Making Kin with Wild Fire

A Relational Design Practice

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Cover: Cimarron Canyon, New Mexico.
35mm film from the Ute Park Fire. 2018. Avi Farber

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Abstract

Standing next to trees as they are consumed by living swirls of heat during a wildfire will make you quickly realize the precarity of your own position. This feeling only deepens after walking past melted microwaves while surveying towns impacted and transformed by this unyielding force. This sense of imbalance between the sites we live in and how we choose to inhabit them is hard to ignore. Yet, away from the fire, the material culture that contributes to this disjunction continues uninterrupted. The objects we use everyday affect the world we live in. This thesis project is about coming to see where we are, how we live, and using objects as storytellers to transfer meaning from this unique place of relations. It is about imagining ways of making that can reknit ways of living. Ways of being tied to the land.

I make 3D printed ceramic flasks—vessels made with foraged clays that undergo a transformation, an interaction, as they are vitrified by wildfires. These functional objects are experiments in ways of making that care for the interconnected web of relationships that the objects we put into the world have. Can we co-design collaboratively with natural forces? Can we craft with wildfire? Can we expand our understanding of kinship and use this inclusivity to re-tool our design practices in order to reconsider who, how, and what we are designing for? The hope is that these vessels carry new ways of seeing and an imperative for new ways of acting. This ongoing project is a personal one, consisting of material assemblages that share parts of my relationships with the places I am making in and the more-than-human actors that I am in conversation with—the wind, the clay, the robots, and of course the fire.

Keywords

Relationality, Wildfire, Ceramics, 3D Printing, Indigenous Knowledge, Philosophy of Technology

Thank You

Arriving in Vancouver and realizing that it is a city and not a town was quite a shock. My graduate school experience was not at all what I expected. It has been challenging and rewarding in ways I couldn't have imagined, and I have many people to thank for their help.

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Finally, I'd like to express my appreciation to Emily Carr University. I came into school looking for a career, and I came out feeling more connected to the world around me. I'm not sure where this will take me, but my life will be more meaningful because of it.

Project Map


Unceded Coast Salish Territories
Territories of the Musqueam,
Skxwú7mesh-ulh Úxwumixw (Squamish)
and Tsleil-Waututh Nations
Vancouver, B.C.
Lilly Point, Point Roberts, WA
Unceded Coast Salish Territories
Territories of the TStz'uminus,
Á,LENENEC LTE (WSÁNEĆ), Tulalip, Semiahmoo
Territoreis of the Mountain Maidu,
and the Koyom:k'awi (Konkow)
Quincy, CA
Territories of the Jicarilla Apache, Comanche,
Pueblos, and Núu-agha-tuvu-pu (Ute)
Taos, NM
Abiquiú, NM

Land Acknowledgment

I would like to acknowledge that every step taken to bring this project to light was on stolen lands: that of the Coast Salish peoples of the Tsleil-Waututh, Squamish, and Musqueam Nations in the area surrounding Vancouver, British Columbia, the Semiahmoo Tulalip, Á,LEN̲ENEC̓ ŁTE (W̲SÁNEĆ), and Stz'uminus peoples where I harvested clay at Lilly Point in Point Roberts, WA, the territories of Mountain Maidu and the Koyom:k'awi (Konkow) where I took that clay and placed it in a wildfire outside of Quincy, CA, and the canyons of the Jicarilla Apache, Pueblos, Núu-agha-tuvu-pu̲ (Ute) and Comanche where I grew up in northern New Mexico.

I was raised by the high mountain snowstorms and desert sun. My parents landed in New Mexico from the east coast and made a home, setting roots from which I grew. This place informs who I am in so many ways, but I never thought too deeply about whom it belongs to.

These lands were acquired through violence and deception—social, cultural, ecological, and physical displacement and through intentional acts to erase people and their ways of life. I have spent much of my life blind to the full depth of these traumas and unaware of the great privilege and benefit I take for granted everyday living on these lands. Understanding my own position and responsibility for this history is difficult. What does it mean to belong to a place? And how do I find my place without being an agent of dispossession?

The following passage in which Rowen White (2019), a seed steward in Northern California, speaks of belonging has stuck with me throughout this project. She says:

> "I remember driving through those cornfields and thinking, these seeds are a reflection of the American people. These seeds are a mix of tattered origins that have been cut and spliced together. In my mind, I said, these are brokenhearted seeds being planted by brokenhearted people who have no idea of who they are and where they come from; so they make seeds that look like themselves."

This project is my humble attempt to explore my context as a designer hoping to steward the places I care about and understand my own belonging within these colonial histories. I would like to acknowledge how significantly Indigenous knowledge has shaped this thesis project and me in the process. In this paper, I use the terms Indigenous Knowledge and Indigenous Epistemologies to speak of these perspectives, but I don't mean to suggest that there is a unified or singular Indigenous way of knowing or being.

This land acknowledgment is empty without sincere efforts to change my actions and work to dismantle the systems of oppression. I would like to acknowledge the unimaginable resilience Indigenous peoples have shown resisting centuries of occupation, as well as my gratitude for the continued generosity and openness I have experienced despite this history. Let this acknowledgment be an opening for all of us to support Indigenous movements for sovereignty and self-determination.

Introduction

This is my story of firing a 3D printed ceramic flask in a wildfire. This may seem like an unlikely combination of things. Clay is usually fired in kilns, and wildfires have a reputation for destroying our possessions, not for being a source of their genesis.

If you know a little bit about me, this story will make more sense. I grew up running around the foothills in Santa Fe, New Mexico. After college I joined a community of dusty potters in northern New Mexico and started making wood-fired ceramics. During the summer months, I worked as a professional wildland firefighter for the U.S. Forest Service, and, in the fall and spring, I returned to Taos, New Mexico, to make pots. Working with fire both in kilns and the landscape, the union of the two was an inevitable collision of my creative process.

When I arrived at Emily Carr University, I started working in the Material Matters Lab and was introduced to ceramic 3D printing. At first very skeptical, I experienced the magic of the novel forms this process affords and I couldn't ignore it.

These three influences formed the basis for my thesis. My original research questions for this project were: 1) In what ways can 3D printed clay broaden our understanding of place, material and digital craft? and 2) How do the artifacts of industrial design influence our responsibility to place? Admittedly very broad, my research scope narrowed to focus on using functional 3D printed ceramic objects and wildfires to explore our relationships with these changing ecologies and complex systems.

The *wildfired* flask offers a vessel through which to contain this exploration and share the outcomes. It is the focal point of this thesis, a visual metaphor that I revolve around as I try to uncover the entanglements of ceramics, wildfire, and industrial design in an era of deep ecological concern. The flask holds stories, combines ideas, and maps relationships. It obliges us to reflect before enjoying our libation.

In this story, 3D printing emerges as a symbol of technological innovation, and I question the influence it has on our lived experience and material culture. My relationship with clay moves beyond just the material, and, learning from Indigenous Knowledge, I reflect on how it connects me to the land in a very direct and spiritual way. Fire is discussed as a force of transformation, life, destruction, and renewal—a force that metamorphoses all of these stories together into a vessel.

I came to know this area of research slowly over many years of material practice—foraging, photographing, throwing clay, 3D printing, and fighting wildfires. Through deep reflection, I attempt to understand how we may live with wildfires on a human-damaged planet. How can I both make things and make a difference in such a turbulent, uncertain world? I can start by telling a story.

A note to the reader:

A relational attitude towards design calls for a personal connection. Fitting with the ethos of this project, I have chosen to write this thesis in the form of a first person narrative. You will find the methods, methodologies, design outcomes, and theory woven in. Like the threads in a wool blanket, we feel/know/experience their warmth through their interweaving.

Throughout this document I have placed QR codes in the margin that link to videos and lectures that I reference. Simply scan the code with a QR reader app to watch them for yourself.

Part One

Fig. 1

On Place, Belonging, Relations, Land

Every morning at four, just before the sun begins to climb from behind the Sangre de Cristo Mountains, a wave of cold wind blows across the sage flats. The dogs bark, a rooster calls, the rough-hewn beams above the kiln creak, and my shoulders pull tight as I zip my canvas jacket up just a little bit tighter. This is the place I found community—where I have come to take refuge.

I pull my truck to the side of the road just north of Abiquiú, New Mexico. The hills here are full of clay—layers of deep purple, red, green, and black earth that move with the sun, geologic paintings so beautiful that you feel them in your chest when you walk through the belly of their canyons. They call this O'Keeffe country because the famous painter Georgia O'Keeffe was fond of painting this enchanting place. Before that, probably God's country, Spain's claim to the new world and lost cities of gold. Someone always wants to own it, easily forgetting the Jicarilla Apache, Pueblo, Comanche, and Núu-agha-tuvu-pu Ute who have dwelled here for thousands of years.

And now I am here, nauseous from a diesel exhaust leak. My shovel strikes the black earth of the hillside as I throw the clay into the back of my truck. The occasional car blows by on the state highway wondering what I'm doing. I don't stop until the springs on my old Ford have started to sag. The road cuts the hillside and exposes earth that was once the bottom of a lake. Dinosaur critters and probably algae? I don't know how old this stuff is, but decomposed plants and time have compressed these creatures into clay that will take on new life now that my hands have pulled this flesh from the earth and driven it back to my studio.

Inside the thirty foot long anagama kiln dug into a berm of chocolate dirt and volcanic boulders, seven hundred pieces of pottery are being transformed by the fire. As I stoke, ash from the wood falls on to the wares like snow on a boulder in a scree field. Over the next five days, the heat of the kiln melts the ash into a glaze. The pots share a distinct organic beauty only achieved through firing with wood, and the process holds a deep magic. By the end of the firing, you'll find me and six artists strewn around the kiln exhausted in the sand. Tired. Happy. Soon to be drunk. We so value this connection more than anything. We come here to work with fire.

