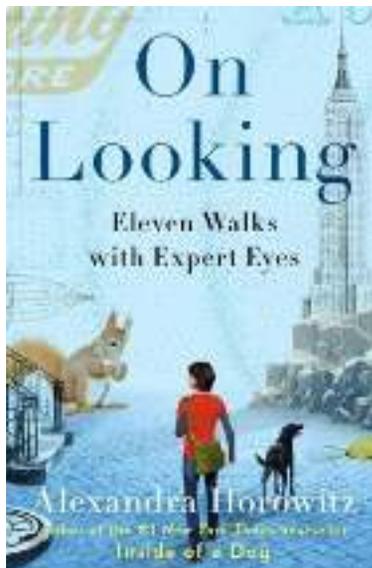


# The Art of Looking: Eleven Ways of Viewing the Multiple Realities of Our Everyday Wonderland

Maria Popova



“How we spend our days,” Annie Dillard wrote in her timelessly beautiful meditation on [presence over productivity](#), “is, of course, how we spend our lives.” And nowhere do we fail at the art of presence most miserably and most tragically than in urban life — in the city, high on the cult of productivity, where we float past each other, past the buildings and trees and the little boy in the purple pants, past life itself, cut off from the breathing of the world by iPhone earbuds and solipsism. And yet: “The art of seeing has to be learned,” [Marguerite Duras reverberates](#) — and it *can* be learned, as cognitive scientist **Alexandra Horowitz** invites us to believe in her breathlessly wonderful [On Looking: Eleven Walks with Expert Eyes](#) ([public library](#)) — a record of her quest to walk around a city block with eleven different “experts,” from an artist to a geologist to a dog, and emerge with fresh eyes mesmerized by the previously unseen fascinations of a familiar world. It is undoubtedly one of the most stimulating books of the year, if not the decade, and the most enchanting thing I’ve read in ages. In a way, it’s the opposite but equally delightful mirror image of Christoph Niemann’s [Abstract City](#) — a concrete, immersive examination of urbanity — blending [the mindfulness of Sherlock Holmes](#) with [the expansive sensitivity of Thoreau](#).

Horowitz begins by pointing our attention to the incompleteness of our experience of what we conveniently call “reality”:

Right now, you are missing the vast majority of what is happening around you. You are missing the events unfolding in your body, in the distance, and right in front of you.

By marshaling your attention to these words, helpfully framed in a distinct border of white, you are ignoring an unthinkably large amount of information that continues to bombard all of your senses: the hum of the fluorescent lights, the ambient noise in a large room, the places your chair presses against your legs or back, your tongue touching the roof of your mouth, the tension you are holding in your shoulders or jaw, the map of the cool and warm places on your body, the constant hum of traffic or a distant lawn-mower, the blurred view

of your own shoulders and torso in your peripheral vision, a chirp of a bug or whine of a kitchen appliance.

This adaptive ignorance, she argues, is there for a reason — we celebrate it as “concentration” and welcome its way of easing our cognitive overload by allowing us to conserve our precious mental resources only for the stimuli of immediate and vital importance, and to dismiss or entirely miss all else. (“Attention is an intentional, unapologetic discriminator,” Horowitz tells us. “It asks what is relevant right now, and gears us up to notice only that.”) But while this might make us more efficient in our goal-oriented day-to-day, it also makes us inhabit a largely un-lived — and unremembered — life, day in and day out.



Art by Maira Kalman from ‘On Looking: Eleven Walks with Expert Eyes’

For Horowitz, the awakening to this incredible, invisible backdrop of life came thanks to Pumpernickel, her “curly haired, sage mixed breed” (who also inspired Horowitz’s first book, the excellent [Inside of a Dog: What Dogs See, Smell, and Know](#)), as she found herself taking countless walks around the block, becoming more and more aware of the dramatically different experiences she and her canine companion were having along the exact same route:

Minor clashes between my dog’s preferences as to where and how a walk should proceed and my own indicated that I was experiencing almost an entirely different block than my dog. I was paying so little attention to most of what was right before us that I had become a sleepwalker on the sidewalk. What I saw and attended to was exactly what I expected to see; what my dog showed me was that my attention invited along attention’s companion: inattention to everything else.

The book was her answer to the disconnect, an effort to “attend to that inattention.” It is not, she warns us, “about how to bring more focus to your reading of Tolstoy or how to listen more carefully to your spouse.” Rather, it is an invitation to [the art of observation](#):

Together, we became investigators of the ordinary, considering the block — the street and everything on it—as a living being that could be observed.

In this way, the familiar becomes unfamiliar, and the old the new.

Her approach is based on two osmotic human tendencies: our shared capacity to truly *see* what is in front of us, despite our conditioned concentration that obscures it, and the power of individual bias in perception — or what we call “expertise,” acquired by passion or training or both — in bringing attention to elements that elude the rest of us. What follows is a whirlwind of endlessly captivating exercises in attentive bias as Horowitz, with her archetypal New Yorker’s “special fascination with the humming life-form that is an urban street,” and her diverse companions take to the city.

First, she takes a walk all by herself, trying to note everything observable, and we quickly realize that besides her deliciously ravenous intellectual curiosity, Horowitz is a rare magician with language. (“The walkers trod silently; the dogs said nothing. The only sound was the hum of air conditioners,” she beholds her own block; passing a pile of trash bags graced by a stray Q-tip, she ponders parenthetically, “how does a Q-tip escape?”; turning her final corner, she gazes at the entrance of a mansion and “its pair of stone lions waiting patiently for royalty that never arrives.” Stunning.)

