

[Wikipedia image of Ninurta]

I'd like to start by reading an excerpt from an article titled "Fighting the Mountain: Some Observations on the Sumerian Myths of Inanna and Ninurta," published in 2004 by a scholar named Fumi Karahashi. This excerpt presents her plot summaries of two myths from the late third millennium BCE, one of which is traditionally attributed to divine origin and the other to the priestess-poet Enheduanna whom Wikipedia describes as "the earliest known poet whose name has been recorded."

*"Two Sumerian mythological compositions share the motif of a god fighting a mountain. One, Inanna and Ebih, tells how Inanna fights and conquers Mount Ebih; the other, Lugal-e, tells how Ninurta, Inanna's male counterpart, campaigns against Asag, which may symbolize a stone or a mountain."*

*"Inanna and Ebih begins with an introductory hymn in praise of Inanna. Inanna goes around heaven and earth and then resolves to attack Mount Ebih because she feels that it does not show her proper respect ... She defeats Ebih and then tells the mountain why she attacked it."*

*"Lugal-e starts with an introductory hymn in praise of Ninurta. At a banquet with the gods An and Enlil, Ninurta's ... weapon Šarur informs him of the creation of a mysteriously strong opponent, Asag, who, together with an allied army of stones, threatens Ninurta's authority. Ninurta prepares for battle, and when he is about to attack the enemy forces, Šarur goes to spy on them and comes back. Ninurta engages in the battle, and when he is losing, Šarur goes ... to ask for help from Ninurta's father, Enlil. Ninurta launches his second attack and finally defeats Asag and its allies. In the following section, Ninurta is portrayed as the inventor of irrigation. He piles up the defeated stones to construct a dam and thereby brings the mountain waters down to the Mesopotamian plain for agriculture ... The story ends with Ninurta blessing and cursing the different stones and establishing their properties."*

From these storylines we may perhaps infer that there was a time, long ago, when people could accept the attribution of subjective agency to what today we would consider inanimate objects—in this case stones and mountains, not to mention Šarur, the enchanted talking mace. The stones and mountains in these myths are capable of assuming disrespectful attitudes and of fomenting revolt; they are deserving of blessing or cursing and of explanation in the wake of divine retribution. They are integral actors in the genesis of civilization, acting in concert or contention with gods to establish worldly orders facilitating agriculture, architecture, metallurgy, and commerce. Far from being mere substrate for human agency, abiotic matter in this ancient Sumerian cosmos participated actively in events of tremendous import.

[Great Chain of Being images]

Fast forward roughly four millennia: we find ourselves on the far side of the Enlightenment and the Scientific and Industrial Revolutions, with prevalent "modern" attitudes of human exceptionalism in which animals, plants and earth have come to be viewed largely as resources for our growth and development. Mankind's apparent dominion beneath the heavens—as represented in the medieval conception of a "Great Chain of Being"—is codified in today's dominant capitalist paradigm. (I'm not

sure how well you can see details of the graphic on the left, this is an engraving from 1579 illustrating the idea of the Great Chain of Being... mankind is a step below the angels, then down to animals, plants, fire (!) and finally rocks.) Humans have learned to domesticate crops and livestock and to modify them genetically; we have learned to purify elements such as silicon and uranium and put them to various uses, and to make new materials such as steel and carbon fiber; we are developing machines that can explore deep space or find patterns in data beyond human mental capacity. Generally speaking, we no longer think of stones and mountains as independently-minded actors contributing to the grand narrative of history. Rather, the story revolves mainly around how humans decide to use them.

[Bennett book cover]

But of course it's not that simple. In 2010, political theorist Jane Bennett published a highly influential book titled *Vibrant Matter*, in which she presents extended arguments for a new ethical/political stance she calls "vital materialism." Vital materialism flattens the ladder of being to put all of us animate and inanimate earthlings on a single equitable level—people, dogs, trees, mud and fire. Perhaps we could think of it as a postmodern return to more ancient ways of relating to the cosmos. In introducing the basic idea of vital materialism, Bennett writes (p.53) "It is no longer so controversial to say that animals have a biosocial, communicative, or even conceptual life. But can nonorganic bodies also have a life? Can materiality itself be vital? ... Does life only make sense as one side of a life-matter binary, or is there such a thing as a mineral or metallic life, or a life of the it in 'it rains'? I think that there is, and that there are good ecological and biotechnological reasons for us to get better acquainted with it." Bennett's book elaborates upon a number of these reasons for developing vital materiality, but for this talk here today I think it will be easiest to focus on her approach to retooling the environmentalist movement:

(p.110) "*In response to a series of practical problems, including Hurricane Katrina ... expensive gasoline, tornadoes in months and places where they had not normally occurred, the dead and tortured bodies from the invasions of Iraq and Afghanistan, and pathogens in spinach, hot peppers, chicken and beef produced by long-distance factory farming, an American public seemed to be coalescing. Stirred from their 'fatalistic passivity' by a series of harms, some members of this public began to note aloud—in the news, in schools, on the street—the self-destructive quality of the American way of life. Environmentalism, invented in the 1970s, was making a comeback ... But I do wonder whether environmentalism remains the best way to frame the problems, whether it is the most persuasive rubric for challenging the American equation of prosperity with wanton consumption, or for inducing, more generally, the political will to create more sustainable political economies in or adjacent to global capitalism. Would a discursive shift from environmentalism to vital materialism enhance the prospects for a more sustainability-oriented public?*"

As to what the alternative narrative of vital materialism actually is, she writes:

(p. 4) "*The story will highlight the extent to which human being and thinghood overlap, the extent to which the us and the it slip-slide into each other. One moral of the story is that we are also nonhuman and that things, too, are vital players in the world. The hope is that the story will enhance receptivity to the impersonal life that surrounds us and infuses us, will generate a more subtle awareness of the*

*complicated web of dissonant connections between bodies, and will enable wiser interventions into that ecology.”*

*(p.111) “If environmentalists are selves who live on earth, vital materialists are selves who live as earth, who are more alert to the capacities and limitations ... of the various materials that they are.”*

So the spirit of vital materialism could be summarized roughly as an attempt to do away, as much as we possibly can, with all of our implicit assumptions about hierarchies of being, to try to embrace what other contemporary thinkers have called “flat ontology” (e.g., Graham Harman). Much of what this means for Bennett is learning to think of even inanimate matter as having agency—much like the stones and mountains from Sumerian mythology—and to think of ourselves not as imposing form and transformations upon matter, but rather as collaborating with things and their natural processes to try to address our wants and needs. Bennett wants us to learn to think about interacting with the awesome forces of weather systems to redirect flows of mechanical energy into the incomprehensibly complex network of temperamental machines and competing self-interested computer algorithms known as the electric grid, rather than harnessing wind power for sustainable electrification. Or to boil it down to more modest terms that may already feel familiar to our community, Bennett wants us to think of “working with materials” in the same way that we think of “working with” a human partner.

Bennett worries that this is a tall order for most people, and wonders about the formulation of yogic practices to help us towards her envisioned enlightenment: (p. 119) “I have come to see how radical a project it is to think vital materiality. It seems necessary and impossible to rewrite the default grammar of agency, a grammar that assigns activity to people and passivity to things. Are there more everyday tactics for cultivating an ability to discern the vitality of matter?” In a partial answer to her own question, she elsewhere muses: (p. 17) “Vital materialists will thus try to linger in those moments during which they find themselves fascinated by objects, taking them as clues to the material vitality that they share with them.” And this brings me finally to one of the main points I want to make in this talk, that the practice and the products of wood-fired ceramics testify viscerally and compellingly in favor of vital materialism. Let’s try to develop that point gradually...

[photograph of Pollock and tureen, Gell quote]

The basic idea that things can exercise various kinds of agency in their involvements with other animate and inanimate matter has many origins, but many point to a widely-read book by anthropologist Alfred Gell, titled *Art and Agency: An Anthropological Theory*, published in 1998. This slide shows a brief quote from that book:

*(p. 33) “The index is, in these instances, a congealed ‘trace’ of the artist’s creative performance. Much post-Renaissance Western art projects the artist’s agency in a very salient manner. The brushwork in works by Van Gogh emanates an almost palpable sense of the artist’s presence, smearing and dabbing the still viscous oil paint. Jackson Pollock’s ‘drip’ paintings provide even more striking examples. They have no subject at all except the agency of Jackson Pollock himself; they are (non-representational) self-portraits of a man in frenzied ballistic activity.”*

The image on the left is a digital copy of a 1984 photograph by Louise Lawler, of a kind of still life arrangement with part of a Jackson Pollock painting and a ceramic soup tureen. With our trained eyes we quickly note the resonances of color and line between the painting and the ceramic brushwork, which are all the more striking for the extreme differences of manner. Despite these differences, getting back to the quote by Gell, I think it's fair to say that we can recognize both marked surfaces as "traces" of an artist's "creative performance."

