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DEEP MAPPING

Space, Place, and Narrative as Urban Interface

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Maps are everywhere. They are the most significant contemporary mediator between people and the spaces we inhabit. Importantly though, they no longer get folded up and placed in glove boxes, waiting for the next road trip, nor are they consigned to those quaint old volumes called "atlases." Now, the map is always with us—in our pocket, on our phone, on our dashboards; it checks us in on FourSquare, shows us the nearest Starbucks, and gives us turn-by-turn directions to our destination. Indeed, the map has become so ubiquitous as to become invisible. It is not solely a representational object but rather an embedded technology—a true medium and extension of ourselves into space. This embeddedness marks the map's final transition to indexicality—that is, the map makes a truth claim about what is "there," and it tells us "you are here." Like a technological begging of the question, it transparently reflects that which it also represents.

Yet we also know that maps are complex graphical, representational, and narrative objects. They have historically been used for everything from navigation to empire building. Rather than relying on the power of the map to *reveal* what is already there, "deep mapping" foregrounds the fact that the affordances of the map can be used to *construct* the complex stories of human thought, culture, history, and production—in short, that the objects of humanities study can be analyzed, critiqued, understood, and articulated through a spatial interface as much as through a linguistic one. In deep mapping, the map is the principal tool of communication, analysis, and argument, similar to the way language performs that function in writing. Of course, maps have always been symbolic and representational, even as they have sometimes, or popularly, made claims to empirical truth and correctness. The difference of the deep map is that it acknowledges its complexity, conflict, politics, and history in its very foundation. As the Polis Center's definition of deep mapping contends, "Where traditional maps serve as statements, deep maps serve as conversations" (n.d.). Deep mapping is a way to open up questions rather than resolving them, to communicate *knowledge* rather than simply *information*.

This chapter provides an overview of the complex confluence of technologies, knowledge frameworks, and social forces that undergird and make possible the emergent field of deep mapping. It also provides examples of deep mapping practices. Philosophical developments in the way we analyze and understand space, technological advances in how we represent

and interface with that space, and material developments in how space is physically structured and navigated have all contributed to new methodologies and new representational strategies. The result is deep mapping: a practice that challenges the empirical and representational assumptions of maps. It contests the cartographic bias of what might "count" as a map while simultaneously building palimpsests, narratives, cartographies, and critical interfaces to space and place. This chapter begins by placing mapping and cartography (for it is important to remember that they are not necessarily the same thing) in their own historical context to situate them as *productions* rather than simply *reflections*. It then examines how these domains shift with the advent of computerized cartography and geographic information systems (GIS), two technological developments that happen contemporaneously with the chapter's next theme: new philosophical understandings of space and place. The chapter then looks at how those parallel developments become intertwined through such practices and domains as spatial humanities, the geoweb, neogeography, critical cartography, and deep mapping. Finally, it presents a few examples of deep mapping as an urban interface and suggests some avenues for further exploration, pointing readers as much toward its future promise and unfinished platforms as to its existing methods and experiments.

Mapping in Context

For much of modernity, the map has been the purview of geographers and cartographers. Historians of science may have read and analyzed maps, but the creation and circulation of maps was principally solidified in the discipline of geography and the profession of cartography over the last few centuries. From early modernity through the eighteenth century, advances in mathematics, geometry, and astronomy, among other fields, simultaneously allowed for and made desirable an increase in map accuracy and indexicality, giving rise to what we now think of as "the map." It is important, however, to begin with the understanding that this articulation is a historically located and constructed concept of the "map" and its purpose. Ancient mapping technologies, such as the Babylonian map of the world, or medieval technologies, such as the mapa mundi, concerned themselves as much with symbolic relationships among peoples, places, and the unknown (including the spiritual) as they did with strict geography. Modern mapping, in contrast, has sought ever-increasing accuracy in representing the physical and mathematical relations contained in space. Maps in modernity developed and mastered a specific purpose: to accurately describe physical spaces such that they could be navigated or administered. Indeed, radical cartographers contend that, throughout modernity, the map has been inextricably linked to the project of exploration and, by extension, empire and colonialism. As European empires expanded, becoming larger and more complex, the need to symbolize them via physical features, transportation routes, boundaries, and resources became a more and more vital enterprise (see, for example, Harley 1989; Harvey 2001). Denis Wood (2010) argues that the map is a performative technology. He provides an excellent history of the concomitant rise of the map and the nation, and contends that the map is the unique technology that *calls into being* the nation state, giving "the elusive idea of the state concrete form" (31). The very origin and development of what we call "the map" is as much about creating what is "there" as it is about empirically reflecting or representing it.