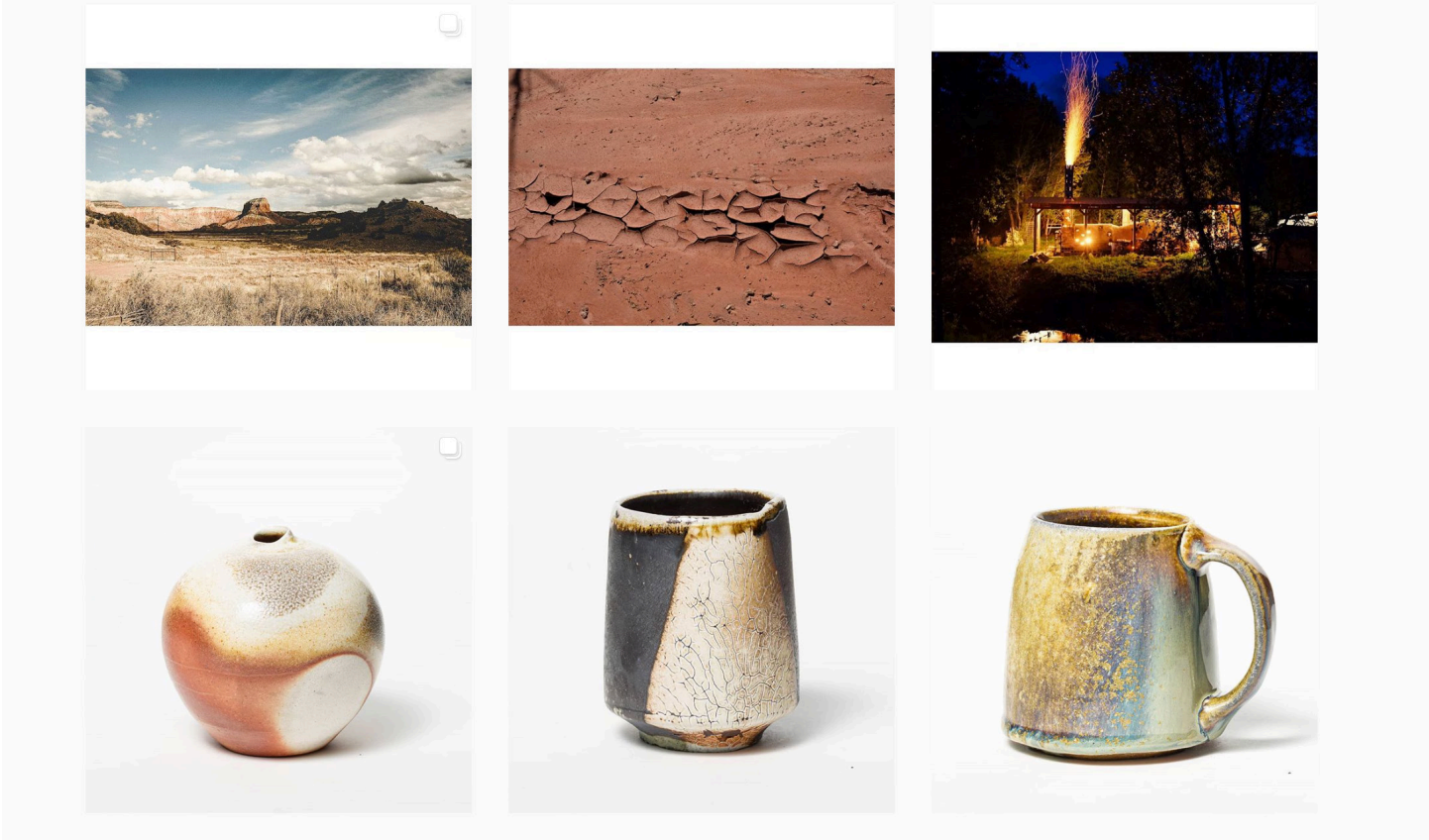

Fig. 2

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"These pots have soul!" I tell my classmates during the first weeks of my Masters in Design studies at Emily Carr University of Art and Design. I made sure to bring some with me to show off. They aren't like those store-bought cups. I think of the ones I've recently seen in Ikea that actually look quite nice but feel so hollow. "See this part is where the ash collected," I say as I try to explain why they are so meaningful. But really it is the place that holds the meanings and my connection to it. It's something personal. These pots are meaningful to me because of all that has gone into making them. By sharing their story, meaning and connections translate through them. My classmates are starting to feel it too.

* * * * * *

My new city life in Vancouver, B.C., called for a new way of making pottery, and I spent the next year and a half learning how to 3D print clay. I struggled with technological difficulties, yet enjoyed the enchanting new forms that emerged when I could get the machine and material to collaborate. As a starting point, I decided to try and translate a clay flask that I typically made by hand into a digital design. The simple and unique shape of the archetype really spoke to people, but it was tedious to make. I wondered if I could make a comparable digital counterpart that would be less time consuming. As I worked on 3D modeling the flask, I realized that 3D printing clay is much more involved than the push of a button. It is a craft that requires a relationship with a machine—an emerging technology I wasn't sure I wanted to be involved with.

I made progress on the flask and came up with some shapes inspired by stones that offered something different from making by hand. But, as I developed the skills necessary for 3D printing ceramics, I felt like something was missing from the process. I was getting to know the modeling programs and basics of coded clay extrusion, but the connection to something wild and bigger than myself that I had found while wood-firing kilns in New Mexico was absent. I was still working with clay, a material that I knew so well, but in an entirely new and confusing way. Working in this new context with this new technology made me question how both were influencing my experience making, and how they affected the artifacts of my design process.

Missing from this new practice was an embodied relationship with the land. The heart of my making, and the part that I enjoyed so much. Where did the machine meet the land? And how could I have an embodied relationship with something bigger than myself through it? This brought up my long standing concerns that I had about using industrially mined materials in my practice and their hidden impacts. I continued to make and reflect, unconsciously searching for a way to tether my making in this new place. I walked the beaches picking up stones and styrofoam. I floated in the cold ocean, and, as I read relational design theory, it gave me the tools to map a familiar relationship with the land in unfamiliar ways.

* * * * * *

I sat in the sand with my back against a log at Wreck Beach listening to the waves move the rocks and feeling the sun on my skin. I was reading Priscilla Stuckey's *Being Known By a Birch Tree: Animist Refigurings of Western Epistemology* (2010) in which she shares her experience of a beloved cut-leaf weeping birch reaching out to her from across the country while it was dying. Stuckey's (2010) recollection of her connection with the birch is used to challenge Western epistemologies that are based on the "body–spirit, human–nature, and subject–object dualisms characterizing the Scientific Revolution and Enlightenment of seventeenth- and eighteenth-century Europe" (p. 184). These western worldviews separate humans from nature and cannot account for the type of more-than-human relationship that Stuckey has with the birch.

The design implications of the dualisms that Stuckey discusses are explained well by Louise St. Pierre (2019) in her recent book collaboration *Design and Nature: A Partnership*, in which she writes, "the elevation of scientific and rational thinking combined to diminish society's ability to see mystery and enchantment in the natural world. Westerners no longer saw themselves within an unbounded and uncontrollable cosmos, a world that was larger than humans, a magical world of intrinsic value" (p. 94). Instead, Westerners held themselves above nature, elevated by reason, and sought to master natural systems for their own benefit through mechanistic means and in the name of progress. This human-centric society replaced "earth-centered values with humanistic ones" (p. 94), instilling values that continue to shape the way we view and interact with the world today.

Stuckey's relationship with the birch tree offers an example of a re-orientation of a Western way of knowing the world, as she places herself back in contact with the more-than-human. Drawing on Ojibwa Indigenous epistemologies, Stuckey suggests that "knowledge in a world made up of persons, only some of whom are human, means navigating an endlessly shifting sea of perspectives. If all 'things' are potentially persons, then there is no objective standpoint; there are only multiple perspectives" (Stuckey, 2010, pp. 194-195). There are only entities creating one another as they interact. Interconnection with all beings. This perspective necessitates a decentering of the human in favor of earth-centered values that respect the land and all the relations that live here.

In that moment, under this new sun, a new side of the world opened up to me. This deep feeling of interconnectedness re-framed how I thought about my relationship with clay, fire, and the land in the context of design. It opened a door towards a way of making that directly engages the mystery of the natural world that arises when we acknowledge that we aren't the only meaningful beings here. I had always felt a connection to clay and fire beyond just a material to use or force to vitrify, but I didn't have much of a framework for talking about them—a way to understand my relationship with these spirits and their agency within the context of my design process. I dug into this realization that I am

entangled with the world when I make—with the force of fire, personalities of clay, community of potters, the trees that are cut to make woodfired pottery, and with the histories of the landscapes where they grow.

Over the course of this project, I focused on a way of making that embraces these entanglements and sought to explore them. I began to trace these relationships and look for ways to share them through design while challenging the subject/object, human/nature dualisms of modern design in the process. While I had often thought of my practice as personal, I realized how dependent it was on the world around me. My practice was in conversation with this wider world, and there were more than just objects that could be shared. There were all of the relationships that an object embodies as well.

I was thinking about how I could use the web of an object's relations, its interconnections, to make us think about our own position and resultant practices for how we use them. With those design explorations, maybe we could collectively come to new understandings that influence us to act more reciprocally with the natural world we live in. I wasn't directly aware of it at the time, but I was figuring out how to make objects that suggest a way of seeing, objects that mapped my entanglements and shared understandings of how I relate to this big confusing world of natural forces, robots, fires and spirits. I was making 3D printed flasks and firing them in an electric kiln, but the whole process felt too controlled. Where was the wild? Touching clay and stoking the fire had always brought life to my practice. I realized it was the *wild clay* and the *wild fire* that I wanted to engage with more collaboratively. The objects I wanted to make would be a conduit to tell their story, vessels for sharing relationships with wildfire, robots, and the land we inhabit.

* * * * * *

Broadly speaking, this project is about telling stories with and through objects in order to help us interpret our entanglements—how we are connected to the things around us and how these relationships influence the world we live in. We all come from unique backgrounds with unique ways of seeing the world. For me, design is in the process, in the merging of ideas with objects and places, and in the sharing of the connections. Design is paying close attention, in getting to know, and being playful. I am most curious to explore what this practice reveals to us about our own positionality—how we see the world, and, resultantly, how we choose to make and use objects as reflections to share these revelations.

The objects of my design process are thus assemblages that point to their material and more-than-human relationships. I use clay to experiment, make connections, and commentary. When designing in this relational way, we are always met with the questions of origin and care. Where was that clay collected and how? How was the kiln powered? What is there to know about the place it was fired, or the computer boards that in part give shape to the form? And how

do I relate to it all? From this vantage, a ceramic Ikea cup is very different from the ceramic wood-fired cup. Going a step further, the wildfired flask lives in a different world altogether, or at least worldview, from a flask you would find in that shopping maze bathed in fluorescent lights. There is a sea of difference between objects of mass industrial manufacturing and those made to consider the impacts of their interconnections.

Tim Ingold's essay, "Ancestry, generation, substance, memory, land" (2011), offers perspective that will help to unpack these differences and understand origin. In this essay he lays out genealogical and relational models of descent in order to explain the differences between colonial and Indigenous worldviews in regard to ancestry and how this shapes the way we see ourselves inhabiting this world. According to the genealogical (colonial) model, people come into the world through the inheritance of genes and cultural traditions, including language, and inhabit the land that is "a surface to be occupied" (Ingold, 2011, p. 142). He writes that "by contrast, the relational model situates the person in the lifeworld from the very start, as a locus of self-organizing activity: not a generated entity but a site where generation is going on." (Ingold, 2011, p. 142). Thus, for the relational model, life is about growth, "unfolding relationships," and continual development (Ingold, 2011, p. 142).

The importance here is that kinship comes from "common involvement in spheres of nurture, rather than any principle of shared descent," which places value on our relationships (Ingold, 2011, p. 148). If we are to think of this distinction visually, the genealogical model is represented by a branching tree with a single trunk that only allows for static, linear points of connection. The relational model on the other hand would resemble a rhizome, consisting of "interacting pathways'' (Ingold, 2011, p. 145). These pathways are what allow for more-than-human agency and different interpretations of space and time common to Indigenous ontologies, and thus "the tree is but one part of that vast rhizome that is the forest as a whole" (Ingold, 2011, p. 145). Everything is connected, not linearly as in the genealogical model, but relationally with everything else.

