to improve how we educate. Six months after I dispersed the ceramic lab timeline, a friend gave me a book by David Edwards, *Artscience: Creativity in the Post-Google Generation*. Since then I've given it to twenty people who are thought leaders in academia, science, government, and who are activists for a better, more sustainable future.

Edwards is working to create, "... tangible cultural, economic, intellectual, and social results." On the subject of combining aesthetic and scientific methods, Edwards says, "... the fused method that results, at once aesthetic and scientific—intuitive and deductive, sensual and analytical, comfortable with uncertainty and able to frame a problem, embracing nature in its complexity and able to simplify nature in its essence—is what I call *artscience*."

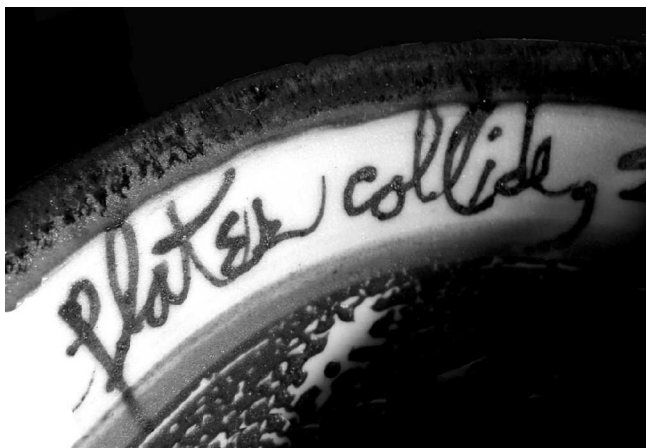
He uses the term "idea accelerator." Who wants to do that? Artscience might produce disruption *and* help us respond creatively to it. *Sound uncomfortable?* Which institutions thrive on and welcome change? When do we dissolve walls that divide departments and disciplines?

I ask myself, am I part of the solution or am I part of the problem? *By writing this book I'm trying to be part of the solution . . .* by letting you know what I know, in case you're a person who will build with it. I meet so many young people who are energetic, talented, smart and eager to make good use of resources to develop relevant new ideas!

Edwards says that by developing ideas together—art and science creators can propel ideas over disciplinary and

institutional obstacles, be catalytic to innovation. His ancillary thesis proposes that educational and cultural institutions would serve creators better if they'd integrate an organizational mechanism (what he calls the lab) that selectively reduces barriers to idea translation between the arts and sciences.

Yes, making clay artifacts with marine glazes and their stories can stay in a domain restricted to potters, but why not open cultural centers for science-centric stoneware around the world? *What a wonderful kind of diplomacy!* Places where we practice indigenous artsience of *this* technological age, when understanding big issues determines survival of species and habitats. That's the dream—I've been stickin' to it and when I haven't, it's been stickin' to me.



GORILLA—Key to Hitting Walls

"I felt like an elephant had jumped out of a tree onto my shoulders and was making me carry it the rest of the way in," said marathon runner Dick Beardsley, after he had no more glycogen to burn in his muscles and he *hit the wall*.

I've encountered my share of obstacles, some felt like hitting walls.

I once put my head between a rock and a hard place. Literally, I put my head into a crack of a huge split granite ledge. It felt oppressive until I looked down and saw deep blue sky reflected in water, and then I had a heavenly feeling at the same time. Struggling and loving what I do simultaneously can be like that, inciting me to improve and progress. I've been introducing myself to new people in the last six months, inquiring about possible connections and opportunities. Fishing. Outcomes vary:

- Knock knock. Come in.
- Knock knock. No answer.
- Knock knock. Let's speak in 5 weeks. Remind me.
- Knock knock. If you write it up, I'll look at it.
- Knock knock. Keep me posted on your progress.
- Knock knock. I don't see anything in it for me.
- Knock knock. I want to help you.
- Knock knock. Speak with—here's a list of people.
- Knock knock. These are hard times.
- Knock knock. Go attach yourself to a gorilla.