Fast-forward to the contemporary, where computer-generated maps and mapping systems, including the advent of GIS in the mid-twentieth century, further extend this prioritization of empiricism. GIS is an entire computational system for collecting, storing, and analyzing data about space. Taking data about space and making it available for computation opens up

huge possibilities for what we can know, learn, and represent about that space. A simple example will suffice: where, on an analogue paper map, we would measure the distance between point A and point B with a ruler (or a string, or a span of our fingers) and then compare that distance with the map's scale to determine the distance between two points, we now need only identify those two points and the power of computation does the rest. Just as that particular instance of *measuring* is faster and more accurate via computation, so, too, are other operations that geographers carry out with maps. GIS allows faster and more accurate measurement, comparison, quantification, and interpolation. Further, all of these data points in a GIS—whether they represent relief lines specifying elevation, flow rates of a river, or even neighborhood coffee shops—can be reused on different maps for different purposes. Such systems are used for everything from mapping weather patterns to planning the placement of emergency response services. In fact, in many of its applications, GIS relies on computational power to answer questions and solve problems. It allows scientists to predict the path of a hurricane by calculating all known data about a storm and its environment, or it can calculate where a fire station would be within acceptable time distances from the greatest number of structures or citizens. The mathematical and predictive possibilities of GIS are key reasons for its expanding influence and industry integration. Yet the advent and deployment of terms like "data" and "computation" solidify and extend the truth claim of a map. Its geometric and mathematical basis found a logical extension in computation.

Reconceptualizing "Space"

At root, GIS subscribes to and perpetuates the story that mapping tells about its own index-icality, and computational advances in mapping technologies and GIS reinforce empiricism and quantification. We know, however, that the development of disciplines, practices, and domains of knowledge are not singular, uniform, linear, or consolidated. Contemporaneous philosophical and theoretical advances in how we think about and conceive of space have challenged geography's quantitative foundations. Within the discipline of geography, such subfields as human geography and critical geography have long histories of revising the emphasis on quantification and accuracy and have instead approached space as a meaningful, historical, and/or political site of human activity.

In *The Image of the City* (1960), Kevin Lynch was among the first in the field of geography (though technically he was an urban planner) to think about the relationship between people and the spaces they inhabit instead of analyzing spaces as a priori objects. Lynch's work examined the mental maps that people have of their urban environments, and he proposed that they imagine spaces in relation to key geographic features: paths, edges, districts, nodes, and landmarks. Lynch's work initiated a significant change, as it accounted not just for the empirical *fact* of space but also the *meanings* people inscribe in it.

Over 30 years later, Lynch's initial impulse to think of space *relationally* is extended and enhanced in the work of Doreen Massey (1994), who integrated the political philosophies of Marxism and feminism into geography. Massey compellingly articulated the concept of "place" as a construction and constellation of social relations weaving together at a particular locus. If one zooms in from the satellite toward the globe, holding all those networks of social relations in one's head, then each "place" can be seen as a particular, unique site of intersection. Place is, indeed, a meeting point. This marks an important departure from conventional geographic thinking for two reasons: first, it challenges the idea that geography can adequately describe (in both senses of that term) that which it might "contain." Second, instead of a single focus on the relation between humans and the spaces they occupy,

as embodied in human geography, Massey's work also put spaces into dialogue with other spaces, allowing us to think of space as articulated moments in networks of relations and understandings (1994: 7). Massey's call for a new way to imagine space from within geography drew on a significant body of theory interrogating the concept of "space" from sociological and philosophical perspectives.

