# SECTION ONE

## Conceptualising Mapping

# Chapter 1.1

# Introductory Essay: Conceptualising Mapping


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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,


*The Map Reader: Theories of Mapping Practice and Cartographic Representation*, First Edition. Edited by Martin Dodge, Rob Kitchin and Chris Perkins.

excerpted as Chapter 1.9). In the centuries that followed, the science of cartography – wherein maps provided objective, truthful representations of the spatial relations of the world – was refined through improvements in surveying and mapping techniques and the development of a set of established principles of design and aesthetics.

Attempts to historicise the nature of (Western) cartography through categorisations of map forms and taxonomies based on purpose, often implicitly use the notion of evolutionary advancement driven by technological development. The end result narrates cartography as a beneficent pursuit, characterised by improving accuracy and comprehensiveness with each new generation of map. Examples of this conceptualisation are quite common in the literature, such that '[t]he normative history of cartography is a ceaseless massaging of this theme of noble progress' (Harley 1989: 4). For example, Crone (1953: xi) notes, '[t]he history of cartography is largely that of the increase of accuracy with which . . . elements of distance and direction are determined and the comprehensiveness of the maps' content.' Histories of cartography in this tradition were histories of techniques, with an underlying assumption that rational decision making leads to the adoption of improved technologies and institutional practices when they become available. The result is that cartographic development can be conceptualised as a 'tree' with evolving complexity of mapping (Figure 1.1.1).

The apparent 'naturalness' of this account belies the politics behind the progressive conceptualisation of the development of cartography from a primitive past to the sophisticated present (Edney 1993, excerpted as Chapter 1.10). The underlying goal of this kind of construction of cartographic history – achievable only through a carefully selective reading of extant map artefacts – is to 'prove' that the objectivity of *current* scientific methods is predestined. It grants an important legitimisation to the positivist notion of contemporary professional cartography as the 'best' and provides a discursive mechanism to dismiss maps that do not fit 'acceptable' scientific standards. Scientific worldviews see technological progress almost like a force of nature that somehow operates outside society and beyond the political concerns of money, power and ego. The way one approaches cartographic history is therefore worthy of consideration, as it is at the heart of the recent political theorisation of cartography and directly informs our understanding of the nature of the map and contemporary positivistic epistemological foundations of cartography (including much of the work on online mapping and GIScience).

This Cartesian rationality still predominates the general understanding of maps. However, over the last half century or so there has been a fresh engagement between cartography and philosophy that has either sought to refine and advance scientific cartography, or has sought to challenge and reconfigure its ontological and epistemological underpinnings. The first of these engagements by Ernest Raisz (1938) and Arthur Robinson and colleagues (Robinson 1952; Robinson and Petchenik 1976; excerpted as Chapters 1.3 and 3.3) sought to provide formalised rules and principles of map design, drawing on a range of disciplines such as mathematics and

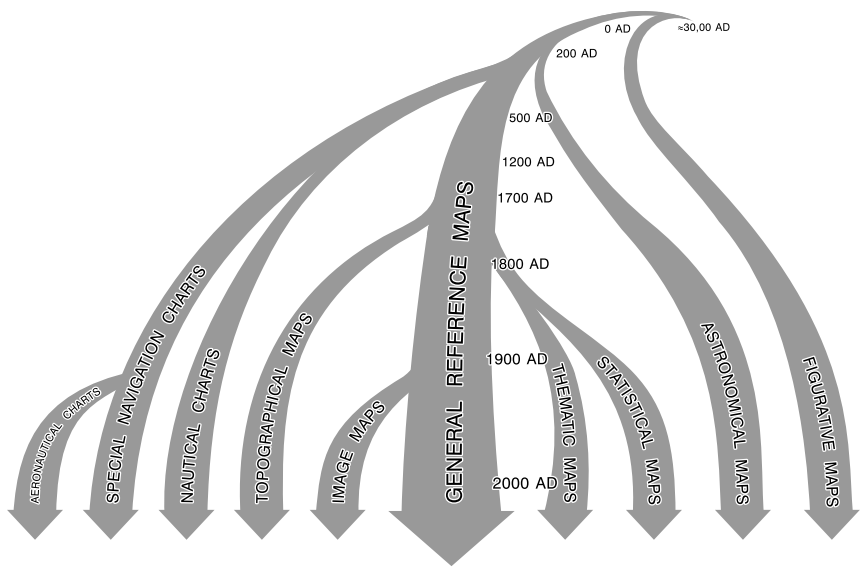


**Figure 1.1.1** Cartography explained as a 'story of progress'. Mapping is shown to evolve over time with the development of increasingly complex forms. (Source: Redrawn from Robinson *et al*. 1995: 22.)