But as soon as she joins her experts, Horowitz is faced with the grimacing awareness that despite her best, most Sherlockian efforts, she was “missing pretty much everything.” She arrives at a newfound, profound understanding of what William James meant when he wrote, *“My experience is what I agree to attend to. Only those items which I notice shape my mind.”*:

I would find myself at once alarmed, delighted, and humbled at the limitations of my ordinary looking. My consolation is that this deficiency of mine is quite human. We see, but we do not see: we use our eyes, but our gaze is glancing, frivolously considering its object. We see the signs, but not their meanings. We are not blinded, but we have blinders.

These “blinders,” despite [psychologists’ concentrated efforts](#) to dissect this strange phenomenon we call “attention,” remain largely a mystery — or, at best, a series of misconstrued hypotheses:

Though *paying attention* seems simple, there are numerous forms of payment. ... To concentrate, to *pay attention*, is viewed as a brow-furrowing exercise. Sit still, don’t blink, and *attend*.

[...]

This may do for a moment of concentration, but it is not the way to better attention in your daily life. For that, we need to know what attention is. The very concept is odd. Is it an ability, a tendency, a skill? Is it processed in a special nugget in the brain, or by your eyes and ears? ...

The longtime model used by psychologists is that of a “spotlight” that picks out particular items of interest to examine, bringing some things into focus and awareness while leaving other things in the dim, dusty sidelines. The metaphor makes me feel like a headlight-wearing spelunker who can only see what is right in front of her in the darkness of the cave. Such a comparison can be misleading, because in fact one can still report on what was within one’s peripheral vision at rates better than chance. And despite that spotlight, we seem to miss huge elements of the thing we are ostensibly attending to.

A better way of thinking about attention is to consider the problems that evolution might

have designed “attention” to solve. The first problem emerges from the nature of the world. The world is wildly distracting. It is full of brightly colored things, large things casting shadows, quickly moving things, approaching things, loud things, irregular things, smelly things.

Thus, evolution’s problem-solving left us modern humans with two kinds of attention: *vigilance*, which allows us to have a quick and life-saving fight-or-flight response to an immediate threat, be it a leaping lion or a deranged boss, and *selective attention*, which unconsciously curates the few stimuli to attend to amidst the flurry bombarding us, enabling us to block out everything except what we’re interested in ingesting. (Selective attention, of course, can mutate to dangerous degrees, producing such cultural atrocities as [the filter bubble](#).) Much like French polymath Henri Poincaré argued that [to invent is simply to choose ideas](#), to attend, it turns out, is simply to choose stimuli — but what sounds so deceptively simple turns out to be marvelously complex. In her walks with expert companions, Horowitz tickles this latter type of attention to unravel all the unseen, unsmelled, and unheard miracles of a city block, the wonderlands of sensation and awareness that bloom behind the looking glass of our evolutionarily primed everyday inattention.

The first “expert” Horowitz walks with is her very own toddler, from whom we learn that a walk is not necessarily the purposeful and linear transfer of a body from point A to point B, but rather an exploratory exercise in touching and — eek! — tasting textures and surfaces, pointing at sights, pausing to absorb the tickling brush of the breeze:

A walk is, instead, an investigatory exercise that begins with energy and ends when (and only when) exhausted.

Much of what makes the story so compelling is Horowitz’s ability to swiftly weave scientific insight into the details of these anecdotal experiences. Here, she notes:

The perceptions of infants are remarkable. That infants reliably develop into adults, who for all their wisdom or kindness are often unremarkable, blinds us to this fact. The infant’s world is a case study in confused attention. ... The world is not yet organized into discrete objects for these new eyes: it is all light and dark, shadow and brightness.

Infants, in fact, seem to experience [synesthesia](#) as a baseline sensory given. (Perhaps MoMA’s Juliet Kinchin touched on a bigger cognitive truth when she reflected that [“children help us to mediate between the ideal and the real.”](#)) But, eventually, they grow out of this wondrous multidimensional awareness, which William James called “aboriginal sensible muchness,” and we, the sensible and selectively attentive adults, emerge:

Part of normal human development is learning to notice less than we are able to. The world is awash in details of color, form, sound — but to function, we have to ignore some of it. The world still holds these details. Children sense the world at a different granularity, attending to parts of the visual world we gloss over; to sounds we have dismissed as irrelevant. What is indiscernible to us is plain to them.

Part of toddlers’ extraordinary capacity for noticing has to do with their hard-wired [neophilia](#) — the allure of the new and unfamiliar, which for them includes just about everything that we, old and jaded, have deemed familiar and thus uninteresting. (Horowitz points to one systematic exception for us adults — vacations — which brim with enough novelty to

produce such fascinating, reality-warping psychological phenomena as [the holiday paradox](#). The reason, Horowitz argues, lies in two factors: “We actually do see new places and second, we bother to look.”)

In a way, “experts” have a toddler’s ability to zoom in on the details, the very fabric of experience, that most of us glide adaptively by.

