

Farther Along

By

Clara Cramer McClenon

Bachelor of Science, Neuroscience, Washington and Lee University, 2006

Thesis submitted in partial fulfillment of the requirement of the degree of
Master of Fine Arts

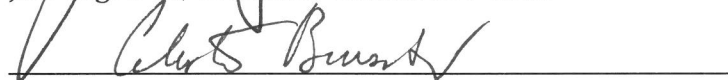
Penny W. Stamps School of Art and Design
University of Michigan
Ann Arbor, Michigan

April 17, 2016

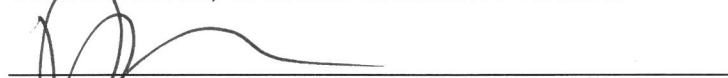
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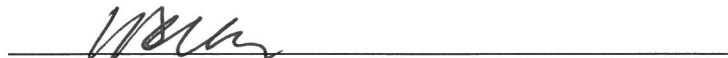
Jim Cogswell, Graduate Committee Chair



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Gunalan Nadarajan, Dean, Stamps School of Art & Design

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Abstract

My MFA thesis exhibition, *Farther Along*, uses what I know about information, drawing, and ways of knowing to set up new encounters with visual information. The installation, "680 Leaves," is a gridded array of drawing of leaves engaging questions of vision and knowledge. In "Farther Along," 42 mixed-media drawings based on photographs taken incrementally on a 500 foot stretch of a tree-lined path use the path as a structure to address a quest for understanding.

This written thesis will also function like a walk. It will walk along a line of thought about how understanding emerges from limited knowledge. This will also tie into the information processing structures and patterns of the visual system, as echoed in drawing, as a model for considering other types of knowledge generating systems. I hope that my work invites reflection on *what* and *how* we may hope to *see* and *understand*.

Keywords: drawing, charcoal, mark-making, information, vision, perception, ontology, epistemology

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Thank you to the Stamps School of Art & Design for dreaming up the MFA/MSI program and to the members of my thesis committee, Jim Cogswell, David Chung, Celeste Brusati, and Dan Klyn, for their questions and insight.

*Farther along we'll know all about it
Farther along we'll understand why
Cheer up my brother, live in the sunshine
We'll understand it, all by and by*¹

Introduction

There's a lot of information in the world. Some will be seen. Some won't. Some will make sense. Some won't. Some will mean something. Some won't.

When I talk about information I mean bits and bytes and leaves, but also books, and also songs, and stories, equations and stones, and tastes, smells, and currents, and fuzzy bits and sharp edges and hills and houses and poetry. When you zoom out far enough, it's just blue and green on a circle in the sky. When you zoom in far enough, it's the way we live. When you zoom in farther, it's stranger than we could imagine.

My MFA thesis exhibition, *Farther Along*, uses what I know about information, drawing, and ways of knowing to set up new encounters with visual information. The installation, "680 Leaves," is a gridded array of drawing of leaves engaging questions of vision and knowledge. In "Farther Along," 42 mixed-media drawings based on photographs taken incrementally on a 500 foot stretch of a tree-lined path use the path as a structure to address a quest for understanding.

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Beginning

As David Hockney put it, "Drawing makes you see things clearer, and clearer and clearer still, until your eyes ache."

Seeing begins with opening an eye to light. I don't understand what it means for light to be a wave and a particle, but I have seen white light refracted into a rainbow, which helps me understand that the light we see is just part of a larger invisible spectrum. For example, there's ultraviolet light, which I've heard that bees can see, and infrared light, which I imagine as being like the dim glow of the nocturnal reptile house at the National Zoo, humming and warm. Light (of all kinds) enters our eye through the contracting pupil, focused by a sliver of lens, and touches the retina in the eye's rear curve.

¹ Lyrics from "Farther Along," a southern gospel song

In the array of cells at the back of the eye, two main types of receptors respond to the light, beginning the process of converting light energy information into electro-chemical information, which can move through the nervous system. Rods, the first type of receptor, are sensitive to contrast and motion. They can function under low light and are concentrated in the peripheral areas of vision. Cones, the other type of receptor, are sensitive to detailed information and color. They are most effective under high illumination, and are concentrated in the central point of vision—the fovea.

Information from the responses of these photoreceptors is then passed to bipolar cells. For rods, there is a high level of convergence, meaning that many rods provide the input to one bipolar cell. The rods are, in this way, averaged. Although this means the “truth” detected by each rod is lost, convergence facilitates vision in low light since small signals are added together. It also enables motion detection, since movement doesn’t occur at a single point, but rather *across points*.

For cones, there is a much lower level of convergence. A bipolar cell gets input from one cone. The signal is preserved more clearly, retaining detail.

The responses of the bipolar cells stimulate ganglion cells. There are more than a million of these in each eye, and it’s their long reaching axons that project from the eye bundled together in the optic nerve, synapsing in the brain. From the limited sliver of light entering the eye, to the particular responses of rods and cones, to the averaging of ganglion cells, to the processing of the visual cortex, imperfect signals form the basis of our understanding.

That’s how visual information begins to move from the world, into the mind. That’s how I begin to draw.

A Touchstone: Contradictions

“Behind dark curtains, snow seems to be whiter. Indeed, everything comes alive when contradictions accumulate.” – Gaston Bachelard, *The Poetics of Space*

I’ve always tended to look for the big picture, to look for resonant patterns in the information I perceive. When I began to study neuroscience, I wasn’t so interested in the particulars of things. The molecular pathways and anatomical structures I memorized only stayed with me for a moment, but the patterns I perceived within them built up and up until those patterns became touchstones, truths. One, that I’ve come to treasure, is the power of contradictions.

Studying neuroscience, I found plenty of contradictions between my lived experiences and the neural mechanisms said to create them. Smells don’t feel like molecules coupling with receptors. Sounds don’t feel like little hairs in my ears getting pushed by acoustic energy.

Vision, our dominant sense, is particularly full of contradictions. Standing in a field, our two eyes take quick snapshots of the patterns of light in the environment. By some miracle of the brain, these little pieces build one coherent picture. The field looks like a field, not a confusing collection of shadows and angles. We perceive it as whole.

And yet, that whole is just a fraction of reality. There is an unfathomable amount of visual information that we simply can't take in. Compared to a hawk, we are painfully nearsighted. Compared to a bee, we are basically colorblind. I can't look to my left and my right at the same time. I can't inspect a pebble while I gaze at the clouds.

This paradox of vision-- its splendor and fallibility-- is at the heart of my practice as an artist. For me, this contradiction provides a powerful description of not just how I *see* but also how I *know*. To know something, like to see something, can feel certain, but it's never the full picture. Knowledge, like vision, is constructed and limited. Moving from the realm of science, to the realm of the studio, drawing provides a visible way to explore the link between *seeing* and *knowing*. Drawing also brings awareness to the contradictions within each act.

Antony Gormley put it this way: "Drawing is not so much a mirror, or a window, as a lens which can be looked at in either direction, either back toward the retina of the mind, or forward toward space. You could perhaps not look so much at drawing as through it." ²

That drawing has these two abilities—to be a lens looking out into the world or back toward the mind-- reveals drawing's own contradictory power. It's what makes it well suited to thinking about seeing and knowing.

Drawing is searching, gathering.
Drawing is complicating, generalizing.
It's abstracting, obscuring, clarifying.

Drawing is a summoning.
It brings to the surface. It calls to mind.

It's a line going for a walk.³

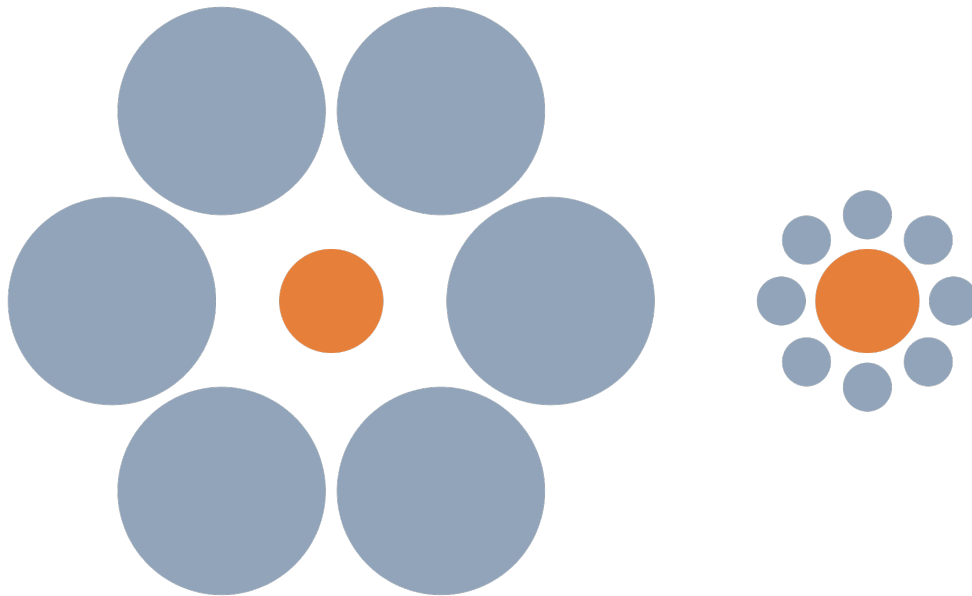
² Antony Gormley, 1979. Quoted by Anna Moszynska, (London: The British Museum Press, 2002), p. 5.

