

World and Screen

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THE WORLD is a strange, changeable, and dangerous place. Getting around in it demands of any animal a great deal of effort, mental and physical. For ages, human beings have been creating tools to reduce the strain of travel. History is, among other things, a record of the discovery of ingenious new ways to ease our passage through our environs, to make it possible to cross greater and more daunting distances without getting lost, roughed up, or eaten. Simple maps and trail markers came first, then star maps and nautical charts and terrestrial globes, then instruments like sounding weights, quadrants, astrolabes, compasses, octants and sextants, telescopes, hourglasses, and chronometers. Lighthouses were erected along shorelines, buoys set in coastal waters. Roads were paved, signs posted, highways linked and numbered. It has, for most of us, been a long time since we've had to rely on our wits to get around.

GPS receivers and other automated mapping and direction-plotting devices are the latest additions to our navigational toolkit. They also give the

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Amerigo Vespucci, a fifteenth-century navigator, uses an astrolabe to find the Southern Cross.

old story a new and worrisome twist. Earlier navigational aids, particularly those available and affordable to ordinary folks, were just that: aids. They were designed to give travelers a greater awareness of the world around them—to sharpen their sense of direction, provide them with advance warning of danger, highlight nearby landmarks and other points of orientation, and in general help them situate themselves in both familiar and alien settings. Satellite navigation systems can do all those things, and more, but they're not designed to deepen our involvement with our surroundings. They're designed to relieve us of the need for such involvement. By taking control of the mechanics of navigation and reducing our own role to following routine commands—turn left in five hundred yards, take the next

exit, stay right, destination ahead—the systems, whether running through a dashboard, a smartphone, or a dedicated GPS receiver, end up isolating us from the environment. As a team of Cornell University researchers put it in a 2008 paper, “With the GPS you no longer need to know where you are and where your destination is, attend to physical landmarks along the way, or get assistance from other people in the car and outside of it.” The automation of wayfinding serves to “inhibit the process of experiencing the physical world by navigation through it.”¹

As is so often the case with gadgets and services that ease our way through life, we’ve celebrated the arrival of inexpensive GPS units. The *New York Times* writer David Brooks spoke for many when, in a 2007 op-ed titled “The Outsourced Brain,” he raved about the navigation system installed in his new car: “I quickly established a romantic attachment to my GPS. I found comfort in her tranquil and slightly Anglophilic voice. I felt warm and safe following her thin blue line.” His “GPS goddess” had “liberated” him from the age-old “drudgery” of navigation. And yet, he grudgingly confessed, the emancipation delivered by his in-dash muse came at a cost: “After a few weeks, it occurred to me that I could no longer get anywhere without her. Any trip slightly out of the ordinary had me typing the address into her system and then blissfully following her satellite-fed commands. I found that I was quickly shedding all vestiges of geographic knowledge.” The price of convenience was, Brooks wrote, a loss of “autonomy.”² The goddess was also a siren.

We want to see computer maps as interactive, high-tech versions of paper maps, but that’s a mistaken assumption. . . . Traditional maps give us context. They provide us with an overview of an area and require us to figure out our current location and then plan or visualize the best route to our next stop. Yes, they require some work—good tools always do—but the mental effort aids our mind in creating its own cognitive map of an area. Map reading, research has shown, strengthens our sense of place and hones our navigational skills—in ways that can make it easier for us to get around even when we don’t have a map at hand. We seem, without knowing it, to call on our subconscious memories of paper maps in orienting ourselves in a city or town and determining which way to head to arrive at our destination. In one revealing experiment, researchers found that people’s naviga-

1. Gilly Leshed et al., “In-Car GPS Navigation: Engagement with and Disengagement from the Environment,” in *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (New York: ACM, 2008), 1675–1684.

2. David Brooks, “The Outsourced Brain,” *New York Times*, October 26, 2007.

tional sense is actually sharpest when they're facing north—the same way maps point.³ Paper maps don't just shepherd us from one place to the next; they teach us how to think about space.