From beloved artist and [reconstructionist Maira Kalman](#) — a woman of [boundless wisdom on life](#) and unrelenting faith in [walking as a creative device](#), whom Horowitz aptly describes as “a hoarder, in the finest sense of that word, of both experience and image” — we learn that looking at the ordinary, looking and really *seeing* it, seeing its extraordinary wonder, is a special talent that takes patient cultivation. Horowitz writes:

One perceptual constraint that I knowingly labor under is the constraint that we all create for ourselves: we summarize and generalize, stop looking at particulars and start taking in scenes at a glance—all in an effort to not be overwhelmed visually when we just need to make it through the day. The artist seems to retain something of the child’s visual strategy: how to look at the world before knowing (or without thinking about) the name or function of everything that catches the eye. An infant treats objects with an unprejudiced equivalence: the plastic truck is of no more intrinsic worth to the child than an empty box is, until the former is called a toy and the latter is called garbage. My son was as entranced by the ubiquitous elm seeds near our doorstep as any of the menus, mail, flyers, or trash that concern the adults.

Echoing Anaïs Nin’s [timeless words on the shared magic of the child and the artist](#), Horowitz writes:

To the child, as to the artist, everything is relevant; little is unseen.

Once you look at what seems ordinary long enough, though, it often turns odd and unfamiliar, as any child repeatedly saying his own name aloud learns. I had the suspicion that walking with Kalman would be the ambulatory equivalent of saying my own name aloud a hundred times.

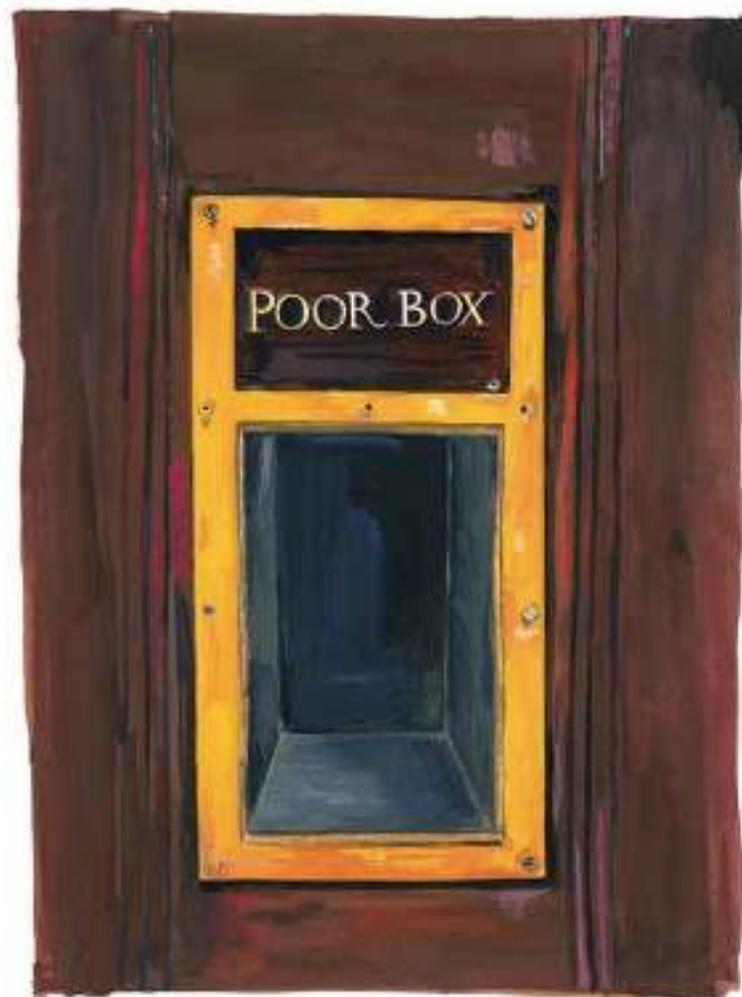
But Kalman’s singular spirit came to life not in the purposeful stride of a destination-walk but in the creative digression of an amble:

With Kalman, walking around the block entered a fourth dimension. ... Eventually, we made it from A to B, but not before visiting all of the later letters of the alphabet. ... Objects and people on our route became possibilities for interaction, rather than decoration or obstruction, as the urban pedestrian might define them.

Kalman gently nudges Horowitz to remove the “invisibility cloak” so familiar to us urbanites as we shield ourselves from strangers, and the two do something city dwellers — especially New Yorkers — never do: They talk to policemen, movers, a mailman, churchgoers, and the social workers tending to a halfway house. In other words, they cease to simply coexist with their fellow citizens and, for the duration of the walk, *live* with them instead, attend to them with presence and curiosity, *see* them; they slow their cadence, now tourists in their native fast-paced New York; they amble. Horowitz once again returns to her potent blend of philosophical reflection and scientific substance:

I had not noticed, until forced to by Kalman's sociability, how I was engaging in a fundamentally social activity by walking out in public.

Still, we all have a sense of the "appropriate" personal space around us — a kind of zone of privacy that we wear, even on the social sidewalk. Indeed, we have many coconcentric circles of personal *spaces*, plural. The Swiss zoologist Heini Hediger, elaborating from studies of animal behavior, proposed that the personal zones around us fall into a few categories. Those with whom we do not mind "inescapable involvement" — as our loved ones — can broach the closest zone and get nearer than eighteen inches to us. At that proximity, we can smell them, feel the heat of their bodies, their breath, hear the small sounds they mutter or emit. We can whisper together. Most social interactions take place in a comfortable zone about one and a half to four feet away — closer in some cultures (Latin American) than others (North American). Friends can waltz through; acquaintances can hover on the edge. We have a social distance up to twelve feet from our bodies for more formal transactions, or for those we don't know well. Beyond that is a kind of public distance in which we use our "outdoor" voice. All of these zones are artificial, varying with differing relationships, based on context and the physical setting — but we have a bodily sense of the reality of these spaces. Violate them, and we may feel stressed and anxious.



