The Map Reader

Theories of Mapping Practice and Cartographic Representation

Editors: Martin Dodge, Rob Kitchin and Chris Perkins

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Martin is Senior Lecturer in Human Geography in Manchester where his research focuses on conceptualising the socio-spatial power of digital technologies and urban infrastructures, virtual geographies, and the theorisation of visual representations, cartographic knowledge and novel methods of geographic visualisation. He curated the well known Web-based *Atlas of Cyberspaces* and has co-authored three books covering aspects of spatiality of computer technology: *Mapping Cyberspace* (Routledge, 2000), *Atlas of Cyberspace* (Addison-Wesley, 2001) and *Code/Space* (MIT Press, 2011). He has also co-edited two books, *Geographic Visualization* (John Wiley & Sons, 2008) and *Rethinking Maps* (Routledge, 2009), focused on the social and cultural meanings of new kinds of mapping practice.

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Preface

Introducing *The Map Reader*

Martin Dodge, Rob Kitchin and Chris Perkins

Delineating maps and mapping

> A map is, in its primary conception, a conventionalised picture of the Earth's pattern as seen from above.
>
> Erwin Raisz, *General Cartography*, 1938.

Mapping provides a uniquely powerful visual means to classify, represent and communicate information about places that are too large and too complex to be seen directly, and cartography is the practice of map making. Importantly, the places that maps are able to represent need not be limited to physical, geographical spaces like continents, rivers, mountain ranges and such like: maps can be used to represent human activities, cultural patterns and economic exchanges, and indeed to construct worlds of the imagination. In this Preface we delineate the nature of maps and mapping, and outline the aims of *The Map Reader* and the practicalities of its making.

The ability to create and use maps is one of the most basic means of human communication, at least as old as the invention of language and, arguably, as significant as the development of mathematics. The recorded history of cartography clearly demonstrates the practical utility of maps in all aspects of Western society, being most important for organising spatial knowledges, facilitating navigation and controlling territory. They are instrumental in the work of the state, in aiding governance and administration, and in assisting trade and the accumulation of capital. Some have gone further to argue that mapping processes are culturally universal, an innate human activity, evident across all societies (Blaut *et al.* 2003), although the visual forms of the resulting cartographic representations are very diverse. At the same time, maps are rhetorically powerful graphic images that frame our understanding of the human and physical world, shaping our mental image of places and constructing our sense of spatial relations. So, in a very real sense, maps make our world.

Conventionally, maps are material artefacts that visually represent a geographical landscape using the cartographic norms of a planar view – looking straight down from above – and a consistently applied reduction in scale. However, it makes little sense to neatly define maps according to the type of phenomena mapped or the particular mode of presentation, or their medium of dissemination. Maps have traditionally been used as static paper repositories for spatial data, but now they are much more likely to be interactive tools displayed on a computer screen. Indeed, many national mapping agencies are discontinuing their printed topographic map products as customers increasingly use digital geospatial data. Today, we live in a map-saturated world (Wood 1992), continually exposed to conventional maps, along with many other map-like spatial images and media (e.g. animated satellite views on television news, three-dimensional city models in video games, medical scans in hospitals and clinics), along with myriad artistically deployed maps, and pictorial and cartoon cartographies meant to amuse and persuade.

Maps have long been used in scholarly research into social and physical phenomena. They are a primary technique of analysis in geography but they are also used widely in other disciplines, such as anthropology, archaeology, history and epidemiology, to store spatial data, to analyse information and generate ideas, to test hypotheses and to present results in compelling, visual forms. Mapping as a method of enquiry and knowledge creation also plays a growing role in the natural sciences, in disciplines such as astronomy and particle physics, and in the life sciences, as exemplified by the metaphorical and literal mapping of DNA by the Human Genome Project. This mapping work is not limited to cartography; many other spatial

visualisation techniques, often using multidimensional displays, have been developed for handling very large, complex spatial datasets without gross simplification or opaque statistical output (e.g. volumetric visualisation in atmospheric modelling, three-dimensional body imaging in medical sciences or huge fractal graphs – see Colour Plate Two). At the start of the 1990s, Hall (1992: 22) claimed that 'more mapping of more domains by more nations will probably occur in the next decade than has occurred at any time since Alexander von Humboldt "rediscovered" the earth in the eighteenth century, and more *terra incognita* will be charted than ever before in history'; two decades on not only has this happened, but the trend shows no signs of slowing.