³ "A drawing is simply a line going for a walk." – Paul Klee

A Second Touchstone: Context Effects

Vision depends on context. At a basic level, what you see depends on what's around what you see. What you see depends on what you've seen before.

In introductory psychology courses, perception is often explained through optical illusions. For example, the Ebbinghaus illusion presents two circles, one surrounded by larger circles, the other by smaller. Although the two central circles are the same size, the one surrounded by the little circles appears larger. It's a context effect.



Ebbinghaus Illusion. Although the two orange circles are the same size, the one on the left appears smaller due its context. ⁴

⁴ https://en.wikipedia.org/wiki/Ebbinghaus_illusion



Composite of Claude Monet's paintings of the cathedral in Rouen, 1892 – 1894. ⁵

The Ebbinghaus Illusion is a textbook example, but context effects in early visual processing are something we experience all of the time. Walk out of a dark theater on a summer afternoon and you will be blinded by the sun. The colors you perceive in the evening are different than the ones you perceive in the morning, as Monet captured in his series of the cathedral at Rouen. In the Ebbinghaus Illusion, you can measure the circles and verify that they are equal, revealing the *truth* that ought to be perceived. But what's the true color of Monet's cathedral? Your experience in place and time inevitably affects the information you get from your environment.

⁵ https://rmarkoo.files.wordpress.com/2013/03/tumblr_m55ieg9rx81qzorveo1_1280.jpg

Context effects are an issue that extends beyond early visual processing into every level of perception and cognition. Working at UC Davis' Center for Mind and Brain, I assisted with research on the relationship between visual attention and visual working memory. Experiments documented that the context of vision isn't just visual information. It's also experience. The things we pay attention to enter our memory. Memory, in turn, guides attention. You know what you see. You see what you know. It's a chicken or the egg kind of thing—context effects mean there's never a clean start.

History is full of examples of the ramifications of context effects. For example, during the 19th century cholera epidemics, physicians saw their cholera patients' symptoms through their experience with poisons. Patients, afflicted with vomiting and diarrhea, looked like they were trying to get a poison out of their body, so physicians gave them substances to further encourage the exit of fluids. The patients nearly always died. Now, with our contemporary understanding of the disease, we see that they were killed by dehydration.

During the epidemic, one physician did think to give fluids to his cholera patients to replenish them. The death rate plummeted. Thrilled, he called his colleagues to report his results. When they arrived and saw the healthy patients they said, "If these people had *really* had cholera, they would be dead." They couldn't see the cure. Their context was blinding them.⁶

To not be blinded by context, we must become aware of it. Malcolm McCullough writes in his book *Digital Ground*, "[C]ontext' is not the setting itself, but the engagement with it as well as the bias that setting gives to the interactions that occur within it. 'Environment' is the sum of all present contexts."⁷ To avoid being blinded by context, we must understand our environment, and the biases guiding how we are informed by it. But how?

Understanding context requires understanding our place in the world. It's a tall order.

⁶ Sonia Shah, *Pandemic* (New York, NY: Sarah Crichton Books, 2016).

⁷ Malcolm McCullough, *Digital Ground: Architecture, Pervasive Computing, and Environmental Knowing* (Cambridge, MA: MIT Press, 2004), 48.

To know the world

*“What can we know of the world? What quantity of space can our eyes hope to take in between our birth and our death? How many square centimeters of Planet Earth will the soles of our shoes have touched?” - Georges Perec, *Species of Spaces*⁸*

My family’s minivan has made it to every state but Hawaii and, as my dad puts it, “all the Canadian Provinces with roads.” Growing up, summers were spent zigzagging out of Texas and out into the plains, the Badlands, the Rockies, the blue Pacific coast.

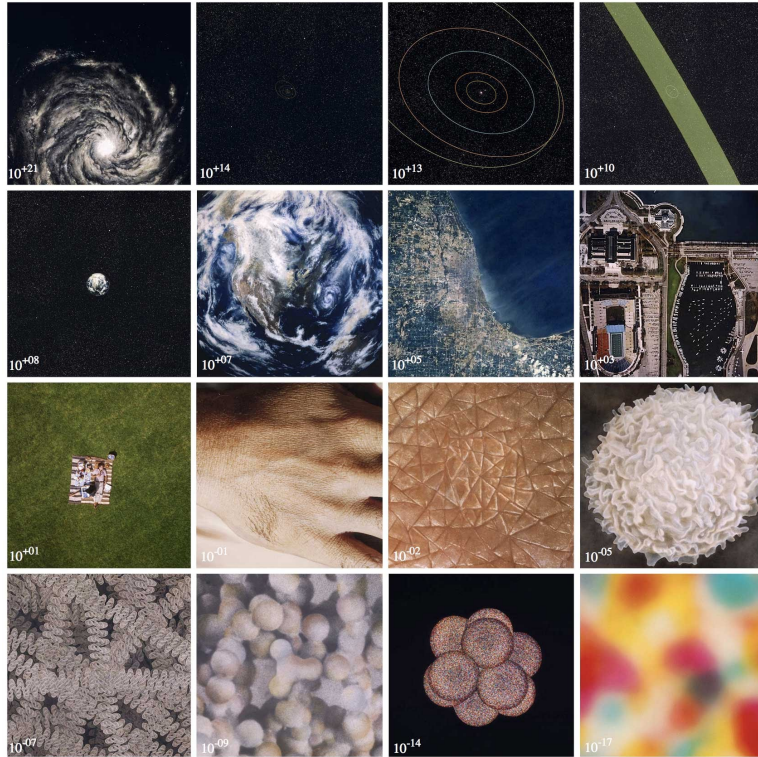
Sometimes it felt like I could see everything. Fields, mountains, driveways, birds. The car window framed the world and I was watching every second. No commercials. No rewinding. We stopped to tour a potato chip factory outside of Birmingham and met exactly whom we needed to: Don, who could smell a spud and say where it grew. His hands moved assuredly in and out of the machinery. He passed me a cheese curl hot off the line. The universe in a grain of sand.

Back on the road, I felt the weight of all the turns we didn’t take hanging like the buzz of cicadas. Wondering about alleys and insides of doors, backyards and bathroom stalls, what else was on the radio. Wondering about how wide I could open my eyes. Wondering what I might miss if I closed them for a catnap.

Sometimes I feel impossibly small, impossibly slow, impossibly limited.
I go to the studio.
I shut the door.

With paper, with charcoal, I begin to draw. In drawing, the world blossoms before me.

⁸ Georges Perec, *Species of Spaces and Other Pieces* (New York: Penguin Classics, 2008), 78.

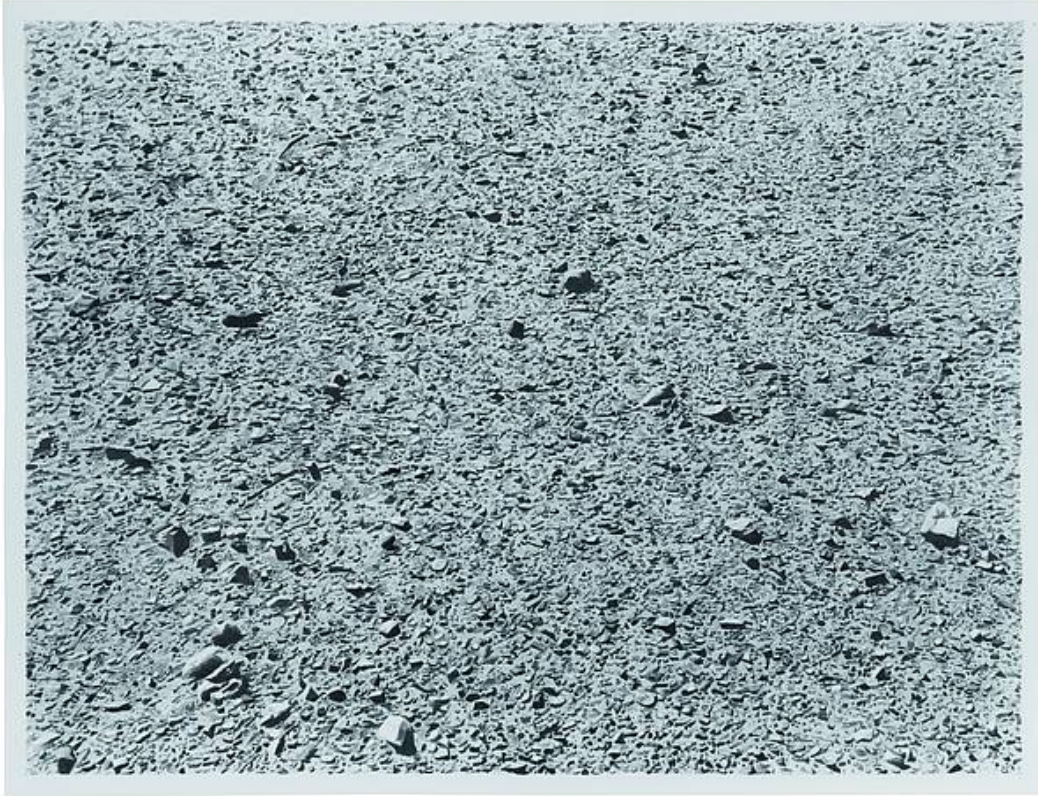


Still from "Powers of Ten," Charles and Ray Eames, 1977⁹

It's like what happens in *Powers of Ten*, where the relative scale of the universe is shown by factors of ten, revealing layer upon layer of information. A view of one meter zooms in to show 10 centimeters, then 1 centimeter, then on and on until it's at the level of atoms. But in drawing, the information isn't the result of magnification; it's the result of attention. Looking intensely in the act of drawing brings detail after detail, relationship after relationship to the surface of the paper, to the awareness of vision, to the knowing of the mind. Drawings, like the ones of Vija Celmins, help us to see what it's possible to see. Through attention, they provide a type of antidote to context effects.