[images of Sue ware and reduction cool, Kant quote]

So, then, what of the marked surfaces of these wood-fired ceramic pieces? Whose creative performances are they the traces of? I'm sure that many of you have strong opinions but I'd actually like to defer formulating an answer; for now, let's just recall that in the Great Chain of Being, trees, flames and minerals occupy the lowest rungs of the ladder. Returning to quote Jane Bennett (Bennett, pp. 119-120):

*"Are there more everyday tactics for cultivating an ability to discern the vitality of matter? One might be to allow oneself, as did Charles Darwin, to anthropomorphize, to relax into resemblances discerned across ontological divides: you (mis)take the wind outside at night for your father's wheezy breathing in the next room ... a plastic topographical map reminds you of the veins on the back of your hand; the rhythm of the cicada's reminds you of the wailing of an infant ... Maybe it is worth running the risks associated with anthropomorphizing (superstition, the divinization of nature, romanticism) because it, oddly enough, works against anthropocentrism: a chord is struck between person and thing, and I am no longer above or outside a nonhuman 'environment.' Too often the philosophical rejection of anthropomorphism is bound up with a hubristic demand that only humans and God can bear any traces of creative agency. To qualify and attenuate this desire is to make it possible to discern a kind of life irreducible to the activities of humans or gods. This material vitality is me, it predates me, it exceeds me, it postdates me."*

Of course in this community we quite often speak of firing as a process of "collaborating with" the kiln, and of pots "painted by ash and flame," and I don't think any of us would go so far as to claim that our surfaces are completely our own, rigorously intentional creations. Turning to the quote in the lower right corner of this slide, we have Immanuel Kant (via Werner Pluhar's translation) speculating on the draw of natural, as opposed to manmade, beauty (Kant, p. 299):

*"A man who has taste enough to judge the products of fine art with the greatest correctness and refinement may still be glad to leave a room in which he finds those beauties that minister to vanity and perhaps to social joys, and to turn instead to the beautiful in nature, in order to find there, as it were, a voluptuousness for the mind in a train of thought that he can never fully unravel."*

If we think of the complex dynamics of clay, heat and atmosphere in a wood firing as "a train of thought" we can "never fully unravel" (as I certainly do), perhaps the traces of it that we find on our favorite wood-fired surfaces may manage to provide a bit of Kant's "voluptuousness for the mind" in a fundamentally different way than those of a Jackson Pollock or a typical over-glaze enamel...

[photo of earthenware jars with lichen]

Of course, we should take care to remember that fired pots are not static and eternal—they are never truly finished, they just go through phases of more or less rapid change. Whose creative performance is recorded here on the surface of these earthenware jars that have spent their most recent years sitting outside in the Mediterranean sun and rain?

[Ingold book cover]

I'd now like to turn to a second recent, highly influential academic book, which Sandy Lockwood already introduced in her inspiring talk yesterday—*Making: Anthropology, Archaeology, Art and Architecture*, published in 2013 by anthropologist and pedagogical innovator Tim Ingold. This book does a lot of things but in this talk I'm going to focus on the response he develops to the question of how to move beyond an outdated, so-called "hylomorphic" (to use an increasingly popular term, the primary critique of which is often associated with the philosopher Gilbert Simondon) conception of making as a process in which human actors impose rationally designed forms on passive material substrates. Ingold's response weighs in on Jane Bennett's question of how we can learn truly to internalize a worldview in which humans are not set above and apart from the material world but rather are immersed in and enmeshed with it. Rather than emphasizing a need to think of inert matter as having agency, however, Ingold prefers a strategy of arguing that human beings themselves lack autonomous agency in their dealings with the world of plants, animals and things. For Ingold, nothing ever gets made except through partnerships involving nonhuman actants; as we heard from Sandy yesterday, he views these partnerships as extended interactions of action and re-action that are like feedback loops in that it becomes difficult to separate cause and effect (or agent and object). Ingold calls these extended interactions *correspondences*. In developing his theories, Ingold does not seem to have nearly the same level of concern with political action that Bennett has, but he does emphasize the broad importance of understanding making as an equal partnership of humans and materials, for research and teaching across the social sciences and humanities.

