Imaging and Imagining the City

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INTRODUCTION

Our recent work has focused on the city as a site of interaction and, in particular, how emerging technological infrastructures provide an opportunity to re-encounter urban space. One of the starting points for this work has been a reconsideration of the forms of representation of urban space that typically support work in urban computing, what we might dub "cartographic realism" – a focus on traditional cartographic representations as a basis for mapping information resources, even when those extend beyond the visual.

Our alternative approach has focused on both information and spatiality as phenomena that are culturally produced. Representations of urban space are powerful elements in the imaginary construction of everyday life, as Vertesi has illustrated in her study of the London Underground map (ref). Our concern with spatiality and representation, then, is with the cultural imaginaries that they reveal – how we can think of spatial representations as narrative objects, objects that tell stories about everyday life. We approach this in terms of three themes: legibility, literacy, and legitimacy.

LEGIBILITY

Seeing spatial information as a cultural category rather than a natural one, we have suggested that it may be more fruitful to think instead about how it is that people find spaces and settings informative. This turns our attention from objects to processes, and to the relationship between forms of knowing, ways of being and patterns of acting. In particular, we have found it particularly useful to think in terms of the legibility of spaces and actions – how it is that they can be read and understood as conveying particular sorts of messages.

On an individual level, the legibility of urban space is the central topic for Lynch (1960). However, of more interest here is a form of collective legibility: how social groups can share not only an experience of a space but a meaning for it.

Scott (1998) discusses at length the history of the legibility of social life and attempts to control it, and out of this arise two quite different forms of legibility.

One is what we might refer to as "panoptic legibility," the legibility of high modernism and central planning. In Scott's work, he associates this particularly with modern state-hood. In order for a state to control or manage (or exploit or appropriate) resources, it must first find a way to understand and compare those resources. Panoptic legibility is a centralized form of legibility, in which a standardized scheme can be applied across multiple settings and locales in order to measure and compare them. Standardized categories – be those categories of work or human action, categories of land or natural resources, or whatever – can be used as the basis for understanding and allocation. Scott provides detailed examples, including agricultural or urban spaces laid out according to straight lines and right angles without reference to local topological features, uniform single-crop (or single-strain) farming planned without reference to variable soil conditions or weather patterns. The primary characteristics of panoptic legibility are uniformity, abstraction, and dislocation; it is, almost by definition, a view from nowhere.

The alternative form of legibility explored by Scott is one grounded in indigenous practice, what we might term "local legibility." Rather than a view from without, this is the legibility of the view from within, the view "on the ground." Where panoptic legibility attempts to eliminate difference in order to achieve a coherent ordering of resources across different settings, local legibility focused on the heterogeneous nature of everyday objects and actions, seeing them in terms of individual differences. Most importantly, local legibility is the legibility of practice – it reflects the ways in which people work in, engage with, and make use of the world around the world around them, rather than the abstracted view of panoptic legibility.

Scott uses the example of the contrast between Western single-crop agricultural management and indigenous African experiences of polycropping. To the Western eye, the practice of planting multiple crops in the same field or patch is disorganized and unscientific, lacking the precision that will allow for yield maximization. To the African farmer, on the other hand, polycrop farming is a practical way to ensure sufficient crops in the face of poor soil and harsh weather, as well as providing for varied growth patterns that can help reduce erosion. Analysis of polycropping practices shows that the multiple crops are not

planted at random, but rather in careful relationship to each other, local terrain and topology, soil conditions, historical patterns of crop success and failure, and so on. Like Western agricultural practice, polycropping draws on a complex store of knowledge and practice – but one that is local, is grounded in the long-term, repetitive encounter with the environment, and operates on a different scale.

This is particularly relevant in information contexts because our work leads us to think not of what information spaces contain, but how spaces might be found informative. Informativeness and legibility are two sides of the same coin. The legibility of a space, a setting, or an activity is what allows us to find it informative, and to see it as an instance of a category, as the kind of action that it is, as containing lessons, implications, or constraints. Legibility is a product of a social and cultural encounter with the world; in turn, it structures and shapes those encounters.

The social origin of legibility is a critical issue for collaboration in mobile and ubiquitous environments. The examples that we have presented argue for a very different view of information and information use than pervades conventional engineering discourse. They argue that the elements of the everyday world around which ubiquitous computing applications seek to organize themselves – individuals, roles, groups, places, activities, times, contexts, and so forth – are not elements of the physical world to be uncovered and recognized, but are instead elements of the social world. Their informativeness derives from the nature of social participation, and their nature and meaning are negotiated in, expressed through, and solely available to social practice.