Mapping processes

The production of cartography and other spatial visualisations involves a whole series of mapping processes, from the initial selection of what is to be measured to the choice of the most appropriate scale of representation and projection, and the best visual symbology to use. The concept of 'map as process' is useful methodologically because it encourages particular ways of organised thinking about how to generalise reality, how to distil inherent, meaningful spatial structure from the data, and how to show significant relationships between entities in a legible fashion. Mapping provides a means of organising large amounts of, often multidimensional, information about a place in such a fashion as to facilitate human exploration and understanding. Yet, mapping practices are not just a set of techniques for information 'management', they also encompass important social processes of knowledge construction. As scholars have come to realise, maps and culture are intimately entwined and inseparable.

Mapping not only represents reality, it has an active role in the social construction of that reality. Mapmakers do not so much represent space, as create it. As Winichakul (1994; excerpted here as Chapter 5.4) and Pickles (2004) persuasively argue, maps precede and make the territory they seek to portray. So, for example, the first maps of Siam delineated the nation providing the model for an imagined community, rather than depicting it. Maps then are a key resource of states in the formation of national identity (Anderson 1991). It is rarely the case, however, that people are conscious of this constructive role when they make or use maps. Sparke (1998: 466, excerpted here as Chapter 5.7) calls this the 'recursive proleptic effect' of mapping, 'the way maps contribute to the construction of spaces that later they seem only to represent'. The power of maps comes from the fact that they are both a practical form of information processing and also a compelling form of rhetorical communication.

Maps work, essentially, by helping people to visualise the unseeable. This is achieved through the act of visualisation, premised on the common notion that humans can reason and learn more effectively in a visual environment than when using textual or numerical descriptions. Maps provide graphical displays which renders a place, a phenomenon or a process visible, enabling one of our most powerful information processing abilities – that of spatial cognition associated with the human eye–brain vision system – to be brought to bear. Visualisation is thus a cognitive process of learning through interactions with the multiple visual signs that make up the map. Effective cartographic visualisation can reveal novel insights about spatial relations, patterns and trends that are not apparent with other methods. In an instrumental sense, then, map use is a powerful prosthetic enhancement for the human body: '[l]ike the telescope or microscope, it allows us to see at scales impossible for the naked eye and without moving the physical body over space' (Cosgrove 2003: 137). The ideal of obtaining a reliable capacity to see the unseen is particularly applicable to much of thematic cartography, because it renders statistical information about people, places and geographical processes tangible by revealing their spatial pattern.

Their ability to communicate effectively means that maps are widely deployed as devices to present ideas, themes and concepts that are difficult to express verbally and to persuade people to their message. Most of the maps encountered on a daily basis (often with little conscious thought given to them) are used in the service of persuasion, ranging from marketing maps and city-centre tourist maps to the more subtle displays such as states' claims to sovereign power over territory, implicitly displayed in daily weather maps. Maps work because they are able to *sell* a particular vision of the world *and* because people are willing to *buy* into this vision: people believe in the authority of the image as a trustworthy representation of reality.

Objectives of *The Map Reader*

The map is one of the key components of visual culture and has proved to be a vital representational technology in many fields for hundreds of years. Maps enjoy widespread functional use for a range of tasks. In recent years, maps have started to gain more significance in the wider academy given the visual and spatial turns across the social sciences. As a consequence, there is an increasing interest is spatial representations and mapping practices in disciplines such as anthropology, literary studies, sociology, history and communications (Elkins 2007; Warf and Arias 2008). Similarly, mapping approaches are proving useful in the information sciences, bio-informatics and

human–computer studies as the basis for novel knowledge discovery strategies (Börner 2010). In addition, there is also a lively engagement with cartography beyond academia with growing artistic interest (see Wood 2010 for a recent overview), numerous exciting participatory mapping projects and mass consumer enrolment of interactive spatial media on the Web, on mobile phones and with in-car satnavs to solve myriad daily tasks.

However, despite this attention and their widespread production and use, at a theoretical and analytical level, maps are still somewhat taken for granted: they are spatial representations that portray the spatial relations of the world. As such, analysis of the rhetorical power and technical complexity of how maps work has largely been confined to the small field of cartography, with some contributions from across the social sciences and humanities. Compared with other visual cultures, such as art and film, this literature is relatively small and, we feel, often overlooked. In compiling *The Map Reader* we wanted to draw together into a single source some of the most influential articles from the last half century to provide an intellectually-driven and interpretative anthology of cartographic research which could act as a primer for students, academics and lay readers interested in understanding the appeal and power of maps.