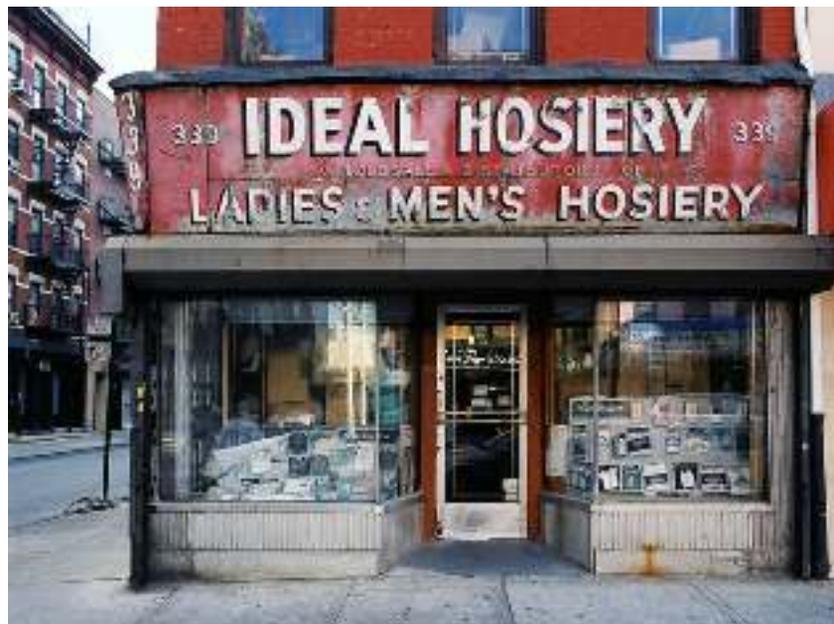
Art by Maira Kalman from 'On Looking: Eleven Walks with Expert Eyes'

Eventually, Horowitz realizes that Kalman has a wholly different way not only of looking, but also of seeing — she challenges the normative expectations of where one is allowed to go in the city and experiences space not "as defined by an edge, but as an infinitely explorable openness" — and so she wonders what it is about the artist's brain that enables that limitless perception of possibility. Though she is careful to insure against any phrenology-like

pseudoscience of the “creative brain,” Horowitz does point to a curious study that suggests brains like Kalman’s might, in fact, be wired differently:

One research team, though, reported a correspondence between the brains of those who seem to be especially creative thinkers. Certain people, they found, have fewer of one kind of dopamine receptor in the thalamus of the brain. These people also performed well on tests of “divergent thinking,” in which people are asked to concoct more and more elaborate uses for ordinary objects, for instance. The reduction in receptors might actually increase information flow to various parts of the brain, essentially allowing them to think up new and interesting solutions. “Thinking outside the box might be facilitated by having a somewhat less intact box,” the researchers wrote.

(For more on this research by Stanford’s Carol Dweck, see [this](#).)



A typographic storefront from James and Karla Murray’s [Store Front: The Disappearing Face of New York](#)

From typography nerd Paul Shaw, who brought us [the almost true story of New York’s subway Helvetica](#), we learn that our minds are constantly coerced into reading the “dull, tedious words” that bombard us from storefronts, billboards, and computer screens nearly every waking moment — but besides the linguistic burden, embedded in each letter we ingest is also a design one, for typography can quietly convey an unwritten message, set a mood, create an ineffable sense of something being either terribly wrong or terribly wonderful. A letter, Horowitz reminds us as she discovers the humanistic quality of words while touring New York’s type-smothered streets with Shaw, can be “jaunty” or “uncomfortable” amidst awkward kerning, an ampersand can be “pregnant” and an S “complacent.” She encapsulates:

Three hours of walking with Shaw later, I felt relieved, for the moment, of my compulsion to read what was readable, to parse text when I saw it. Surprisingly, this relief came not from avoiding text, but from seeking it out — only to zoom in on the details held within. It was a vision that let me miss the forest and see the trees. Rather than words, I saw the components of words. Some small part of my brain (the linguistic part) rested; the shape-identifying part hummed with activity.

[...]

The thing you are doing now affects the thing you see next.

From geologist Sidney Horenstein of the American Museum of Natural History we learn that our entire world consists of only two types of things: minerals and the biomass of plants and animals. A city suddenly becomes not a sterile “man-made” object but a thriving ecosystem of living and once-living landscapes, “an ersatz natural landscape writ small ... on every single block,” a place suddenly brimming with reminders of its own impermanence:

Viewed with this lens, the city feels less artificial. The cold stone is natural, almost *living*: it absorbs water, warms under the sun, and sloughs its skin in rain. Like us, stone is affected by time, its outer layer softened and its veins made more prominent. And viewed as a natural landscape, the city feels less permanent: even the strongest-looking behemoth of an apartment tower is gradually deteriorating under the persistent, patient forces of wind, water, and time.