In the studio, drawing, information envelops me. I welcome it as it grows and grows.

⁹ https://sites.google.com/a/wcastl.org/the-westminster-school-of-business-and-communication/_/rsrc/1433291325348/entrepreneurship/powersof10/Stills-from-Powers-of-Ten-1977.jpg



Vija Celmins, *Untitled (Large Desert)*, 1974-1975. Graphite on acrylic ground on paper.¹⁰

The Difference that Makes a Difference

Anthropologist and epistemologist Gregory Bateson called information “the difference that makes a difference.” I believe, as did he, that there’s a “bonus” to understanding provided by having more than one source of information. In his book, *Mind and Nature: A Necessary Unity*, he uses the example of binocular vision to demonstrate how the information streams coming from two eyes create something that’s more than the sum of its parts—the sensation of depth.¹¹ Through differences, information emerges from information. I think that’s what’s happening in the act of drawing, as an idea takes shape on the page.

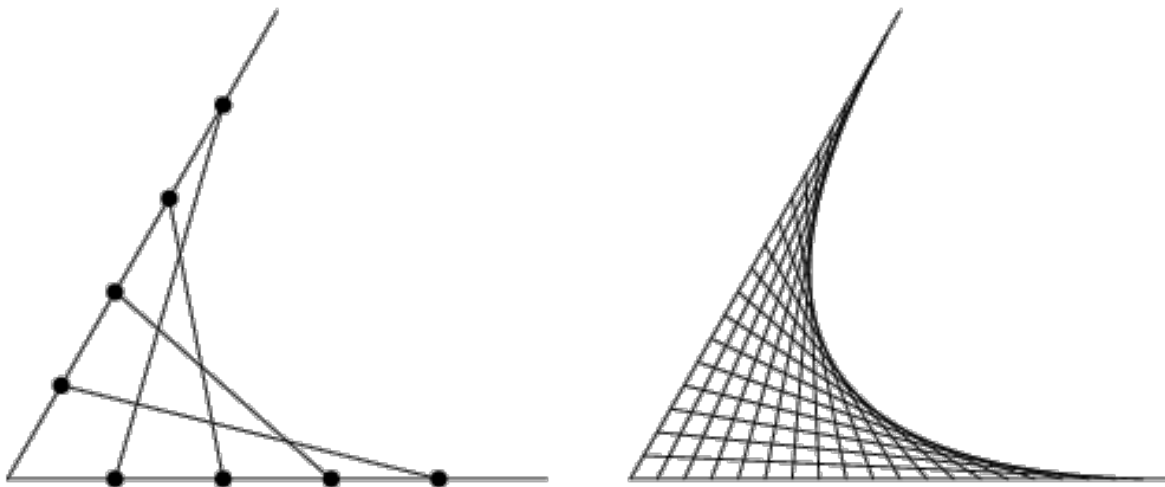
I’d always drawn as a kid, as most of us do. Later, I drew the T-shirts for school clubs and posters for prom. I drew birthday cards and parade banners. I learned the tricks of perspective and shading—doodling cubes and spheres. But it wasn’t until college that I started to think about the act of drawing.

¹⁰ https://hammer.ucla.edu/exhibitions/2007/vija-celmins/#gallery_daa41fb30bf23aa1500e5f5bcf0e1d2fae00cb9d

¹¹ Gregory Bateson, *Mind and Nature: A Necessary Unity* (New York: E. P. Dutton, 1979).

It struck me on an assignment where we drew a boxy toy truck. My professor, Leigh Ann, gave me a thin stick to use as a measuring tool. Following her instruction, I held the stick up to the truck and aligned the stick's angle with the angle of the truck's bed. I brought the stick back to my page and marked the information with a piece of charcoal. I couldn't believe how well it worked.

Measure by measure, line by line, the truck began to appear. It came faster and faster until I didn't need to use the measuring stick. The lines on my page revealed other lines to draw. It felt like the truck was drawing itself.



*Demonstration of how a curved parabola can be composed of straight lines.*¹²

The wheels were hard—not quite circles. I was stumped until Leigh Ann showed me that I could start by drawing the straight lines I could measure. From those, the curve would show itself. Another miracle! My mind raced. Remembering my work in research labs, I suddenly saw the straight lines as the things you could record or document as facts. I thought, “*If data is points, then perhaps information is straight lines, building into curved knowledge....*” Following the metaphor, I wondered if the curve was out there, to be recorded, or if it was something built, discovered, drawn. Is it understanding that's curved? Or the environment itself?

Much later, I read Gaston Bachelard's *Poetics of Space*, and my heart fluttered with recognition and relief at his simple proposal: “Being is round.”¹³

¹² Image accessed at <http://mathworld.wolfram.com/Parabola.html>. From David Wells & John Sharp (illustrator), *The Penguin Dictionary of Curious and Interesting Geometry*. (London, Penguin, 1992).

¹³ Gaston Bachelard, *The Poetics of Space*, 1958, Reprint (Boston: Beacon Press, 1994), 234.

Looking for answers

My thesis exhibition uses two familiar structures—a grid and a path-- to investigate the relationship between information and understanding through landscape imagery. The first piece, a gridded installation, is “680 Leaves.” The second piece, a series of drawings based on a path, is “Farther Along.”

Before computers, before the scientific method, before the Enlightenment, we looked for answers in the structures and patterns of nature. We want to know if there is order in the chaos—some key to the meaning of it all. Sometimes it seems like there might be.

Consider a tree. It depends on the age and species, but a single tree can hold 200,000 leaves. (That’s a little more than the population of Shreveport.) But, structured on twigs and sticks and branches and trunks, it’s all just part of a tree. Only in moments of alignment between light and breeze and emotional state are we reminded of the volume of information held there. The tree’s structure is intuitively understandable.

I look to the way basic and familiar information structures hold complexity and contradictions to gain insight into how we can navigate the rapidly multiplying world of information. Recognizing that we simply can’t know, let alone recognize or record, all of the information in the world, how can we still reach a place of understanding? Looking for contradictions leads to a fuller, *rounder*, understanding than a simple accrual of data. Looking for contradictions helps us to find the differences that make a difference. In my exhibition, *Farther Along*, the contradictions I build into each work, and the contradictory views of the world the two works offer, are in place to facilitate reflection and understanding.