Where am I going to find a gorilla? Why would a gorilla want to carry me around? Was I being mocked or given a tried-and-true method? A program director at a grant agency suggested I may need the help of a gorilla. During a conversation with him I learned that to get a grant for a science partnership I'd need an institution, evaluator, educator and scientist. That looks like a wall. What I imagine spans so many disciplines, it's unwieldy for organizations to even *imagine* managing.

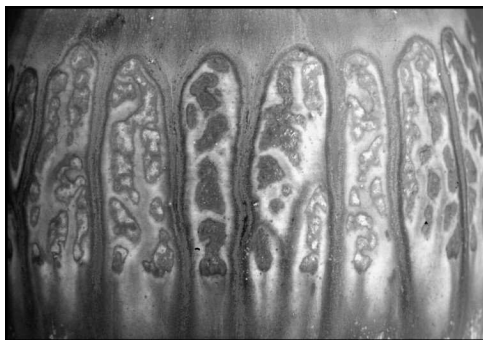
Once I applied for an arts grant that required me to apply in only one discipline when I cross many. I was told, "You have incohesive vision." I laugh now but it hurt then, not because I didn't get the grant but because what I thought was my strength was reflected back as weakness.

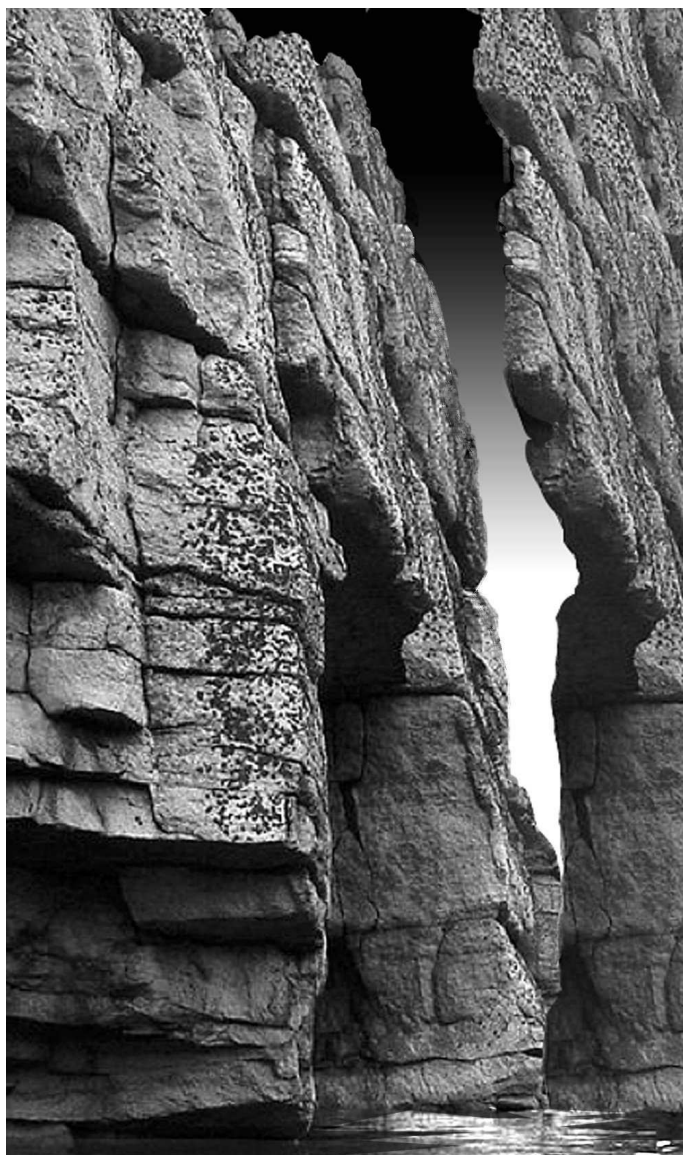
Another flashback: in 1994 I tried to interact with the science community. I hung posters on their bulletin boards that said, "If you would donate your body to science, why not donate your doodles to art? Under them I tacked envelopes for what I hoped to collect, study, and interpret as paintings and diagrams for a show. THUD. I got neither doodles nor interest in the idea, except from one prolific doodler who doodled with a pink eraser on his steel desk. He told me how important his doodles were to his creative process, and he applauded my idea.