[marble statues and stalagmite]

The photographs on this slide were all taken during a recent trip to Cycladic islands of Greece; the first two are of ancient marble statues in the archaeological museum on Paros, while the third is of a stalagmite in the upper region of the Cave of Antiparos. With these images as background I'll read an extended quote from Ingold's book (p. 21):

*"I want to think of making ... as a process of growth. This is to place the maker from the outset as a participant in amongst a world of active materials. These materials are what he has to work with, and in the process of making he 'joins forces' with them, bringing them together or splitting them apart, synthesizing and distilling, in anticipation of what might emerge ... Far from standing aloof, imposing his designs on a world that is ready and waiting to receive them, the most he can do is to intervene in worldly processes that are already going on, and which give rise to the forms of the living world that we see all around us—in plants and animals, in waves of water, snow and sand, in rocks and clouds—adding his own impetus to the forces and energies in play. The difference between a marble statue and a rock formation such as a stalagmite, for example, is not that one has been made and the other not.*

*The difference is only this: that at some point in the formative history of this lump of marble, first a quarryman appeared on the scene who, with much force and with the assistance of hammers and wedges, wrested it from the bedrock, after which a sculptor set to work with a chisel in order, as he might put it, to release the form from the stone. But as every chip of the chisel contributes to the emergent form of the statue, so every drop of supersaturated solution from the roof of the cave contributes to the form of the stalagmite. When subsequently, the statue is worn down by rain, the form-generating process continues, but now without further human intervention."*

And elsewhere in the same book, Tim Ingold (*Making*, p. 45): "... the essential relation in a world in formation (as distinct from a world that we look back on, as though it were completed long ago), is not between form and matter but between forces and materials."

[photo of kaolin cliffs/caves on Kimolos]

It's all too easy to find examples outside the museum of what Ingold refers to as humans "intervening in worldly processes that are already going on," and we are greatly helped in the analysis of such phenomena by keeping a long-term perspective. Here in this photo we see our friends Dave and Dan climbing up to a manmade cave in a giant cliff-like kaolin deposit on the shore of the island of Kimolos. Of course the geological formation was created by worldly processes that had nothing to do with humans. As for the caves, we were told that they were made by women collecting clay to use in brightening their laundry—small human interventions in shaping the landscape, soliciting earthly contributions to the social lives of the islanders. Kaolin that would have made its way into the ocean by erosion took a different route, carried for a while on peoples' backs and then back through the watershed. Now we're hoping to divert some of that kaolin into a body of porcelain work, which will then take a *really* long time to move on to its next geochemical milieu, but eventually it will.

I think it's interesting to consider this image as something created—I like the interplay of all the blues and whites and oranges, and the contrast of sharp lines and billowy masses. As for the scene itself, I don't think there's any controversy in characterizing it as an assemblage of human, atmospheric, vegetal and geographic contributions.

[map-like rock]

Sometimes we come across features in the landscape that clearly feel *made*, even if the making extended over an indefinite period of time and involved cryptic interactions of animate and inanimate factors—perhaps even multiple generations or successions of animate factors. In the case shown here, I think it's natural to regard the "creation" in its current state as a product of equal contributions of organic and inorganic partners, without any hierarchical relationship of maker and substrate.

[photo of Mediterranean pottery sherds]

What about these creations, now in an archaeological collection but previously strewn about like rocks in the Aegean landscape? We have a deeply engrained habit of seeing these as artefacts *made by humans*, by means of their mastery of mineral resources, but what happens if we try to follow Ingold's urging to think of them as products of merely perturbative human interventions in ongoing worldly processes? We may feel justified in emphasizing human agency in the creation of painted pottery

because someone had to place selected pigments in specific locations, but then it may be worth noting that the finest clays harvested for decorative glosses in classical Athenian pottery are thought by some experts to have been Aeolian deposits carried by wind all the way from North Africa. Perhaps humans did the fine finishing in terms of relocating pigments from where they were geochemically produced, but they may not have done the heavy lifting...

