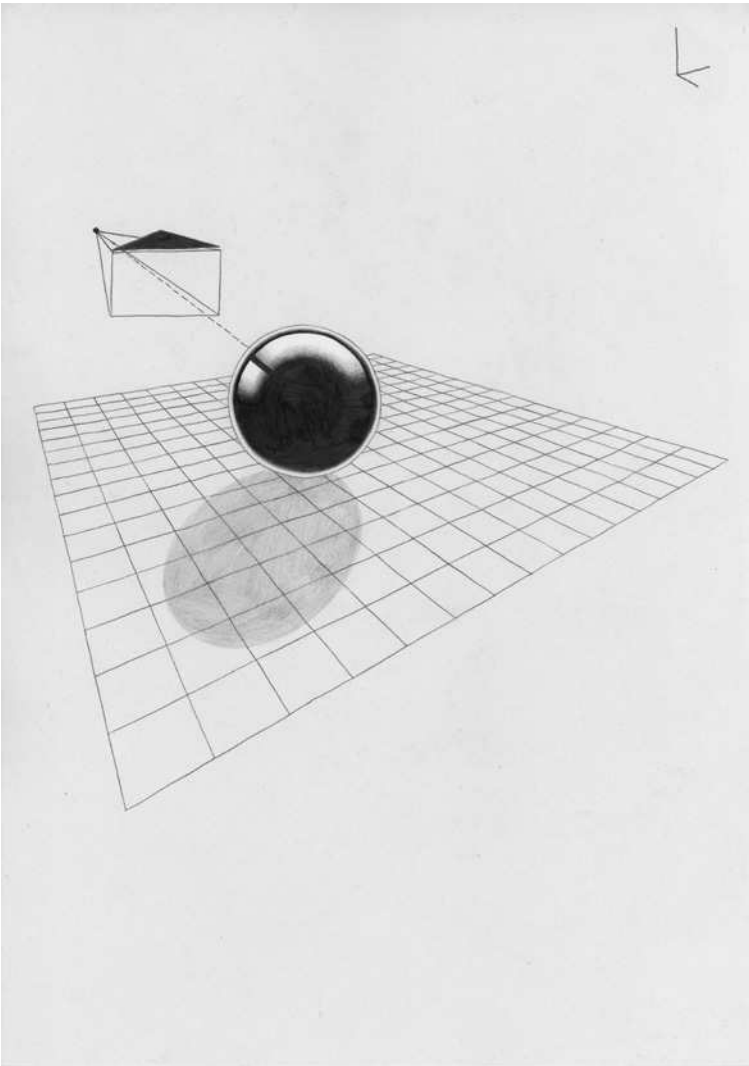


Hi Mathew,

I promised I'd send some notes after we spoke.

The camera mounted on a robotic arm that I mentioned is called Milo. It can be programmed in various ways. A sequence of moves performed by a human camera operator can be recorded and reproduced by the camera; or a set of spatial coordinates can be plotted and executed, the camera smoothly tracing the optimal movement from one position to the next to achieve particular sequential perspectives; or a target can be registered and then automatically tracked; and so on.

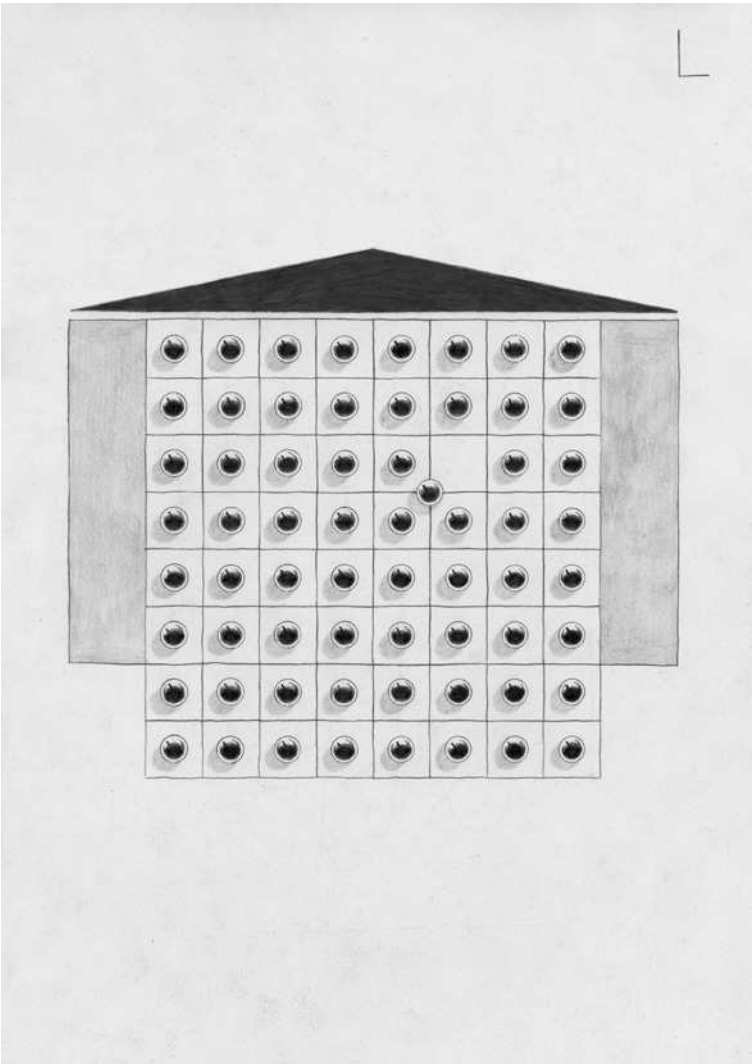
Most interesting to me, though, is how the camera can be programmed to follow a vector—like a drawing in space, a path with the potential to yield a sort of *autonomous form*; or perhaps the potential to "write" in space, akin to French film critic and director Alexandre Astruc's concept of the *caméra-stylo*. British artist Runa Islam's 2008 film *Empty the pond to get the fish* is exemplary: the camera surveys the interior of the former Museum Moderner Kunst in Vienna, now empty, while its movement in space spells out the work's title.

We talked about imagining programmable movements in relation to subjects and situations, compiling a set of vectors for looking. I'm sending you here some ideas for these, drawn from different fields. Excited to see how you might visualize them.

– James

Some of the following scenes have appeared before, in *Fillip*, no. 17, and *Bricks from the Kiln*, no. 1.