I was disappointed with the aborted idea because I had no project to carry out—but the escapade prepared me for the future. I had an idea, articulated it, enumerated the tasks required, and followed through by reality-testing the idea. Results happened to show that it didn't click with the community at that time, but I was satisfied that I tried.

That experience ripened me, so when sea mud appeared, I recognized it as an answer to a question I had been asking for years—how can I be an integral part of the community where I live while still being Joan? Not only was an answer presented to me, but I recognized it—more cause for gratitude, especially as people helped me find gold in the muddy nuggets; community solved for me what I could not do for myself.

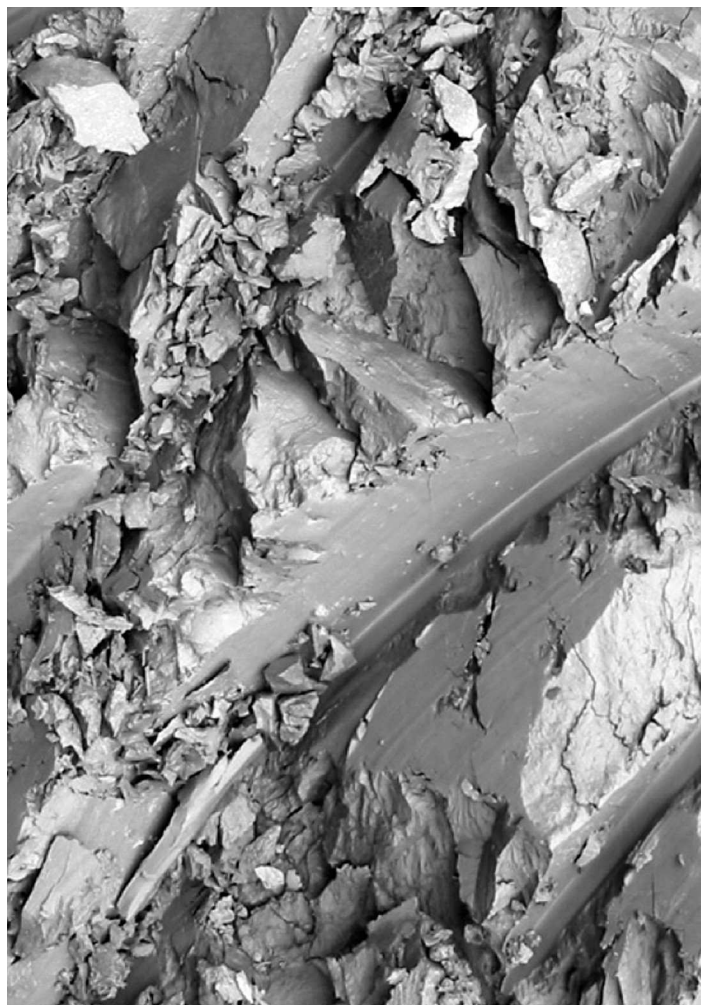
Hitting walls is painful but being cornered is not a hopeless feeling. As I peck out the last words here, *know this*: even when I whine and stomp, I often laugh, and there are many moments when my heart pitter-patters passionately. Rather than a problem to be solved, life is a mystery to be lived, and breaking through walls leads to open spaces.





