

Sociospatial

4 The Transduction of Space

The social is inherently temporal and spatial

The modern city exists as a haze of software instructions. Nearly every urban practice is becoming mediated by code.

—Ash Amin and Nigel Thrift

Technicity and transduction account for how things *become* what they are rather than what they are.

—Adrian Mackenzie, our emphasis

In the opening chapter, we proposed that one of the primary reasons why software makes a difference to the world people inhabit is because it modulates the conditions under which sociospatial processes operate. We also suggested that software studies to date have largely ignored the role of space as a conceptual and analytical tool for understanding how and why software matters, instead prioritizing the role played by social relations and time. Space has been effectively relegated to the role of mere backdrop or inert stage.

In this chapter, we challenge such a view, arguing that space is a critical component, along with social relations and temporality, in understanding everyday life. Social relations do not operate independently of space or simply at a location, rather space is an active constitutive element in the production of social relations, communal formations, political organization, and personal regulation. In other words, the social is inherently temporal and spatial. Indeed, one only has to think of everyday living to realize how space provides a defining context in which relations unfold, and which in turn produce space. For example, people's labor is performed in particular workplaces, consumption unfolds in specific retail and leisure spaces, domestic life takes place within individual homes and distinctive neighborhoods, travel consists of journeys through and between localities, and communication is embedded within particular domains or links together geographically separated places. In all these cases, the spatial context is not incidental or inert, it is constitutive and productive—the *where* makes a difference to the *what* that unfolds. Space is a lively participant in the making

of meanings and memories. From this perspective, the work that software does is profoundly shaped by the co-constitutive relationships between software, social relations, space, and time; and in turn software matters because it alters the conditions through which society, space, and time are formed.

To commence the discussion we detail a brief genealogy of spatial thinking, summarizing how social scientists' understanding of the ontology of space has evolved. We do this in order to contextualize the recent development of an ontogenetic conception of space, and its utility in illustrating the productive relationship between society and space. In so doing, we make it clear how this new conceptualization differs from more traditional philosophies of space. Starting with implicit and absolute notions of space, we then outline relational conceptions of space, finishing with more recent ontogenetic understandings of space that argue for a shift in focus from questions concerned with "what is space?" to "how does space become?" (for a more detailed discussion, see Kitchin 2009). Developing the latter, we argue that code/spaces are best understood as ontogenetic in nature, bought into being through the technicity of software to invoke processes of transduction. Throughout the discussion we clearly privilege the spatial, but for good reason—to highlight how the social is thoroughly spatialized and to thus illustrate the relevance and potency of sociospatial approaches in understanding how and why software matters to everyday life; how it transduces diverse spatialities.

A Genealogy of Space

Spatial thinking has developed apace in the last forty years, so much so that commentators now talk of a spatial turn within the social sciences. Prior to the 1950s, however, it is fair to say that beyond physics and theology, little conceptual work had been undertaken on the ontology of space. For social scientists, space was an *implicit* container or backdrop in which things happened. Even geographers—whose primary focus is the spatial—were more interested in describing the uniqueness of places and plotting spatial patterns across regions and within particular landscapes, rather than exploring the nature of space itself. Here, space was loosely understood in absolute terms, as having fixed dimensions across which objects of study could be measured and mapped. While not formally recognized as such by those working at the time, conceptually, space was natural, given, and essential, and spatial processes were teleological and predictable. Epistemologically empiricist, wherein facts spoke for themselves, research was largely analytically naïve, consisting of the accumulation of facts as evidence for generalist theories (Hartshorne 1959).

In the late 1950s and into the 1960s this implicit notion of space was rearticulated as an *absolute* ontology of space wherein space was understood as a geometric system of organization, "a kind of . . . grid, within which objects are located and events occur"

(Curry 1995, 5). Such a formulation, implicit previously, was now explicitly stated and was accompanied by an epistemology that saw geographical scholarship seek to reinvent itself as a "spatial science," transforming itself from an ideographic (fact gathering) to a nomothetic (law producing) discipline focused on locational arrangement, geographical patterns, and processes (see Schaefer 1953; Burton 1963; Harvey 1969). Here, space was defined and understood primarily through Euclidean geometry (with x , y , and z dimensions). The phenomena operating within a given space could be determined objectively and measured scientifically, then analyzed using spatial statistics and modeled quantitatively. Deeply essentialist in formulation, space is effectively reduced to the essence of locational geometry, its properties natural and given. Converts to this new way of researching the world, spatial thought became the science of spatial laws wherein observed geographic distributions and patterns could be explained through functional equations and modeled. Although few of these converts refer to the philosophy of positivism in their work, it is clear that many of spatial science's central tenets are drawn loosely from this school of thought (Kitchin 2009).

Developing from the 1970s onward, as a more explicit counter to the scientific ontology of absolute space, were calls for relational ontologies (see Crang and Thrift 2000). The concept of *relational* space was first articulated overtly within radical approaches within human geography (for example, Marxist and feminist geographies) that developed in opposition to the dominant methods and ideology underpinning spatial science. These theorists argued that spatial science was highly reductionist and by treating space as absolute in nature, phenomena were evacuated of social meaning and political purpose. Space, it was argued, was not a neutral and passive geometry, essentialist and teleological in nature. Instead, space was conceived as relational, contingent, and active, as something that is produced or constructed; "constituted through social relations and material social practices" (Massey 1994, 254). Space was not an absolute geometric container in which social and economic life took place; rather, it was constitutive of such relations.