Michel Foucault offers one such philosophical perspective in "Of Other Spaces: Utopias and Heterotopias" (1986 [1967]). Foucault argues that, while the nineteenth century was concerned above all with themes of time and history—development, accumulation, and the slow, inevitable course of so-called progress—we are now in an era defined by the characteristics of space. Massey fundamentally echoes Foucault's assertion that

> [T]he space in which we live, which draws us out of ourselves, in which the erosion of our lives, our time and our history occurs, the space that claws and gnaws at us, is also, in itself, a heterogeneous space. In other words, we do not live in a kind of void, inside of which we could place individuals and things. We do not live inside a void that could be colored with diverse shades of light, we live inside *a set of relations* that delineates sites which are irreducible to one another and absolutely not superimposable on one another.
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> (Foucault 1986: 3, my emphasis)

Space is thus not an empty container for human actions, a kind of void to be geometrically demarcated and filled, but rather a set of relations. Human action and meaning do not straightforwardly occur within space; space is co-constitutive of those very actions. Space is multiple and complex, already inscribed with meaning, and generates relations as much as it "houses" them.

Henri Lefebvre in *The Production of Space* (1992 [1974]) is likewise interested in freeing the concept of space from its perception as not only geometric and mathematical (i.e., *physical space*) but also a metaphorical mise-en-scène for knowledge and ideas (i.e., *mental space*). Lefebvre instead theorizes a third term, *social space*, which proposes that space is produced by social actions and actors. This gesture provides social space with far more nuance than a concept like physical space, while simultaneously providing structure and substance in a way that the concept of mental space lacks.

These theorizations of space clearly distance it from a purely indexical or empirical thing by demonstrating the ways that it becomes meaningful through human interaction—the historical and the contemporary, the creative and the everyday. These new understandings of space occur contemporaneously with the technological developments we looked at earlier: computer-based mapping technologies and GIS. The result of their union is an interest in producing maps that account for more nuanced analyses of space and also represent spaces differently than strict empirical or indexical approaches. If, as Michel de Certeau contends, "space is a practiced place" (2011: 117), then our task is to analyze and express the *practice* itself as the interrelation between space and place. The four main practices that have arisen from this nexus are counter mapping, neogeography, the spatial humanities, and deep mapping. While the topic of this chapter is deep mapping, it is important to understand how the same basic concepts and technological advances find slightly different expressions through these practices. It is also important to understand that the boundaries between where one of these practices might end and another begin are highly subjective and ever shifting. Each practice readily and frequently borrows from the others.

New Mapping Practices

Counter-mapping and neogeography both use the map itself as the primary mode of expression and argument—they make things that can be readily identified and read as "maps." Counter-mapping is premised on the argument that maps are expressions of power, and that they most frequently serve dominant power structures. As its name suggests, counter-mapping aims instead to map places and territories *counter* to dominant power structures, and to use the map as a tool of politically engaged discourse. William Bunge's maps of Detroit are pioneering examples of counter-mapping and still stand as emblematic examples of the power of maps as political agents (see Wisniewski 2013 for an expanded commentary on Bunge's work, including reproductions of many of his maps of Detroit). "Where Commuters Run Over Black Children," arguably his most famous map, plots the locations of children struck and killed by cars in an inner city neighborhood. That the neighborhood is predominantly African American, and that the collisions occur on major commuter routes to the white suburbs, give the map its title, politics, and power.

Still in the realm of mapmaking, neogeography "consists of a set of techniques and tools that fall outside the realm of traditional GIS . . . Essentially, Neogeography is about people using and creating their own maps, on their own terms" (Turner 2006: 2–3). Neogeography principally employs free online mapping tools, the so-called "geoweb," like Google Maps or Open Street Map, eschewing expensive applications like ArcGIS; it also relies heavily free and open-access data sets to produce maps. Alan McConchie (2015) persuasively traces the genealogy of neogeography through a computational history of hacking, crowdsourcing, and making instead of a history of geography or cartography. As such, neogeography blurs the boundaries between mapmaking and application building on the one hand, and producers and consumers on the other. It is the map-based province of the *prosumer*—a term coined by Alvin Toffler to name a person who blurs the boundary between producing goods and consuming them.