In a generous and moving talk at the Bioneers National Conference in 2002, Indigenous author and educator, Jeanette Armstrong, paints a picture of what relationality looks like for the Okanagan people that helped me to understand the distinction Ingold describes. She says, " In the Okanagan our understanding of the land is that it's not just that we are part of the land, it's not just that we are part of the vast system that operates on the land, but that the land is us. In our language the word for our bodies contains the word for land" (Armstrong, 2014, 04:25). The ability to think, dream, and eat comes from the land. The body is in the land, and the land gives life. The Okanagan people have "perfected a way of interacting with the land that is respectful to the land and respectful to each other" (Armstrong, 2014, 05:15). This reciprocity that Armstrong describes highlights the responsibility of making with clay, making with the land, and the relational power of this act.

So what does all this have to do with making ceramic objects? When making with an ethic of care in mind, we have to think about an object's relations, the objects we put into the world affect the world we live in. My experiments in making with more-than-human forces, wildfires, are research through design into ways of making that consider interconnectedness and the wide-ranging implications this has for design.

A note: There is rich discussion to be had on the topic of more-than-human kinship with man-made robots and AI. I will be exploring this in future work, invoking Donna Haraway's notion of the cyborg which bends our conception of being, but for this project I have chosen to focus my discussion of kinship on fire and clay.

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Fig. 3

Two sleepy potters crawl out of their frosted-over cars. An enamel pot warms coffee over a slash fire I have lit for them. Over the night, while everyone slept, I moved the fire through the kiln, slowly gaining temperature in cycles, listening to the crackles in the fire box that punctuated the serenity of the night, stoking in precise rhythms, choosing my wood very carefully. My friends will pick up this thread now and fire the kiln till dusk. In a week these potters will leave this place and tell stories about it. How they danced with fire. How the feeling of the land came up through their boots.

Fig. 4

Clay As Connector

I remember watching the snow fall from the window of my mom's studio as fog floated through the deep green Ponderosa pines on Atalaya Mountain. These were my favorite mornings. Snow day, school cancelled. A break from the endless winter sun in the high desert. The wood stove warmed the adobe walls as my mom worked on her ceramic jewelry and kept me busy with clay next to her.

She built this house with her friends and her hands. Nestled in the mountains, the walls are formed from stacked adobe bricks made of clay, sand, and straw. Clay holds them together. Like many traditional homes dotting Northern New Mexico, ours blends into the landscape it is made from. It flows into the land.

When I was ten, my mom knocked a hole in the kitchen wall to put in a window. I was upset. "I liked that wall," I told her. When you grow up within earthen walls your relationship to mud is different. These walls hold you. They warm you. Their gentle curves sooth you as you grow within them. It is no surprise then that I have a close relationship with dirt. Clay has always been in my life—sometimes in my hands, sometimes over my head.

As I began to make functional pottery after college, I was fortunate to apprentice in a community of potters that forage for clays locally. I got a taste for how clay can carry a material connection to place through my hands and into vessels. Willi Singleton is a potter in the Appalachian Mountains of Pennsylvania and perhaps one of the most resolute in using only local materials in order to foster this connection to place. His approach has influenced my design practice and inspired me to work with what's around me.

For Willi, making pottery is about *conveying* place through the direct, intimate, experiential connection of working with local materials. He harvests clays and rocks from creeks below Hawk Mountain, makes ash glazes from rice and bamboo ash, and fires his kiln with members of his local community. This locavorism, as he calls it, contributes to the "presence and energy"of the pottery and the "labor connects [him] to place in ways that cash on the barrelhead at the ceramic supply store does not." (Singleton, 2017, p. 33) This practice is not simply about offsetting his own use of industrially mined materials but working with his home in an intimate way that can be shared. He believes that everyone, including the people who buy his pottery, are contributing to the making and understanding of the work. In this way, Willi's vessels offer an example of pottery that can invite us to "think more deeply about place and connectedness in a broad way" (Singleton, 2017, p. 32), and for me a big takeaway is thinking about how clay and potter reciprocally shape each other.

One of my favorite things about Willi's practice is that he uses clay that is naturally very difficult to work with— "a reluctant accomplice" as he puts it. This would send most potters to the store to find commercially mined materials to mix with the clay to make throwing easier. Willi, however, has taken the time to learn how to work with this clay. He writes,"…the clay dictates how the work is done. Potters let the clay teach them and lead them forward. Now that I have gotten accustomed to it, I feel a great satisfaction working with my temperamental clay. I like feeling that I am meshing with my mountain, as I sink my hands into the clay." (Singleton, 2017, p. 34) The clay that Willie works with has shaped his process, his pottery, the way he works, and the way he lives his life.

This practice invites us to think about the reciprocity between potter and place, the pots and the enjoyment of their use, embracing our environment and being open to the serendipity found while turning mountains into mugs, but, most importantly, to see clay as a teacher — the land as pedagogy (Simpson, 2014). Clay is truly an amazing material. It is a link that connects all potters. We fall in love with touching it, seeing the rich textures and colors of clay found around the world, and the way potters work with them. We listen with lifted ears to the stories that clay tells, and we work within its bounds as mediators to share these voices, which we never quite know ourselves until the clay comes out of the kiln or pit. Clay has a will and a personality. It is always from some place, and the potter is always in collaboration.

Yet, for the potters and designers whose clay comes in two 25lb blocks, neatly wrapped in plastic bags and packed in cardboard boxes, I can't help but feel like they are missing the best part. It's like not knowing where one of your best friends is from. How long have you known each other? I don't mean this pejoratively. To the contrary, I just want everyone to experience the joy that can await you as you lift the clay from a hillside and rub it between your fingers for the first time, the sun warming your skin and seagulls calling nearby.

This relationship with clay, or lack of a relationship to where clay comes from, influences the objects we make. When we reduce it to a commodity, the rectilinear block or industrial bag, we start our practice without the direct material connections to places that offer natural imperatives for taking care of the sites we make and take from. Clay becomes just a material that we can load into 3D printers or slip cast cups from.

The design implications of this un-grounded modern attitude are the mass produced Ikea cups that do little to energize the encounter with the consumer before ending up in a landfill. They carry no soul. This is no surprise since the systems of their manufacturing strip objects of the meaningful connections from which soul arises and replaces them with externalities—costs to communities, land, water and people that come in the form of pollution and exploitation. The good news is that clay has endless potential to help reknit these connections, to shape the way we view and inhabit the world, to bring soul into the design process.

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Coming to understand clay as a relation and a teacher has its seeds in the house I grew up in and my experiences collecting this earth in New Mexico. But it wasn't until I read Leanne Betasamosake Simpson's essay, "Land as Pedagogy: Nishnaabeg intelligence and rebellious transformation," that I really began to think deeply about how making, knowing, and being in the world are connected and how working with clay can ground a way of coming to know how to be in this world. Simpson (2014) uses stories of the Nishnaabeg people to "advocate for a reclamation of land as pedagogy, both as process and context for Nishnaabeg intelligence, in order to nurture a generation of Indigenous peoples that have

the skills, knowledge and values to rebuild our nation according to the word views and values of Nishnaabeg culture" (p. 01). She evokes the term Land as Pedagogy as a means to show how the land is the source of knowledge and the context of knowing for her people and coming to know is a spiritual, lifelong practice that "takes place in the context of family, community, and relations" (Simpson, 2014, p. 7, 22).

She tells the Nishnabeeg story of Kwezens or "little woman" who, while out in the sugarbush, discovers the sweet syrup of a maple tree after watching an Ajidamoo, a red squirrel, sucking the sap. She tells her mother who celebrates this discovery and through this story Simpson says that Kwezens "learned the sheer joy of discovery. She learned how to interact with the spirit of the maple. She learned both from the land and with the land. She learned what it felt like to be recognized, seen and appreciated by her community. She comes to know maple sugar with the support of her family and Elders" (Simpson, 2014, p. 16). This way of coming to know is "an intimate process, the unfolding of relationship with the spiritual world" that "requires complex, committed, consensual engagement" (Simpson, 2014, p. 15).

Fig. 5

I can see myself in Kwezens when I think of playing in the mountains behind my house as a kid and collecting clay as an adult in Abiquiú, NM. But my childhood experiences were largely without the support of a community of individuals who were passing along ways of knowing the land through sharing stories and embodied learning. I found myself coming to know within a worldview that couldn't fully acknowledge the spirit of the clay or how one would go about forming relationships with it. As someone who is not Indigenous, I find these stories deeply resonant, though how I relate to them or embody them has been confusing without a community of my own with which to talk about coming to know in these ways.

Making wood-fired pottery opened a door to this connection and I have started to give credence to, and incorporate an openness to animism and learning from the land into my design process—making room for this spiritual connection that I have always had but was never especially vocal about as an integral part of my design practice. I am embracing land as a teacher, a source of knowledge, and the context for knowing as a foundation for design. In this thesis, clay is the source of knowledge and the context that connects my project. Clay is the connector. Clay is the pedagogy. Clay is the teacher. Harvesting clay has been a way for me to come to know this new area of British Columbia, to think both about the histories, geologies, material properties, cultures, and the give and take of how I live in this place. Clay connects the geographically disparate sites of making that took place during this project and forms a vessel through which I can discuss emerging technologies as they relate to place. Clay offers a direct connection to the earth.

* * * * * *

I drive out to Lily Point in Point Roberts, Washington, to escape the city and partly just to go to the United States. Homesick I guess, and the sun tends to shine a little more out here. There is something weird and interesting about this pene-exclave. The mailboxes are painted with American flags, but the gas stations still sell in liters. I push off trail through some brush until I come to a bluff, a cliff edge rising above the tidal flats several hundred feet below. I am looking for a way to the water, but this will do. Beams of sun break through the clouds, and I soak it up as long as I can, walking back to my truck in the dark.

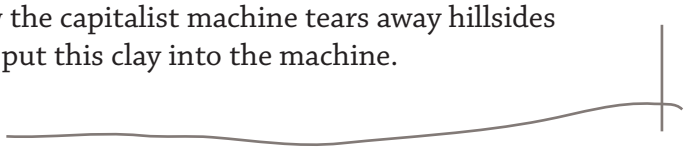
I had heard rumors of there being clay deposits somewhere at Point Roberts, and when I return to Lilly Point a few weeks later, I find the trail down to the water's edge and walk along the beach for a long ways. A downed log blocks the beach and, looking up, I notice the hillside is composed of a dark shale clay. My eyes follow the deposit up the hillside to the top of the bluff where I realize I had been sitting the last time I came here. The clay was beneath my feet! I collect a small chunk to test and take it back to school. Andrew Drakeford, a fellow researcher in the Material Matters Lab at Emily Carr University, teaches me how to load it into the 3D printers, and together we make a few prints that work surprisingly well. It is my first 3D clay print. I'm still skeptical, but this 3D printing thing seems easy. (I can tell you, after hundreds of hours of mess-ups, that's not the case, but Andrew graciously got me started.)

Fig. 6

Before 1892 the reefs of Lilly Point were the shared fishing grounds of the Semiahmoo, Lummi, Saanich and Malahat peoples, providing substance for the winter months. Sometime during the 1870s, a settler named John Waller cut down the Indigenous drying racks and claimed the fishing rights to Lily Point, known as Cannery Point at that time. (Brown, 1971) The years 1892-1934 marked a period of commercial fishing by settlers who in that short time decimated the salmon population of these Salish waters and uprooted the Salish peoples there. (Brown, 1971) As I walk up to this new clay deposit in a territory that is not my own, I can't ignore the colonial history of this place or the question of, Is it okay for me to collect this clay?