In such relational thinking it was recognized that the spaces people inhabit—the built environment, transport systems, the countryside—do not simply exist, pre-formed and awaiting meaning. Instead, these landscapes, and the spatial relations they engender, are produced, they are made, shaped, managed, and given meaning by people; they are the products of diverse material and discursive practices that in turn actively shape social relations. Conceived of in these terms, an everyday space like a football stadium can be seen to be both a physical form constructed by certain agents and institutions for particular ends as well as a space given meaning through the daily labor of staff, the behavior and language of visitors, and the rituals and memories of fans: its use and occupation is shaped both by its material form and the immaterial meanings that coalesce around it (Hubbard et al. 2002). Epistemologically, what this relational conception of space meant was a significant shift from seeking spatial laws

to a focus on how space is produced and managed in contingent and relational ways by people to create certain **sociospatial relations and not others.**

In the last decade, a small cluster of scholars have begun to challenge absolute and relational conceptions of space, seeking to develop new understandings of space based on ontogenetic ideas. In so doing, they change the central question of inquiry from "what space is" to "*how space becomes.*" Space (and everything else in the world), they argue, is not ontologically secure, it is not a fixable, definable, knowable, predetermined entity. Rather, space is always in the process of becoming; it is always in the process of taking place. Space, in these terms, is a practice, a doing, an event, a becoming—a material and social reality forever (re)created in the moment. At a fundamental level space achieves its form, function, and meaning through practice. Space emerges as a process of ontogenesis. As Doel (1999) has pointed out, from this perspective space can be understood as a verb rather than a noun, and he suggests that term space might better be replaced by "spacing" to better capture its perpetual production.

The ongoing practice of space can be illustrated in many ways. With respect to geographical form it is clear that the world is never static and fixed. Instead, the material landscape is constantly being altered, updated, demolished, and constructed through the interplay of complex sociospatial relations in ways that continuously moderate, in often subtle and banal ways, the spaces people inhabit. At a macroscale there are new local, regional, and national development schemes that are enacted daily to transform and regenerate built environments, transport infrastructures, and natural landscapes. For example, road layouts are modified, new buildings are designed, bus routes across the city are reorganized, new planning zones for industrial development are drawn up, land management schemes for drainage are devised, and so on, that adjust and revise the physical landscape and space-time relations of places. Locally, streets and buildings are always in a process of being refashioned and remodeled and spatial layouts rejigged. Roads are trenched for cabling, storefronts are updated, shop interiors are redesigned and maintained, trees are planted, grass is mowed, and litter is dropped and cleaned up. In other words, the material fabric and social relations of places are constantly created and recreated through spatial practices that vary in their pacing, so some changes are more immediately noticeable than others. As processes of erosion and entropy at abandoned buildings demonstrate, all places are in the course of change, slowly mutating from one state to another.

Similarly, the function of space is not static but alters with time (whether seasonally, as for tourist destinations, or daily, as for business venues and nighttime establishments) and the use of space is negotiated and contested between individuals and groups. Spaces have multiple functions and through the daily flux of interactions, transactions, and mobilities are always in the process of being made differently. For example, Trafalgar Square in London functions as somewhere to meet, to have lunch,

to chat, to visit museums, to gather for protests, to party, to take tourist photos, to travel across, to feed pigeons, to work on a food stall, to steal, to catch a bus or a subway train, to sunbathe, and to people watch. It is always in process, constantly being created in the moment as a collective manufacture composed of hundreds of recursive, interconnected relationships between people and place. Trafalgar Square does not simply exist, fully formed; a still landscape. It is endlessly remade, never the same, ceaselessly reterritorialized. As the Greek philosopher Heraclitus observed, "you cannot step twice into the same river, for fresh waters are ever flowing in upon you" (Russell 2004, 52).

Likewise, the meanings associated with spaces shift, ever changing with mood, action, memory, and events. Again in relation to Trafalgar Square, the meanings inscribed upon that location vary as a function of how the space is being used (as a tourist, or as a Londoner), how the viewer interprets Nelson's Column and the surrounding buildings (as visually stimulating scenery or an imperialist celebration), the social background and attitudes of a person, that person's memories and understandings of the Square, and so on. Similarly, meanings attached to home, workplace, particular buildings, and familiar journeys metamorphose with the passage of time. How space is related to, and the spatiality that engenders, can never be static, but emerges, varying over time, and across people and context.

The spatiality of Trafalgar Square (and indeed the notion of what Trafalgar Square is) is always in the process of taking place—its form, function and meaning is ever-shifting across people, time, and context. Its reproduction as Trafalgar Square appears to be relatively stable because it is maintained as such through a diverse set of discursive and material practices, including street cleaning, pavement repairs, policing, social norms, embodied conventions of behavior, history lessons, reading guide books, viewing postcards, sitting on steps, splashing in fountains, and many more. In other words, Trafalgar Square is constantly remade through consistently repeated, iterative practices enacted by people and things. These practices are citational in Butler's (1990) terms in that they endlessly, but imperfectly, cite the previous moment and thus give the appearance of coherence and continuity. Taken as a whole, it is important to realize these sets of practices are not planned or coordinated, nor necessarily conscious; they simply proceed. Moreover, many practices are easily forgotten or so ephemeral as to not be remembered, or are actively precluded and hidden to give impression of complete, fixed, and final existence. They are so banal that they are largely ignored, others are culturally invisible, and increasingly others happen automatically through the employment of technology. For example, this printed book consciously denies the evidence of the writing practices that brought it into being—the multiple versions, edits, revisions, and corrections made to sentences, sections, and chapters using word processors, pen and paper, and lengthy conversations. As such, Trafalgar Square is something that happens rather than something that is. Space

emerges, ceaselessly citing earlier spatial practices in a never ending, but always changing, cycle.