The spatial humanities and deep mapping, on the other hand, are less strictly focused on the creation of actual maps and instead conduct research that takes the spatial as a starting point for knowledge production. They concern themselves with a broad range of texts, including narrative, visual, and cartographic texts, to engage in humanistic inquiry in a new way. As with all of the new spatial practices outlined here, it is difficult to draw clear or simple distinctions. Still, it is possible to broadly describe the spatial humanities as a more formal practice, where geotools, be they professional-level GIS or consumer-level Google maps, are used to address the conventional questions and problems of the humanities. One example is the work of Anne Kelley Knowles (2013), who asked the question, "What could Robert E. Lee actually see at the battle of Gettysburg, and how does that change how we understand that historical event?" By reconstructing the physical landscape of the battle in a GIS, and literally putting Lee on the battlefield, Knowles proved that Lee could not have known the extent of the reinforcements arriving on the federal side because he literally could not see them. Here, the technologies of the map are used to investigate an historical question, with groundbreaking results.

Deep Mapping

Deep mapping is an amalgam of each of these approaches. It combines the spatial humanities' scholarly treatment of "space" as an analytic with neogeography's interest in an open and participatory geoweb and counter-mapping's self-conscious remaking of maps to challenge

dominant power structures and discourses. In so doing, it interrogates not just the scholarly concepts of space and place, but also the very practice of mapping itself.

One approach to achieving the goals of deep mapping is application development—that is, building applications that allow users to make maps differently. The *HyperCities* platform is an excellent example of just such a project. Developed by Todd Presner, David Shepard, and Yoh Kawano at UCLA, its method is "thick mapping" rather than deep mapping. "Built on the idea that every past is a place" (Presner 2009), *HyperCities* allows users to place a wide variety of media objects, including images, historical maps, texts, and tweets, into a map interface to explore the layered histories of city space. The platform arises from a need for researchers in the spatial humanities to access affordances different than those of standard GIS platforms. One such affordance is allowing users to specify not just the geographic co-ordinates of their objects but also the temporal ones. In *HyperCities*, users can navigate by time as well as by space. Using the timeline feature in the interface, objects on the map appear and disappear according to the temporal range the project creator assigned to them. The result is the ability to construct a multilayered history of a small geographic area and show changes over time and space.

The multiple layers of history also play a central role in The Museum of London's "Streetmuseum" app, which exemplifies what is possible when digital content, maps, locative technology, and the dense histories of urban spaces are brought together. The app maps a number of locations where significant historical events took place in greater London. Once they are at the sites of these events, users can hold up their tablet, "see through" their screen (the app activates the rear camera on the tablet), and view historical photographs superimposed on the contemporary reality of the location. Imagine standing at the gates of Buckingham palace and seeing the superimposed image of suffragette Emmeline Pankhurst being arrested, or imagine seeing a building falling to the ground on Queen Victoria Street during a bombing raid in 1941. These are the sorts of deep mapping experiences that capture precisely what Lucy Lippard means when she says:

> Place is latitudinal and longitudinal within the map of a person's life. It is temporal and spatial, personal and political. A layered location replete with human histories and memories, place has width as well as depth. It is about connections, what surrounds it, what formed it, what happened there, what will happen there.
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> (Lippard 1997: 7)