Organisms inhabiting a single cubic foot of space from [One Cubic Foot](#) by photographer David Liittschwager

From field naturalist and insects advocate Charlie Eiseman, we learn that on every square inch of surface, [entire microcosms](#) oscillate between vibrant life and violent death. (“If a driveway holds an ecosystem,” Horowitz ponders, “what of a parking lot? Perchance a universe.”) Over the next few hours, the two proceed to discover traces of just about every kind of insect — from spider egg cases to discarded fly exoskeletons — lacing the most ordinary of city blocks. What emerges is a keen awareness that the negative space of the unseen is itself a source of rich information:

Surprisingly, those leaves that have no sign, no holes, no smattering of excrement, are themselves sign of something else. They indicate that the tree is probably not from around here.

Once again, Horowitz explores what enables Eisenman’s brain to function so differently from her own and pops the cognitive hood of his singular selective attention, tracing it to the work of notable early twentieth-century bird-watcher Luunk Tinbergen:

Tinbergen noticed that songbirds did not prey on just any insect that had recently hatched in the vicinity; instead, they tended to prefer one kind of bug — say, a particular species of beetle — at a time. As the numbers of young beetles rose through a season, the birds gorged on these beetlettes, ignoring any other available young insects nearby. Tinbergen suggested that, once the birds found a food they liked, they began to look *just for that food*, ignoring all others. He called this a search image: a mental image of a beetle—with

its characteristic beetly shape, size, and colors—with which the bird scans her environment.

This *search image*, it turns out, is something all of us employ when we need to narrow our attention in a goal-oriented task, like spotting a friend across the crowded street or finding the brand of salsa we went looking for amidst the overwhelmingly well-stocked shelves at Whole Foods. But this search aid, Horowitz soon realizes, is only helpful or even possible if we know what to look for, and most of us won't have the luxury of being escorted along our familiar walks by some of the world's most fascinating brains. Horowitz shares this "melancholy thought" with Eiseman as they conclude their walk:

Eiseman reflected for a moment, and then quoted one of his tracking teachers, Susan Morse: "Half of tracking is knowing where to look, and the other half is looking." If you understand even the most superficial elements of the life histories of different animals — such as what kinds of things they are attracted to — once you start looking, you are going to find them everywhere. ... A small bit of knowledge goes a long way when thinking about "where to look." ... Once you have an eye for these things, even when you're not looking for them, they just jump out at you. Everything is a sign of something.

Next, from Humane Society senior wildlife scientist John Hadidian we learn that the main distinction in the city's life is that between day and night, and a remarkable amount of wildlife floods the seemingly humdrum city streets once the sun averts its gaze — pigeons, sparrows, squirrels, chipmunks, raccoons. (And, lest we forget, the bountiful "wild cats" [Gay Talese so poetically described](#).) High above, falcons, eagles, and hawks haunt the urban skies. Down below, rats — who spend most of their waking hours preening and who use their sensitive whiskers to navigate along walls and orient themselves — run their ceaseless races. (Of the latter, Hadidian says that "from a strictly natural history perspective, they're one of the most poorly understood animals out there.")

We also learn that "every animal you can think of is drawn to the persimmon tree" — a useful factlet should you ever find yourself lonely in your backyard. But most humbling of all is the sudden awareness that nearly every single crack, hole, and slit between buildings is part of a vast and elaborate transit system of urban wildlife passageways, with which comes the equally humbling reminder that maybe, just maybe, we aren't the complacent kings of our own city we go about fancying ourselves to be:

This is what makes the urban animal so elusive. He is actually attempting to elude us, and our imaginations do not seem to account for animals (aside from pets) in cities. Even our sense of scale is distorted when considering urban wildlife corridors and passageways. Remembering, perhaps, a childhood inability to scale a fence or shimmy through a gate, we find it incredible that urban animals are not thwarted by the seemingly impenetrable stone walls and chain-linked barbed-wire fencing we present to them. But the descriptions of nearly all urban animals include an impressive dimension: the size hole the animal can squeeze into, through, or out of. Raccoons, even as adults, can fit in a four-inch space between grates, flattening themselves and taking advantage of their broad, short skulls. Squirrels fit through a hole the size of a quarter; mice, through dime-sized holes. Look around you on your next walk. See any holes at all? Gaps between stair and building? Between sidewalk and curb? An animal goes there (after you have passed).

And so we return to the straitjackets of our perception, that disconnect between seeing and

knowing what to look for, filtered through the uncompromising sieve of our attention — something most memorably demonstrated in the famous [invisible gorilla experiment](#).

Horowitz writes:

Part of what restricts us seeing things is that we have an expectation about what we will see, and we are actually perceptually restricted by that expectation. In a sense, expectation is the lost cousin of attention: both serve to reduce what we need to process of the world “out there.” Attention is the more charismatic member, packaged and sold more effectively, but expectation is also a crucial part of what we see. Together they allow us to be functional, reducing the sensory chaos of the world into unbothersome and understandable units.

As intriguing as the city’s non-human dwellers are, its human ones brim with a deluge of data that something as seemingly simple as observing their bodies and movement can reveal. That’s precisely what Horowitz learns from her walk with Dr. Bennett Lorber, president-elect of the country’s oldest medical institution, the College of Physicians of Philadelphia:

Simply by being outside on the street, people are inadvertently revealing their life histories in their bodies, in their steps, in the hunch of their shoulders or set of their jaw.