In the Material Matters Lab, we often talk about utilizing 3D clay printers on a production scale with minimally processed wild clays to make wares that offer an example of ethical design in line with local values. The idea is that these emerging technologies make possible a form of distributed manufacturing that is connected to place. Through the utilization of robotic work and the use of local materials we could easily produce a large quantity of considered objects—soulful connected cups to offset the Ikea cup. But, as I grab a handful of clay, and think of my motivations—to make an object or system of utility to sell—the inherent capitalist foundations of my way of being gives me pause. Part of me wants to make 3D printed clay to make a living. How different am I than John Waller? While I don't intend to take more clay than I can carry in my backpack, the point is not lost. Where are the bounds? This is a question of amount, but more importantly of intention. How many pounds of clay would tip the scale as too much? What relations with a place keep us beholden to the health of our providing planet and limit our greed? And what does this look like in a design practice?

Perhaps making with clay from this Point that is at once within the United States yet culturally quite Canadian, and inhabiting the unceded territories of the Coast Salish peoples, is precisely the way to begin to explore these boundaries—boundaries within ourselves, or societies and how we relate to earth. How we take earth and how the capitalist machine tears away hillsides in the silent background. It's time to put this clay into the machine.



Part TWO

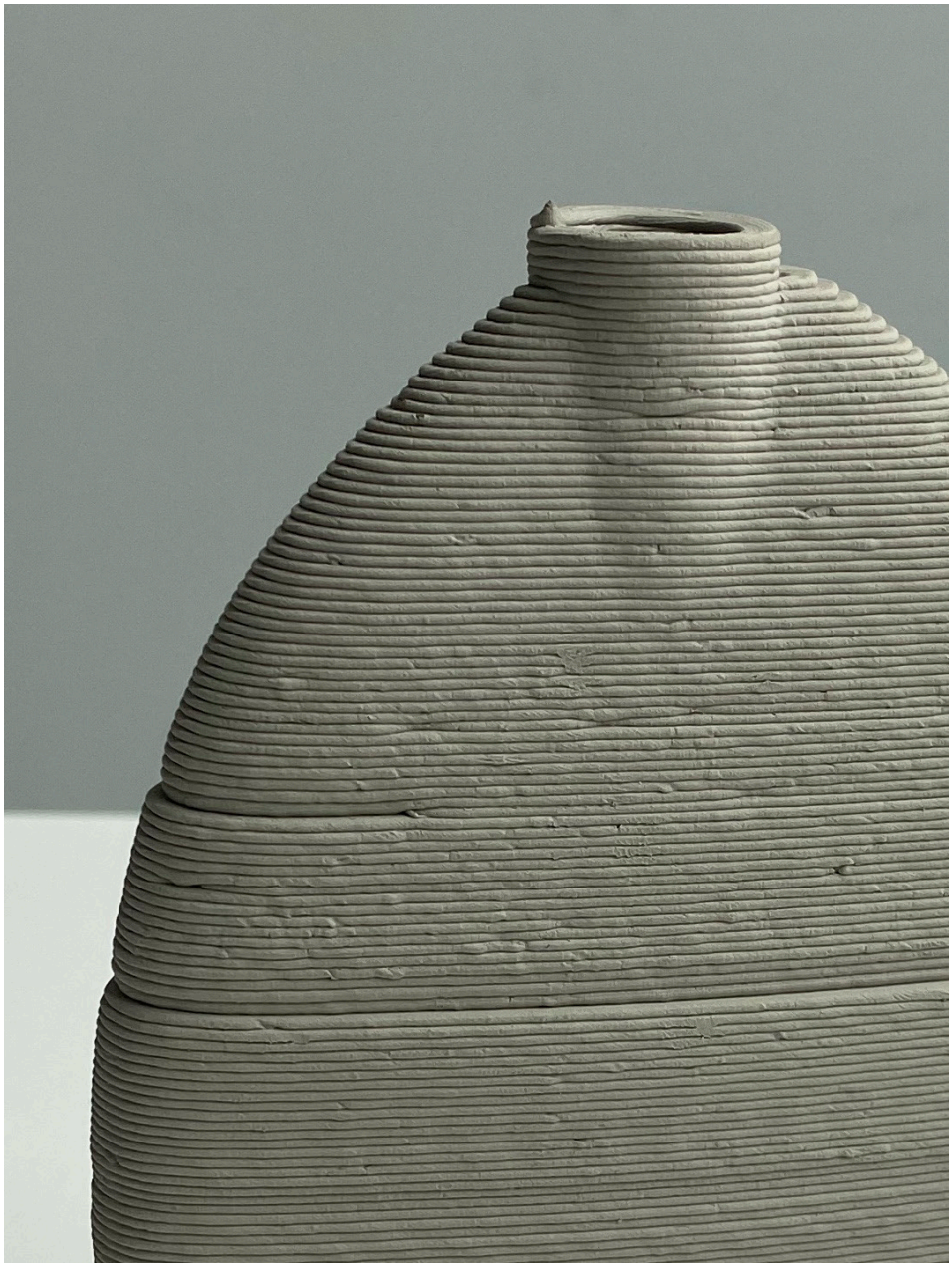


Fig. 7

Machines And Meaning

It is clear that the ecological benefits and sophistication of nearly 30,000 years of material advances in clay, combined with recent developments in additive manufacturing, should not be seen as opposing ends of a technological spectrum, but rather as two paradigms that, when coupled together, have the potential to generate an emergent body of work which will advance the cultural legacy of clay in an era where the machine and the body work hand in hand. (Rael, Fratello, 2017, p. 97)

I drive up to the architect and researcher Ronald Rael's place just south of Antonito, Colorado, as a summer monsoon rain moves across the farmland—wide open grasslands punctuated by center pivot sprinklers and towering Cottonwoods. This place is surprisingly lush. Beautiful. Open space to think. I imagine the Serengeti may feel like this. To the east the Rio Grande river meanders through this gentle landscape which comes as a surprise to me as I arrive from Taos, New Mexico, just south of here where the same river carves its way through a rugged basalt box canyon 240 meters deep.

I'd pestered Ronald Rael for a few weeks before he agreed to allow this stranger to come see his 3D printed adobe buildings during a pandemic. Rael's family has been here for eleven generations and you can tell he takes pride in this place. Even though he is a professor in Berkley, CA, this is his home and the pandemic has afforded him more time here. The 3D buildings are recognizable immediately as I drive up. Rising like silos, they make me chuckle when I first see them. I'm not sure why exactly, but I think it has something to do with how normal they feel here. In a way, Rael's Instagram feed and all the attention these structures have received makes them feel larger than life, revolutionary, but here they just feel like part of the landscape. Still just mud. Highly organized but not overly refined, they are experiments.

The printer is nearly silent and we take time to chat. Rael's past projects *BAD OMBRÉS* (2017) and Emerging Objects (2016) call attention to the rich historical legacies of clay and create potentialities through which we can see clay as *the* sustainable material of the future. The flowing surfaces of these vessels reference traditional basket weaving and are outwardly political. *BAD OMBRÉS* is a series of 3D printed ceramic vessels that combine light and dark shades of clay to comment on Donald Trump's racist use of the term Bad Hombres in reference to U.S./Mexico border security. Rael writes, "An ombré, in this case, would be a geopolitical or cultural ombré that crosses political boundaries fluidly and allows for continuous cultural connections to be made" (Rael, Fratello, 2017, p. 96). Inspired by this metaphor, and the use of 3D printing clay as critique, I'm curious where this current work stands, and I ask him, "Do you see these as a means to house the world or a commentary about place?" To which Rael responds something like, "Well, yes, but I also see them as a business model."

His response both surprises me and reminds me of my idealized way of thinking. He brings up his business *Potterware*, a system for visually designing 3D printed ceramics that makes the technology more accessible, and he mentions how the potter's adoption of the 3D printer will be akin to the wheel. This makes me somewhat uncomfortable as a potter who has always felt that there is something lacking in the 3D printer—something alien, disembodied, and disconnecting. But, as I look off into the field that Rael's great great great grandfather cultivated and tended, and see the earth from this place take shape in the rich brown 3D printed adobe spirals, a connection to place enabled by technology has never felt stronger. Yet, as I think about my last month trying to build a 3D printer of my own, wrestling with a CERAMBOT 3D printer kit, my weariness of this technology resurges.

Fig. 8

Fig. 9

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There's a crumpled box leaning against the door of my Taos studio that looks like it just tumbled out of a van passing by on the highway. The CERAMBOT 3D printer that I've been waiting for has finally arrived! Opening it up, a pile of unmarked parts, screws, belts, and electronics spill out onto the cement floor of my studio. I scratch my head then spend the next several weeks trying to piece this frustrating mess together. Tolerances are off, plastic parts that should be hollow to accept a tube are solid, and the motor isn't strong enough to push clay. The list of grievances goes on, and the online and social media forums supporting the printer mirror my sentiment. Hundreds of people expecting to be happily 3D printing clay have found themselves knee-deep in a DIY nightmare.

After 70 hours or more of troubleshooting this machine, I start to question the point of the endeavor. What is the importance of making objects this way? Here I am running between my computer and the printer wanting to pull my hair out, typing in codes G28, M420 S1, M164. Why won't it work? Where is the flow, the creative intuition, the soul? The getting lost in the tactile feeling of turning out pottery like the machinist does a screw? I feel like I am at the machine's mercy.

I imagine Willi throwing in his studio with the clay he's spent a decade getting to know. Maybe I just need to get to know the machine a little better, create a digital connection. Willi would roll his eyes. I'm not convinced myself. Most potters who know me wonder why I would even be interested in 3D printing to begin with. It seems so antithetical to my personal practice. Computer chips feel alien, extractive, cold. Clay feels warm, earthy, alive. It offers a direct, tactile, simple connection. Why would I want to use a machine to do the very thing I love to do so much with my hands?

At face value, the handmade object and the robot-arm-made pot are incomparable, especially to the skilled craftsman. The potter's sentiment towards this intrusion of technology into the human act of making pots with our hands drifts towards disdain. Thinking back to my conversation with Rael though, technological advances have always influenced hand-made crafts and often to our benefit. The electric-powered pottery wheel reinvented the human-powered kick wheel, which arguably made it easier for potters to make a living by increasing the speed at which they could make sell-able wares.

The analogy isn't perfect since the electric wheel didn't displace the potter's hands and the specific knowing through their use. The 3D Ceramic Printer may increase the speed at which potters can produce work, and in this way perhaps it offers this same technological reinvention for ceramics that Rael mentions—one that is needed to keep pace with the culture of automation that the world is adopting.

If we are to think of this as simply an issue of economics or efficiency, the automation of clay production makes sense, but the question is not simply

about economics. It has to do with how we value objects more broadly. What they mean to us, how they make us feel, how we enjoy making them, the stories they tell and connections they make. Making pottery by hand is tactile and sensorial in a way that 3D printing is not. There is a level of abstraction when making 3D printed pots. The machine has taken the place of your hands, and it is important to think about how both the machine and the objects they produce mediate our experience with making, place, and material.