Pipelines

Lippard's metaphors of width and depth, and her enunciation of place, have been particularly enabling in my own work on Edmonton, Alberta, Canada, a city whose layered history I have been learning about and excavating for some years. Here, I belong to a research cell called the *Edmonton Pipelines Project*. *Pipelines*, as we call it, is a collection of distinct yet reciprocal projects (under the direction of different scholars, including undergraduate and graduate students) that share common spatial, theoretical, and/or methodological ground. Each project approaches the deep map as both a method and metaphor, using depth both as *concept* and *instantiation* to engage with issues of history, suburbia, gentrification, and urban planning. In a geographical location too frequently assumed to be without geographical depth (e.g., the flatness of the prairies) and historical depth (e.g., the erasure of precolonial and ecological history), Edmonton in many ways serves as a model of the North American city of the

twentieth century. If cities such as Montréal and New York stand as idealized forms for the urban, it is the Edmontons, the Tulsas, the Phoenixes, and the Salt Lakes that serve as the model for what most cities *are* (not what they aspire to be). Reintroducing depth to that urban conversation disrupts the very flattening of discourse that renders these types of cities under-narrated, uninteresting, and somehow always already known.

While we initially imagined *Pipelines* to be a singular effort that could somehow synthesize the disparate ideas and visions of its collaborators, we soon realized that we would require different methods and strategies to accomplish the varied thematic and localized aims of our interests. Indeed, we realized that one strength of deep mapping is the capacity to collect different scholarly pursuits together—to juxtapose them under a single umbrella, without any necessary adherence to methodological purity. Thus, each of the projects that make up *Pipelines* can at once stand alone while also contributing to the collective expression of a shared ambition. For example, the Rossdale project is building a layered historical map of the area with the same name, an area inhabited for some 6000 years with a deep Indigenous, colonial, civic, and industrial history, to name but a few of its intersections. As project director, Heather Zwicker, urges:

> Stand in one spot in the Rossdale Flats to apprehend the complexity of place. If you look closely at the boreal bush along the bike trails, you can discern raspberry canes and apple trees on the riverbanks, domestic remnants of the backyards from houses expropriated in the 1970s to build the "Ribbon of Green." Where you stand and marvel, trying to imagine that disappeared cityscape, will be on a riverbank hollowed by coal extraction: a formative city phenomenon beneath the plane of the visible. Beneath that vision, another made forcibly invisible by the false celebration of this city as a hundred-year-old entity: aboriginal Rossdale, routinely inhabited for six thousand years.
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> (Zwicker n.d.)

In this description, we can see the depth that the Rossdale project evinces. By juxtaposing the long history of human habitation in the form of Indigenous history and settler domesticity (historical depth), the industrial legacy of coal extraction (geographic depth), the civic impulse to park development (political depth), and the ecological footprint of the boreal bush (environmental depth), the Rossdale *Pipelines* project stands as an exemplary instance of how to think and represent the complexity of depth.

Daniel Laforest's Vertical Suburbia *Pipelines* project encourages a different kind of depth. It argues that suburbia is perceived almost exclusively on the horizontal plane. The crowd-sourced project challenges its contributors to look differently, to produce images that highlight the verticality of suburban landscapes. Other *Pipelines* document and narrate "desire lines," or "unsanctioned paths worn by frequent footsteps" (Luckert n.d.). Still others take the block-by-block makeup of the city and rearrange it chronologically rather than spatially, or they ask what aspirational urban planning projects have never actually come into being. Taken together, the *Pipelines* projects represent a sustained and varied engagement with what constitutes space and place, what might count as a "map," and how we might insert "depth" into our theories and methods alike. While we take our name, *Pipelines*, from the oil and gas industry on which the city's economy is largely based, we use the term metaphorically, to denote the ways that each of our deep mapping endeavors is a way of channeling meaning, rather than oil, through dense city spaces.

The field of deep mapping is changing rapidly, like technologically influenced fields always do. New internet-based mapping tools and plugins emerge at a pace that makes mastering them almost impossible; new open source GIS applications, such as QGIS, allow developers to build out the kind of functionality that they want to see in their GIS; new platforms, like *HyperCities*, encourage humanists to experiment with spatial arguments in an environment that demands subject matter expertise rather than technical expertise; and all of this is happening in an environment where users of all types are generating geographic data that scholars cannot even begin to capture and have only just begun to study. The deep map has emerged, for humanists, as a new method of argument and a new form of scholarly production. It is exciting to anticipate what it might offer once it is an established, rather than an emergent, praxis.

Acknowledgments

Further Reading

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