



THE COGNITIVE LIFE OF MAPS

By Roberto Casati

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Review by: Lucy Haggard, The Nature Conservancy in Colorado

LET ME MAKE ONE THING CLEAR, FROM MY PERSPECTIVE as a cartographer: philosophers and cartographers think and talk about maps in fundamentally different ways. When I use the term “map,” at least in the context of my daily work, I mean a geospatial representation of a real (or possibly fantasy) world. I think about features and their relative locations, about data and scale, and about graphic design and style. For the philosopher Roberto Casati, this definition is far too narrow. Much of his book, *The Cognitive Life of Maps*, is taken up with establishing what things are maps and what things are not, and it is this semantic exercise that largely makes his book a text by and for an academic, philosophical audience. Casati acknowledges frankly that he is not a cartographer (7) and explicitly notes that this sort of intellectual exercise is best understood within its respective context. He writes that: “Nobody ‘speaks’ in the language of propositional logic, and we do not expect anybody to teach geography or to find their way by using a formal map (please don’t)” (50). The book’s style and tenor, while not easy for the lay reader, are not inherent drawbacks to the points Casati makes—many of which resonated with my experience working in the modern GIS industry.

The book starts by walking through the two modes of cognitive operation that, according to the psychological literature, handle reasoning and decision-making tasks. While the geographically-inclined may find this to be a detour, it’s a critical foundation of Casati’s argument, so I’ll recap it briefly here. Mode 1 (M1) relies on memory

and rules of thumb, and delivers rough but locally acceptable results, while Mode 2 (M2) is “regulated by will and attention that operates slowly and stepwise, is taxing to memory, and delivers comparatively more accurate results than M1 in many cases” (12). To this pair, he proposes to introduce Modes 3 and 4, both of which involve the use of a “cognitive representational artifact” — something accessory to the thinker, such as a paper map or GPS device (28). In Mode 3 (M3) one engages in a navigational activity — for example, orienting and reading a paper map — while in Mode 4 (M4) one only cares about the solution or destination, and delegates the navigational process to some external device or process. An example of M4 would be “tak[ing] directions from a GPS-based navigation device by listening to the instructions dictated to you” (15).

From a philosophical standpoint, it is helpful to understand how these categories of neural processing influence the definition of “map,” but if you are like me, your eyes will periodically glaze over and you’ll keep circling back to reread the last few paragraphs. That said, I was intrigued by the idea of M4 cognition. Casati’s example of plugging an address into Google Maps, tapping “start,” and blindly following the directions reminded me of the “**This is your brain on GPS**” (August 15, 2024) episode of the *Outside/In* podcast. In the worst cases, placing all faith in M4 can go terribly awry, such as the time Google Maps rerouted dozens of drivers out of a dust storm by way of an unmaintained dirt road. Even banal use of M4, as the podcast finds, can change the way we think: unlike many species,



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humans are not born with innate navigational skill, and like a muscle that weakens without continued use, our ability to navigate atrophies when we offload the task elsewhere. Understanding why and how our brains process information, from maps as well as other tools and concepts, may help us better understand how we move through and interact with the world.

Of course, navigation is a critical use for a map, and Casati dedicates Chapter 4 to the topic, in large part through exploring the bizarre map at the center of the short story by Jorge Luis Borges titled “On Rigor in Science”. Borges writes of a 1:1 representation of space that is superimposed onto the space it represents (a mouthful, I know). It is functionally impractical—but only when our understanding of a map is limited to printed or electronic artifacts. “We usually think of maps as drawn on paper or computer screens. But, fundamentally, maps are representations that are . . . marked arrays” (125). Casati argues that utility markings spray-painted onto streets and sidewalks constitute a type of Borgesian map, as do trail markers. When using a Borgesian map, Point X on the map is in the same place as Feature X is in real life. Casati argues that “all maps are abstractions from Borgesian maps” (129), and what we do is to synthesize the information and repackage it into manageable formats like paper or GIS, artifacts Casati considers “ordinary maps” (79).