Cover: Key.



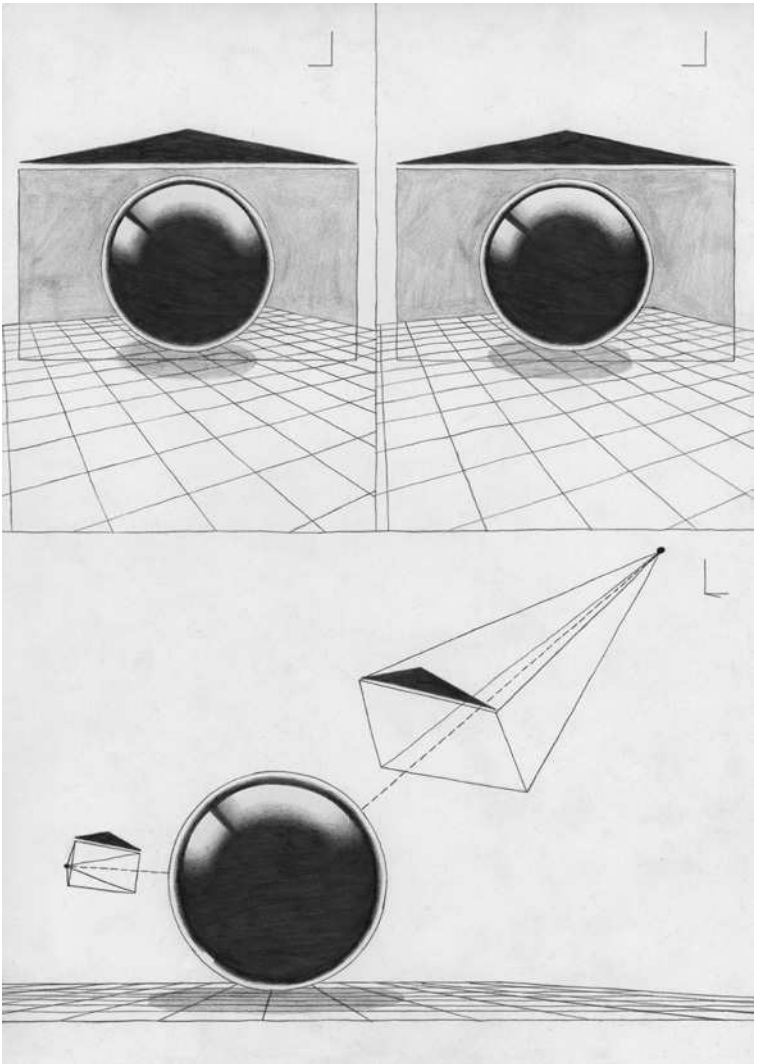
1. REGISTERING

In the process of writing his short book *Tentative d'épuisement d'un lieu parisien* (*An Attempt at Exhausting a Place in Paris*) (1975), Georges Perec regularly visited Place Saint Sulpice to observe its routines of everyday life. The text documents his findings prosaically, listing phenomena and speculatively classifying them. The fixed elements: architecture, street furniture and signage, even the ground — packed gravel and sand. And the fleeting: trajectories of traffic, gestures of people in motion — carrying a bag or holding a child's hand. That no particular drama occurs is precisely the point.

A photograph taken around 1974 and reproduced in the book *Georges Perec Images* shows the author at work on *Tentative d'épuisement d'un lieu parisien* at a window seat in Café de la Mairie on Place Saint Sulpice. Seen through the glass from outside, he poses as an artist-at-work. On his table are writing paper, cigarettes, and a cup of coffee. He looks purposeful and alert, smiling with a certain satisfaction. What explains his expression? Perhaps it is the realization that his presence is subtly subversive. His fixed position situates him outside the incidental flow of life, which — it follows — reveals itself only to him, eluding the distracted attention of those who appear in the text, preoccupied by getting to work, shopping, running errands.

If you stay in one place it becomes easier to register movement, *to see what's going on.*

←



2. ALIGNING

Repeat photography is a documentary technique used in natural sciences such as geology, meteorology, and geomorphology. A repeat photograph recreates as exactly as possible the composition of an original photograph. *Second View: The Rephotographic Survey Project* (1984) is an exemplary publication in the genre. From 1977 to 1979 a group of photographers led by Mark Klett, Ellen Manchester, and JoAnn Verburg, repeated a series of 122 photographs made in the late 19th century for the United States Geological Survey.

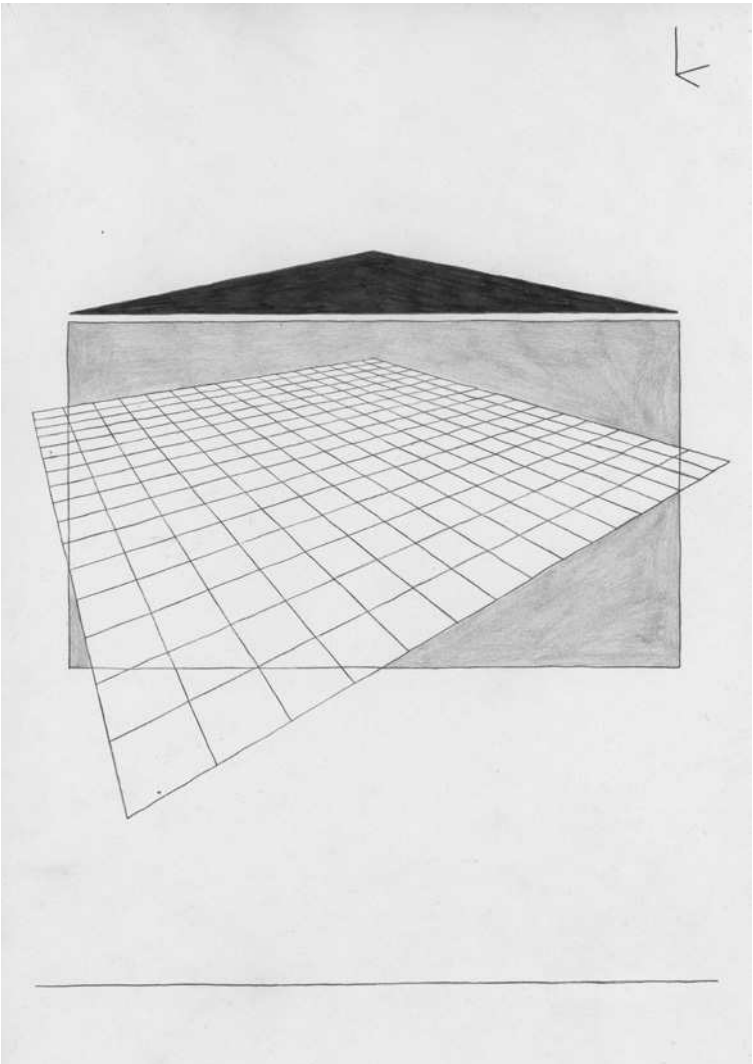
Presented next to the originals, on first inspection the repeat photographs reveal predictable narratives. Many pairs chart the domestication of wilderness — the imposition of highways and other evidence of urbanism on previously remote parts of the country. A barren desert landscape in Green River, Wyoming, photographed in 1872, is transformed in a repeat photograph from 1979. Trees, houses, vehicles, and telephone lines have appeared to obscure the view. At the upper edge of the image, a sheer butte of rock that dominated the original photograph is relegated to a background detail.