Indeed, we learn that a man’s gait can reveal anything from his medical pathology to his occupation to, even, his religion. (Enter another curious factlet: the average step is divided into 62% stance, meaning contact with ground, and 38% swing, meaning no contact with ground.) We also realize that the extraordinary act of walking — a miracle of motion and alignment that propels us forward despite the awkward balance of our bodies’ bipedalism, a rarity in the animal kingdom — is an exquisite metaphor for the human spirit as “one becomes aware of how many different but successful ways there are to propel oneself around one’s day.” Still, there is such a thing as an ideal walker:

Their gaits had few asymmetries, were smooth and loose, and wasted no energy doing anything but going forward. From an evolutionary perspective, efficiency is the key. Our ancestors may have been easily outrun by any potential predator — we are not a particularly fast species — but we have endurance: those proto-humans who could keep running won their lives. And they could do that if their gait was efficient.

Horowitz once again considers the difference between her brain and the experts’:

While I had a vague sense of *Hmm, something’s amiss . . .*, they could diagnose. It is not only the diagnosis that I valued; it is the way that knowledge orients their looking — an ability to “see what they see,” as it were.

But partway through her experiment, Horowitz is befallen by a medical curveball of her own — a herniated disk in her back paralyzes her foot and renders her barely able to walk, which presents an obvious challenge to her walking exploration of city blocks. She writes:

The street changed for me during those months, as it certainly changes for anyone who is temporarily or permanently injured, or suffers the ultimate injury of simply aging.

Still, she perseveres and brings even greater awareness to the next portion of her urban anatomy — the sensory landscape of the city. She meets Arlene Gordon, a remarkable

woman who has traveled the world and shares enchanting stories of the souvenirs filling her apartment. And this is where the gift of Horowitz's narrative comes most viscerally alive: as she talks to Gordon and notes the subtle details of her dimly lit apartment and her too-blue eyes, you the reader (or at least I, the reader), already primed for this art of observation, realize before Horowitz reveals it that Gordon is completely blind — and oh how sweetly gratifying this earned micro-mastery is, and oh what plump promise it holds for the possibility of similarly broadening our everyday awareness as we follow Horowitz's experiment.

As the two stroll together, their walk becomes a powerful revelation:

After a handful of city walks I realized that what many of them were missing was any experience other than a visual experience. This was not terribly surprising. After all, humans are visual creatures. Our eyes have prime positioning on our faces. We have trichromatic vision, which is sufficient to paint a Technicolor, million-colored landscape of the world. Our brains' visual areas, with hundreds of millions of neurons designed to make sense of what we see, takes up a full fifth of each of our cortices. The resplendent scene our eyes carry to us is entrancing. As a result, we humans generally do not bother paying attention to much other than the visual. What we wear, where we live, where we visit, even whom we love is based in large part on appearance — visual appearance.

But the world around us is not entirely or even mostly defined by its light-reflective qualities. What of the odors of the molecules making up every object, and those loosened odors wafting in the space around us? Or the perturbations of air that we can hear as sound — and the frequencies higher or lower than we can hear? I imagined that someone who has lost her sense of sight could lead me, however superficially, into the invisible block that I miss with my wide open eyes.

And lead she does: Gordon navigates swiftly along the sidewalk, masterfully using her cane — a sort of sensory extension of herself and the “peripersonal space,” that bubble of space defined by our bodies and their immediate surroundings — and Horowitz marvels at our brains' magnificent plasticity, the same adaptability behind the “[limbic revision](#)” of love.

Our brains are changed by experience — in a way directly related to the details of that experience. If we have enough experience doing an action, viewing a scene, or smelling an odor to become an “expert” in a field, then our brains are functionally — and visibly — different from nonexperts.

And yet:

The brain is plastic, and can creatively adapt to a new situation, but it changes right back when it no longer needs to be creative.

From the walk with Gordon, we learn about the physics of wind, which moves according to the Bernoulli principle and the Venturi effect, creating a whole new layer of aerial flux over the city's landscape:

Winds over the rivers flanking Manhattan Island speed down side streets on land. ... Tall buildings create other wind effects: winds that hit high on a building rush down its face, sometimes creating enough pressure to make passage in and out of the doorway difficult. Sheer glass towers can pull air not just down, but also up from below (the Bernoulli

principle) — as well as lift any skirts being worn in the vicinity.

But most poignant of all are Gordon's parting words, emblematic of the book's broader underpinning message:

In front of her building she turned to shake my hand. "Nice to see you," she said. And then, as if noticing my smile in response, she added: "There's someone in my building who asked me, 'How come you use that word, "see?" How can you say "I see it"?' Well, I do see it. I said, 'see' has many definitions."

Next, from sound designer and vocal engineer Scott Lehrer we learn that the urban soundscape is often a violent cacophony on which [Dickens and Babbage were right to wage war](#), and our ability to tune it out is among the most fascinating manifestations of our selective attention — though our ears are always open, we only attend to a fraction of what is audible, and even to that we append our intellectual interpretations:

Simply giving a name to a sound can change the experience of it: when we see the thing that clatters or moans or sighs, we hear it differently.

(In fact, Horowitz herself employs, perhaps unwittingly, this emotional soundscape in a previous chapter: limping awkwardly and painfully with her paralyzed leg to meet Gordon, she encounters a door that "sighs" open for her.)