psychology. These approaches tended to see cartography as a blend of art and science, but where the aesthetic elements could be formalised through colour and visual theory and thus made more effective. Robinson, in particular, sought to advance a communications model approach that drew inspiration from psychology and information theory, and which sought to foreground the fact that maps serve as communication devices. As such, cartographic research needed to be framed around the goal of effective communication, wherein maps capture and portray information in a way that an idealised map reader could easily and intuitively analyse and interpret. Here, the aims of the cartographer were framed normatively to reduce error in the representation and to increase map effectiveness through appropriate design. Research thus sought to improve map designs by carefully controlled scientific experimentation that focused on issues such as: how to represent location, direction and distance; how to select information; how best to symbolise these data; how to combine these symbols together; and what kind of map to publish.

Robinson's ideas were extended and developed by others such as Joel Morrison (1976, excerpted as Chapter 1.4) and Christopher Board (1981, excerpted as Chapter 1.6). These scholars sought to forward the communication model as the new dominant paradigm for academic cartographic research, producing increasingly sophisticated conceptual models of how maps worked. Links were forged with cognitive scientists and behavioural geographers interested in cognitive mapping and how maps were learnt and people used and interpreted maps (Downs and Stea 1973; Lloyd 2000; excerpted are Chapters 4.3 and 4.9). Morrison, for example, envisaged cartography developing as 'communications science' with researchers working to understand the structural transmission of mapped information from data collection through to map use – including the science of data classification, generalisation, symbolisation and so on – in order to develop more effective cartographic syntax and grammar suitable for a given situation. By the early 1980s, Board was able to provide an overview of different information flow models, which by that stage had started to engage with the ideas of semiology.

Whilst Anglo-American cartographic researchers were examining the communicative properties of maps from a functional and pragmatic perspective, French academics were examining the utility of semiology – the study of signs and symbols – for map design. This work was based principally on the influential work of Jacques Bertin (1967) on graphic design (the 1983 English translation is excerpted as Chapter 1.2). Bertin set out what he saw as key properties of graphic systems and a set of rules for their presentation founded on a semiological analysis of the presentation of information in graphic form. These rules were influential in informing map design, and the science of semiology became an important touchstone for Anglo-American researchers in the late 1980s and early 1990s seeking to move beyond the limitations of the communications model. A semiological approach elided the divide between mapmaker and reader that underpinned communications theory. Technological advances were already exposing this divide as a fiction by the late 1980s and communication theory also failed to recognise the social and cultural aspects of mapping. A representational theory of cartography offered a more useful and practical grounding for scientific research. For example, MacEachren (1995) sought to blend cognitive and semiotic approaches, along with visualisation theory, to provide a coherent picture of how maps worked. Such work became influential amongst those working in GIScience and geovisualisation seeking ways to scientifically conceptualise and improve mapping within increasingly exploratory and interactive media. This new representational orthodoxy is borne out in research agendas of the geovisualisation community (MacEachren and Kraak 1997, excepted as Chapter 1.11) and in emerging work in multimedia cartography (Cartwright 1999, excerpted as Chapter 2.11).

A different challenge to cartographic theory emerged at the end of the 1980s, however. The communications model and its subsequent offshoots are still framed within a scientific rationality that sought to produce objective, 'value free', accurate representations. In a landmark paper, Brian Harley (1989, excerpted as Chapter 1.8) argued that, far from presenting the truth of the world, maps were social constructions presenting subjective versions of reality. Harley was by then a well-established scholar in the history of cartography, able to draw on a wealth of empirical material. He built on an emerging critical tradition, dating back to research from John Kirkland Wright in the 1940s (Wright 1942, excerpted as Chapter 4.2). Although there is a long history of analysis examining the role of maps in society, and the part they have played as cultural artefacts in political and economic development of nations and empires, including the 'persuasive cartography' of propaganda maps (Tyner 1974), Harley changed the tenor of such analysis by focusing on the power of maps and the power invested in maps. Drawing on the ideas of Foucault and Derrida, Harley argued that maps are a product of the society that creates them, and regardless of how much they seek to represent 'the truth', they inherently capture the interests of those that produced them and work to further those interests. Such a position recognises that in the production of maps many subjective decisions are made about what to include, how the map will look, and what the map is seeking to communicate. As such, maps are the product of power and they exert power, and therefore in any theory or history of cartography it is necessary to be mindful of the historical

and social context in which mapping has been employed and to deconstruct the power relations inherent within its production. His goal was to 'subvert the apparent naturalness and innocence of the world shown in maps both past and present' (Harley 1992: 232).