Other pairs diverge according to contrary forces. The Nevada landscape besieged by mining in the 19th century has, 100 years later, been stripped of its mineral wealth and returned to bleakest desert, the heavy machinery and workers' accommodations all disappeared.

The most extraordinary pairs are almost impossible to differentiate. Two photographs of Vermillion Creek Canyon in Colorado, taken 107 years apart, record a landscape uncannily preserved. The view is from the base of the canyon looking toward the open sky, steep walls of sandstone framing the composition on both sides. Unbelievably, the two pictures are essentially the same, even small formations of rock remain unmoved by a century.

Several appendices establish the technical difficulty of achieving such fidelity to original photographs. The position, orientation, and specification of camera and lens at each site were deduced by studying the images and triangulating distinctive features in the landscapes. Then there is the matter of timing. Daily and annual arcs of the sun, seasonal cycles of growth and decay, all leave signatures in an image. To repeat the original Vermillion Creek Canyon photograph, including the position of the shadows, numerous factors required calculation. Even after such extensive preparation, the fidelity of the repeat photograph was still contingent on the weather.

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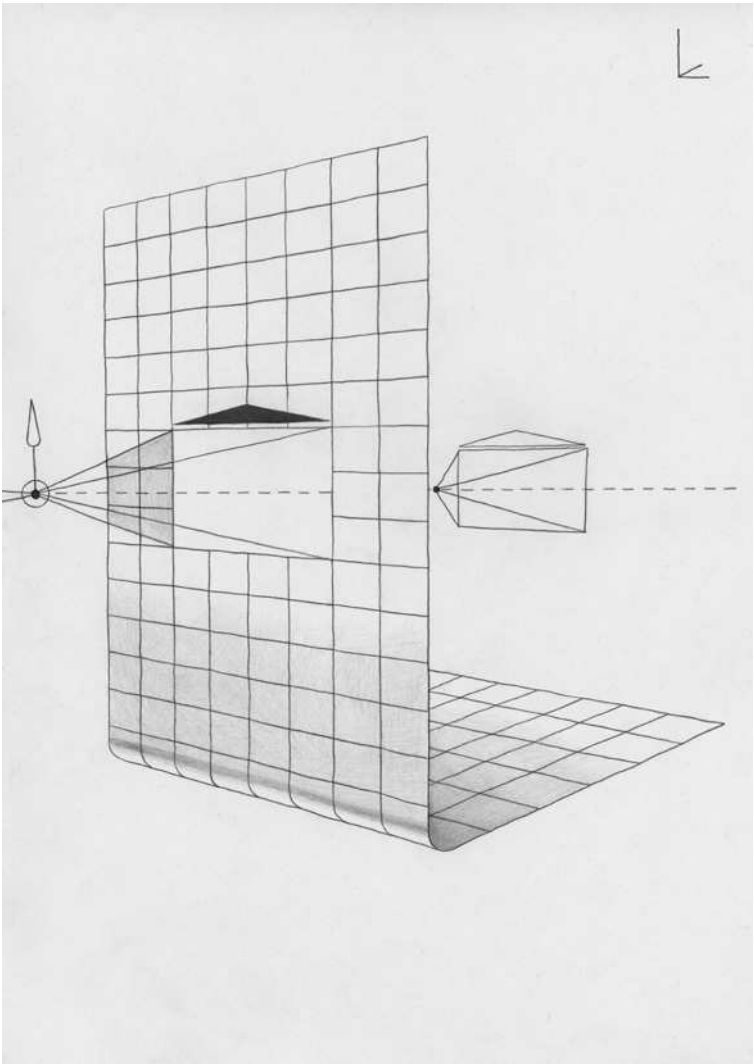
3. SENSING

Considering their inaccessible habitats and reclusive instincts, it is surprising that typical photographs of snow leopards show them looking directly, curiously, into the camera. Such images are produced using remote cameras triggered by movement, or by the heat signature of a mammal in their field of view. The animals apparently find the cameras mysterious and stop to examine them. Some cameras automatically send the images that they capture to their operators, avoiding a human presence that might deter the animals.

The domestic cat in Bruce Nauman's *Mapping the Studio* series (from 2001) exhibits what is likely more routine behavior. Nauman used an infrared video camera to record events in his studio over several nights when he was not there. In the studio environment the camera attracts no attention and everything goes on as normal — nothing happens, a mouse appears, the cat chases the mouse, nothing happens, an insect appears.

Nauman reviewed his considerable volume of footage manually with a notebook to list the timings of events. To some extent tedium is the point, but an irony remains: according to these two procedures it takes less human attention to see a snow leopard — one of the most elusive mammals on the planet — than Nauman's pet cat.

←



4. STALKING

In Sophie Calle's *Suite vénitienne* (1979), the artist adopts the guise of a private detective. Having previously made several works in which she follows strangers through urban Paris, she resolves to raise the stakes. She meets a man, "Henri B.," at a party in Paris. He says he is about to take a trip to Venice, and she decides to follow him, documenting the process in text, photographs, and maps.

The journey lasts 13 days but does not conform to the expected dynamics of pursuit. At the outset Calle writes:

I see myself at the labyrinth's gate, ready to get lost in the city and in this story. Submissive.