In the book, *Innovation and its Enemies*, Calestous Juma explains social and cultural resistance to new technologies while offering a pro-technological argument for innovation. With the advent of music recording at the start of the twentieth century, the life of the performing musician changed drastically. Juma (2016) notes that this new technology "democratized music and made listening more convenient. But it threatened the employment of live musicians in America"(p. 207). The jukebox and radio put musicians out of work which prompted unions to enact a 1942 ban on recordings. Critics of the new technology argued that this new mass produced music "reduced the human interaction afforded by live music" and that "jazz recordings removed music from its source, and as a result it lost its authenticity and meaning" (Juma, 2016, p. 210). The parallels to 3D printing clay are clear through the fears associated with a change in the degree of human connection, interaction, and also the economic repercussions of the emerging technology.

Many potters are fearful of the 3D printed robotic pot replacing them or at least making it harder for them to make a living. If we look to the history of musical recording, their fears are well founded. Broadcasting industries were focused on making a profit and did little to benefit the musicians who were struggling to make a living (Juma, 2016, p. 217). Juma (2016) acknowledges that these economic fears, which he terms "technological unemployment" are real, but argues that the broad benefits and economic opportunities created by new technologies are often ignored (p. 220). One such benefit is the accessibility of music which we are all probably grateful for, or at the least influenced by. The development of electronic music is another. Both are positive outcomes to a highly resisted technology.

A key difference of course is that potters can choose to integrate this technology into their practices without fear that the "industry" as a whole will make them obsolete. There will always be a place for the handmade pots just as there are still performing musicians, and Juma argues that demonizing technologies based on the "uncertain nature of the risks associated with new technologies and the logical impossibility of proving the negative" are often unfounded (Juma, 2016, p. 66). We just don't know what these technologies will bring about. There may be some uncomfortable changes, but there will also be great societal advantages, and Juma suggests that demonizing new technology is futile.

This same argument—that we don't know what these technologies will afford, or how they will affect us—is equally as important when questioning unbridled technocratic solutions. This is especially salient in a world where

the globalized production of new technologies has a history of causing social and ecological harms. With this in mind, I can't shake the discomfort I have incorporating 3D printers so directly into my design practice which aims to do exactly the opposite. To make in a way that is more connected and less extractive. So does this distrust of these emerging technologies mean I'm just the musician that fears the record? The potter that hates the computerized pot?

Perhaps this technology, though dependent on harmful industries and practices for its production, can provide benefits that far outweigh these harms. Maybe smaller scale distributive 3D clay manufacturing has the power to create objects that re-knit our connection to place, or perhaps a flask fired in a wildfire can help us to build a more reciprocal relationship with, and phenomenological understanding of, this natural force. From this vantage point, we need to think more deeply about how technologies and subsequent technological artifacts affect us both as makers and users and how they mediate our relationship to the world we live in.

In the book *What Things Do: Philosophical Reflections on Technology, Agency, and Design*, Peter-Paul Verbeek offers an accounting of how technological artifacts mediate humans' relationship with their world. He analyzes what technologies and technological artifacts actually do with people and argues that they play a mediating role in the "ways the world can be present for people and the ways people can be present in their world" (Verbeek, 2010, p. 08). By this he suggests that technologies "co-shape" our relationship with our world in profound ways (Verbeek, 2010, p. 08).

Fig. 10

Verbeek offers a departure from classical approaches to philosophy of technology and provides a framework through which we can evaluate the implications of the Wildfired Flask as an object that conscientiously mediates our relationship to our world. Citing the philosophy of Jaspers, Heidegger, and Walter Benjamin's 1935 essay, *The Work of Art in the Age of Mechanical Reproduction*, Verbeek (2005) argues that these classical or "transcendental" works in philosophy of technology paint a picture of technology that "alienates" people from the world, reducing them to a cog in the machine with no meaning (p. 99). Grappling with the ramifications of this new era of industrialization, these early twentieth century perspectives make sense given their context, and Verbeek (2005) writes that "the repetitive, monotonous character of assembly-line work appeared to herald a new kind of mass society and homogenized existence; cold, anonymous industrial complexes seemed to indicate the onset of a reduced relation to the world" (p. 99). Prescient insofar as the 3D printed pot is concerned, the same fear rings true—one that these hi-tech pots somehow reduce our relation to the world.

What are the consequences of this 3D printed mechanical reproduction? They are often criticized as cold and impersonal, especially by potters that have never handled one. It feels natural to challenge the authenticity of an easily replicable, 3D printed ceramic object. Certainly this mass-printed computer-generated object reduces our human connection to the world. It can't be as meaningful as something handmade. But Verbeek argues that these classic arguments are based on the object's "*conditions of possibility*" looking backward to how it *originated* and not "forward to what it actually does" (Verbeek, 2005, p. 29). Our relationship with technologies is more complex than can be understood simply by focusing on an object's origins, and Verbeek (2005) argues "an artifact can play more roles in human life than functional ones" (p. 30). In order to understand these roles, we need to take a phenomenological approach to the philosophy of technology.

Verbeek's phenomenological account of technology bears interesting parallels to the relational ways of knowing discussed at the opening of this thesis on Indigenous epistemologies. He states, "what people are and what their world is, is co-determined by the relations and interactions they have with each other" (Verbeek, 2010, p. 03), which is to say we are our relations. For Verbeek (2010) the world is the only place we can "realize our existence" and "the world can only be what it is when humans deal with it and interpret it" (p. 03). This perspective builds on Heidegger's existential philosophy of being in the world and acknowledges that we are interrelated with our world and the interconnections produce our experience—insights which have, not surprisingly, been endemic to Indigenous epistemologies for thousands of years. Only in contemporary times have Western philosophers begun to migrate towards them. (Verbeek, 2010, p. 78)

The logical necessitation of this argument is that technologies orient how we are in the world. They mediate how we deal with it and interpret it. Verbeek (2010) suggests that "artifacts are not neutral intermediaries, but actively co-

shape people's being in the world: their perceptions and actions, experience and existence" (p. 04). Examples of this can be seen through scientific instruments like the microscope that reveal "aspects of reality" that we must interpret (Verbeek, 2005, p. 144), Bruno Latour's example of a speed bump that mediates our intention of driving quickly to driving slowly so as not to damage our car (Verbeek, 2010, pp. 04-06), and using a wood-fired stove instead of forced air. The wood stove structures your day as you chop kindling, brings your attention to the fuel you are using, and connects you to the source of the heat.

Like Juma, Verbeek believes that we should focus on the ways in which technology can mediate our relationship with our world positively. In response, I immediately think of the embodied comforts of ways of old. I'm someone who prefers to heat my house with wood because of the way it connects me to the mountains where I harvest Piñon pine and the feeling on my skin as I crouch next to the stove. Admittedly, I appreciate the convenience of not having to wake up in the cold and start a fire. I like to make pottery with my hands because of the way it connects me to the clay and the feeling of flow I experience while making. But, admittedly, I am entranced watching my 3D clay printer put down layers, especially while listening to house music. An immediate acceptance of emerging technologies has not come naturally to me. I am inherently skeptical, but my inquiry is precisely about engaging the ways in which we see the positive potentialities of 3D printing clay.

The tenet that artifacts of technology mediate our actions carries with it several imperatives and Verbeek highlights the important role designers play in determining these mediations that affect all of us. It is through both affordances and material that objects mediate our relationship with our world and our sensorial involvement with them. (Verbeek, 2010, p. 07). We handle pottery, we touch and feel it, eat and drink with it, and these sensorial connections are meaningful to how we live. Verbeek (2010) suggests that "the aesthetics of mass products should not only concern beauty or meanings, but the sensorial relationships between humans and their world as well," and he calls for a new aesthetics that anticipates "the mediating role of products'' (p. 07). This aesthetic is not simply visual, it carries with it an ethic since objects "shape the way in which people experience their world… and organize their existence," (Verbeek, 2005, pp. 216-217), an ethic of designing permanence and making objects that we form attachments to. With the recognition that objects affect people's existence, it is designers' responsibility to be mindful of how we mediate these relationships.

When viewed through this framework, the making of 3D printed ceramic objects carries both meaning and responsibility. This is especially so when we think of 3D printing clay as an alternative to mass-manufacturing in the form of a localized, distributive practice that puts objects in the hands of many. But also in ways it affects the personal practice of artists and designers that engage this emerging technology. I am exploring this meaning. How can these 3D printed objects and the practice of making them shape our experience and even organize our existence?

The 3D printed wildfired flasks are my attempt to show a mindful way of making a vessel, designing permanence, and experimenting in how we may design when we truly make an attempt to be mindful of the mediating role objects play. Can we design collaboratively with natural forces? Can we craft with wildfire? Can we expand our understanding of kinship and use this inclusivity to re-tool our design practices in order to reconsider who, how, and what we are designing for? The hope is that these vessels carry new ways of seeing and an imperative for new ways of acting for those who engage with them. They metamorphose the seemingly cold, calculated, industrial technology of 3D printing with the wild, forceful energy of a wildfire that elicits both fear, awe, and rejuvenation. In so doing they offer a medium through which we can think about how designed objects are entangled with our natural world. We are confronted with a functional object that challenges us to think more deeply about the origins and relations of the things we use every day.

I have reservations accepting Verbeek and Juma's technocratic position in the age of the Anthtropocene in which technological innovation is arguably a factor contributing to our changing climate. But leading examples of utilizing emergent technologies that begin to reknit these connections to earth are helpful models to evaluate how we may innovate.

As I leave Ronald Rael's place, I pass by 100 year old adobe houses that are crumbling into the ground, returning to the same earth that Rael is himself printing. They are ruins from a different time, but they are the same mud now used in this new era "where the machine and the body work hand in hand" (Rael, Fratello, 2017, p. 97).

Fig. 11

Fig. 12

Fig. 13

Part Three

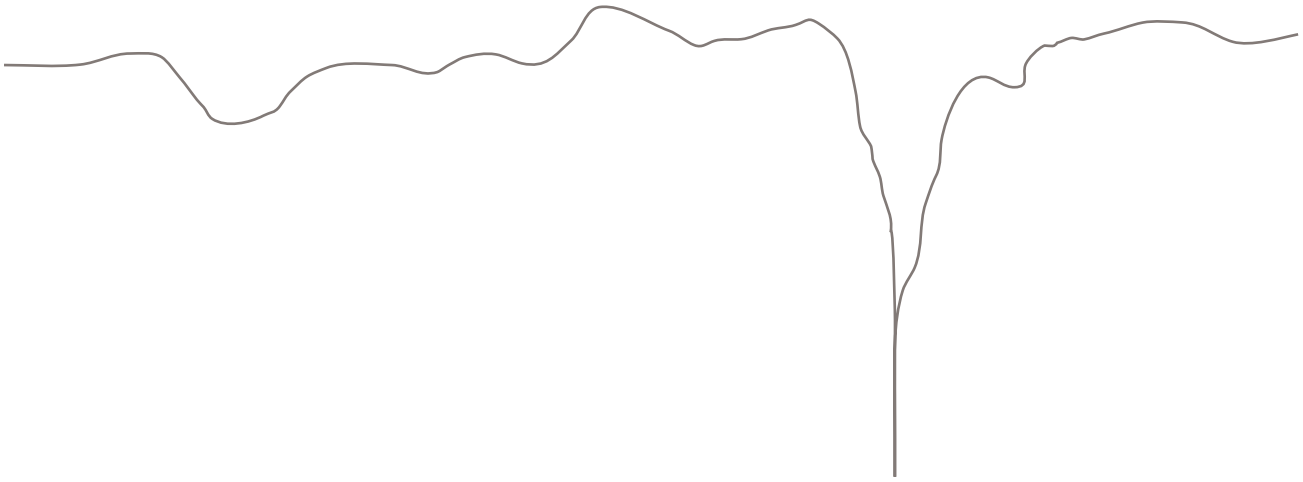

Fig. 14

With Fire

There is no better feeling than coming off of a burning mountain into a town of residents cheering for the firefighters as they return from the field. You have saved their homes. You have supported their communities by keeping the fire at bay. You and your crew have protected the forest and have worked hard to do it. You are a hero, and fire is the enemy. While the firefighter's efforts are praiseworthy, this narrative is as problematic as it is easily understandable. A force with the power to level towns and turn the landscapes we love into blackened moonscapes is, without a doubt, scary and disruptive. We want to push it away or control it and have the fire live by our terms. But the truth is, humans have co-evolved with fire and the regenerative role it plays in ecosystems. The environments where we now reside are livable because Indigenous peoples utilized fire to shape these landscapes over thousands of years. We can thank our earliest ancestors for blazing this symbiotic relationship with fire— and we can thank our recent history for the disunion visible in the hero stories so symbolic of our modern time.