But with Lehrer she sets out to "to listen to the sounds in and of themselves, to hear beyond their names." She learns that the tires of a car sound different when it rains and that sounds can reverberate with various levels of "wetness" in different spaces, depending on the size of the space, the objects filling it, and the distance of the sound source from the walls. She learns how the fact that even temperature alters sound perception explains why birds sing at dusk and dawn. She then ponders the man-made distinction between "sound" and "noise" as she considers [legendary avant-garde composer John Cage's legacy](#):

What makes that "noise" and not just neutral "sound" is another question. The avant-garde composer John Cage famously declared that "music is sounds," and thus appropriated ordinary sounds to be his music. In one of his compositions, the orchestra is silent for four minutes and thirty-three seconds; whatever sounds come in through the window of the concert hall or emerge from the increasingly restless and puzzled audience constitute his music. Still, if Cage was right, it need not follow that all sounds are music(al). Any sound we do not like we call *noise*, thereby introducing a subjective assessment to the din. That subjectivity is always there in talking about noise.

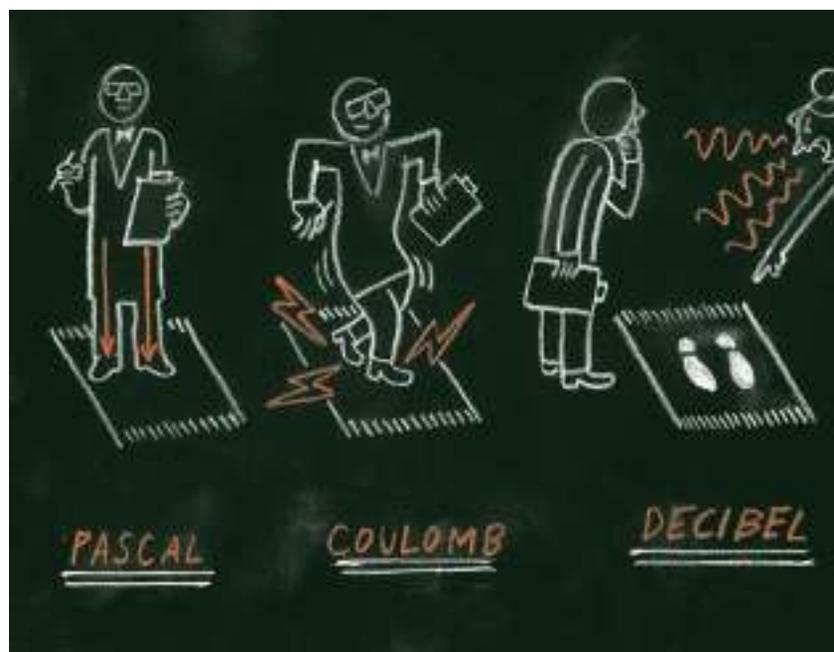
But Horowitz finds a certain reassurance in the relativity of noise as she realizes that sound resonates with what we bring to it and our experience of the city's soundscape can change dramatically with exposure. (Cue in E. B. White, who [embraced the hustle-and-bustle of New York' with such memorable poeticism](#).) But one of her most chilling realizations has to do with the biology of our ear — itself a [magnificent machine](#) — and violent ways in which the city assaults it daily:

Decibels are the subjective experience of the intensity of a sound. Zero decibels marks the threshold for hearing a sound—and in a modern city, there is never a moment of zero decibel silence. We mostly reside in the 60–80 decibel range, which includes sounds from

normal conversation across the dinner table, vacuum cleaners, and traffic noise. Once a sound gets to 85 decibels, it begins to damage the mechanism of our ears irreparably. The reason lies in the mechanism itself.

Cilia, tiny hair cells that stand upright in the cochlea, sway and jiggle when the vibration of air—the rush of air that is sound — wends its way into the inner ear. So stimulated, the cilia trigger nerves to fire, translating that vibration into electrical signals that give us the experience of hearing something. If those vibrations are strong enough, the hair cells bend deeply under their force. Air pressure can mow, crush, or sever the hairs until they are splayed, fused, floppy, or fractured — an earful of well-trodden grass. Bent and damaged enough because of exposure to loud sounds for prolonged periods, the hair cells do not grow back; the ears lose their neural downiness. The world becomes progressively quieter for the person attached to those ears, until there are no sounds, no music, no noise.

Cities are crowded with sources of sound regularly approaching this threshold of hearing loss. ... Enormous numbers of man-made sounds occur in those same frequencies. We often find high pure tones the most irritating: the screech of a subway turning a tight corner or braking, at 3,000 or 4,000 hertz, or the sound of fingernails on a chalkboard, between 2,000 and 4,000 hertz. These sounds clobber us because of the shape of the human ear, which allows high frequencies to find their way efficiently to the cochlea. The very design of the ear amplifies these vibrations for waiting hair cells. But it is not just our ears that find the sound distressing; it is our brains. If we know that we are hearing what we have already deemed an “annoying sound,” our bodies react to it as though it is: we have a sympathetic nervous system response, usually reserved for final exams, suddenly appearing lions, and the sight of our beloved. We sweat, and then we notice that we are sweating, and we sweat some more.



From Christoph Niemann’s *Abstract City*: “To describe different phenomena, physicists use various units. PASCALS, for example, measure the pressure applied to a certain area. COULOMBS measure electric charge (that can occur if said area is a synthetic carpet). DECIBELS measure the intensity of the trouble the physicist gets into because he didn’t take off his shoes first.”