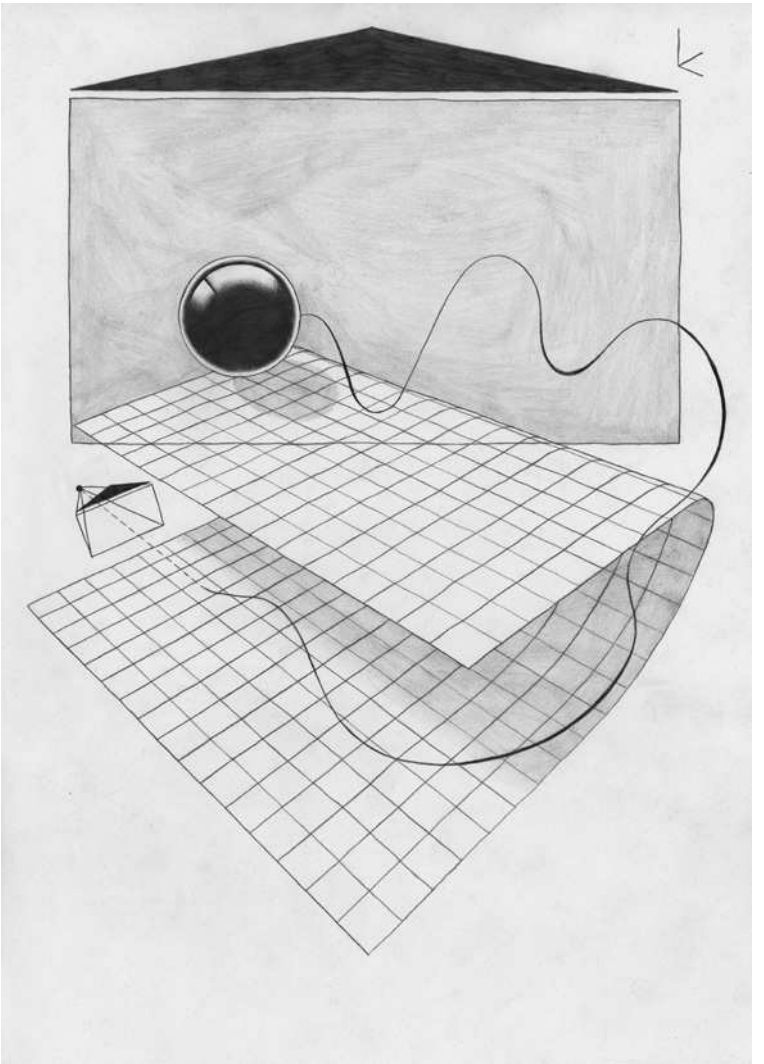
She is in Venice for several days before she finds Henri B. During this time she rehearses some clichés of the private investigator. She takes photographs of strangers while appearing to look in the other direction. She observes people in the reflection of a shop window. She changes her appearance with a blond wig.

I slip through the streets. A dread is taking hold of me: he recognized me, he's following me, he knows.

Thrilled and anxious, the precariousness of the situation seems to sustain her. The experience of being a covert observer becomes more the subject than Henri B. That is, until she eventually finds him and begins to shadow him through the labyrinth of Venice. He is apparently a photographer, exploring the city through his camera.

Ponte della Madonetta — he crouches to snap a shot of the canal, or perhaps of that passing boat? After several seconds, I imitate him, trying my best to take the same picture …

←



5. TRACKING

In *The Peregrine* (1967), J. A. Baker writes through a winter spent cycling around Essex with his binoculars in pursuit of peregrine falcons. He is an admirer. He describes the pure vectors of the hunting hawks as they "slip smoothly through the wind," "glide," "veer," "flinging and darting" at "sudden tangents." Most encounters end with a kill, which Baker reports with strikingly linear prose:

He … dived vertically down … his body shooting off like an arrow from the tight-strung bow of his wings.

But there is a problem on the ground:

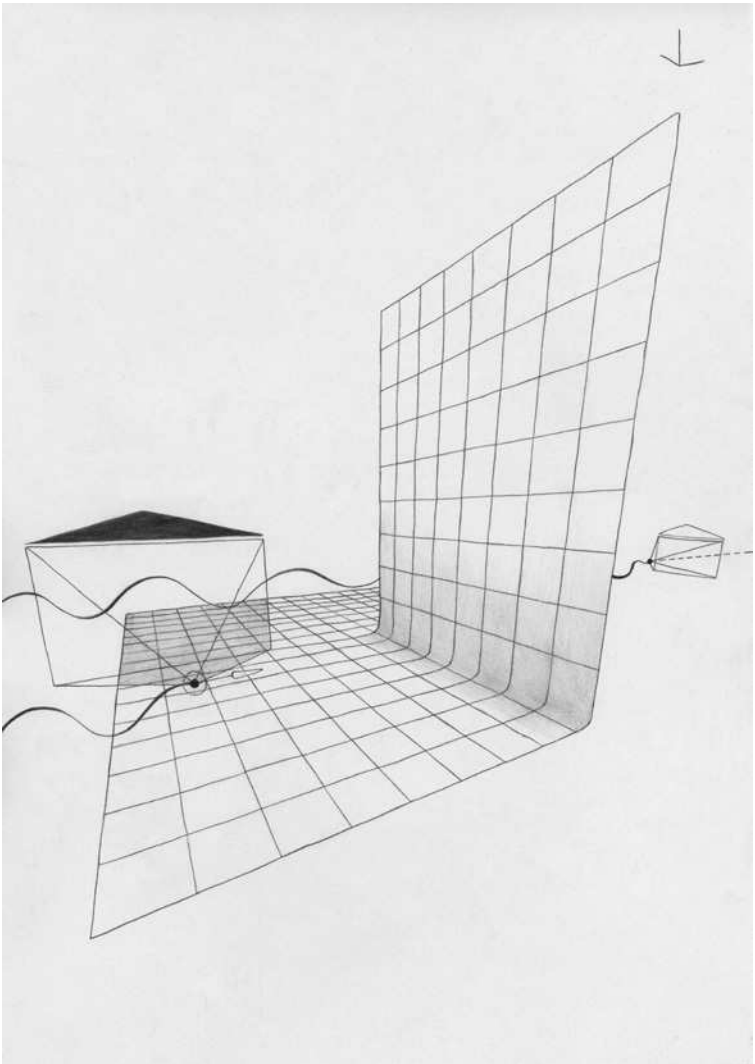
As so often on spring evenings, no birds sing near me, while all the distant trees and bushes ring with song. Like all human beings, I seem to walk within a hoop of red-hot iron, a hundred yards across, that sears away all life. When I stand still it cools, and slowly disappears.