Since the turn of the 20th century, foresters in the United States have pushed for fire prevention practices to limit the spread of fire on public lands,

citing economic impacts, forest health, and conservation. In the 1920 publication, *"Piute Forestry" Or The Fallacy of Light Burning*, William B. Greeley, Assistant Forester of the United States, argued that we should "make the woods as fireproof as practicable" and " put fires out by the systematic organization of all the forces available in an emergency" (Greeley, 1920, p. 33). His argument came in response to a growing call from the Southern Pacific Railroad and large timber-owning corporations for Light Burning or "Piute Forestry." Light Burning is an Indigenous method of forest management in which fires are deliberately set during the shoulder seasons of spring and fall when higher moisture levels allow for low-intensity ground fires. The result is a regular occurrence of low severity fires that clean up the ground fuels and prevent larger catastrophic fires. Greeley (1920) argued that this "propaganda" about light burning would lead to "total destruction of young growth" (pp. 34-36) and fires thus had to be prevented at all costs in the name of conserving our forests.

An era of industrialized wildland firefighting ensued, modeled on the military apparatus, and supported by the abundance of machinery left over from World War Two. Flash forward to 2021, and over a hundred years of wildfire prevention coupled with a changing climate has led to overgrown, unbalanced forest ecosystems that burn with catastrophic intensity. As they burn, we are all reminded and many are becoming aware for the first time that forest ecosystems are fire dependent, and yet the survival of our communities seems, paradoxically, dependent on fire prevention which is becoming increasingly more difficult.

Fig. 15

It is not enough to simply re-introduce fire into landscapes. We must also consider the historic ways people have lived with fire. In *Fire A Brief History*, Stephenn Pyne maps the history of humans and fire and suggests that "what is needed is the return of the aboriginal fire regime, a particular pattern of fire foraging, hunting, cleansing, and littering" (Pyne, 2001, p. 64). We must consider the historic Indigenous use of fire that has shaped these ecosystems which includes the relational practices of living with and using fire. Moving forward with prescribed fire without the change in mindset for how we relate to our forests would be tantamount to not even starting because modernist attitudes are incompatible with rebalancing our fire-adapted ecosystems. What is needed is a new story for how we may relate to wildfires. These flasks that I have placed in wildfires are vessels with which to carry that message: to begin to work in a relational way with fire and to carry stories that can help shift attitudes.

Before wildland firefighters walk out of those mountains, floating in the smell of sawdust, gasoline, sweat, and diesel, they have been working with fire. Either deliberately setting backfires to burn out fuel ahead of the main fire, chasing the cold edge, or mopping up the hot spots left behind. This work takes know-how and a rich relationship with fire. In the world of wildland firefighting, there is talk of being *students of fire*. You are always learning from fire—both about the fire and all the while about yourself. You learn its patterns and behaviors. You watch as it crawls like a maze through pine litter on a meditative afternoon or stand aside as full swaths of forest are swallowed in the roars of a running crown fire.

Fig 16

Sleep deprived, its warmth may lull you into a nap as you rest your face on pine needles nearing the end of your night shift. Or your heart will beat hard in its presence as you learn how to manage your fear, pushing the physical limits of your body. Which way is out? A good student remembers that fire can always defy your expectations and is constantly humbled. You have spent so many hours walking in the woods with fire that you learn the intricacies of how it moves within a myriad of ecosystems—the many moods, modes and manifestations of wildfires. You may feel the heat of the rising sun on your neck and notice that the morning dew has dried from the California eucalyptus and know the fire will soon wake. Or you lift your eyes from your work as you hear the afternoon winds picking up and moving through the canopies on an adjacent ridgeline, and you expect to see smoke starting to rise.

For something you grow so close to, enemy is not a fitting name, nor is fire something you fight. It may chase you through the woods and move through your dreams, but it also gives you something deep that you come back for every summer. This force captivates you; it makes you feel strong and connected. Without it you feel something is missing. You may take a summer away, but you'll come right back the next, motivated to return not so much by the paycheck, or even the desire to put the fire out, as you are by your enjoyment of being around fire. You have grown dependent on fire, an anomaly in the modern day, though perhaps not so crazy when we acknowledge the historic relationship between humans and fire. It is a co-evolving one that allowed humans to colonize the earth, as Pyne (2001) points out in saying, "unburnable landscapes were generally unlivable ones," (p. 46) a statement that on its own should make us rethink the hero story of firefighting.

Fig. 17

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Potters in Taos build a connection with fire as they stoke their kilns, like the wildland firefighters that harnesses flame to limit the growth of a wildfire. Both are forms of containing fire and using it in a controlled manner for a desired outcome. From the burning of fields to the combustion engine, humans have used the power of fire to provide comfort and refuge, making unlivable climates livable, inedible food edible, and allowing our footprints to crisscross the globe. (Pyne, 2001, p. 182). The technologies we have built from this elemental reaction and our relationship with it make us uniquely human, affording us evolutionary advantages that we have used to shape the very climate we inhabit. But as influential as we may have become, our lives are quite simply dependent on fire.

This dependency on fire is as profound as we want to make it. Just think of the sun, a ball of fire fueling the photosynthesis that supports all life. But, in the western context, it can also seem as trivial as the flame hidden away in the machine in the basement that warms our house. Design has had the tendency of hiding the inner workings of the objects we use. The Blaauw kilns at Emily Carr University of Art and Design hide the flame within a sleek, sexy computer-programmed white box. They are efficient and easy to use, but you could graduate without ever seeing fire on your wares. This disconnected design process makes for disconnected wares. It's time to let the fire out of the kiln.

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The North Complex Fire near Quincy, CA (2020) made a historic run that leveled over 180,000 acres and several towns in sixteen hours, killing 16 people. It was unprecedented; it was a "career fire". Fire managers frequently told me something like, "In all my years doing this, I've never seen a fire behave like that." I was there documenting for the U.S. government, filming the fire move across the landscape, the firehose being laid down in threatened communities, and interviewing firefighters.

Inside my pocket next to my lighter, my Incident Action Plan, and my lens cap—were two 3D printed Point Roberts clay flasks. The idea of wildfired ceramics came to me one morning in western New Mexico when I was putting in line on a fire crew. Our Pulaskis (the original firefighting tool, a hybrid axe and hoe) pulled up chunks of rich red clay, and I joked with another potter on the crew that we should make some pots out here. We didn't, but the idea stuck. After working so closely with fire in both kilns and in the landscape, the collision of the two was inevitable.

The first flask I placed in the California grass immediately disappeared into the green foliage on a steep hillside. The 3D printed clay lines camouflaged like the tan hide of a white-tailed deer, and it took searching around on my hands and knees to find it again. I laughed to myself as I padded the flask with dried pine needles, branches, and a layer of rock to protect it from getting crushed. I was preparing a pit firing of sorts as the fire was putting up a huge plume in the adjacent canyon, and I could feel its presence. I marked the GPS point and then

headed down the road. The flask is presumably still there, since I didn't make it back into the area after the "firing."

A few days later another opportunity arose to fire a flask as firefighters were burning off a road, setting fire ahead of the main fire to consume the fuel before it got there. I ran into the Manzanita brush with my camera and the flask, and dropped the flask hurriedly. I marked its location and left, driving down the road to the town of Berry Creek where a ruin awaited me. I came back to the firing spot under moonlight that night and stumbled around for a while until I found the flask. "Fuck!" I blurted out when I found it. "It just barely kissed it." The fire had backed into the area and crawled through the grass with low intensity. The hot, blackening, rock-forming firing I was expecting had been supplanted with a smoky whispering. Picking up the flask left a green relief in the burnt grass. Replaying the video later, I was surprised by my reaction which showed my expectation for the fire to behave in the way I desired. Was I really making *with* fire?

Fig. 18

The piece is subtle and expressive, blackened with wisps of fire that you can feel. An x crosses over the spout, a relief mark created by the grass it was fired in. Transposing a narrative and seeking to build a relation; What does this flask hold? Is it whiskey or water? Is it 100 years old or an object from the future? A stone or an ancient sacramental vessel? Here is a collision of the hi-tech and the wild. A layering of meaning. When 3D printing clay, we take mud and push it through a machine, the sum of our tool making knowledge and refined commodities-- knitting together the ancient with the future, the wild with the synthetic. When *wildfiring* we take all of this and metamorphose it into one, solidifying the layers of meaning embedded in the clay and fire and prompting us to think about how we relate to all these things. The resultant vessels give visible form to the often invisible systems that underpin our experience and behavior in the world we design. They are vessels for which we are meant to hold new stories and visualize these relationships.

In *The Carrier Bag Theory of Fiction*, Ursula Le Guin, challenges the hero's story and offers a more nurturing view for how we engage the world and write history. Julie Van Oyen, a masters student in my cohort, summarizes this nicely in our recent publication Micro Care, writing, "Le Guin's (1988) *The Carrier Bag Theory of Fiction* offers an alternative way of being human to the usual story of prehistoric hunters and weapon-wielders. This one theorizes that before "the luxury" of sharp tools and weapons, humans quite possibly had already been using containers for storing food, valuables, children and even themselves (via houses) for a very long time. This is important to allow space for humans to be collectors and sharers as well as (and perhaps before) killers and consumers, a space we need now possibly more than ever." (Van Oyen et al., 2020, p. 12). Le Guin (1988) offers the hero as a bottle, a thing with which to carry "in its older sense of container in general, a thing that holds something else" (p. 150). As Julie points out, the carrying, the collecting, the sharing is a space from which we must come together to face the biggest challenges of our day. As we pass the proverbial flask around, we are all invited to take a sip of what is held within. Not a hero's story, but a vessel through which to carry a more nuanced story. The flasks are containers offering a new way to carry fire.