[images of cherry blossoms, greyed-out chair-rust-cobweb]

It doesn't take much mind bending to see the aesthetic assemblage on the right, taken towards the end of cherry blossom season in Kyoto along the Philosopher's Walk, as the product of a correspondence of human and non-human factors—we have a manmade canal, sidewalks and manhole cover; cherry trees with their blossoms and petals; and a distribution of fallen petals attributable to gravity, the flow of the water, and air currents. For me it's the distribution of the petals—laid in the recesses of the manhole cover and completely carpeting the canal—that makes the scene really interesting. Humans may have done the heavy lifting in terms of moving materials around, but this time they didn't do the fine final placements.

[full color images of cherry blossoms and chair-rust-cobweb]

And we have something similar going on in the scene on the left, found in the outdoor section of a garden supply store—manmade table and chair, painted in bright colors but succumbing to rust, the chair a perfect frame for an amazing cobweb. (I actually searched for these photos, for this slide, just based on my memories of them as interesting assemblages... but then I was amazed to see how they talk to each other in terms of the geometric forms!) Both of these scenes convey a sense of transience, as some of their components are durable while others are ephemeral. As Ingold and Bennett both like to emphasize, scenes, things, communities, people never simply exist outside of time but are always in a state of becoming... We may not like to think of the objects we make in our studio practice this way, but in the long view it's true. Quoting the contemporary Japanese potter, Tsujimura Shiro (2007 Mitsukoshi catalog, p. 33): "On one occasion, some of the components comprising the earth take shape via the hands of a potter. When viewed from the history of the earth, this is just a tiny moment and the creation will soon be engulfed by the ground again."

[photo of Djerassi installation]

You can really feel this idea of making as corresponding with nature on many timescales, I think, when you work on outdoor site-specific installation. This is a photo of a piece I made at the Djerassi Artist's Residency back in July, incorporating rocks I lifted up from the creek bed, hanging in hand-tied rope nets from a fallen redwood, with a pot made from the local ground clay suspended between. I've stopped working on it but the piece isn't finished—I'm hoping the earthenware will grow some nice moss after we get some rain, I'm sure there will be cobwebs, and maybe even some critters will move in... And the rocks are hanging low enough that in a really good rainy season they'll get caught in the current of the creek. The way the pot is suspended it could get sheared into pieces if the rocks move enough, at which point I guess the work will finally be done!

[images of Medalta work]

But we don't need to work deep in the woods to feel that we're corresponding with materials. All of us make pots whose forms and textures express the unique qualities of clay. In ceramics (and other

traditional craft media) that's just what we think of as materiality. To quote Tim Ingold again (*Making*, p. 22): "Suffice it to say, at this point, that even if the maker has a form in mind, it is not this form that creates the work. It is the engagement with materials." And in another part of his book (*Making*, p. 31): "Making, then, is a process of correspondence: not the imposition of preconceived form on raw material substance, but the drawing out or bringing forth of potentials immanent in a world of becoming. In the phenomenal world, every material is such a becoming, one path or trajectory through a maze of trajectories." I think most of us would say we take these kinds of ideas for granted, but they have been driving some radical rethinking in the contemporary fields of anthropology and archaeology.

[images of reduction cool work, tile surfaces]

Of course in ceramics we like to distinguish between form and surface, and one of the reasons many of us like wood firing is that it provides a means to achieve surfaces that are lively and sometimes surprising, yet organically complement the forms we put in the kiln and respond to decisions we make about stacking and stoking. But to try to relate what we do to the ideas of thinkers like Bennett and Ingold, rather than thinking about the forms we create and the surfaces we choose to finish them with, let's see what we can do to inhabit their ideas about making as a back-and-forth correspondence of forces and materials. For the remainder of the talk I'll be focusing on reduction-cooled dark clay surfaces such as the ones shown here. Like many of you I've been especially interested, lately, in what we usually call reduction-cool reds—if you're not familiar with the term, I'm referring to the types of purple-to-vermillion "highlights" on grey-to-black backgrounds that we often find on clay bodies or clay slips with a few percent or more of iron oxide by weight. In a sense they appear in similar ways to what we call "flashing" in the context of high-fired porcelaneous clays, but they're actually quite different on a microscopic level. The pieces on the left of this slide show some of these highlights in context; the images on the right show what they look like at higher magnification (the brown spot with the red flare is a wad mark, for scale).