Gradually the birds become familiar with his presence. They even appear to manipulate him, drawing him towards sheltered spots to flush out prey. In response, Baker subverts his conspicuousness by bringing a psychological dimension to his pursuit:

By two o'clock I had been to all the peregrine's usual perching places, but had not found him. Standing in the fields near the north orchard, I shut my eyes and tried to crystallize my will into the light-drenched prism of the hawk's mind.

In the book's final scene Baker ultimately bids to escape his hoop. Concealed from view, he stealthily maneuvers himself to within a few feet of a resting peregrine. As he emerges from cover, the bird detects him immediately. The reader, who has been conditioned by this point, anticipates a wild reflex. The bird closes its eyes and sleeps.

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6. CHANNELING

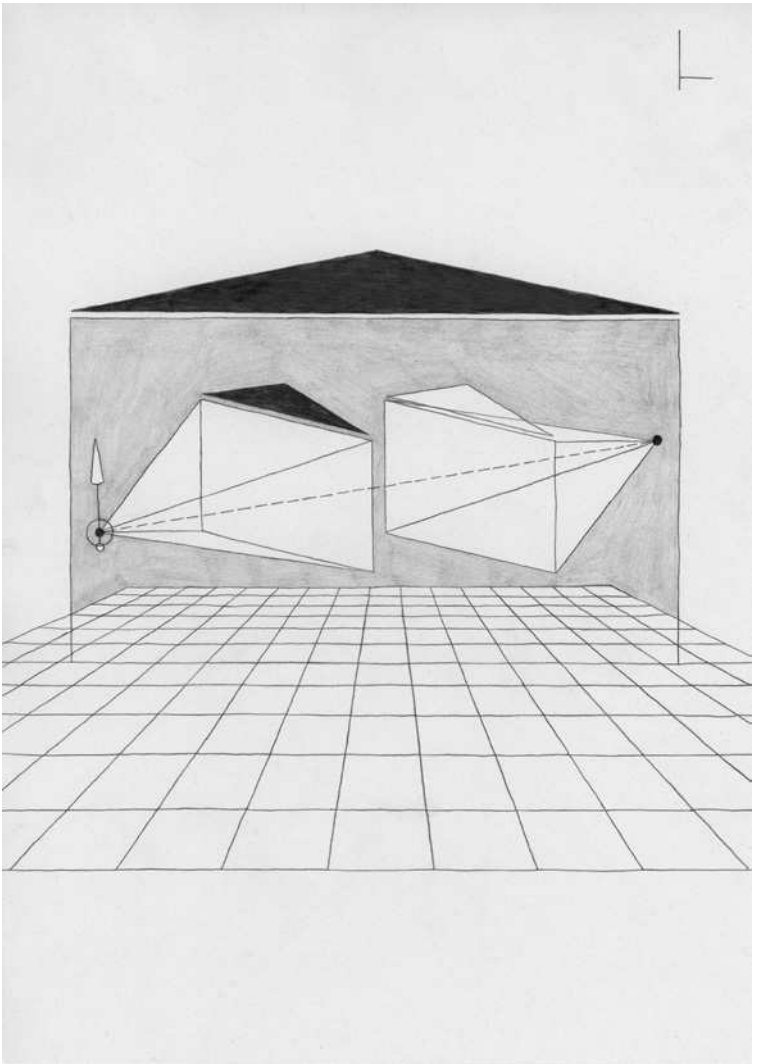
Julia Blackburn's 2015 biography of John Craske is called *Threads*. Craske was a fisherman who suffered from an unidentified debilitating illness. In his convalescence he became an embroidery artist. He rendered views of the sea, the Norfolk coast, the daily lives of fishermen in the first decades of the 20th century. Blackburn saw Craske's work and was compelled to write about it. But there was so little to go on: a few examples of his work in provincial museums around Norfolk; a few people distantly connected to him; some surviving correspondence and documents in local archives and libraries. She judiciously reviewed these sources, but what seems to have motivated her is not information but empathy.

The arc of her journey follows an elusive document, *My Life Story of the Sea*, a short memoir written by Craske but now lost. She can find no copy with an archive or with Craske's surviving family. She begins to fictionalize the missing text, imagining scenarios in which she might discover it.

In absence of this text, Blackburn's attempts to relate to Craske become increasingly speculative. She stays in places that would have been familiar to him, observing the sea and the quality of light. She consults experts in embroidery and in endocrinology, seeking insight into his technique and his illness. Circuitously, she meets a man called Keith, a fisherman from Cromer, onto whom she immediately projects her fantasies of Craske's state of mind. She asks Keith to write *My Life Story of the Sea*. No doubt mindful of her longing, Keith delivers *The Sea and Some of What I Have Learned about It*. Delighted, she embeds the text within her own:

And then the sea itself like glass one day and a raging monster the next, waves thirty feet high so you crawled all the way to the top where you could see for miles and miles, then racing down into the trough so when you look up all you can see is water all around you.