THANKS TO PLACES

Alaska, Glacier Bays	Iceland
Antarctic	Indian Ocean
Arabian Sea	Indonesian Seaways
Arctic Seafloor	Juan de Fuca Ridge
Arabian Sea	Juan de Fuca Strait
Austin Texas	Kane Fracture Zone
Beaufort Sea	Lake Erie
Bering Sea	Lau Basin
Bermuda Bio Station	Long Island Sound
Bermuda Rise	Manganese Nodule
Big Dig	Maui Sand
Black Sea	Mediterranean
Boston Harbor	Monterey Bay
Bramsfield Strait	Mud Patch
Brazil Margin	Muscongus Bay
Ceara Rise	North Atlantic
Charlston Bump	Norway Fyord
Chukchi Sea	East Pacific Rise
Costa Rican Plate Area	Orcas Basin
Dead Sea	Penobscot Bay
Deception Island	Phoenician Wreck
Eel River	Red Sea
Elephant Island	Sahara Desert
Farrallone Islands	Sierra Leone Rise
Gakkel Ridge	Snowball Earth
Galapagos	South China Sea
Grand Bahama Banks	Titanic (adjacent to)
Gulf of Mexico	Tobago
Gulf of Maine	Lake Titicaca
Havre Volcano	Washington Margin
Hydrates Ridge	West Carmen Basin



THANKS TO SHIPS

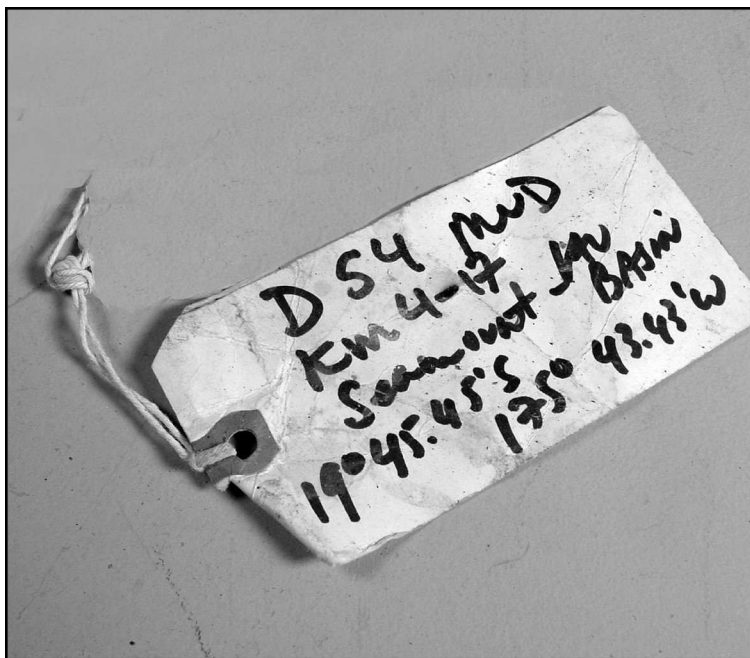


Atlantis II
Cape Hatteras
Delaware
USCGC Healy
Kila Moana
Baruna Jaya
Knorr
Atlantis
Chain
Alvin
Argo Maine
ROV Jason
Murano Wave

Maurice Ewing
Oceanus
Melville
Nathaniel B. Palmer
New Horizon
Corwith Cramer
Icebreaker Oden
Thomas Thompson
Point Sur
Dayang Yihao
JOIDES Resolution
Long Lines
Roger Revelle