[photos of tiles and tile surface closeup]

Abstract notions of color – red, brown, black – are actually ridiculous oversimplifications when we speak about wood-fired ceramic surfaces. It's like saying that a forest is green or that the earth is blue. You can't really talk about color independent from texture and form, if you care about details... Experiencing this deeply this in the context of wood-fired ceramics is, I think, a great moment of vital materialism in Jane Bennett's sense. What we perceive from a distance as "reduction-cool red" is in fact just the coarsest possible characterization of an incredibly rich clustering of nanocrystal structures that form when we fire iron-bearing clays with delayed re-oxidation. The early 20<sup>th</sup> Century Spanish philosopher José Ortega y Gasset once wrote, referring to a red leather box on the desk in front of him but we'll apply the spirit of what he's saying to a red wood-fired pot (*Phenomenology and Art*, p. 134): "There is the same difference between a pain that someone tells me about and a pain that I feel as there is between the red that I see and the being red of this red leather box. Being red is for it what hurting is for me." Or a bit more esoterically, we can think of a widely quoted passage from the mid-20<sup>th</sup> Century German philosopher Theodor Adorno's work, *Negative Dialectics* (p. 5): "The name of dialectics says no more, to begin with, than that objects do not go into their concepts without leaving a remainder ... It indicates the untruth of identity, the fact that the concept does not exhaust the thing conceived." So making and studying and appreciating wood-fired ceramics are powerful ways of understanding that earth and fire are not just tools and resources—they are worldly processes of unknowable depth and

complexity. I want to really emphasize the point here that while have gotten used to recent emphasis in the art-world on the conceptual basis of work, there is a very strong ongoing movement in the humanities and social sciences that feed art theory, towards renewed focus on scrutinizing things-in-themselves in their all of their concrete materiality.

[optical micrographs of tile surfaces]

One day we'll move on from focusing just on reds and try to understand some of the other colors we find on reduction-cooled surfaces. These are again some optical microscope images from tiles we've fired in the USU train kiln; each patch is somewhere around a few millimeters in scale.

[normal photo of hot tiles in situ]

So lots of magic happens in the kiln. In this last part of the talk I'd like to take a brief tour through some of the recent technical work we've been doing as a Stanford-USU collaboration, to try to develop a more concrete understanding of reduction-cool reds and what the critical factors are in their formation. First I'll show some results from our latest attempt to use high-temperature imaging to try to watch reds form *in situ*, and then I'll show some electron micrographs and talk about a vague hypothesis about formation mechanism that we need to investigate further...

[underexposed photo of tiles in situ]

[reflected-light photo of tiles in situ, hot]

[photo of tiles in situ, kiln open]

[saturation-enhanced sequence of tile surfaces]

[two slides – how to reconcile with previous draw-tile studies?]

[images setting up F124 sample]

[SEM image of iron splotch]

[EDS maps]

[hi-mag SEM of silver region]

[hi-mag SEM of red region]

[hi-mag SEM 1 of black border]

[hi-mag SEM 2 of black border]

[hi-mag SEM of silver-red interface]

[higher-mag SEM of iron busting through surface, technical figure]

And finally in this higher-magnification image (the scale bar at 2 microns is about the size of a largish individual clay particle), if you look especially at these features in the lower-left corner, it's hard not to get the feeling that all these nanoscale iron oxide particles are somehow busting up through the surface, and maybe that's a clue about how we develop the surprisingly high surface iron percentages that I discussed a few slides ago. In fact, if you search through the literature on iron and aluminosilicate melts,