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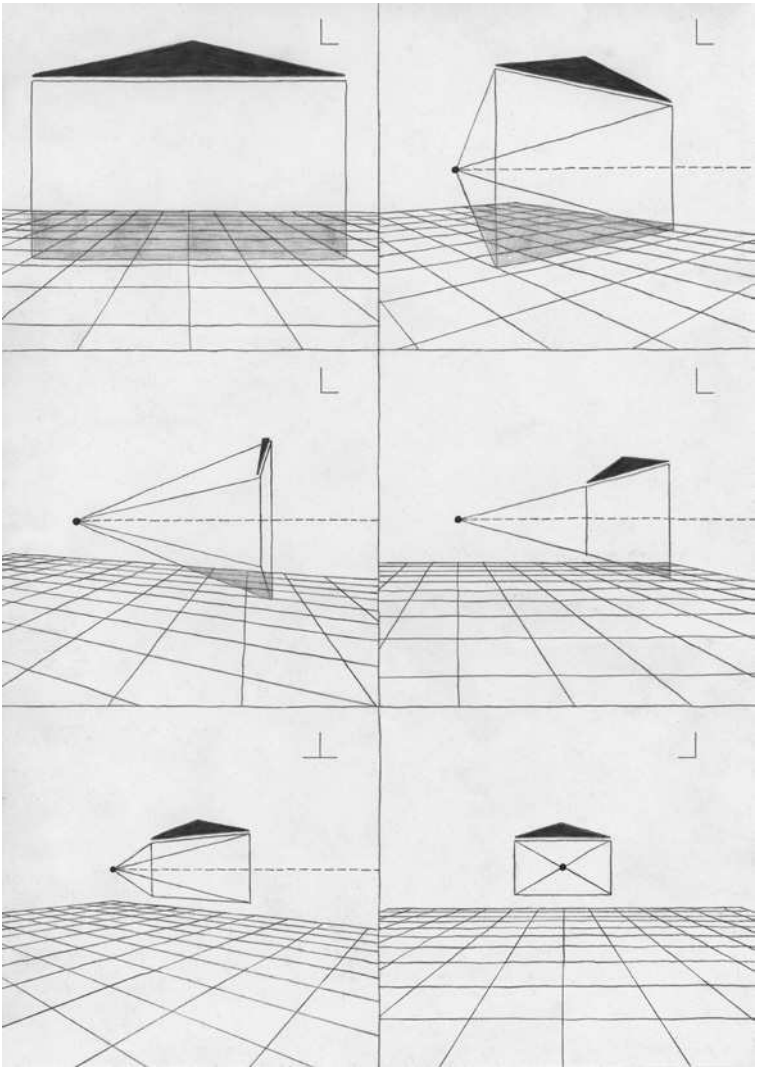


7. EMBODYING

In James Benning's films the camera never moves but the experience is quite unlike looking at a photograph. Stillness is not the point. *Natural History* (2014) documents the Naturhistorisches Museum in Vienna. The camera inspects the public and the unseen spaces of the museum: vitrines, offices, stores, the building's infrastructure and services. Toward the end of the film are two shots in a corridor, unoccupied but apparently a public space. The first, about ten seconds long, shows the space dimly lit by arched windows to the right of the image. Lining the wall at left are wooden display cabinets with glass fronts, containing hundreds of human skulls arranged in tight rows.

The second shot, of two skulls closely framed, is three minutes, 20 seconds. There is sound: ambient noise from the building, the echoing voices of visitors. In filmic time, it's a long stretch for nothing to happen. The viewer's attention cycles through scrutiny, boredom, antagonism and reconciliation, registering the patination of these particular skulls: the marbling of their bone surfaces, the differing condition of the teeth—complete and clean on the left, shattered and discolored on the right—some speculation about their age, their identity, their origin. Finally, a restless urge. The viewer begins to embody the camera, to personify it, to socialize it. The preceding image of the corridor situates this imaginary observer. Unmoving, unflinching, fixated on the two skulls, just standing there, staring at the skulls.

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8. RELATING

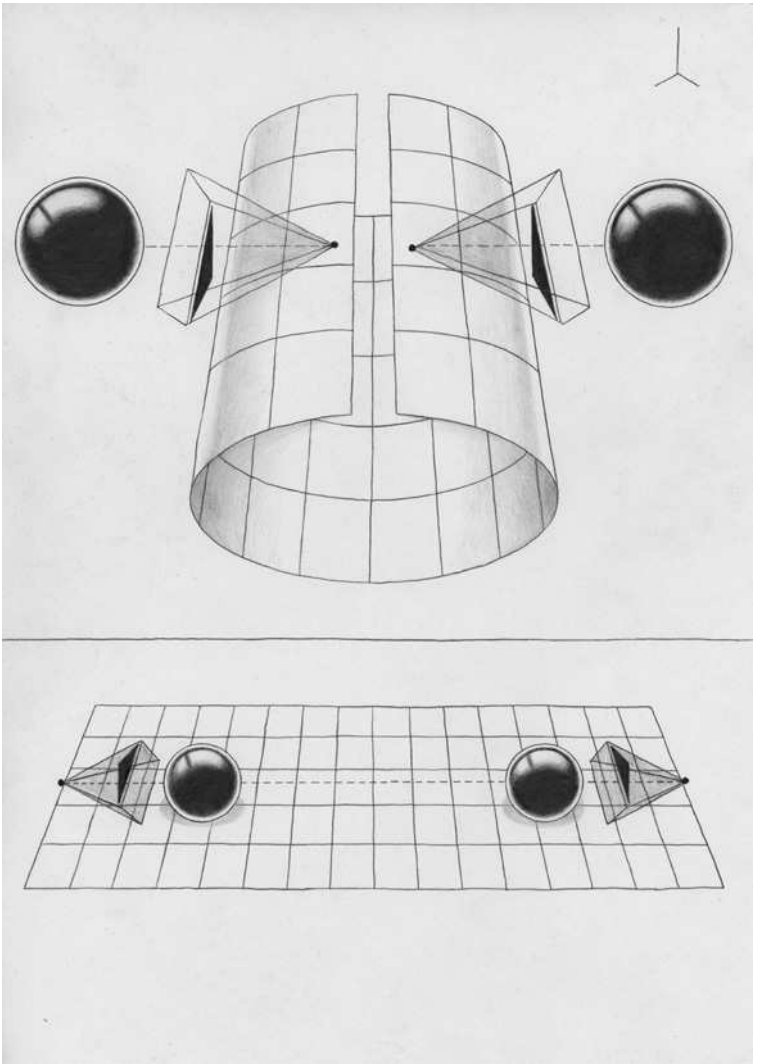
For three decades Richard Proenneke lived in the wilderness, building a cabin in remote Alaska and surviving there as a hunter-gatherer. He recorded his activities using a 16mm film camera on a tripod, and a number of documentaries about his life were later produced from this material, including *Alone in the Wilderness* (2004), narrated by Proenneke himself.

Before the self-conscious aesthetics of the selfie-stick, Proenneke resolved how to behave in front of his disembodied camera. Formally, his photography is more calculated than adventurous. He typically produces two kinds of shot. Either he appears working —sawing timber, fashioning tools, preparing food—or traversing, emerging from behind the camera and walking out into the landscape beyond.