"680 Leaves" installed at Slusser Gallery

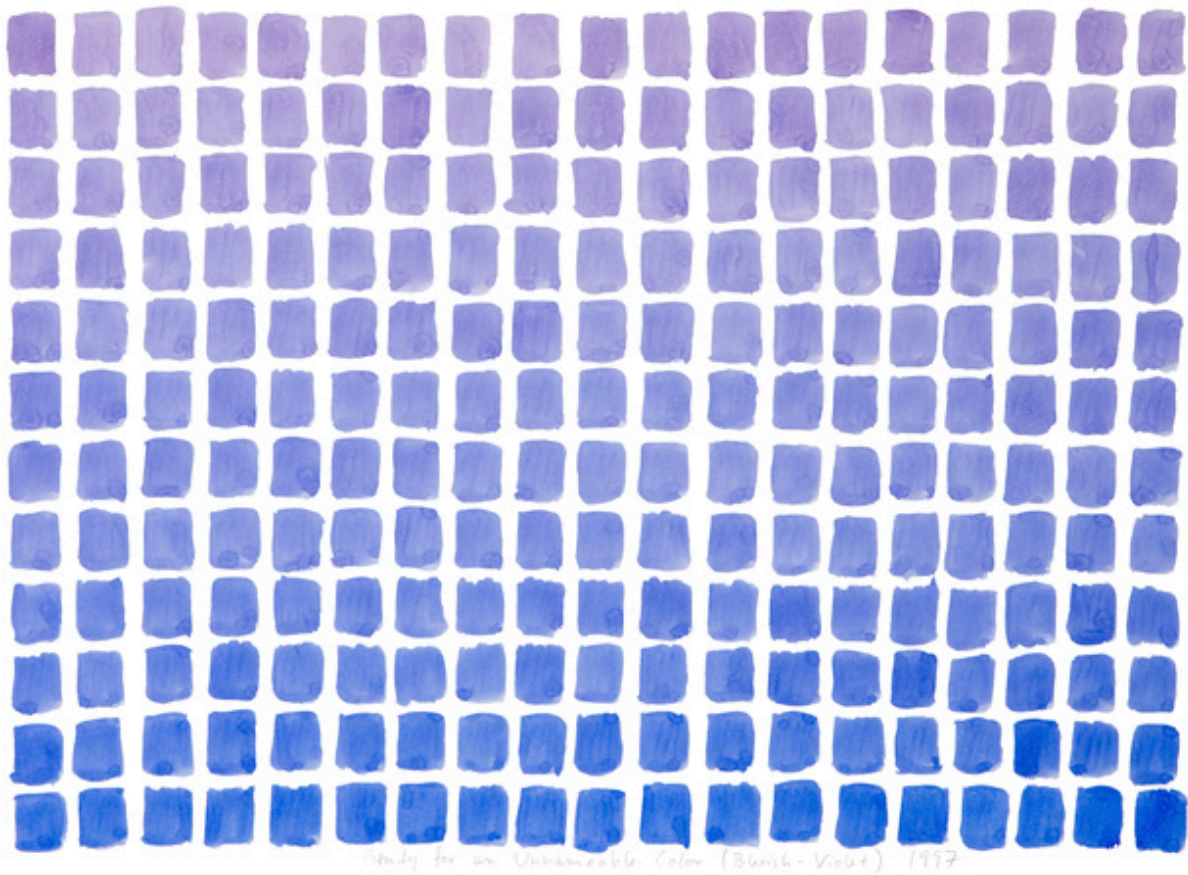


"Farther Along" installed at Slusser Gallery

Grids

A grid helps your eyes see as much as possible. It tells you there's no focal point, no depth to gaze into. It brings everything to the surface, where you can distribute your attention diffusely before making the decision to focus on an individual item.

A grid is a way to show that the information is in between the items, not just in the items themselves. It's like how the periodic table gives us access to all of the elements and the promise that it's a complete index. Or how Spencer Finch allows us to access his "Groovy Unnamable Color" through an array of close approximations.

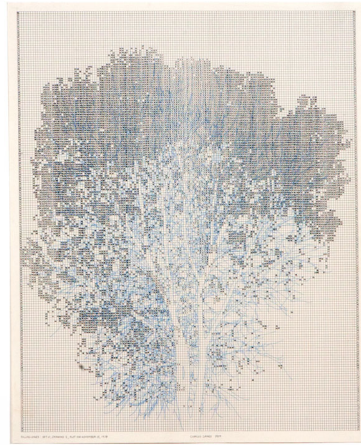


Spencer Finch, Study for a Groovy Unnamable Color (Purplish-Blue), 1997. Watercolor on paper, 22 x 30".¹⁴

¹⁴ <http://www.spencerfinch.com/view/drawings/25>

A grid is also a way to dissect something. It's a tool you can overlay on the world to focus on little parts as a way to get a grip on the whole. In drawing, a grid is a way to copy something from one place to another.

A grid, like a tree, is a form of gathering.

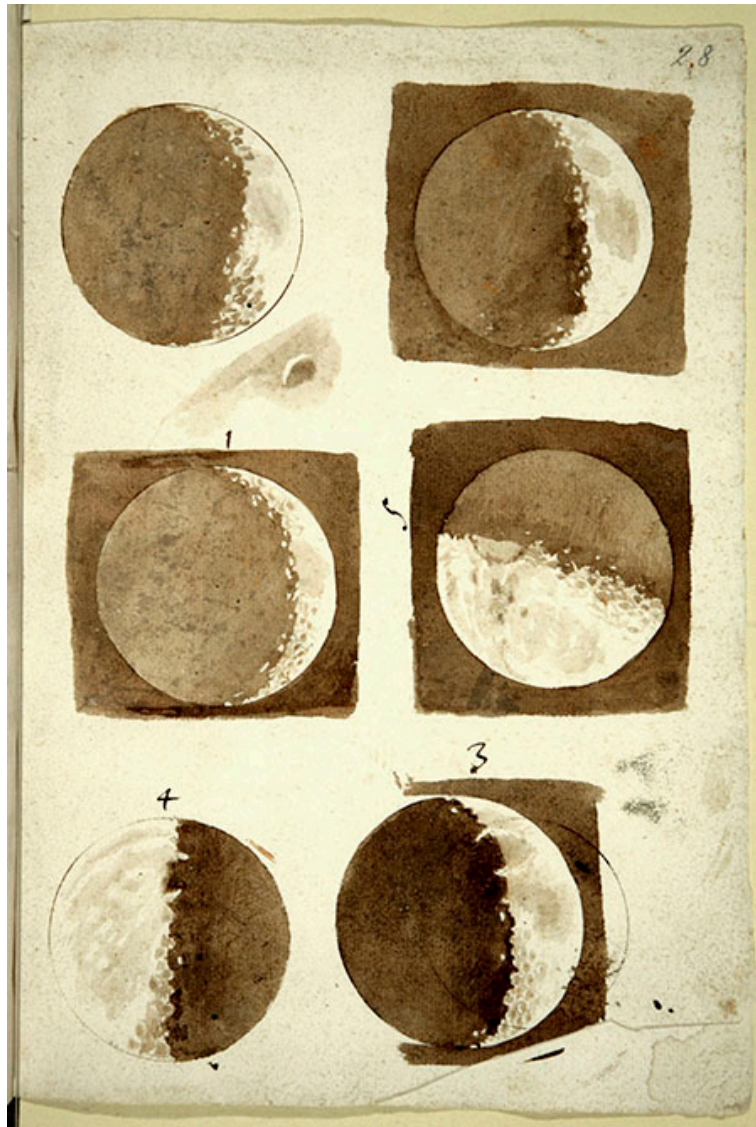


*Charles Gaines, Falling Leaves #10, 1978. Color photograph, ink on paper. Three parts: 20 x 16" each. Collection of Daisy Addicott.*¹⁵

¹⁵ <https://hammer.ucla.edu/exhibitions/2015/charles-gaines-gridwork-1974-1989/>

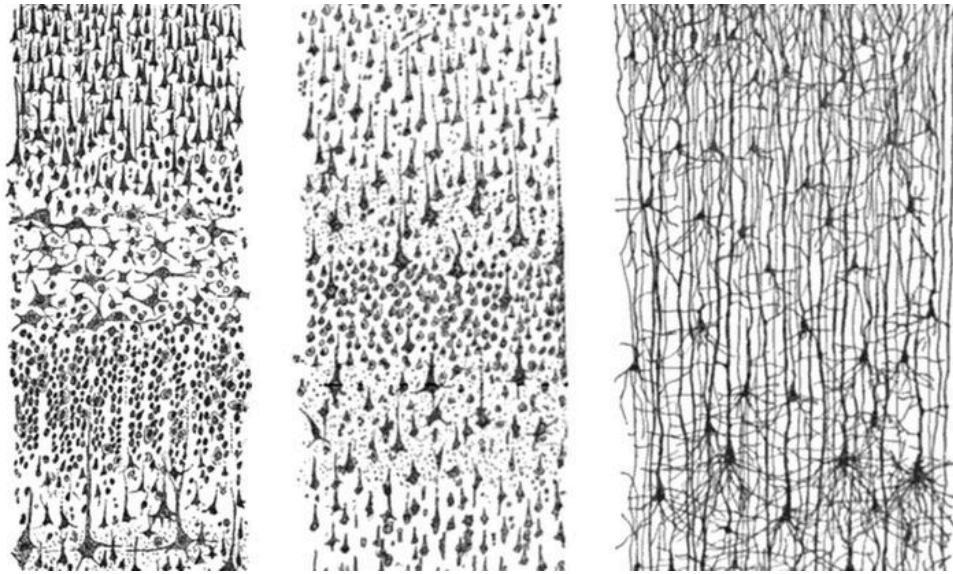
Gathering

Drawing lets you gather things together where you can look at them, inspect them. Putting things side by side lets you see differences, patterns. In Galileo's drawings of the moon, bringing the phases to one plane facilitates understanding connections between them. In Ramón y Cajal's drawings of neural development, we are again invited to inspect, compare. In a drawing by Van Gogh, the gathering occurs in the marks. Each stroke may be ambiguous on its own but gathered together, grouped into parts making the whole of the scene, it's the differences between the marks that make a difference.



Galileo Galilei (1564-1642) Drawings of the Moon ¹⁶

¹⁶ November-December 1609, Florence, Biblioteca Nazionale Centrale, Ms. Gal. 48, f. 28r
<http://brunelleschi.imss.fi.it/galileopalazzostrozzi/object/GalileoGalileiDrawingsOfTheMoon.html>



Ramon y Cajal. 1899, from the book "Comparative study of the sensory areas of the human cortex." Left: Nissl-stained visual cortex of an adult. Middle: Nissl-stained motor cortex of an adult. Right: Golgi-stained cortex of a 1 ½ month old infant.¹⁷

¹⁷ <https://s-media-cache-ak0.pinimg.com/736x/86/91/04/86910401bbd140232c85f46226efb946.jpg>



*Vincent van Gogh, Cottage Garden, 1888. Reed pen, quill, and ink over graphite on wove paper, 24 x 19 1/4".*¹⁸

¹⁸ <http://artcritical.com/gelber/images/gogh1.jpg>

680 Leaves



680 Leaves, 2016. Gesso on paper, 32 x 8' (detail).

I was thinking about gathering when I decided to pick up 680 leaves. I brought them to the studio and, one by one, quickly recorded them by brushing gesso over the top of the leaf, creating a black outline of it, and then flipping the leaf over and pressing down to get some of the information about the leaf's internal structure.