there are some groups of papers that show that iron (as well as magnesium) ions can be pushed into or pulled out of the surface of a hot glass under reducing or oxidizing conditions. And note that the directionality is that reduction pushes iron deeper into the surface while oxidation draws it back out. But apparently for this to happen—for oxidation to occur by pulling iron to the surface rather than by oxygen diffusing into the surface to find buried iron, re-oxidation needs to be delayed to happen at a lower temperature than we usually hold before shutting down a firing. All these articles deal with specific material and firing conditions that are somewhat different from what we have in wood-fire ceramics, but it's tempting to think there could be a connection. (And since I'm sure some of you are wondering, I don't really know how this relates to the way we think about oil-spot glazes.) But for the purposes of our talk here today I think the essential point is that oxidation and reduction are *forces we exert on our materials*, not so different than when we pull clay up on the wheel just at a very microscopic scale. Oxidation and reduction are not just about changing the chemical state of the metals in our clays and glazes; they are also tools we have for *moving matter around*—at least iron and magnesium atoms, anyway. This sort of insight may or may not have any deep implications for you in terms of how you approach making, but I do find something dramatic in the idea of sucking iron up out of the depths of a clay body—like something Magneto would do, to use a pop culture reference, or to be more classic, like drawing blood from a stone ... Quoting again from Theodor Adorno (*Negative Dialectics*, p. 52): “It is when things in being are read as a text of their becoming that idealistic and materialistic dialects touch.” Looking at this electron microscope image, we not only see a structure but are prompted to envision the dynamic forces of vital materialism that created it. And again from Tim Ingold (*Making*, p. 108): “To correspond with the world, in short, is not to describe it, or to represent it, but to answer to it ... it is to mix the movements of one’s own sentient awareness with the flows and currents of animate life.” It’s up to each of us to decide how we want to respond, but in the long history of the development of wood-fire ceramics I like to think that modern microscopy gives us new ways of listening to what our materials are saying.

[images of ceramic surfaces and geology]

As I move into my final few slides I want to recall that the complex processes we correspond with in wood-fired ceramics are not so different from those at work in geology. When we wood-fire clay, which is basically weathered material of the earth’s crust, there are fluxes in the kiln atmosphere (sodium and potassium) that help to liquefy the outer skins of our pots, forming aluminosilicate melts that are not so different from magma. When the pots cool, crystals form out of the melt, in a manner not so different from what happens when a volcano erupts and gemstones form from the cooling lava—just on a much smaller and faster scale. (describe micro-Raman spectra of sherd and rock, if time permits)

[photo of Dave near old mine on Antiparos]

So I think it’s really neat how ceramics in general, and wood-fired ceramics in particular, is so entwined with the forces and materials of geology on both macro- and micro-scales. To pick up on another line of thought from Jane Bennett’s book, I’ll read a brief quote she references from a paper by geographer and social scientist Nick Bingham (“Bees, butterflies and bacteria: biotechnology and the politics of nonhuman friendship,” *Environment and Planning A* 38, 483 (2006)): (here he’s tying together some ideas he gathers from other authors...) “What Tamen, Derrida, and Haraway together help us to consider, then, is whether friendship might be better characterized not (as has traditionally been the case) by the sorts of entities it links but, rather, by a certain quality of being open to and with others.

Although we cannot ‘speak’ with nonhumans in any straightforward way (even if any ‘straightforward’ way of speaking existed), what we can and more importantly do do is become articulate with them in various ways.” Hence, I think Bingham and Bennett might support the notion that working in wood-fire ceramics is one way of being with the earth as better friends.

[image of clay cuneiform tablet and photo of Fumiko cups and steel sheet]

And just to tie everything back to where we started, I thought I would end by reading a short passage from the part of *Lugal-e* in which Ninurta is passing judgment on various stones that took part in Asag’s rebellion. Here he addresses the “Truth” stone, which was among the stones that ultimately left the rebellion and proved loyal to Ninurta (translation of Thorkild Jacobsen, pp. 260-261, ll. 497-509):

*“The warrior stepped over to the ‘Truth’ stone,  
called out to (it in) its strength,  
Ninurta, Enlil’s son, passed sentence on it (saying:)  
(God-)fearing youth, shedding light to (all) sides,  
“Truth” stone, whom I reclaimed from the rebel region,  
not in violence did my hand reach you,  
nor did I fetter you along with the defiant ones,  
but united the nation at your feet.  
May Utu’s office be your sacred office,  
righting as judge all countries.  
Among the wise ones knowing everything  
may you be dear to them like gold!”*

A translator’s note to this passage reveals that the “Truth” stone is none other than hematite—that’s red iron oxide to you and me.

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