The preparation of shots is unseen but easy to imagine. One scene from *Alone in the Wilderness* shows Proenneke canoeing across a lake. He enters the frame at the right, rowing out and across the water as his voice-over announces a hunting trip. Thinking laterally, to film this he must have first set up the camera and mentally noted some point of reference in the landscape, so that he might enter the frame believably into his rowing stroke. Then, having performed his crossing—and without glancing back at the camera to check his position—he had to come back around to retrieve the camera before the actual trip could begin. He would have no way to review the footage to be sure his performance was convincing.

The lonely existential narrative of survival, the epic landscape, and the inconvenience all remain equally imperceptible in Proenneke's stoic demeanor.

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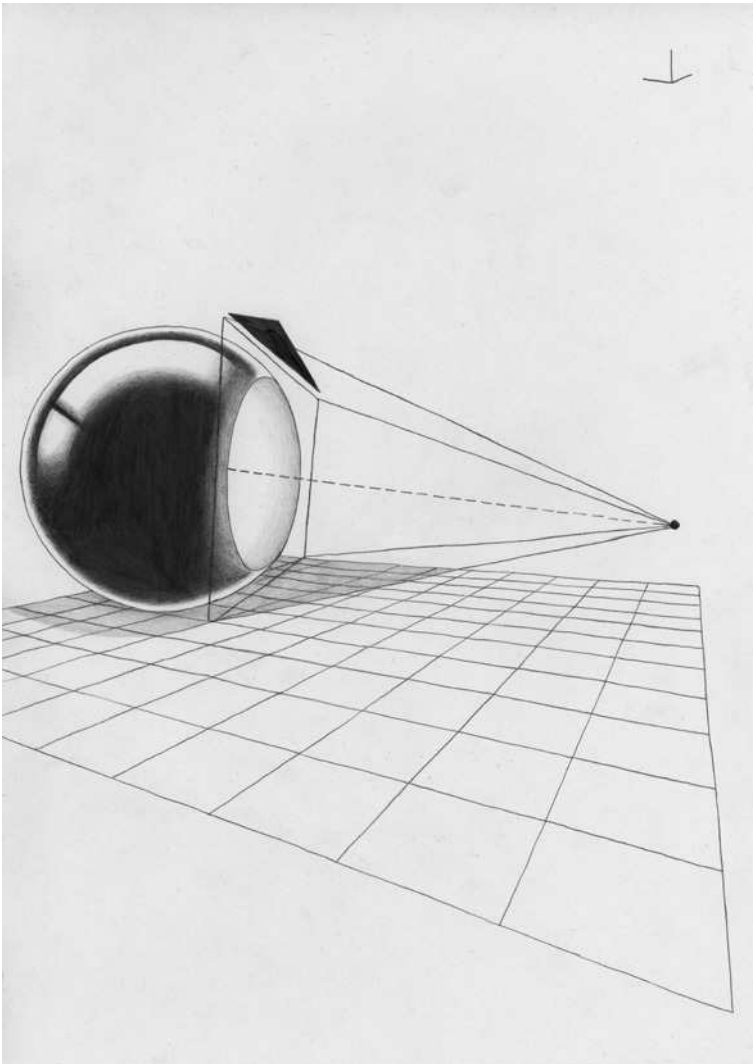
9. RECONCILING

In 1961, at White Memorial Hospital in Los Angeles, a small group of patients voluntarily underwent an experimental surgery to irreversibly sever the channel of nerves connecting the two hemispheres of their brains. The surgery was a last resort to treat uncontrollable epilepsy by preventing the feedback of electrical signals between the hemispheres that occurs during a seizure.

Post-surgery, Michael Gazzaniga's laboratory at CalTech initiated a series of experiments to test the visual perception of these split-brain patients. In a film demonstrating his testing apparatus, Gazzaniga is seen operating a modified tachistoscope. He describes how he trained the patients to fixate their vision unrelentingly on a point in the center of their visual field. Using the tachistoscope, he would flash images to the right or left of the point for a fraction of a second, and then questions the patients about what they had seen. The brain processes images from the right and left visual fields separately — images received in the left field are processed in the right hemisphere, and vice versa. In a normal brain this modular processing is undetectable and inconsequential, because the brain pre-consciously combines the sensory input to create the perception of a unified visual field.

Gazzaniga discovered that a split-brain patient is difficult to test. Even with the direct connection between hemispheres severed, pre-conscious routines in the brain are powerfully equipped to resolve conflicting information and present a coherent vision of reality to the conscious mind. Unable to explain some of his results, Gazzaniga gradually realized that patients were unconsciously using "cross-cueing" gestures and other subtle behavioral signals to share information across hemispheres, enabling one of their isolated hemispheres to correctly identify images that it never actually saw. This brought an adversarial dynamic to the study, the scientist in competition with the patient's unconscious brain.

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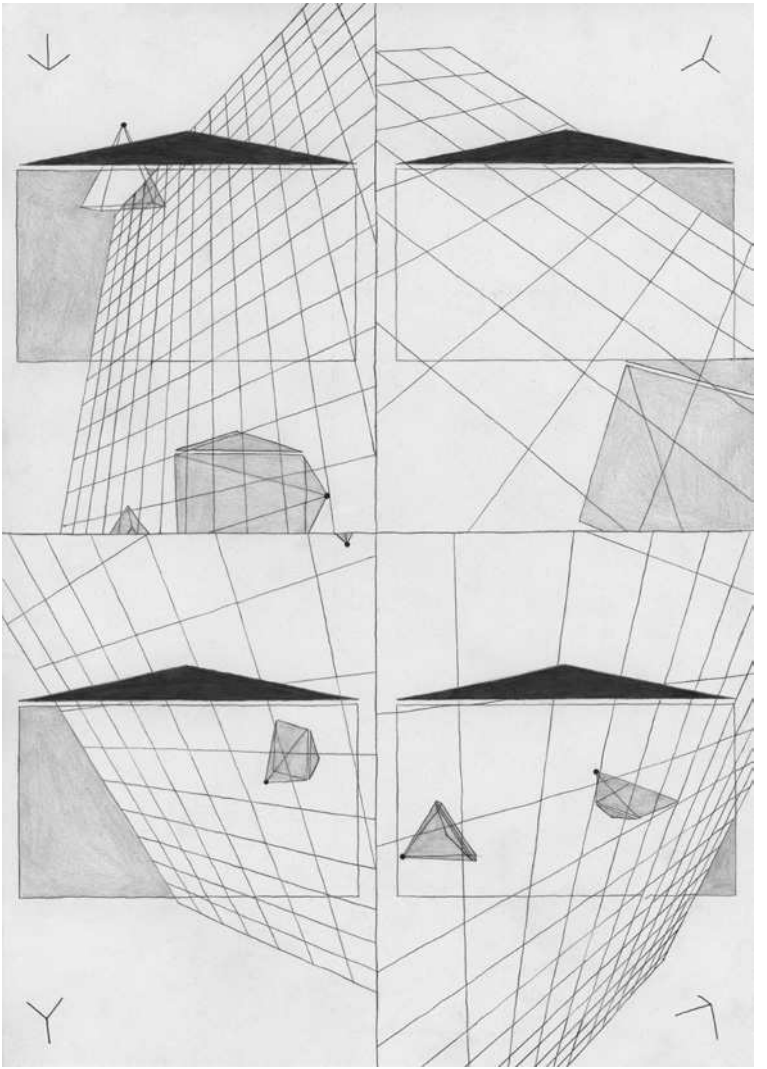
10. OPENING