Fig. 19

> Somehow, in the midst of ruins, we must maintain enough curiosity to notice the strange and wonderful as well as the terrible and terrifying. Natural history and ethnographic attentiveness-themselves products of modern projects-offer starting points for such curiosity, along with vernacular and Indigenous knowledge practices. Such curiosity also means working against singular notions of modernity. How can we repurpose the tools of modernity against the terrors of Progress to make visible the other worlds it has ignored and damaged? Living in a time of planetary catastrophe thus begins with a practice at once humble and difficult: noticing the worlds around us. (Tsing et al., 2017, p. M7)

I can tell that I should be wearing a mask immediately after stepping out of my truck in Berry Creek, California. There is something acrid hanging in the air—a community of homes, play structures, gearhead's car collections, not to mention an entire forest and the reality that our material culture is hazardous to our health. I've never seen something like it. I drove through twenty miles of leveled forest to get here. Nuked. Moonscaped. The entire forest was turned into blackened sticks. Every tree, as far as I could see, was killed.

The stories from the day Berry Creek burned are harrowing. Firefighters broke into buildings, sheltering behind cement walls that turned into saunas as they breathed through their supplied air respirators. When the firestorm had passed, they emerged into a blackened wasteland. The houses had disappeared leaving only brick chimneys, and melted cars left pools of aluminum running down their driveways. The small mountain community nestled in a dense green forest was gone. In its place stood an apocalyptic scene once reserved for movies, now a recurring reality.

The sound of my boots on the blacktop punctuates the silence as I walk through this ruin several days later. I am alone here. Drifts of ash collect on the fallen mailboxes, and I leave a trail of footsteps as I work to document what has become of this place. My tracks are the first disturbances in a site where nothing has been touched, and yet everything has been disturbed. As I focus my camera, I forage for meaning in this ruin. Scanning for something to bring back from this place. Taking notes, images that I will spend the next several months tangling and untangling in my head while trying to make sense of it all.

Insight comes by way of Anna Tsing (2017), *The Mushroom at the End of the World: On the Possibility of Life in Capitalist Ruins*, in which she explores the entanglements of capitalism, the planet, and those who inhabit it. She follows the path of the matsutake mushroom from the hillsides of the Pacific Northwest, where refugees from Laos and Cambodia forage them, through the brightly-lit warehouses of brokers where they are sorted, and into the Japanese economy

where they are a gifted delicacy. The story highlights the impacts that systems of capitalism have on people, the mushrooms, and the planet. It is a story of exploitation, but also of creativity, diversity, and resilience as the foragers and mushrooms "manage to survive within human destructiveness" (Tsing, 2013, 08:54).

Matsutake emerge from disturbed soil, and Tsing uses them as a metaphor for the "precarious life without the privilege of stability" (Tsing, 2013, 10:03) emblematic of both the pickers whose livelihoods are dependent on them and the environments where the mushrooms thrive. The foragers' precarity stems from their disadvantaged position within capitalist systems. Living on the fringes, they turn to the damaged land left in industries' wake where they "search for assets" and learn to "live in capitalist ruins" (Latour et al., 2018, p. 590). Tsing's message is stark, but so is the aftermath of the North Complex Fire in Berry Creek, CA. This site forces us to reflect on our precarious position living on a human-damaged planet, to take a step into a capitalist ruin.

While the social and environmental impacts of capitalist systems can be seen directly through exploitative labor practices and oil spills, the causal link between human actions and communities leveled by wildfires is more opaque. Berry Creek is a capitalist ruin in the sense that byproducts of capitalist practices like emissions are affecting the climate and making places like it unlivable, but, more importantly, it is symptomatic of a way of inhabiting a place that is out of balance with the natural world. In a conversation between Bruno Latour, Anna Tsing, and Isabelle Stengers, Stengers comments that Tsing's Matsutake is "a story of expropriations," of alienation in terms of exploitation of humans, but also alienation as "a being separated from what makes you alive, a condition in which you stop thinking, imagining, and noticing particular beings and reactions" (Latour et al., 2018, p. 590). Ruins like those found in Berry Creek highlight our strained relationship with the systems that sustain life. They are wake-up calls that our attitudes toward inhabiting place (e.g. through petrochemical dwellings built in fire-starved ecosystems) ignore the other beings, reactions, and systems that we are entangled with. These modernist attitudes have made us blind to the intricacies of our reciprocal relationship with fire and place.

Latour (2018) comments that the funny thing about the modernists is that they have "invented a way of not being of the Earth" (p. 592). In the pursuit of progress, we have grown estranged from our natural world, creating a utopia that is a "place of nowhere" (Latour et al., 2018, p. 592). Less connected to our context and relations, we are a culture that has lost touch with the depth of our reciprocal relationship with the earth. In his book *Facing Gaia: Eight Lectures on the New Climactic Regime*, Latour explains the imperative of "redefining modernity's relation to its own earthly grounding" (Latour et al., 2018, p. 588). This re-grounding comes through discussion on Gaia, the theory of a self-regulating system that maintains homeostasis on earth and the critical zone which is the thin covering of the planet where all life exists. It is a hypothesis that entangles us directly within these systems.

It is hard to sit with a community that has been transformed into toxic black ash like Berry Creek, but paying attention to these sites of jarring transformation and thinking deeply about what is happening within them is a way to start re-shaping these ruins. As the story of the Matsutake mushroom rising out of the disturbed soil shows, there are "opportunities in these ruins" (Latour et al., 2018, p. 594). There is opportunity to begin noticing and engaging, paying close attention to what is happening within these sites and engaging by means of research through design. By spending time in these areas, cultivating a material practice within them, and then deeply reflecting on the relationships that I am observing, I hope to better understand what problems we need to address and how we can address them. Creating objects in and with these places—objects that mediate our experience with our world as Verbeek suggests, may help us to understand the complex systems and relationships at play so we can learn to navigate them more harmoniously.

* * * * * *

The wind picks up little swirls of ash as it moves through the blackened trees, and I kneel down to scoop some into a zip lock bag. It is calm here. The storm has passed. There is a microwave smoldering in the distance. Burnt beer cans are littered about. I'm kneeling in what was a good old forest trash heap. I think of the pottery sherds that I have found while out walking in the deserts of the Southwest U.S. and their beautiful designs patinated by time but still visible. Archaeologists have told me the sherds are from trash heaps. I think back to Berry Creek down the road and the heaps of houses. Is this what our distant relatives will find of us? What stories will our remains tell? And what stories can our objects tell us now to persuade us from leaving toxic ruins in our wake?

I make my way to the GPS point where I have placed the flask in the fire. After a while, with the help of my headlamp I find it. The flask emerges from the ash like a matsuke, full of hope and possibility. It is holding the story that I can now share. A story of imperfect reciprocity, making sense of place, emerging technologies, and how I relate to them. I drive down the road and pull over on a desolate stretch. A burning tree sends up fireflies into the night sky. I have seen a lot today, but sitting here, with the crackling fire, I feel a comforting stillness. I take a shower when I make it back to my hotel, and my body leaves a hydrophobic film of grey residue that sticks to the tub. The air in Berry Creek has coated my body in a way that a forest never has. When I make it back to my studio, I make a glaze out of the ash I collected that day and use it to make a series of flasks—flasks that not only rise from the ash like a matsutake, but use it to transform them into something beautiful, something to carry stories of fire that can't be put out.

Fig. 20

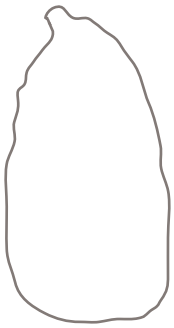

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Image List

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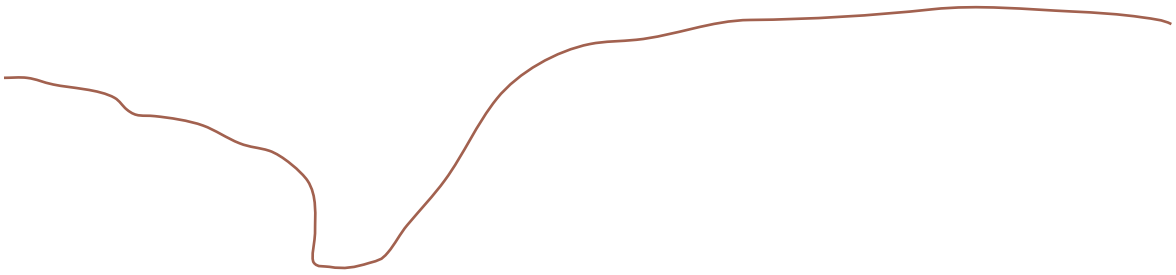
Photo Stories

Berry Creek, California



Aluminum melted out of a burned car in Berry Creek, CA. 2020. Avi Farber

Thinking of kids. Berry Creek, CA. 2020. Avi Farber

Downed power lines, blown needles. Berry Creek, CA. 2020. Avi Farber

A painting. Berry Creek, CA. 2020. Avi Farber

The good old forest trash heap. Sherds of a toilet. Berry Creek, CA. 2020. Avi Farber

A road sign shows the intensity with which the fire moved through this area near Berry Creek, CA. 2020. Avi Farber

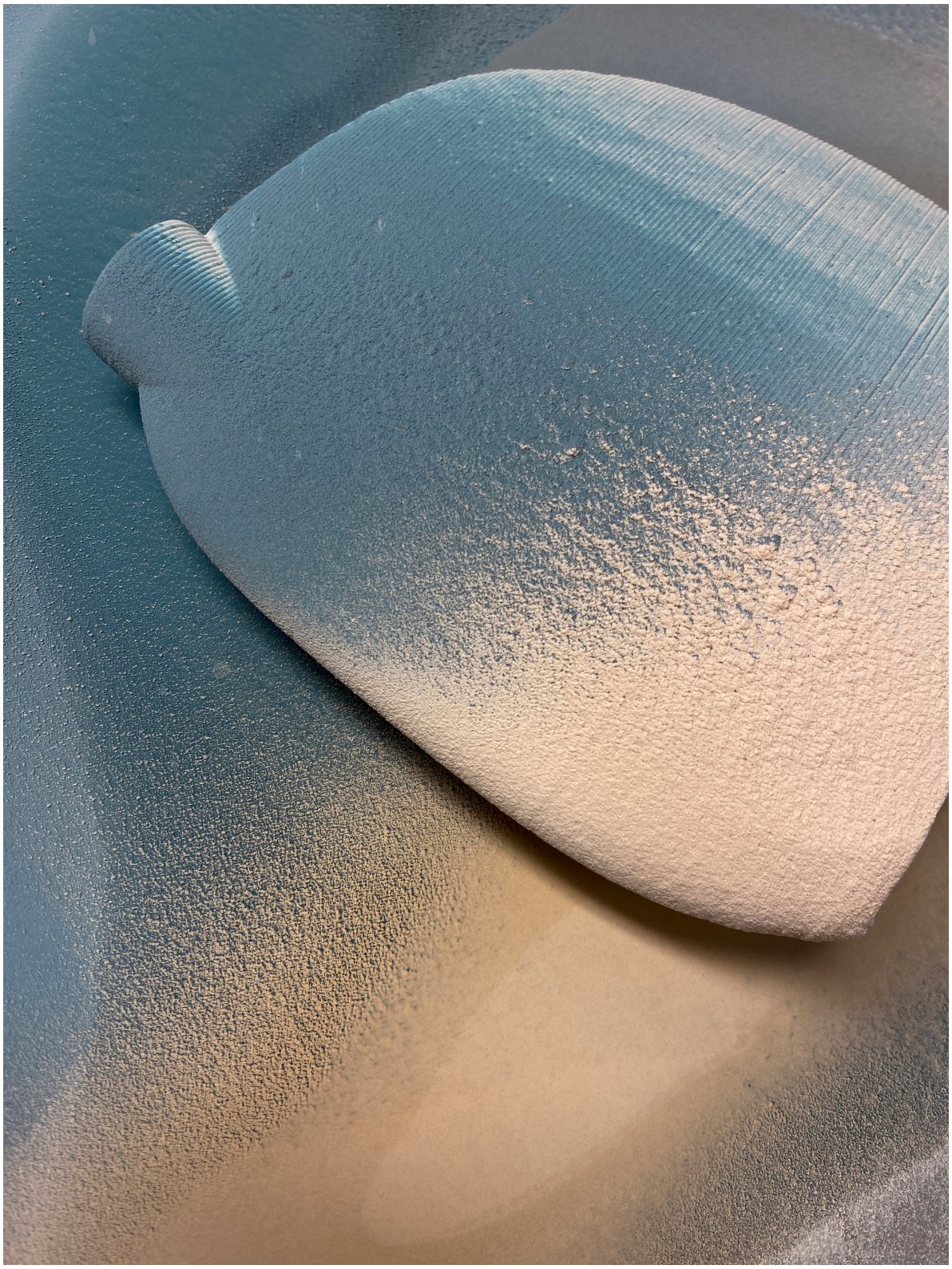
The fire is alive just north of Berry Creek, CA on my drive home. 2020. Avi Farber