In that sense, the book cuts through the 'information overload' generated by bibliographic databases and ready online access to e-journals and digital books by providing direct access to a careful selection of the most influential texts. The materials selected for inclusion in *The Map Reader* are diverse in their agendas and approaches, drawn from leading scholars and researchers from a range of cognate fields, including cartography, geography, architecture, anthropology, literature, political science, graphic design and geomatic engineering. Each reading provides a thought provoking analysis, and collectively they demonstrate the diverse philosophy, history, praxis and technologies of mapping. They thus provide an insight into how influential cartographic ideas arise and how they circulate as catalysts that can codify and instigate important areas of research within cartography. While the focus on past 'classics' might seem rather backward looking in an era of such rapid change in mapping techniques and technologies, there is nonetheless real intellectual value understanding the roots and routes of cartographic thinking because it places current developments in context and provides a basis on which to build and extent contemporary analysis.

To aid the reader, we have structured the readings around five broad themes: (1) concepts, (2) technologies, (3) aesthetics and design, (4) cognition and culture, (5) politics and power. Each theme is set into context by an original interpretative essay from the editors. A series of full-page colour plates between sections present distinctive map exemplars that we hope will serve as provocative visual 'think-pieces' that counterpoise the surrounding texts.

Making our selection

The task of drawing up a limited, yet definitive, list of significant work for inclusion in a 'reader' text that would achieve widespread agreement is, for any academic discipline, an almost impossible one. We therefore acknowledge our final selection for *The Map Reader* is subjective, reflecting our personal biases, partial knowledge and political agendas. To guide our selection we used a number of parameters. Firstly, we decided to focus on the post Second World War period. This period has seen a diverse range of new theoretical ideas and technological developments, when cartography emerged as a distinct scholarly discipline with its own peer-review journals. Secondly, our remit centred upon pieces that were concerned in the main with contemporary mapping. There is only a limited consideration here of the history of cartography. Thirdly, we limited our selection to the English language given our own language limitations and the prospective readership of the book. As a consequence, the book is unavoidably reflective of Anglo-American scholarship. Fourthly, we sought to select material that speaks in a scholarly fashion to trends and concepts, rather than include more applied, technical and practical papers. Fifthly, nearly all of the readings were published in peer-review journals and scholarly monographs.

We did not, however, use quantitative metrics to guide the assessment of what counts as 'significant'. There is a panoply of projects that seeks to 'scientifically' assess the most significant scholarly work using citations counts, impact factors, h-scores and an assortment of other quantitatively derived metrics. While such calculative approaches seem to offer objectivity, this is very much a veneer that masks a whole host of messy realities, fallacies and contingencies with citation data, particularly relating to relative comparability through time and across subject areas. The material we have selected for *The Map Reader* has a range of citation counts from over one thousand to more recent articles which have so far attracted little attention. For example, according to Google Scholar (July 2010), the foundational semiological work of Jacques Bertin has been cited 566 times in the original French language version, and 1341 times in the 1983 translation (excerpted here as Chapter 1.2). Another well-cited 'classic' article in this collection is *Deconstructing the Map* by Brian Harley (excerpted here as Chapter 1.8), with well over 500 citations since its publication in 1989. A few of the pieces we have included have, as yet, negligible numbers of citations (e.g. Aitken and Craine's 2006 article in *Directions Magazine* cited only seven times so far; excerpted here as

Table P.1 Count of excerpts in *The Map Reader* by decade in which they were first published

Decade	Count
1940–1949	1
1950–1959	2
1960–1969	3
1970–1979	4
1980–1989	6
1990–1999	23
2000–2010	15
Total	*54*

Chapter 3.10). We have included such pieces because we think they have something important to contribute and are worthy of a wider audience.

While the material in *The Map Reader* covers a wide time span – nearly 60 years – running from 1942 up to 2010, there is an uneven spread of material selected and we are perhaps guilty of overlooking earlier significant work. Styles and conventions of academic discourse evolve and the pace of change in mapping tends to focus attention on the more recent past. Looking at the dates of the pieces included grouped by decade (Table P.1) it is somewhat evident that there is a bulge of material post 1990. This is reflective of the notable upsurge in philosophical engagement given the influx of social theory into cartographic debates and the explosion of new mapping technologies underpinning the growth of digital cartography. Given that we wanted to cover a wide range of topics it has meant that none could be covered in depth; not all the issues are as well represented as perhaps needed and, consequently, many important topics are represented by a single piece of work (in some cases this is unavoidably a placeholder for larger subfield). Clearly in these cases, these articles cannot encompass the full complexity and nuances of on-going debates. We hope that our introductory essays will help provide some additional context.