The cutaway is a genre of illustration that provides a partial view inside an object for the purpose of revealing what it is made of and how it functions. The cutaway is distinguished from more comprehensive and diagrammatic forms of technical representation by its characteristic graphic device: the opening. The surface of a subject — its skin, bodywork, or other encasement — is selectively removed to show what it conceals.

The history of the cutaway spans several cultural registers. Significant works of Renaissance anatomy, such as Andreas Vesalius's *De humani corporis fabrica* (1543), mark a period in which the cutaway offered the most advanced medical imaging in existence, rendered directly by skilled draftsmen from observation of dissections conducted by the work's author.

The illustrated cutaway is presently in sharp decline, made redundant perhaps by the outputs of CAD (Computer-Aided Design) software. Representations of designed objects from an infinite number of perspectives are routinely derived from the same digital information that will program the machines that manufacture these objects. Satisfying though this process is in its technical fidelity to an original design, what is lost is something of the artfulness of the cutaway. Graphic artists such as the "cutaway king" Yoshihiro Inomoto worked not only as technicians, but as enthusiasts. Inomoto's cutaway drawings of powerful cars, loaded with implausible levels of detail, project an expression of love for the world of engineering and machines. Inomoto might exaggerate a powerful engine with scale and perspective, emphasizing a feeling for the car as an iconic object with meaning beyond its technical specifications. The gaze of the cutaway craves the opening.

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11. FLATTENING

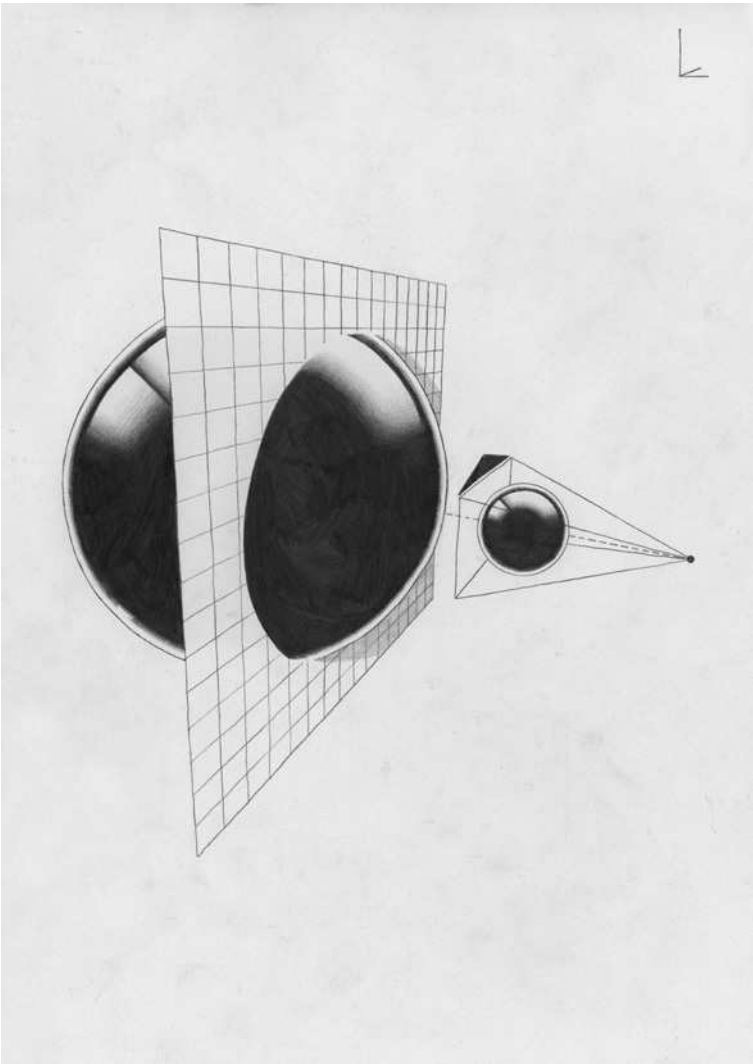
In *The Virtual Window* (2006), Anne Friedberg constructs a conceptual lineage from Leon Battista Alberti's Renaissance study of perspective to the contemporary computer interface. She writes:

> Perspective may have met its end on the computer desktop. As computing devices added a screen for the display of data, the graphical user interface (GUI) introduced an entirely new visual system — a text or image in one "window" meets other text or images in other "windows" on the same screen. Above, below, ahead, and behind are simultaneous on the computer display, where each element in composition is seen separately with no systematic spatial relationship between them.

Consider this pervasive mode of looking in relation to an anecdote from Walter Isaacson's 2011 biography of Steve Jobs, co-founder of Apple, the company that popularized the GUI:

> One of the most extreme — and telling — implementations of that philosophy came when he scrutinized the printed circuit board that would hold the chips and other components deep inside the Macintosh. No consumer would ever see it, but Jobs began critiquing it on aesthetic grounds. "That part's really pretty," he said. "But look at the memory chips. That's ugly. The lines are too close together." One of the new engineers interrupted and asked why it mattered. "The only thing that's important is how well it works. Nobody is going to see the PC board." Jobs reacted typically. "I want it to be as beautiful as possible, even if it's inside the box … even though nobody's going to see it."

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12. ALL-SEEING

Nothing in all creation is hidden from God's sight; everything is uncovered and exposed before the eyes of Him to whom we must give account.

(Hebrews 4:13)

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