Harley's ideas opened the floodgates for a re-imagining of cartography and maps, and a re-examination of works that had been suggesting such a reorientation but had, at that time, received little attention. Shortly after its publication other significant pieces by Pickles (1991, excerpted as Chapter 5.3) and Wood (1992) were published. Wood's book, *The Power of Maps*, drew together and extended a number of his works published over the previous decade (see the 1986 Wood and Fels' article 'Designs on Signs', excerpted as Chapter 1.7). Wood, drawing on linguistic structural thought and Barthean semiotics sought to detail how maps worked as a complex sign system, through their design and structuring, to produce certain versions of truth in order further the interests of those that created them. 'No sooner are maps acknowledged as social constructions than their contingent, their conditional, their . . . arbitrary character is unveiled. Suddenly the things represented by these lines are open to discussion and debate, the interest in them of owner, state, insurance company is made apparent' (Wood 1992: 19). Maps from this perspective are always political, working to (re)produce certain ways of thinking about the world. Rather than drawing on semiology, Pickles (1991, excerpted as Chapter 5.3) argued for a hermeneutic reading of maps that understood them as texts. As with Harley and Wood, Pickles argued that maps are inherently political and to fully understand them requires a method of deconstruction that seeks to provide a multifaceted, contextual and interpretive reading of their meaning and purpose. This includes examining the context in which a map is made, how the map is framed by other texts, the situation into which it is projected, and the world of the reader.

These new ways of thinking opened up fresh opportunities for historians of cartography. For example, Edney (1993, excerpted as Chapter 1.10) argued that historical accounts of cartography and the role of maps in society up to that point were largely empiricist and teleological, charting out in linear ways the progression of cartographic knowledge and method. He points out that the development of cartography has not followed such a well-defined path, but rather has been contingent on the social, cultural and technical relations at particular times and places. In so doing, Edney argues for a non-progressivist and non-presentist history; that is, a history that is sensitive to the science, politics and technologies of map production at the time of their creation and which does not judge maps *vis-à-vis* the standards and norms of the present day. In other words, maps from the past are seen as no better or worse than now, but rather are simply different and can be thought of a rhizomatic tangle of mapping modes rather than a family tree of cartographic progress.

While this body of critical writing on cartography has been forceful (and sometimes polemical), it is not without its problems, inconsistencies and critics (Andrews 2001; Belyea 1992; Godlewska 1989). Keates (1996: 194), for example, undermines the methodological agenda of Harley and 'critical cartography' paradigm more broadly, commenting: 'The question of how the production and publication of maps is controlled in any society is an interesting and important issue, but it is not illuminated by uttering clichés about hidden agendas.'

Ideologically-driven cartographic deconstruction can also be seen as unproductive in that it offers little in the way of an agenda for changing or improving mapmaking practice other than exalting cartographers to be aware of the power of the maps they create (Crampton 2001; Kitchin and Dodge 2007, excerpted as Chapter 1.14). Indeed, the influence of new critical theoretical approaches within academic discourse is in marked contrast to the work of the large majority of cartographers in practitioner communities, in university drawing offices, in government departments and in commercial design firms. The profession has largely ignored this new epistemological line as it offers little of value for those tasked with real world demands of making effective maps and they have little reason to contribute to wider theoretical debates; as Petchenik (1985, quoted in Keates 1996: 190) wryly notes: 'Practising cartographers tend to be so busy earning their living by making and selling maps that there isn't 'free' time or energy left to be expended on research and writing projects: as a consequence, their point of view is not accurately reflected in the literature.' Equally disappointing in terms of effecting progressive change in the nature of cartography is the failure of human geographers and other social scientists to make critical use of maps in their research. Accordingly, Perkins (2004: 385) laments: '[d]espite arguments for a social cartography employing visualisations to destabilise accepted categories most geographers prefer to write theory rather than employ critical visualisation'.

Other accusations levelled at critical cartography include: a misreading and superficial misuse of social theories; of simply jumping on the cultural 'bandwagon' of deconstruction; and the foisting of a false 'conspiracy' view of cartography through biased sampling of empirical evidence (Black 1997). 'In contrast to Harley's experience of cartographers', Godlewska (1989: 97) notes, 'I have found that most have a subtle and critical sense of the nature of their work and do not perceive cartography as an objective form of knowledge'. Of course, the critical scholars themselves had an agenda in their attacks on mainstream cartography, being 'propelled by an odd mixture of cynicism and idealism' (Lemann 2001).