BAG TAGS & NOTES

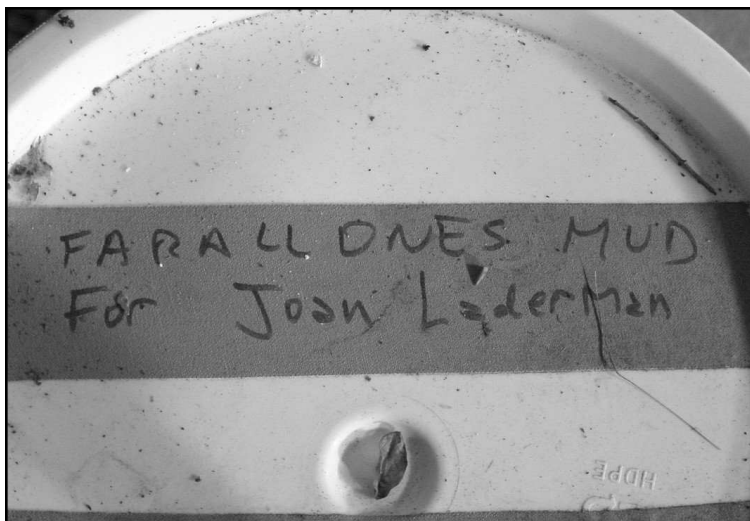
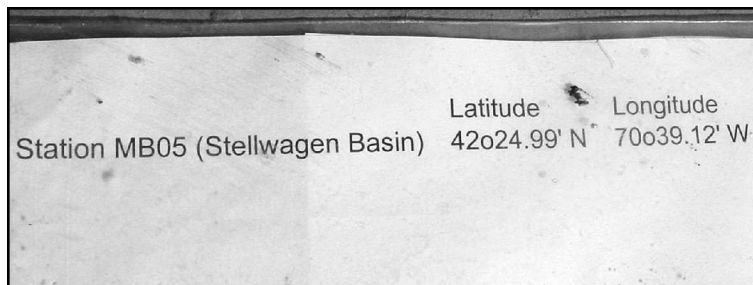
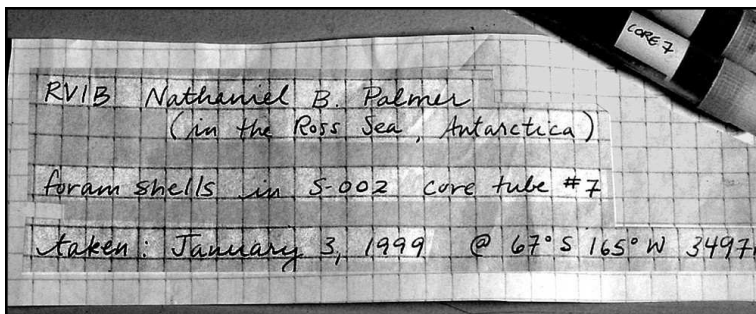
<p>Mineral content list down - hydrated uveol. calcoparite. manganese oxide. iron- zinc. Hogert-</p>	<p>1 Fast Pacific Rise - <u>9° - 50mn north.</u> Site: fast spreading ocean ridge crest - P Hydrothermal vent. Manganese. Recent formation.</p>
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GARY C-159-075-5GB
NOV 13 1998
Galleon's Passage
East of Tobago. Inbetween
Trinidad and Tobago

16 July 1996
37°-21' N
68°-50' W
4,500.0M = 4.5 Km
~~14,760.0ft~~
14,760.0ft
Tue 16 July 1996 0111 local
37°-23.029 N
68.50.010 W

BAG TAGS & NOTES



Uber Fabulous
Snowball Earth
dust for
Ms. Lederman

Howdy do!

Here are two samples
of marl from Texas

① Pecan Gap (Campanian ~ 75 million
years old)
(in plastic bag)

- This sample has lots of calcite prisms of
Inoceramus (a big clam) as well as forams.