The maps generated by satellite-linked computers are different. They usually provide meager spatial information and few navigational cues. Instead of requiring us to puzzle out where we are in an area, a GPS device simply sets us at the center of the map and then makes the world circulate around us. In this miniature parody of the pre-Copernican universe, we can get around without needing to know where we are, where we've been, or which direction we're heading. We just need an address or an intersection, the name of a building or a shop, to cue the device's calculations. Julia Frankenstein, a German cognitive psychologist who studies the mind's navigational sense, believes it's likely that "the more we rely on technology to find our way, the less we build up our cognitive maps." Because computer navigation systems provide only "bare-bones route information, without the spatial context of the whole area," she explains, our brains don't receive the raw material required to form rich memories of places. "Developing a cognitive map from this reduced information is a bit like trying to get an entire musical piece from a few notes."⁴

Other scientists agree. A British study found that drivers using paper maps developed stronger memories of routes and landmarks than did those relying on turn-by-turn instructions from satellite systems. After completing a trip, the map users were able to sketch more precise and detailed diagrams of their routes. The findings, reported the researchers, "provide strong evidence that the use of a vehicle navigation system will impact negatively on the formation of drivers' cognitive maps."⁵ A study of drivers conducted at the University of Utah found evidence of "inattention blindness" in GPS users, which impaired their "wayfinding performance" and their ability to form visual memories of their surroundings.⁶ . . .

Nicholas Carr cites an interesting mix of scholarly and popular sources. For some tips on finding sources, see Ch. 20.

3. Julia Frankenstein et al., "Is the Map in Our Head Oriented North?," *Psychological Science* 23, no. 2 (2012): 120–125.

4. Julia Frankenstein, "Is GPS All in Our Heads?," *New York Times*, February 2, 2012.

5. Gary E. Burnett and Kate Lee, "The Effect of Vehicle Navigation Systems on the Formation of Cognitive Maps," in Geoffrey Underwood, ed., *Traffic and Transport Psychology: Theory and Application* (Amsterdam: Elsevier, 2005), 407–418.

6. Elliot P. Fenech et al., "The Effects of Acoustic Turn-by-Turn Navigation on Wayfinding," *Proceedings of the Human Factors and Ergonomics Society Annual Meeting* 54, no. 23 (2010): 1926–1930.

Which raises the obvious question: *Who cares?* As long as we arrive at our destination, does it really matter whether we maintain our navigational sense or offload it to a machine? An Inuit elder on Igloodik may have good reason to bemoan the adoption of GPS technology as a cultural tragedy, but those of us living in lands crisscrossed by well-marked roads and furnished with gas stations, motels, and 7-Elevens long ago lost both the custom of and the capacity for prodigious feats of wayfinding. Our ability to perceive and interpret topography, especially in its natural state, is already much reduced. Paring it away further, or dispensing with it altogether, doesn't seem like such a big deal, particularly if in exchange we get an easier go of it.

But while we may no longer have much of a cultural stake in the conservation of our navigational prowess, we still have a personal stake in it. We are, after all, creatures of the earth. We're not abstract dots proceeding along thin blue lines on computer screens. We're real beings in real bodies in real places. Getting to know a place takes effort, but it ends in fulfillment and in knowledge. It provides a sense of personal accomplishment and autonomy, and it also provides a sense of belonging, a feeling of being at home in a place rather than passing through it. Whether practiced by a caribou hunter on an ice floe or a bargain hunter on an urban street, wayfinding opens a path from alienation to attachment. We may grimace when we hear people talk of "finding themselves," but the figure of speech, however vain and shopworn, acknowledges our deeply held sense that *who we are* is tangled up in *where we are*. We can't extract the self from its surroundings, at least not without leaving something important behind.

A GPS device, by allowing us to get from point A to point B with the least possible effort and nuisance, can make our lives easier, perhaps imbuing us, as David Brooks suggests, with a numb sort of bliss. But what it steals from us, when we turn to it too often, is the joy and satisfaction of apprehending the world around us—and of making that world a part of us. Tim Ingold, an anthropologist at the University of Aberdeen in Scotland, draws a distinction between two very different modes of travel: *wayfaring* and *transport*. Wayfaring, he explains, is "our most fundamental way of being in the world." Immersed in the landscape, attuned to its textures and features, the wayfarer enjoys "an experience of movement in which action and perception are intimately coupled." Wayfaring becomes "an ongoing process of growth and development, or self-renewal." Transport, on the other hand, is "essentially destination-oriented." It's not so much a process of discovery

"along a way of life" as a mere "carrying across, from location to location, of people and goods in such a way as to leave their basic natures unaffected." In transport, the traveler doesn't actually move in any meaningful way. "Rather, he is moved, becoming a passenger in his own body."⁷