Installed, "680 Leaves" consists of six-hundred-eighty 5 x 7.75" inch sheets of drawing paper arranged in a 10 x 68 grid with 1" margins. Each is attached to the wall in the upper right and left corner with small nails. The overall dimensions are 32' x 8'.

The work brings into contrast the promise of certainty offered by a set quantity with the arbitrariness of selecting quantities from a continuous world. It also creates tension between the quickness of each leaf's rendering and their display in a grid. Although the leaves are presented as specimens, the quickness of their rendering undermines the promise of accurate observation, even as there was direct contact between the leaf and the paper. In making the work, I was conscious of the absurdity of it. (These depictions were so from the careful observational drawings of scientific illustration, but it was Eva Hesse who said, "Series, serial, serial art, is another way of repeating absurdity."¹⁹) I wanted to access something about the flickering opticality of looking up at a tree, while also giving weight to the strange ways we deal with scale. For me, each leaf served as an analog piece of data. Collecting and recording leaves was a way to grasp, tangibly, what I perceive to be the ambient information in the environment.

Limits, Methods

As used in "680 Leaves," a gridded array is a geometrical structure that focuses attention on a quantity of information. In the natural world, the way trees arc over paths to form tunnels provides another attention-focusing information structure.

I love how tree tunnels frame the world. They provide containment in the face of endless visual information. They provide the comfort of a heavy blanket. Moving through open space, it's easy to feel adrift. A tree tunnel brings your attention back to the place you are. I love them like I love the orange Torii gates in Kyoto. Like I love the doors to cathedrals and the expectation of walking through big train tunnels. Like I love coming to tall wrought entrances, like those at the Ivy League schools. All these things remind me that I'm not everywhere or anywhere, I'm *here* and perhaps for a moment I don't need to know anything else. A tree tunnel helps a context of visual information become a distinct place by providing a salient frame to a limited quantity of space. In doing so, it provides a moment to pause, and notice how your view is framed. It's a place to be mindful of your context, even as it narrows the environment.

I set out to find a way to investigate how tree tunnels appear and disappear on a path. I chose a path I'd never walked before, though it had a familiar rhythm. Tree tunnels came and went, focusing and dispersing my attention. Overall, the path was unexceptional, which meant it would provide the best promise of generalizable results. Decided, I used a long measuring tape and surveying flags to stake off 500 feet of the path, placing a flag every 25 feet to form a curving transect. I then took a photograph at each flag facing forward as I walked down the path until I reached 500 feet. I turned around, took a photograph, and walked back down the path, taking a photograph again at each flag. Through a defined method of measurement, I aimed to balance a feeling of the objective with the inherently subjective acts of seeing and drawing.

¹⁹ Eva Hesse, quoted in Lucy Lippard, *Eva Hesse* (New York: De Capo, 1976), 96.

The methods I employ to begin my drawings may seem arbitrary. And they are, in the way that measurement strategies *always* are. But setting definable limits on the information I'm dealing with helps to focus attention and bring awareness to context. I've learned to appreciate that it's as important to know what you don't know, as what you do. Limits frame understanding.

In her essay accompanying the exhibition, "The Porous Practice of Drawing: System, Seriality, and the Handmade Mark in Minimal and Conceptual Art," curator Meredith Malone explained, "Drawing, a medium long associated with both the activity of ideation and the manual act of creation, played a central role in attempts by artists ... to open up established understandings of aesthetic production as well as a generative site for the ongoing negotiation between subjective and objective approaches, between touch and measured distance."²⁰



Farther Along 14, 2016. Charcoal pencil, gesso, acrylic paint, matte media, and willow charcoal on paper, 5 x 7".

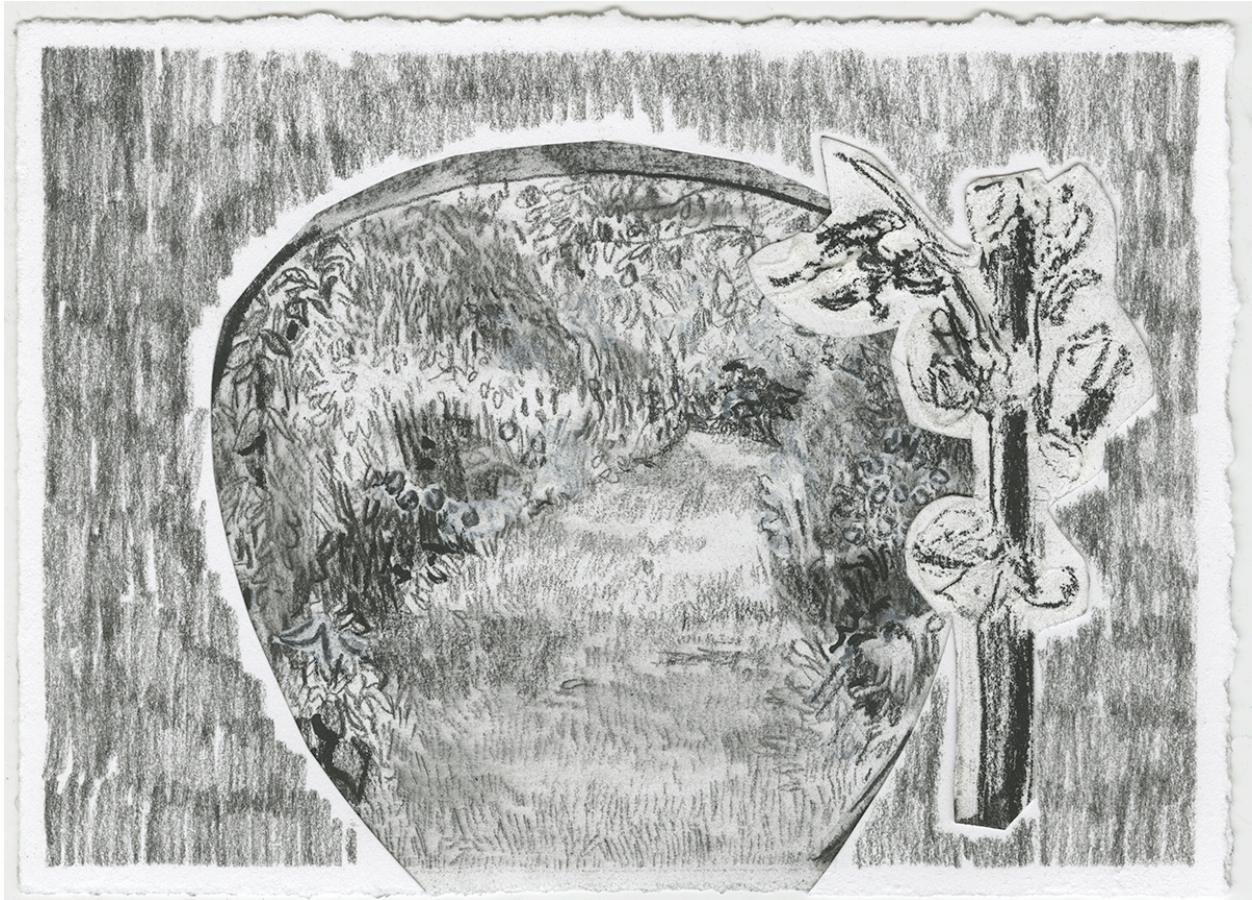
²⁰ Meredith Malone. "The Porous Practice of Drawing: System, Seriality, and the Handmade Mark in Minimal and Conceptual Art." *Notations: Contemporary Drawing as Idea and Process*. 2012. <http://notations.aboutdrawing.org/essay/>



Farther Along 15, 2016. Charcoal pencil, willow charcoal, and gesso on paper, 5 x 7.



Farther Along 16, 2016. Charcoal pencil and gesso on paper, 5 x 7".



Farther Along 17, 2016. Charcoal pencil, willow charcoal, compressed charcoal, gesso, and cut paper on paper, 5 x 7".

Farther Along

Back in the studio, I created a set of 42 drawings, each based on one photograph of the path. My materials are decidedly unscientific. Powdery, globby, smudgy, crumbling: each is as likely to make a mess as make a mark. The properties of each material, and the differences between those properties, are critical to helping me understand and articulate the patterns and signals of the visual information before me.

Willow charcoal

Dry and grey-ish. Good for gesturing, guessing. Lines. Shapes. Shades. Good for pushing, searching, forming.

Charcoal pencil

Light and fine to dark and mushy. Good for collecting marks. Good for describing by parts. Good for working without thinking.

Compressed charcoal

Very black. Very serious. Good for strong impulses and insights.

White charcoal pencil

Hard to understand, but comes in handy. Blue-ish white. Good for shaping.