As Crampton (2003) has noted, these new theorisations – maps as communicative models, sign systems, social constructions – whilst significantly advancing the conceptual ideas for understanding and interrogating maps, are still rooted in representational ways of thinking. As the new millennium turned, a small number of cartographic theorists started to rethink maps from a post-representational perspective. In particular, they drew on post-structural theory that was becoming popular across the social sciences and humanities at the time. From a post-representational perspective, the questions applied to cartography change from what maps represent and mean, to focus more on how maps work and their effects on the world (Corner 1999, excerpted in Chapter 1.12). Further, the separation of map and territory – a fundamental tenet of representational cartography – becomes problematised.

For example, the landscape architect, James Corner, following Baudrillard, argued that a territory does not precede a map, but that space becomes territory through bounding practices that include mapping (see also Winichakul's 1994 work on Siam, excerpted as Chapter 5.4). And since places are planned and built on the basis of maps, so space is itself a representation of the map; maps and territories are co-constructed. In other words, he demonstrates that space is constituted through mapping practices, amongst many others, so that maps are not a reflection of the world, but a re-creation of it; mapping activates territory. Corner thus develops an understanding of maps as unfolding potential; as conduits of possibilities. He thus argues for a processual understanding of maps, wherein mapping is seen to consist of multiple processes of action that have effects in the world. In so doing, maps endlessly remake territory through their employment. The power of maps then is not simply in their capturing and presentation of the world, but in their use and suggestion of new possibilities. For him, cartographic research thus needs to focus on mapping actions and mapping effects and not solely on map design, map meaning and the reading of maps.

Del Casino and Hanna (2005, excerpted as Chapter 1.13) similarly draw on poststructural theory, and in particular the idea of performativity, to argue that maps, far from being fixed, immutable objects, are in a constant state of becoming; that they are 'mobile subjects' whose meaning emerges through socio-spatial practices of use that mutate with context and is contested and intertextual. They argue that the map is not fixed at the moment of initial construction but is in constant flux, where each encounter with the map produces new meanings and engagements with the world, the product of the map as representation and material object, the knowledges the subject brings to bear on it and the space it represents, and the context of its use. Maps are produced and used through practices, and maps and space co-produce each other through their creation and use. They thus argue that maps can only be fully understood by examining the complex, recursive interplay between map and the world.

Likewise, Kitchin and Dodge (2007, excerpted as Chapter 1.14) have argued for a shift in cartographic theory from seeking to understand the nature of maps (an ontological project) to examining the practices of mapping (an ontogenetic project). This move denies maps any ontological security as representations of reality and instead posits that they are always in the state of becoming, bought into being through embodied, social and technical practices to solve relational problems such as plotting, planning, navigating and so on. Maps then emerge through a mix of creative, reflexive, playful, tactile and habitual practices; affected by the knowledge, experience and skill of the individual to perform mappings and apply them in the world, and shaped by the context of its reproduction. The map does not re-present the world or make the world, it is a co-constitutive production between inscription, individual and world; a production that is constantly in motion, always seeking to appear ontologically secure. Of course, this process very often succeeds – hence the real utility of cartography in all kinds of contexts for all manner of pragmatic tasks. Conceiving of maps in this way reveals that they are never fully formed but emerge in process and are mutable. Such a re-imagining of maps changes in quite fundamental ways the focus of cartography, moving it away from notions of accuracy, design, aesthetics and power, to emphasising the complex, contingent interactions between cartographers, users, maps and the world.

As is clear from this discussion, how maps are presently conceptualised varies substantially between scholars. Understanding maps and conceiving of how to undertake cartographic research is anything but straightforward. Mapping is a lot more complex than it at first seems; the theory, history and principles of map creation and use are contested. And so it should be. The engagement between cartography and philosophy is enormously important because it sets the parameters through which maps are thought about, produced and used; it shapes our assumptions about how we can know and measure the world, how maps work, their techniques, technologies, aesthetics, ethics, ideology, what they tell us about the world, the work they do in the world, and our capacity as humans to engage in mapping (Kitchin, Perkins and Dodge 2009). There are many fundamental ontological, epistemological, ideological and methodological questions that need further examination and debate, and yet more questions that have not yet received sufficient attention. This is the challenge for cartographers going forward, to continue to debate, refine and extend our theories during the search for a conceptual framework that adequately accounts for the nature of maps and the work that they do in the world.

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