If a map is not just the final layout that I make in ArcGIS Pro, or its interactive and 3D counterparts, then what can a map be? Casati defines the concept as “representations where you can physically *locate on them* the *representation* of something’s physical location [this can be spatial or temporal, according to Casati] in a *territory*, in a *certain systematic way*, and they are such that they have the *same dimensionality* of the territory they represent” (41, emphasis from the author). In the category of maps, Casati includes ordinary maps (i.e., what I create in my day job) along with concepts like clockfaces, fMRI scans, certain physical models, sound recordings, some lists, music notation, a line of people waiting for a service (also known as a queue), and “natural maps” (81) like star patterns. As he sees it, a table of contents is a map, while an alphabetical index is not. This is because features or concepts are organized in the table of contents by locational proximity, while elements in the index are ordered by other criteria (by, say, alphabetical order). Similarly, Casati considers fMRI scans—which record data about brain activity—as maps rather than pictures because the false colors in the image correspond to

properties, such as blood sugar levels, rather than to an accurate visual appearance (98).

However, there are some components of Casati’s definition of a map that differ from what us cartographers may intuit. While he includes the items mentioned above, as well as some map-like concepts — for example, movie sequences that represent real scenes — he expressly excludes railway “maps.” It’s here that the semantics of philosophy diverge from the lived experience of many laypeople, myself included. While the New York subway map is not geographically accurate, it does accurately maintain topological relationships; relationships that are, in the context of the subway system, every bit as significant as measured distance relationships might be in other situations. Because it allows a train rider to understand where they are in relation to stations and to the routes of other lines, and thus to navigate through space and time, I would argue that most people correctly consider schematic abstractions of train lines to be a legitimate map. Nonetheless, following Casati’s argument about how and why maps are what they are, and aren’t what they aren’t, requires the reader to at least temporarily accept his definitions.

Many maps require their users to apply additional forms of cognition beyond M4, and although I ended up wanting to understand these further, the book does not explore them in depth. For example, while exploring the question of whether and how pictures are maps (the answer: yes, and no), Casati notes that maps can express multiple properties about the same location, but they’re not particularly good at representing occlusion, such as when a bridge feature overlaps with a river feature (86). Nonetheless, I know that when we—and I am guessing that this goes for you, too—read a map, we “know” that the bridge does not in fact split the flow of the river, as it literally appears on a map to do, but that the bridge instead goes over the river. When did we learn this? Most of us probably couldn’t say exactly, but it is clear that graphic map literacy (understanding that the symbolized bridge exists on a different graphical plane than the symbolized river) is the cognitive key to reading the map—it is how we “know” the relationship of the bridge to the river. Unfortunately, the author does not really engage with this aspect of map comprehension, focusing instead on his categorization of maps as ordinary, natural, Borgesian, or otherwise. Casati does, however, explore the cognition behind the cartographic practice of illuminating terrain from the upper left, which causes relief shadows to fall to the lower right. Using a

satellite image as an example, Casati points out that the natural illumination dictated by astronomical physics can cause us to misinterpret remotely sensed images, as they do not necessarily follow the illustrated convention (93).

While reading this book, I often found myself in a recurring thought pattern: at first I would consider a given concept absurd, but gradually—as I worked my way through Casati’s discussion and came to better understand what he meant—I often found that I did not disagree. While his philosophical perspective on maps is, so to speak, a different and interesting snack for my brain to chew

on, I would not say it is of particularly practical use for GIS practitioners. That said, it is clear that Casati has a deep respect for the process of making an ordinary map: “Metaphorically speaking, the work of a cartographer is like scratching the scratch-off layer of a lottery ticket and uncovering correspondences place by place. (Of course, cartography in practice is much more difficult than that.)” (60). In this sense, *The Cognitive Life of Maps* might not be a required read for cartographers or GIS practitioners, but it may just help a stagnant mapmaker think about their craft in unconventional and interesting new ways.