LITERACY

Rather than taking the configuration of urban space as a given, we give particular attention to the processes by which our experience of the world is shaped and shared. That is, we take a practice-oriented view in which the ways of acting in different settings both reflect and sustain ways of understanding and organizing those settings. Applying this view to our conventional interpretation of "information" has two consequences. One is that we should look towards the ways in which we must actively constitute the informativeness of the everyday world through our actions within it, and we explored this view particularly through a series of examples considering the ways in which space might be found informative. A second consequence, though, is the relevance of representational practices themselves. By representational practices, we mean both the practices by which certain kinds of representations are brought into existence, and the practices by which those representations are used, shared, and manipulated.

Walter Ong's (1988) classic account of the relationship between oral and literal cultures puts forth the argument that the different forms of representational practice associated with each results in quite different sorts of experiences of the world. The invention of written language

allows for a form of static, reproducible and transmissible experience of the past that is simply impossible to achieve in an oral culture. Looking from our own perspective, in which literacy is the basis of recorded knowledge, oral cultures seem simply to strive but fail to achieve the precision and durability of written knowledge. However, Ong notes that the experience of the world in a pre-literate culture is one in which no such durable, stable, and external record can exist; oral cultures are, instead, performative, ones in which, for example, poetic recitations are not valued for their accuracy but for their vibrancy and their appropriate response to local conditions (indeed, to such a culture, accuracy would be viewed as a poor measure of aesthetic value, and not a part of the poet's art). At the same time, this performative nature of cultural knowledge is also a source of reinvention and adaptation; in his study of Melanesian ritual practices, Barth (1987) ascribes certain aspects of the evolution of these rituals to the "repeated oscillations of cosmological lore between its private keeping and its public manifestations" associated with pre-literal cultures.

Ong's focus on the performative aspect of oral culture clearly resonates with a processual account of information, but it also suggests a concern with similar aspects of written language. Written documents also have their performative aspects, and, by extension, different kinds of representational forms, since they provide different sorts of orderings of objects, imply different kinds of understandings of the world. Goody (1977) discusses different forms of knowing associated with basic literacy and with later developments such as lists and tables. In the absence of the list as a generalized form of knowledge, cataloging and ordering categories are not formalized as practices. Similarly, as the list emerges as a practical form, so too does the practice of knowledge become the accumulation of lists, and then of hierarchies, tables, and more. Studies of early book collections, such as the library of Elizabethan mathematician and magus John Dee (Sherman, 1995), suggest that both forms of writing and even the physical forms of presentation contribute, themselves, to the practice of scholarship; if scholarship consists in amassing and assessing knowledge in the forms of books, then the forms of the books themselves and the capacities that they present – for marginalia, for end-notes, etc. – become aspects of the practice of scholarship and authentic knowledge.

In the spatial realm, maps are one of the most obvious intersections of practice, knowledge, and representation. The invention of maps gave rise to new ways of conceiving, cataloging and moving through space, but maps carry with them commitments to forms of practice. Hutchins (1995) refers to navigational charts as "analog computers" for seafaring, noting that "not until the Mercator projection did a straight line have a computationally useful meaning" (ibid: 113). In other words, the particular cartographic projection with which we are most familiar is designed in

order to support specific kinds of navigational and computational practices. However, while a boon for Western navigation, the Mercator projection is a controversial one. In creating straight lines with navigational utility, the projection distorts the representations of the Earth's surface area, exaggerating the size of countries which lie closer to the poles (largely first world countries and former colonial powers) while under-representing the landmass of those closer to the equator (often third world countries and sites of former colonial occupation.) In this case, our appreciation of the vastness of the African continent is ruled as secondary to the opportunity to use geometric tools for navigation. As a different form of cartography, consider the "occasion maps" that one might draw when giving someone directions to a party or a favorite coffee shop. Here, what is represented is not space but a journey, and we notate significant points along the way: landmarks and turns but not small bends in the road. Consistent representational schemes are forgone or transformed in support of the particular kinds of mutually understood practice within which the map will be put to use.

Representational technologies, then, are coupled to representational practices. Their accuracy or veracity can be defined only with respect to the particular practices by which they are employed, and through which a relationship is established between the object and its representation. In the approach to information that we have been developing here, then, we similarly see the modern idea of information as a consequence of particular kinds of representational practices. Computer scientists and technologies read environments as informative according to a set of understandings they have of the ways in which the world might be represented; computational representations are tools of the trade, and learning to be a computer scientist involves learning to encounter the world as amenable to those sorts of representations, as a world of iteration and recursio. We make this point for two reasons. First, by "de-naturalizing" computational representations and informational accounts of the everyday world, we want to further support a transition from "information" to "informativeness," draw attention to the role of mediating practices in informational accounts of ubiquitous computing settings. Traditional informational accounts obscure the work that must be done in creating and maintaining a correspondence between computational and non-computational aspects of a setting (Smith, 1996). Second, by emphasizing the processual aspects of information, we want to turn research attention towards alternative cultural experiences of settings in which technology might be embedded.