Wayfaring is messier and less efficient than transport, which is why it has become a target for automation. "If you have a mobile phone with Google Maps," says Michael Jones, an executive in Google's mapping division, "you can go anywhere on the planet and have confidence that we can give you directions to get to where you want to go safely and easily." As a result, he declares, "No human ever has to feel lost again."⁸ That certainly sounds appealing, as if some basic problem in our existence had been solved forever. And it fits the Silicon Valley obsession with using software to rid people's lives of "friction." But the more you think about it, the more you realize that to never confront the possibility of getting lost is to live in a state of perpetual dislocation. If you never have to worry about not knowing where you are, then you never have to know where you are. It is also to live in a state of dependency, a ward of your phone and its apps.

Problems produce friction in our lives, but friction can act as a catalyst, pushing us to a fuller awareness and deeper understanding of our situation. "When we circumvent, by whatever means, the demand a place makes of us to find our way through it," the writer Ari Schulman observed in his 2011 *New Atlantis* essay "GPS and the End of the Road," we end up foreclosing "the best entry we have into inhabiting that place—and, by extension, to really being anywhere at all."⁹

We may foreclose other things as well. Neuroscientists have made a series of breakthroughs in understanding how the brain perceives and remembers space and location, and the discoveries underscore the elemental role that navigation plays in the workings of mind and memory. . . .

In a 2013 article in *Nature Neuroscience*, Edvard Moser and his colleague György Buzsáki provided extensive experimental evidence that "the neuronal mechanisms that evolved to define the spatial relationship among landmarks can also serve to embody associations among objects, events and other types of factual information." Out of such associations we weave the memories of our lives. It may well be that the brain's navigational sense—its

7. Tim Ingold, *Being Alive: Essays on Movement, Knowledge and Description* (London: Routledge, 2011), 149–152. The emphasis is Ingold's.

8. Quoted in James Fallows, "The Places You'll Go," *Atlantic*, January/February 2013.

9. Ari N. Schulman, "GPS and the End of the Road," *New Atlantis*, Spring 2011.

ancient, intricate way of plotting and recording movement through space—is the evolutionary font of all memory.¹⁰

What's more than a little scary is what happens when that font goes dry. Our spatial sense tends to deteriorate as we get older, and in the worst cases we lose it altogether.¹¹ One of the earliest and most debilitating symptoms of dementia, including Alzheimer's disease, is hippocampal and entorhinal degeneration and the consequent loss of locational memory.¹² Victims begin to forget where they are. Véronique Bohbot, a research psychiatrist and memory expert at McGill University in Montreal, has conducted studies demonstrating that the way people exercise their navigational skills influences the functioning and even the size of the hippocampus—and may provide protection against the deterioration of memory.¹³ The harder people work at building cognitive maps of space, the stronger their underlying memory circuits seem to become. They can actually grow gray matter in the hippocampus—a phenomenon documented in London cab drivers—in a way that's analogous to the building of muscle mass through physical exertion. But when they simply follow turn-by-turn instructions in "a robotic fashion," Bohbot warns, they don't "stimulate their hippocampus" and as a result may leave themselves more susceptible to memory loss.¹⁴ Bohbot worries that, should the hippocampus begin to atrophy from a lack of use in navigation, the result could be a general loss of memory and a growing risk of dementia. "Society is geared in many ways toward shrinking the hippocampus," she told an interviewer. "In the next twenty years, I think we're going to see dementia occurring earlier and earlier."¹⁵

Even if we routinely use GPS devices when driving and walking out- 15

10. György Buzsáki and Edvard I. Moser, "Memory, Navigation and Theta Rhythm in the Hippocampal-Entorhinal System," *Nature Neuroscience* 16, no. 2 (2013): 130–138. See also Neil Burgess et al., "Memory for Events and Their Spatial Context: Models and Experiments," in Alan Baddeley et al., eds., *Episodic Memory: New Directions in Research* (New York: Oxford University Press, 2002), 249–268.

11. See, for example, Jan M. Wiener et al., "Maladaptive Bias for Extrahippocampal Navigation Strategies in Aging Humans," *Journal of Neuroscience* 33, no. 14 (2013): 6012–6017.

12. See, for example, A. T. Du et al., "Magnetic Resonance Imaging of the Entorhinal Cortex and Hippocampus in Mild Cognitive Impairment and Alzheimer's Disease," *Journal of Neurology, Neurosurgery and Psychiatry* 71 (2001): 441–447.