The residue my body left in the bathtub after documenting Berry Creek, CA. 2020. Avi Farber

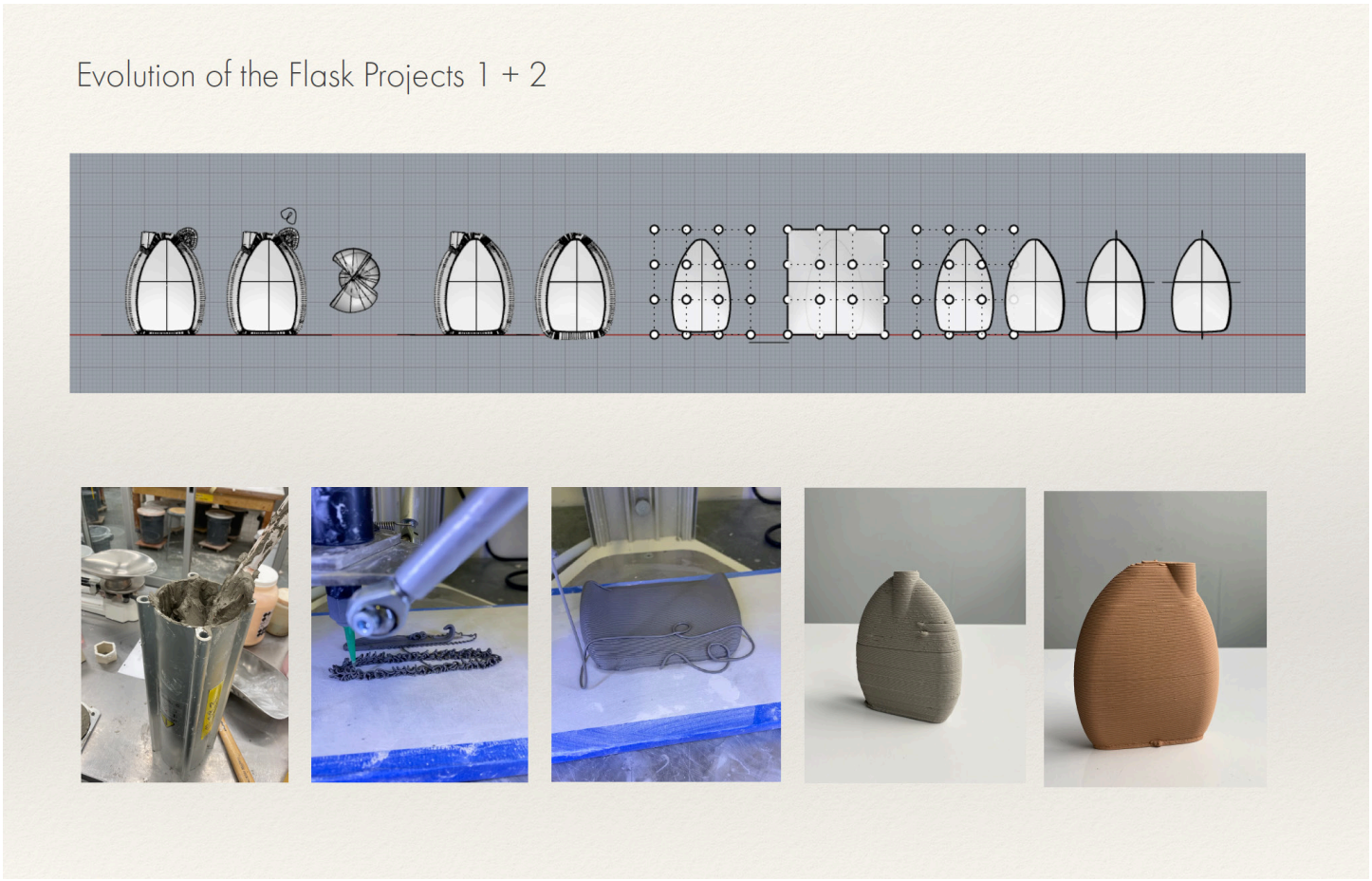
Making 3D Pots

A 3d printed ceramic flask with a glaze made from ash collected on the North Complex Fire. 2021. Avi Farber

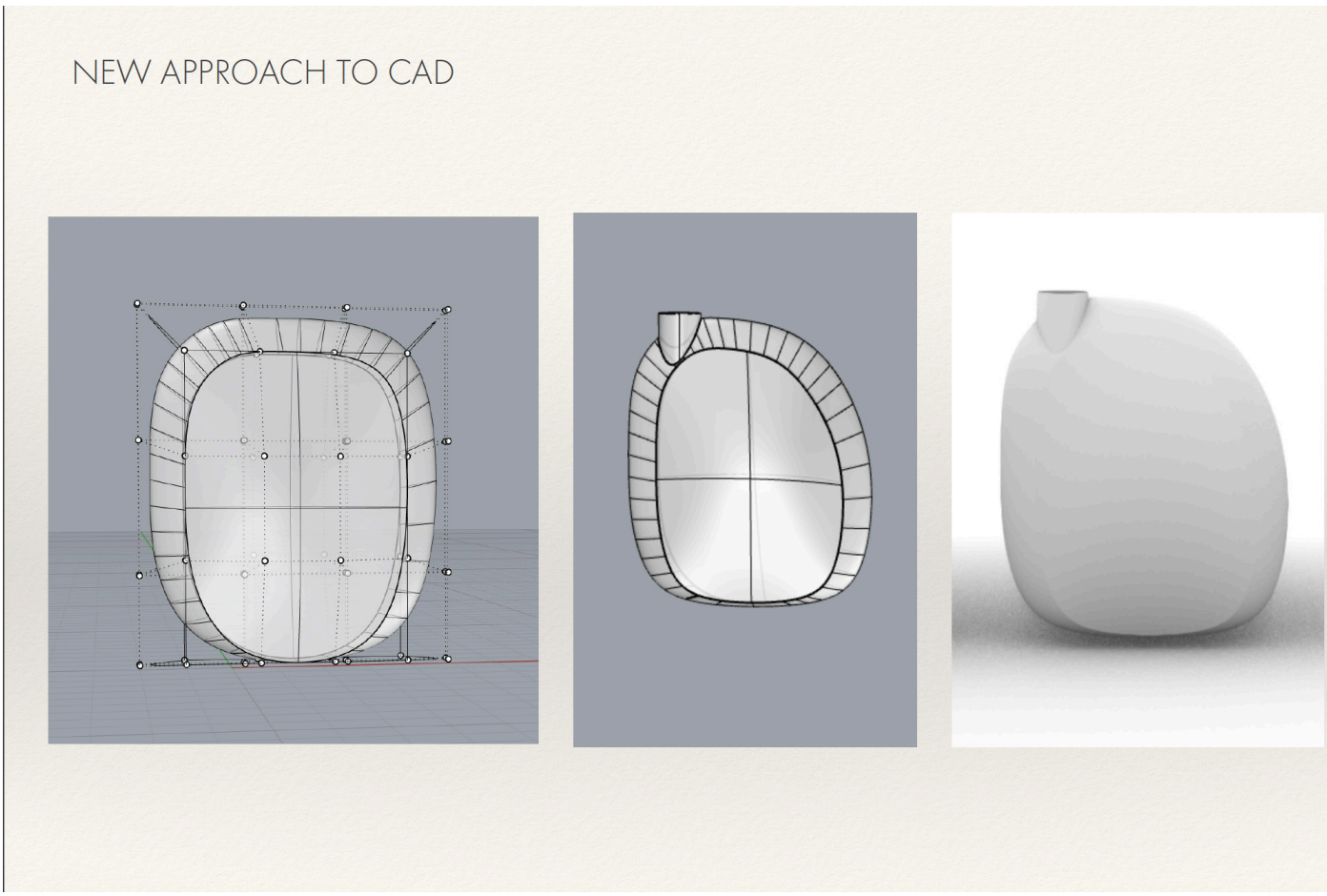
The second iteration of a 3D printed ceramic flask form. I like the box patterning which is an unexpected artifact of the CAD modeling process. 2020. Avi Farber



Integrating the ocean. Experimenting with a sedimentary application of glaze. 2020. Avi Farber



From my process documentation notebook. The first steps in learning how to 3d model in CAD and print with a WASP machine. 2020. Avi Farber



Form my process documentation notebook, form finding the second iteration. 2020. Avi Farber

The Cerambot 3D printer kit arrives. 2020. Avi Farber

My local machinist Mr. Archuletta helps me fix the lead screw that came improperly designed for my Cerambot 3D printer. As I watch his skilled hands work, he ask me how he can learn how to use CAD programs. I try to dissuade him. There is something really nice about working with your hands. Often it's nicer to let your body do the thinking Taos, NM. 2020. Avi Farber

Mixing and Loading. Preparing clay to print. 2020. Avi Farber

Working with clay from Abiquiu, NM that I mixed too wet. 2020. Avi Farber

This happened a lot. Making a tall slender vessel was technically challenging. At this point I was learning how to balance the machines flow rate, print speed, nozzle size, and clay consistency. 2020. Avi Farber

Material test of clay from Point Roberts, Washington. 2020. Avi Farber

Hank Saxe meets the Cerambot. Taos, NM. 2020. Avi Farber

A flask made with a special blend of clay. A collaboration with Hank Saxe. Discovering that each clay and machine gives the design a unique look. Taos, NM. 2020. Avi Farber

A flask placed to be fired on the North Complex Fire. It's still out there somewhere. California. 2020. Avi Farber

A fire hydrant in Point Roberts, WA that highlights the quirky patriotism in this pene-exclave. 2020. Avi Farber

Crumbling adobe houses near Ronald Rael's place outside of La Jara, CO. 2020. Avi Farber

An analog 3D clay pot. Making the 3D modeling shape by hand. Coiled micacious clay in the evening sun. Taos, NM. 2020. Avi Farber