- cheers

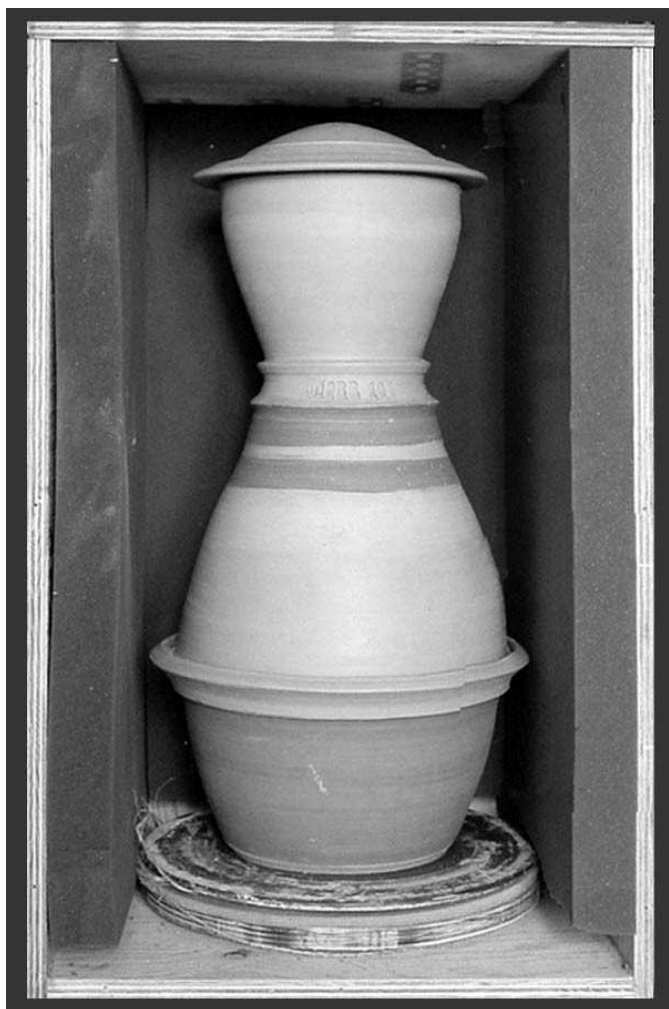
Earth & Fire



Research Vessel *Knorr* Cruise 191, 2007
I made this for WHOI's long core sea trials.

Photo at right: ready to ride on the ship in its padded box, so that after historic first sediment was retrieved, people aboard could apply the mud and carve their names into it. After firing it, I donated it to WHOI as a salute to those who fund experiments, calculate risks, put their intelligence and skills on the line and then accept the outcomes.

—Photo of Joan Lederman by Joan Perlman

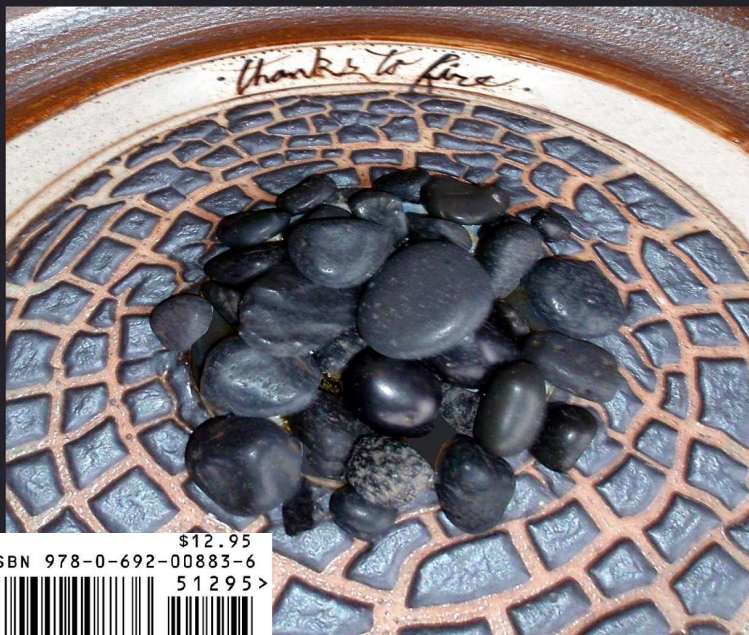


WE CAME TO GORE ... WITH
B.B. WALDEN
BERNARD
RISE
1007
YEARS OF





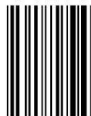
Above is THE melted sea-floor mud that caused my life to pivot. Below are two examples from the Mid-Atlantic Ridge: round stones from above and flat plates from below sea level. In this book you'll find information and revelation—not recipes—from the author's encounters with marine materials.



\$12.95

ISBN 978-0-692-00883-6

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