Editorial practicalities

In terms of the editorial process we have employed in *The Map Reader*, working within practical constraints of an affordable and commercially viable book, has meant that the pieces included are mostly reprinted as excerpts rather than verbatim. For monographs, we have generally excerpted from a single, most pertinent chapter. Where material has been deleted from the original this is indicated in the text by [. . .]. In some cases sizable edits have been made, but we have endeavoured to preserve the core intellectual argument as well as the narrative flow of the original, whilst removing extraneous examples or more elliptical context.

Each entry has been reformatted for consistency and to remove variability in the layout and referencing style evident in the original versions. The degree of standardisation, particularly the switch from footnote citations to Harvard style referencing in some excerpts, has necessitated some very minor changes to the texts themselves involving the insertion of references. Bibliographies have been edited from the originals to include only the references used in the excerpted text. Spelling has generally been standardised to British English. Some tables and figures have been omitted (to save space and for copyright reasons), so the numbering of these sometimes differs from the original. Many of the original illustrations included have been faithfully redrawn for this book by Graham Bowden (Cartographic Unit, University of Manchester) to ensure higher quality reproduction than scans of the originals.

Conclusion

Over the past fifty years there has been a sustained scholarly engagement in thinking about the ontological bases of cartographic representation and an exploration of new epistemologies of mapping. Moreover, there is burgeoning interest from many scientists, social scientists and humanities disciplines in theorising the nature of cartography and productively applying mapping and geographic visualisation to solve research problems. This coupled with tremendous socio-technical developments in the production of cartographic representations has led to a widening and more vibrant array of different kinds of mapping being employed by scholars. We hope *The Map Reader* will further advance understandings of cartography by illustrating the ways in which maps have been thought about and researched and that it will encourage a wider appreciation of where mapping has come from, and perhaps where it might go.

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SECTION ONE

Conceptualising Mapping

Chapter 1.1

Introductory Essay: Conceptualising Mapping

Rob Kitchin, Martin Dodge and Chris Perkins

It is all too easy to think of maps and cartography in a naïve, commonsense way – a map is a two-dimensional, spatial representation of the Earth, and cartography is the creation of such maps. If only it were so simple! The history of cartography reveals a rich engagement with different philosophies of science. As a result, the scholarly understanding of what maps are and the processes, procedures and protocols through which they are created and deployed has changed enormously over time. This has never been more so than over the past fifty years as academics from a broad range of disciplines have focused on conceptualising mapping.

In this section, a broad range of readings are excerpted; they span more than 60 years and have sought to advance how maps and cartography are conceptualised. What unites the thirteen chapters is the common pursuit of rethinking the ontological and epistemological bases of cartography. That is, they each put forward a novel way to conceptualise maps as artefacts and mapping practices, each moving beyond commonsense and naïve understandings to set out a viewpoint that they believe provides a more robust and useful theoretical underpinning. At the time of writing, none of the approaches detailed in the readings is considered hegemonic amongst academics. For some, this conceptual plurality is considered a hindrance because it means that there is no generally accepted way to understand maps, thus introducing uncertainty and undermining the credibility of cartography as a 'science', with well-grounded theory and prevailing methods and an established canon. For others, it is a sign of intellectual fervent that has reinvigorated what was arguably becoming an increasingly technical discipline that was progressing largely through technological advances and methodological refinement rather than more philosophical ideas (Crampton 2003).

According to Harvey (1989, excerpted as Chapter 5.2) the first major change in how maps were conceptualised, in a Western context, occurred in the Renaissance through the application of Enlightenment thought and technologies to cartography. Prior to this, knowledge of the geographical world was parochial and documented from multiple perspectives to no formal, universal standards. Areas that were unknown were literally off the map, filled with religious cosmology and figures of myth and imagination. Maps were understood more as reminders – as spatial stories – than as scientific representations of the world based on surveyed data (Ingold 2000). Replacing the piecemeal frameworks of medieval cartography was the adoption of a single, universal system of measuring and representing the world that used perspectivism and Cartesian rationality, underpinned by notions of objectivity, functionality and ordering. This perspective understood space and time in quite different ways to the medieval period, and the resulting transformation in cartographic thinking made the world knowable, navigable and claimable, for a privileged and powerful few, through a shared framework of scientific endeavour that was translatable across peoples and places (see Latour 1992,

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