Stump

Marks without marking. Good for complicating.

Chammy

Soft, deletes by averaging. Good for generalizing.

Eraser

Hard, deletes by lifting. Good for showing dark with light.

White Gesso

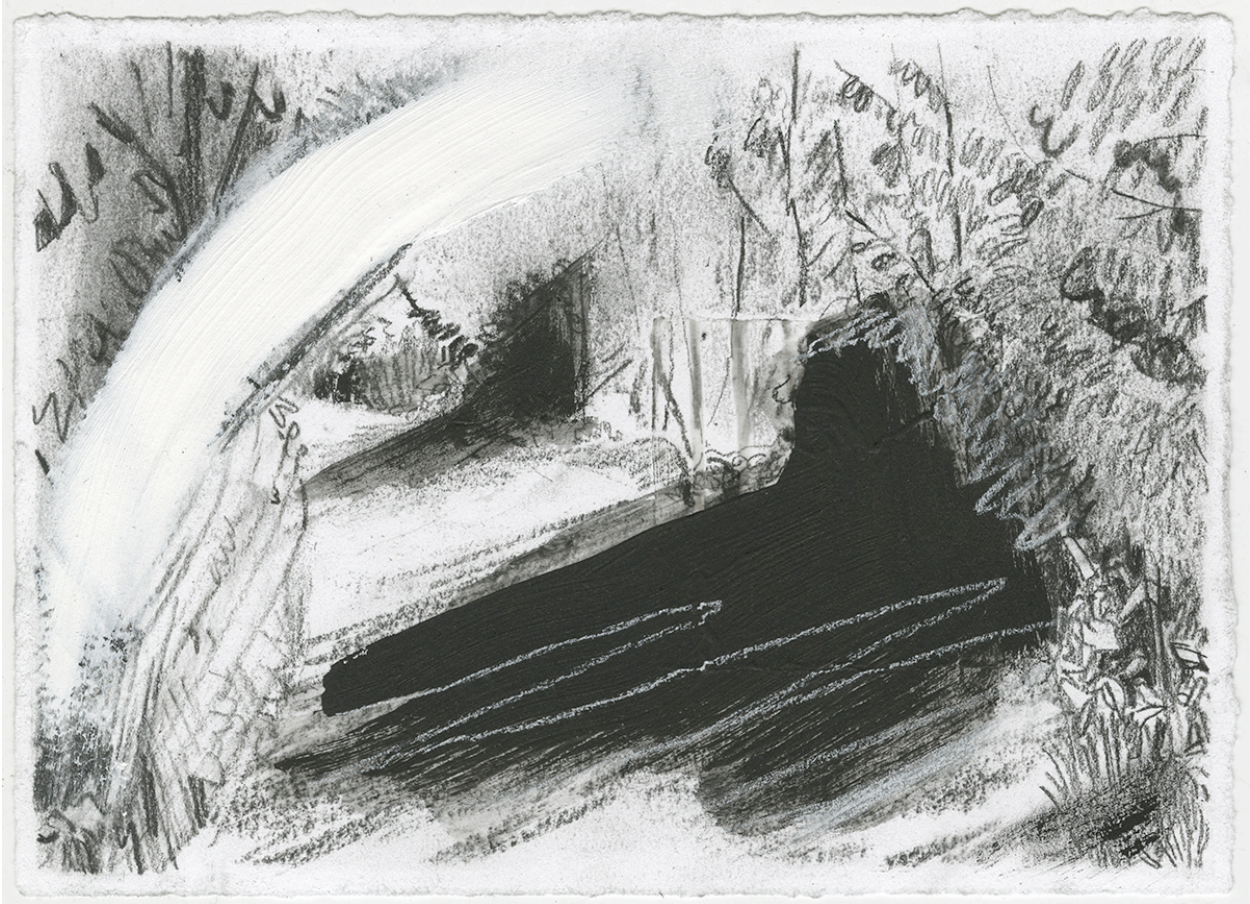
Good for covering up. Good for tricking the eye. Good for making weird surfaces. Good for a new start.

Black Gesso

Good for something independent. Super matte. Super black. Good for making strange.

Super Heavy Gesso

Stiff and globby. Good to break flatness. Good for weird textures. Good for laying on thick. Good for a bold gesture.



Farther Along 34, 2016. Willow charcoal, charcoal pencil, and gesso on paper, 5 x 7".

I use the photo as reference the most at the beginning. With a blank paper in front of me, the information contained in the photo is much more complex than anything I could bring to mind. I often think of Mark Twain's line, "Truth is stranger than fiction, but it is because Fiction is obligated to stick to possibilities; Truth isn't."²¹ The focus that comes from drawing from a photo is a way for me to find the wide-eyes that come from the unexpected truth.

As the drawing starts to take shape, I usually really talk to it. I'll say, "Now, what are you trying to say?" At some point, the dynamic shifts from me talking to the drawing to the drawing talking to me. When it's really going, the drawing is always cracking me up. It's a quick-witted friend whose clever turns of phrase are too nimble for words.

How do I know when a drawing is done? In this series, I was looking for the point when the information in the drawing churned around within the white edges of the paper. The drawing is done when it's set in motion. I think of the story about a bunch of monkeys in a room of typewriters banging out Shakespeare. I want my drawings be something like that-- to reach a point where they have all the dynamics to bang out truth. There's something that my eyes do when it's right-- a kind of shimmy—that let's me just feel when it's there.

²¹ Mark Twain, *Following the Equator*, (American Publishing Company, 1897).

Framed, the forty-two 5 x 7" drawings wrapped around the circumference of the gallery slightly below eye-level. The scale and spacing of the work compelled viewers to approach each drawing individually, looking at one before stepping to the next image from the sequence. Moving from one drawing to the next, viewers moved through the path and were continually exposed to shifts in the styles and materials I employed to render the visual information from the photographs. That the drawings employ many materials creates opportunities for discovery and highlights their constructed quality. In addition, it brings attention to how different kinds of information—both detailed information and more general information-- are at play within a single image. In doing so, I'm building on the metaphorical understanding of *ways of drawing* as *ways of seeing*, as did Jennifer Bartlett in her series "In the Garden," which of over 200 drawings of the view of her small backyard.

Richard Saul Wurman wrote, "Understanding is a path, not a point. It's a path of connections between thought and thought; patterns over patterns. It is relationships."²² With each drawing in the series, I don't aim to capture a distinct place. Rather, I intend for the drawings to serve as a collection of thoughts to look through.



Jennifer Bartlett, *In the Garden II, #1, 1980*. Oil on canvas, Enamel over silkscreen grid on baked enamel steel plates, Pastel on paper, Enamel on glass²³

²² Richard Saul Wurman, "Hats," *Design Quarterly*, 1989, 4.

²³ http://www.title-magazine.com/wp-content/uploads/2014/09/in_the_garden_2_1_PRESS.jpg



Farther Along 18, 2016. Charcoal pencil on paper, 5 x 7".

Mystery

One recent morning, on my Facebook feed, I read, “In the future, artificial intelligence may not just be relegated to the role of personal assistant or data analyzer: it may also make art.” I’ve made strict rules for myself about not following these kinds of links, but it struck enough of a nerve that I tapped through. It led to a “Smart News: Keeping You Current” article on the Smithsonian site. A novella co-written by a human and an artificial intelligence had moved ahead in four rounds of a Japanese literary contest. It ultimately lost out to other entries, made solely by humans, partly due to issues such as “character development.”²⁴ I felt relieved.

When I studied neuroscience, I was told to think of the mind as a computer. The basic analogy set up the brain as hardware, the mind as software, with inputs and outputs moving through the system. Early in my study, I read an article about the Blue Brain project, which aimed to create a biologically accurate supercomputer of the brain. The director of the project was quoted as saying, “There is nothing inherently mysterious about

²⁴ Danny Lewis. “An AI-Written Novella Almost Won a Literary Prize,” *Smithsonian*, March 28, 2016, <http://www.smithsonianmag.com/smart-news/ai-written-novella-almost-won-literary-prize-180958577/>

the mind or anything it makes... Consciousness is just a massive amount of information being exchanged by trillions of brain cells.”²⁵

The implicit hope seemed to be that if, down the road, there was a computer that worked like the mind, we could feed it inputs of everything we know and it would output an *answer*. The quest for artificial intelligence shows us both the desire to know the mind and the desire to know all knowledge.

Chess Grandmaster Garry Kasparov was defeated by IBM’s Deep Blue in 1997 (leading to *Newsweek’s* headline “The Brain’s Last Stand”). Writing a decade later, Kasparov described the results as being “met with astonishment and grief by those who took it as a symbol of mankind’s submission before the almighty computer.”²⁶ The more intricate game “Go” still remained as a human-dominated domain until March 2016, when in a match with the world’s top player, the computer made a move that puzzled its opponent and the seasoned commentators.²⁷ Then, a few moves later, the computer’s “intent” became clear, the tide turned on the table, and the computer’s victory became imminent. Upon reflection, it was a beautiful move, beyond the comprehension of the human spectators. Sadness and awe filled the room. Is this Godlike? To have this powerful ability... Or is it brute-like? To win, not with creativity, insight, and intuition, but with the pure force of hundreds of millions of calculations per second?