LEGITIMACY

The variety of forms of "environmental knowing" suggests that the account of information or knowledge incorporated in traditional technologies and technological representations is only one amongst a number of ways of understanding the relationship between people, space, and action. So, for instance, the moral landscape of Native American tradition and the cultural historical landscape of the aboriginal Australians do not contain information in the ways we might normally suggest, but rather are inhabited in ways that render them informative. These alternative environmental epistemologies are products of habitation and purposeful action (Brewer and Dourish, in preparation).

However, as we have presented these, there has been one significant consideration that we have not addressed, which is the fact that these different epistemologies do not always sit comfortably side by side, but are frequently in competition with each other. Implicit in any consideration of how to understand the informative nature of a space, then, is the question of the struggle for legitimacy of different forms of knowledge.

The context in which these struggles take place is the rise of technical rationality as the basis of both industrial practice and state governance. Management "by the numbers" – whether that is the management of production schedules, of marketing campaigns, or of state welfare – has become the dominant approach to understanding and acting within the natural world. Data analysis is the basis for understanding and responsiveness in this approach, and so information technologies of all sorts have played a critical enabling role (Yates, 1993). As scientific and computational accounts of the social and natural world are the basis of industrial and governmental practice, they inevitably come into conflict with the alternative epistemologies that they displace.

These issues are vividly demonstrated in disputes over First Peoples' land right claims. In Australia, a growing White population increasingly came into conflict with the indigenous people over land rights and the designation of sacred sites (Hill, 1995). Part of the difficulty here arises from the problems of describing sites and their significance. While the legal frameworks provided by the state operate in Western cartographic terms, Aboriginal descriptions of space depend on historical contingencies or on Dreamings that, themselves, move through the landscape. Further, the kinds of knowledge by which the significance of spaces could be determined is inherently local, partial, and secret. When the interpretive nature of Aboriginal spatial knowledge runs up against the formalist spatial expressions of title law, what results is "debate over the political meaning and legitimate nature of Aboriginal beliefs" (Povinelli, 1993: 697).

In the United States, this has arisen as a problem of cataloguing and assessing cultural resources. Stoffle et al. (1997) discuss this problem as it arises amongst the Southern Paiute. The protection of cultural resources, when incorporated into Western scientific traditions, requires a means for calculating and comparing the cultural significances of different places, so that decisions can be made about priorities. Cultural resources are organized into "Traditional Cultural Properties" which identify specific

sites and objects of cultural significance for legal purposes. By contrast, Stoffle and colleagues suggest, the Southern Paiute think not of specific properties, objects, or sites but rather of cultural "landscapes" which focus on the patterns of interdependency and proximity that link cultural resources rather than the properties intrinsic to one or another. Further, again, this holistic approach to the designation of cultural properties is one that is based around a human perspective rather than the "view from nowhere" of traditional cartography. So, in addition to landmarks (which might fit within the Traditional Cultural Property model), Stoffle et al. point to the importance of holy landscapes, storyscapes, ecoscapes, and other ways of understanding the relationship between the land and cultural practice. Similar considerations have been documented in other groups, e.g. amongst the Navajo (Kelley and Francis, 1993).

Both of these cases involve questions of one's claim on the land in the first place, but that is not our focus here. Nor is this simply a tale of incompatible ways of seeing the world. Rather, these examples are struggles for the legitimacy of different epistemologies (Eglash et al., 2004; Nader, 1996). These different epistemologies are embedded within different systems of practice, and when the practices are in tension, then the legitimacy of forms of environmental knowing is called into question. Information technologies are technologies of representation; as such, they inscribe particular worldviews and, inevitably, obscure others. Information technology, tied as it is to our mental and cultural images of scientific representation and progress, is a tool not only for automation but also for legitimation.

CONCLUSION

Our concern with images of urban (and other) spaces is certainly grounded in the visual. But it reaches into other spheres. In particular, we are concerned with the ways in which spatial imaginaries gain currency, and with the recursive relationship between imaging and imagining spatial settings; and similarly with the status of imagings and imaginings as knowledge claims.

We have been conducting this work particularly in the context of ubiquitous computing and its refiguring of the relationship between people, action, and space. Recent work in "urban computing" has explicitly presented the city as a site for interaction and therefore brought questions of urban imaging and representation to the fore. However, we believe that significant problems attend the ways in which both the city and the urban resident are imagined in many of these applications. We are looking towards current work in critical geography and urban studies as a way to understand this, and in the hope that by connecting these two literatures we can fruitfully contribute to debates on the relationship between technology, space, and society.

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