And still, her walk with Lehrer yields a celebration rather than a lament of the city’s sounds —

an invitation to know and love the city in yet another dimension:

What I heard had morphed from noxious urban noise into being the characteristic, flavorful clatter of my city. I enjoyed the roar of traffic and the buzz of flies; I looked at pigeons hoping they would coo; I stared down passersby, silently egging them on to hum or cough. I counted squeals and squeaks and squawks and measured them against whines and whistles. Each sound felt invited, a pleasure.

Horowitz's final walking companion is — fittingly, given the original inspiration for the project — her new dog, the playfully curious Finnegan. (That a cognitive scientist would name her dog with a nod to James Joyce is only further evidence of Horowitz's remarkably well-rounded mind.) And if you thought the human ear was a marvel, just wait for the dog's nose:

The inside of the nose is a labyrinth of tunnels lined with specialized olfactory receptors waiting for an odorant molecule — a *smell* — to land on them. In the back of the nose is an “olfactory recess” separated from the main respiratory pathway by a bony plate, allowing smelling to be distinct from breathing, and letting odors loiter for a long time to be considered. Though we tend to think that only some things are smelly — a spring bloom, a trash can, a new car, a bus's exhaust — just about everything has a scent. Anything with molecules that can be “volatile,” that can evaporate into the air and travel toward a receptor in someone's nose, smells.

The dog nose has *hundreds of millions* of receptors in that nose; they even have a second kind of nose above the hard palate of their mouth, called a vomeronasal or Jacobson's organ. Molecules such as hormones that do not stir the receptors of the nose to fire may find a rousing welcome here. All animals house hormones, which are involved in bodily and brain activities, and those hormones we emit, called pheromones, are detected by the vomeronasal organ. This is how a dog could detect another dog's stress or sexual readiness in a spray of her urine left on the ground.

Dogs are called macrosmatic, or keen-scented, while humans are called microsomatic, or feeble-scented.



Drawing by Wendy MacNaughton based on a proposed (and, sadly, rejected) cover for a Print magazine issue themed Communication.

How humbling it is and how hard to maintain the typical human god-complex when the layman language describing our natural givens contains the word “feeble.” In fact, our feebleness is not due to software but to hardware — it’s not that we don’t know *how* to use our noses like a dog does, it’s that we lack the dog’s extravagant number of cells to detect and decode smells, which they’re able to do at the unimaginably low concentration of one or two parts per trillion. (As Horowitz puts it, “One part mustard, one trillion parts hot dog: dogs can detect the mustard.”) Even more remarkably, a dog’s nose is wired to detect the half-life of smells, with each noseful of the “same” smell delivering different information — a sort of stereo olfaction that gives them astounding precision in tracing where the smell has come from and where its carrier has gone next. Horowitz reflects:

To see a scene is not to stare fixedly at one point; it is to open our eyes to everything in front of us, looking to and fro. Similarly, to *smell* a scene, Finn approached it from the side, from above, sniffing the air to see if the artist who concocted this particular odor splotch was anywhere nearby. A dog can smell something different in each noseful — and there *is* something different there to smell. This taught me something about smells: they are not at fixed points, nor are they static and unchanging. They are a haze, a cloud, spreading out from their source. Viewed as odors, the street is a mishmash of overlapping object identities, each crowding into the next’s odorous scene.

After her olfactory adventure with Finn, Horowitz takes one final walk by herself as she attempts to implement all her new learnings in experiencing her city block with new layers of awareness. And she does:

A simple walk had become unrecognizably richer. ... Part of seeing what is on an ordinary block is seeing that everything visible has a history. It arrived at the spot where you found it at some time, was crafted or whittled or forged at some time, filled a certain role or existed for a particular function. It was touched by someone (or no one), and touches

someone (or no one) now. It is evidence.

The other part of seeing what is on the block is appreciating how limited our own view is. We are limited by our sensory abilities, by our species membership, by our narrow attention — at least the last of which can be overcome.

But the greatest learning is that our ability to see is a factor of two complementary forces — attention and intention — as the choices we make in what we attend to shape our entire experience of reality. And expertise is nothing but the carefully orchestrated osmotic balance of the two:

What allowed me to see the bits that I would have otherwise missed was not the expertise of my walkers, per se; it was their simple interest in attending. I selected these walkers for their ability to boost my own selective attention. An expert can only indicate what she sees; it is up to your own head to tune your senses and your brain to see it. Once you catch that melody, and keep humming, you are forever changed.

Indeed, one of Horowitz's most piercing insights arrives during her walk with Paul Shaw:

One trouble with being human — with the human condition — is that, as with many conditions, you cannot turn it off. Even as we develop from relatively immobile, helpless infants into mobile, autonomous adults, we are more and more constrained by the ways we learn to see the world.

But the greatest promise of *On Looking: Eleven Walks with Expert Eyes* — which, it can't be stressed enough, is a rare and necessary soul-expander for any city-dweller — appears as a poetic aside Horowitz drops during her walk with the geologist:

Follow me here: your brain will begin to change as you do.

She notes that he “can never walk down a block and not see its geology.” And that's precisely the point: The art of seeing might have to be learned, but it can never be unlearned, just as the seen itself can never be unseen — a realization at once immensely demanding in its immutability and endlessly liberating in the possibilities it invites.