I’ve heard that we’re living in the Information Age. I’ve heard that we create 2.5 quintillion bytes of data each day.²⁸

The Blue Brain project is still at work. As of 2015 it had modeled a “sand grain-sized chunk of rat brain” with roughly 31,000 digital brain cells.²⁹

Can a computer answer what it means to be human? Modeling not just the mind but also all the data we’re generating? We have computers that can take algorithms calculated in hyper-dimensional space and distill them, through a series of rules, to something flat that will fit on an output screen. “This is the visualization,” the researchers might say. “Now we can see what’s going on.” But can we?

I like the way libraries smell. I like the way everything feels accessible, organized. I like to see the grids of books on shelves and grids of shelves on floors and to think about the weight of the floors on top of floors in a humming Rubik’s cube of information. All the

²⁵ Jonah Lehrer, “Out of the Blue,” *SEED Magazine*, March 3, 2008, http://seedmagazine.com/content/article/out_of_the_blue/

²⁶ Michael Hiltzik, “A computer is now the Master of Go – but let’s see it win at poker,” *Los Angeles Times*, March 16, 2016, <http://www.latimes.com/business/hiltzik/la-fi-hiltzik-go-computer-snap-htmlstory.html>

²⁷ Cade Metz, “The Sadness and Beauty of Watching Google’s AI Play Go,” *Wired*, March 11, 2016, <http://www.wired.com/2016/03/sadness-beauty-watching-googles-ai-play-go/>

²⁸ “What is big data?” *IBM*, accessed April 15, 2016, <http://www-01.ibm.com/software/data/bigdata/what-is-big-data.html>

²⁹ Moheb Costandi, “Fragment of rat brain simulated in supercomputer,” *Nature*, October 8, 2015, <http://www.nature.com/news/fragment-of-rat-brain-simulated-in-supercomputer-1.18536>

information feels present, possible, but also just out of view. Letters lined up in words, lined up on pages, tucked into covers. Pulling a book off the shelf gives me the same feeling as drawing. With both, what was out of view comes into view.

But I know I won't read all the books in the library. I won't know how to play chess like a computer. I won't take all the roads not taken. I won't fully see all those I took. But I do believe in the heart-filling capacity of wonder, of mystery. I believe in touchstones, in possibilities. I draw them to me with my paper, my pencil. I draw to have the wide-eyes of a traveler. Living in the Information Age, I draw to see, to understand.

Understanding, Knowing

In his book, *Too Big to Know*, David Weinberger discusses the history of facts. The word "fact" only entered into English in the early 1500s with the meaning "action" or a thing "that was done."³⁰ While today we consider the most verifiable facts to be about particulars (there is a cup, here on the table), in the past this type of information about individual perceptions wasn't valued highly. After all, it came through the senses, which animals have as well. As Weinberger describes, surely the knowledge of humans, created in the likeness of God, had to access more than what is immediately observable. In the eyes of our ancestors, knowledge had to access something more essential, more universal, than our notion of immediately observable facts.³¹

Here are some problems that happen:

Conflating data and information.

Conflating facts and truths.

Conflating facts and knowledge.

Conflating knowledge and understanding.

Conflating understanding and wisdom.

Here is a question to consider:

Where does the mind end and the world begin?

Merleau-Ponty proposed that we consider a blind man, probing the world with the tip of his cane. He sees through its contact. So how can we say he ends at his skin?

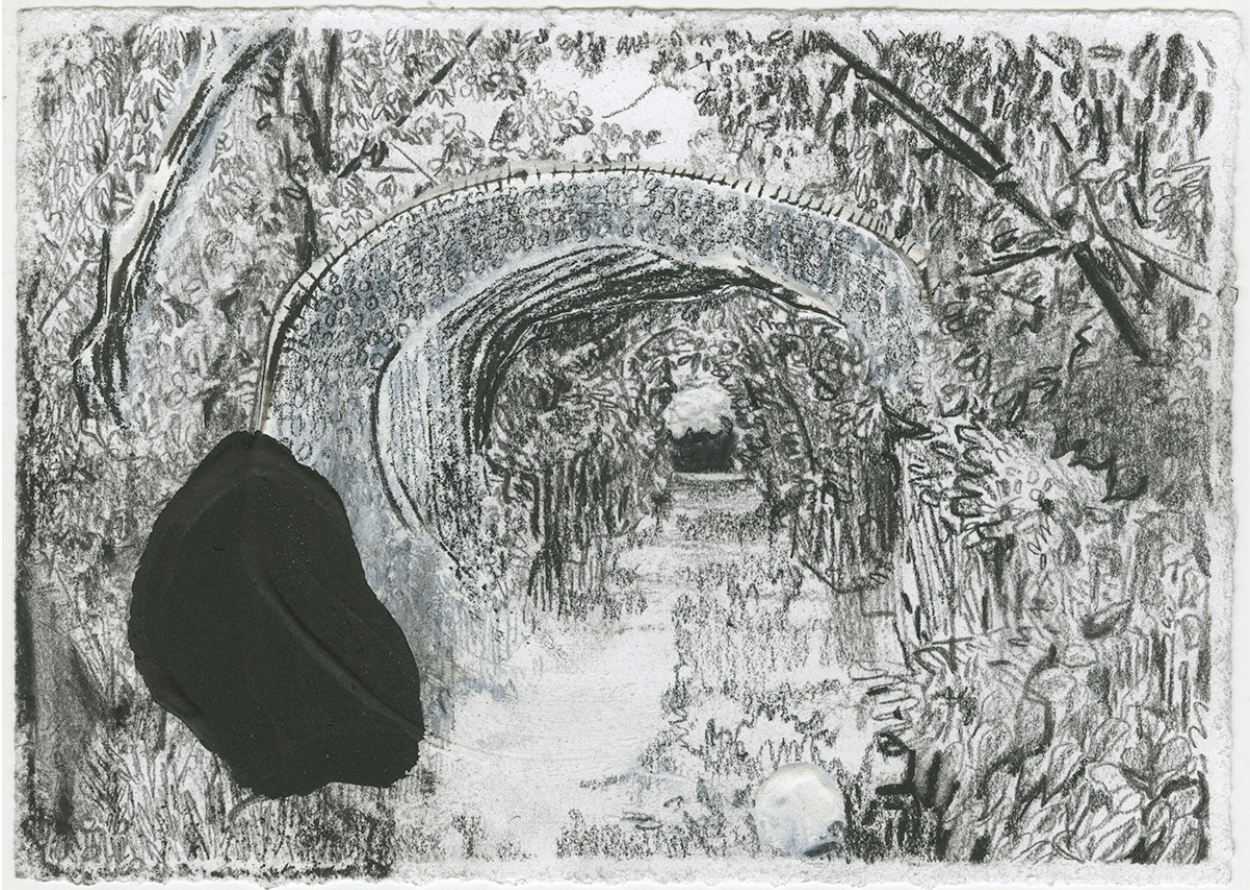
When drawing, it doesn't feel like a mark is just a product of my mind. It is integral to my mind. It reminds me that I don't just think about the world, I think in the world, in my body.

Regardless of how you feel about the factual value of observation, it's important remember that we aren't computers. We exist in bodies and those bodies gather information. In our bodies, we act in the world. This cannot be emphasized enough. As neuroscientist Giacomo

³⁰ This information is available at <http://www.etymonline.com/index.php?term=fact>.