13. Kyoko Konishi and Véronique D. Bohbot, "Spatial Navigational Strategies Correlate with Gray Matter in the Hippocampus of Healthy Older Adults Tested in a Virtual Maze," *Frontiers in Aging Neuroscience* 5 (2013): 1–8.

14. Email from Véronique Bohbot to author, June 4, 2010.

15. Quoted in Alex Hutchinson, "Global Impositioning Systems," *Walrus*, November 2009.



A smartphone displays an indoor map of the Florida Mall.

doors, it's been suggested, we'll still have to rely on our own minds to get around when we're walking through buildings and other places that GPS signals can't reach. The mental exercise of indoor navigation, the theory goes, may help protect the functioning of our hippocampus and related neural circuits. While that argument may have been reassuring a few years ago, it is less so today. Hungry for more data on people's whereabouts and eager for more opportunities to distribute advertising and other messages keyed to their location, software and smartphone companies are rushing to extend the scope of their computer-mapping tools to indoor areas like airports, malls, and office buildings. . . .

Indoor mapping promises to ratchet up our dependence on computer navigation and further limit our opportunities for getting around on our own. Should personal head-up displays, such as Google Glass, come into wide use, we would always have easy and immediate access to turn-by-turn instructions. We'd receive, as Google's Michael Jones puts it, "a continuous stream of guidance," directing us everywhere we want to go.¹⁶ Google and Mercedes-Benz are already collaborating on an app that will link a Glass headset to a driver's in-dash GPS unit, enabling what the carmaker calls "door-to-door navigation."¹⁷ With the GPS goddess whispering in our ear, or

16. Quoted in Fallows, "Places You'll Go."

17. Damon Lavrinc, "Mercedes Is Testing Google Glass Integration, and It Actually Works," *Wired*, August 15, 2013, wired.com/autopia/2013/08/google-glass-mercedes-benz/.

beaming her signals onto our retinas, we'll rarely, if ever, have to exercise our mental mapping skills.

Bohbot and other researchers emphasize that more research needs to be done before we'll know for sure whether long-term use of GPS devices weakens memory and raises the risk of senility. But given all we've learned about the close links between navigation, the hippocampus, and memory, it is entirely plausible that avoiding the work of figuring out where we are and where we're going may have unforeseen and less-than-salubrious consequences. Because memory is what enables us not only to recall past events but to respond intelligently to present events and plan for future ones, any degradation in its functioning would tend to diminish the quality of our lives.

Through hundreds of thousands of years, evolution has fit our bodies and minds to the environment. We've been formed by being, to appropriate a couple of lines from the poet Wordsworth,

Rolled round in earth's diurnal course,
With rocks, and stones, and trees.

The automation of wayfinding distances us from the environment that shaped us. It encourages us to observe and manipulate symbols on screens rather than attend to real things in real places. The labors our obliging digital deities would have us see as mere drudgery may turn out to be vital to our fitness, happiness, and well-being. So *Who cares?* probably isn't the right question. What we should be asking ourselves is, *How far from the world do we want to retreat?*

Thinking about the Text

1. Nicholas Carr argues that satellite navigation systems "are not designed to deepen our involvement with our surroundings." What does he mean by that? **SUMMARIZE** his argument. Is it persuasive? Why or why not?
2. Although it is still a matter of speculation, how might the long-term use of a GPS device contribute to the development of dementia in later life, according to Carr? What does he say happens in the brain? **EVALUATE** the **EVIDENCE** that Carr presents for what he says. Does it seem reliable? Explain.

3. Carr borrows two terms from the work of anthropologist Tim Ingold: *way-faring* and *transport*. How does he **DEFINE** each of these terms? What is the key distinction between them, and how is that distinction important to Carr's argument?
4. How do you get around in the world? When navigating a new place, do you use a map? a GPS device? landmarks, or street signs, or something else? **REFLECT** on your preferences. How do they contribute (or not) to your feeling comfortable in your surroundings and grounded in the world?
5. Imagine that someone has asked you for directions from one location in your neighborhood or on your campus to another spot nearby. Try giving them directions by drawing a map, sketching in relevant streets and landmarks; by describing how to get there with words alone; and by listing directions as a GPS device would. Was one set of directions easier (or harder) to articulate than the others? Write a brief essay **COMPARING** these three ways of giving directions.