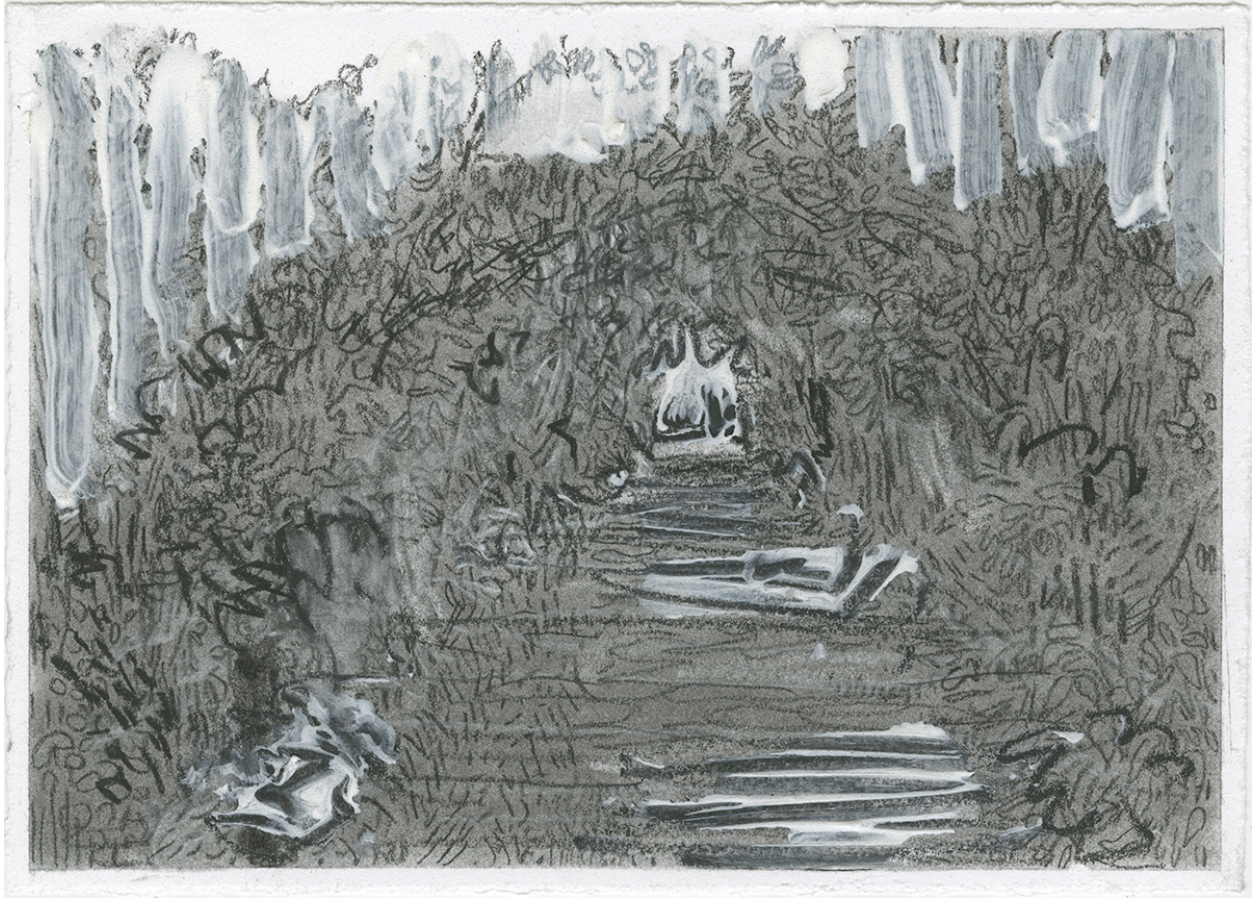
³¹ David Weinberger, *Too Big to Know*, (New York: Basic Books, 2012).

Rizzolatti describes, “...*the acting brain* is also and above all *a brain that understands*.”³² In the act of drawing, I can, for a moment, understand. I sense my place in my body, in the world.



Farther Along 36, 2016. Willow charcoal, charcoal pencil, compressed charcoal, acrylic, and gesso on paper, 5 x 7"

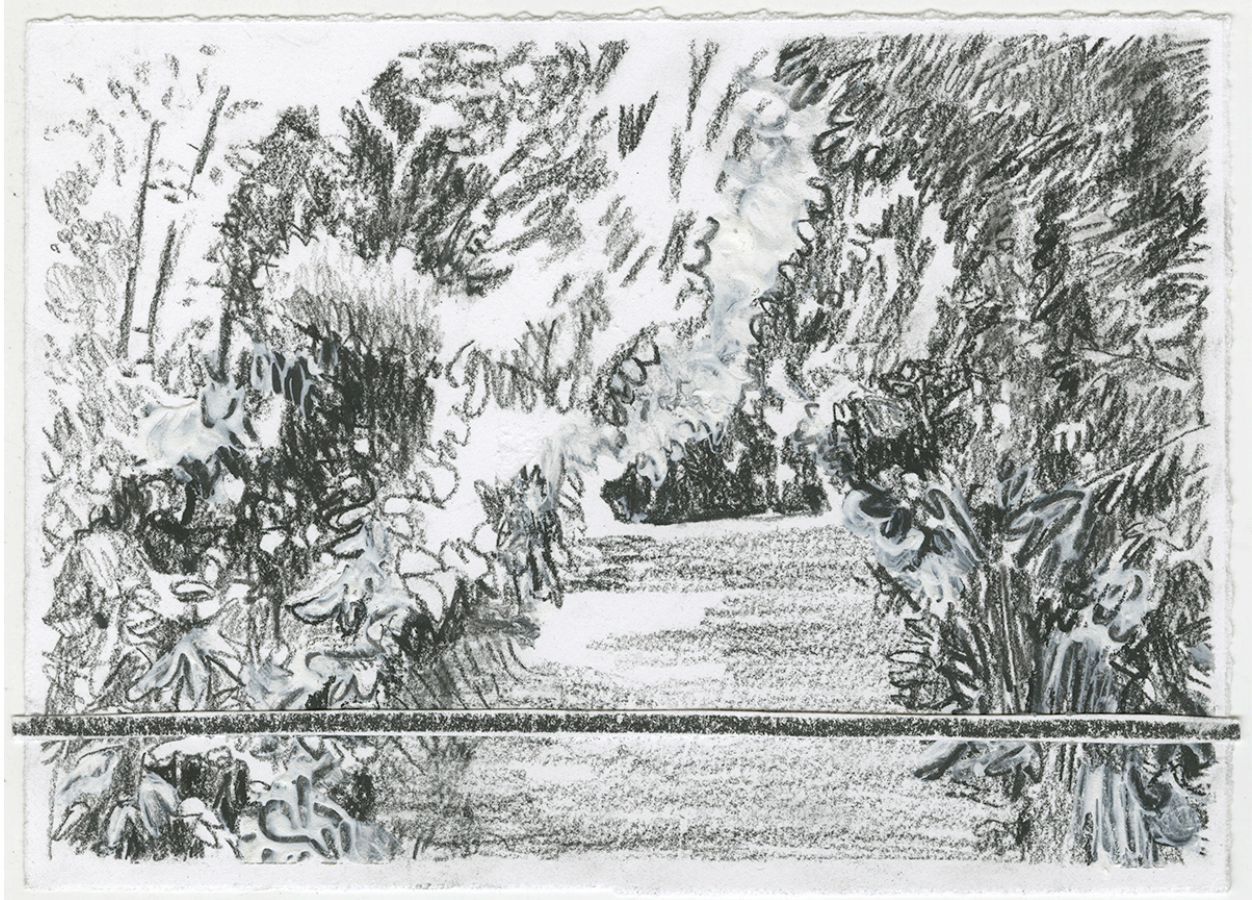
³² Giacomo Rizzolatti and Corrado Sinigaglia. *Mirrors in the Brain: How Our Minds Share Actions, Emotions and Experience*. trans. Frances Anderson. (New York: Oxford University Press, 2006), xi.



Farther Along 37, 2016. Willow charcoal, charcoal pencil, and gesso on paper.



Farther Along 38, 2016. Willow charcoal and charcoal pencil on paper, 5 x 7".



Farther Along 39, 2016. Charcoal pencil, gesso, and cut paper on paper, 5 x 7".

The Path

Sometimes understanding is like walking.

It moves along a line you can see. It's a line through a thought like the line of a drawing. It's a way of moving through information.

On a hike, I prefer to be in front. Otherwise all I see are my feet, your feet, my feet. I can't think about the woods when I see walking. Sometimes, in the woods, I am overcome by awkwardness. Because of the wrong clothes, I think. I get the sense that if I were naked I could be part of what is happening, out there.

I tried it out on a path in Virginia—walking deep into the woods in my sneakers and swishy shorts and T-shirt and bra. I just started pulling them off. And, yes, of course-- there was the air on my chest. And a lightness in my wrists. And everything present around me softly green. I'm in it—like I'm *in* my drawings—no more costume catching the corner of my eye.
Thank you world.

In order of what I look at: My pencil, my fingers, my wrist, my elbow, my shoulder, my back. In order of what's most likely to hurt: My back, my shoulder, my elbow, my wrist, my fingers, my pencil.

Whizzing downriver on my silver bicycle at sunset, the soft violet light wraps around me with the silky dry warmth of the breeze. I breath it all in. Rising. Broadening. Saying, "I am a brain with a body on wheels." Me, in my dusty pink coat, a part of this unspeakable beauty. Everything moving, everything still. I grip the handlebars to pick up speed, grinning at the dinging rattle of my chirping little bell.

When I draw, I hunch, shuffle, shift, sigh. I frown, moan. I pause to inspect.

"Thank you brain," I say to myself smiling. "Thank you body," I say to my hands holding paper. "Thank you world," I say as I see.



Farther Along 40, 2016. Charcoal pencil and cut paper on paper, 2016"

Ending

In a world facing the effects of rising fundamentalism and dogmatic thinking, we, more than ever, need strategies for understanding that embrace the known and unknown. Drawing brings attention to the information we navigate in our environment and reminds us that we've always lived in an infinitely complex and layered world. Faced with the challenge of reaching understanding from limited knowledge, I believe we are called to find the joy in humility and the joy in striving. Built on contradictions, my creative work is a manifestation of both.

Between the hand and the eye, marks build and gather to summon a poetry that's both beyond and within the material. A line becomes a horizon, a mood, a wish, and it reminds me of the slivers of light hitting the back of our eye, or of the shadows blinking in Plato's cave. A mark is specific, but also generative. It's plain, and it's inherently metaphorical. A drawing is an emergent structure of visual information. It's knowledge. And it's some ash clinging to a slip of paper.



Farther Along 42, 2016. Willow charcoal, charcoal pencil, Dura-Lar, matte media, cut paper, and gesso on paper, 5 x 7".

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