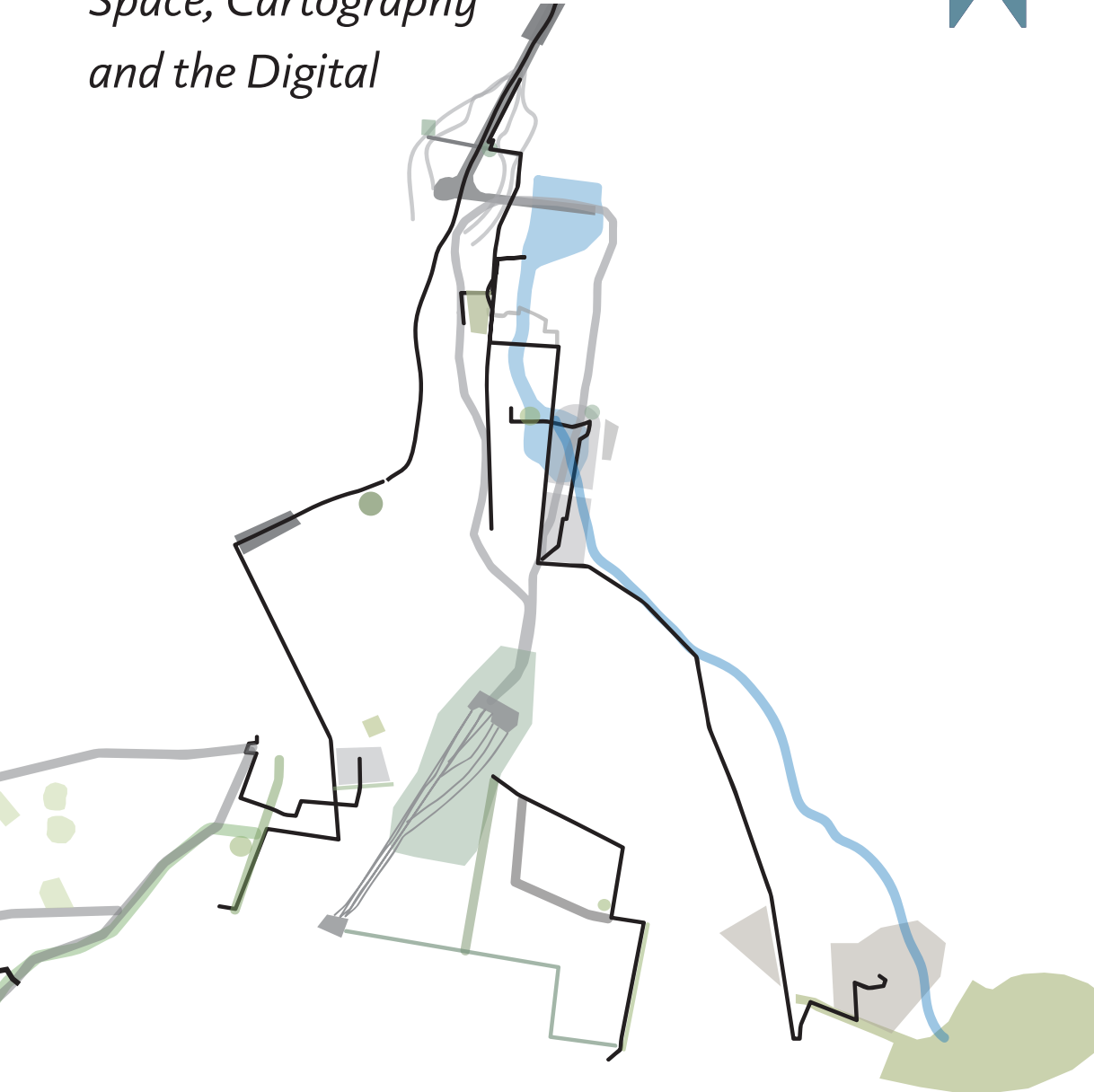




Mobile Mapping

*Space, Cartography
and the Digital*



Amsterdam
University
Press

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AMSTERDAM UNIVERSITY PRESS

CLANCY WILMOTT

Mobile Mapping

MediaMatters

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Part 1

Maps, Mappers, Mapping

1. Introduction: Mapping beyond the map

We do not feel the disruptions of space, the coming upon difference. On the road map you won't drive off the edge of your known world. In space, as I want to imagine it, you just might.
– Massey, *For Space* (2005: 111)

How can we understand mobile mapping in its amorphous liquidity? Boundless, mutable, personal, digital, what does mapping mean in an age of mobile digital media? Or, more precisely, who are the mappers and what is the map? What does it mean to see, read, capture, catalogue, comprehend, calculate and represent the vast networks of spatial relations that assemble on a day-to-day basis? 'Mapping' is a complex term – not least because of its ambiguity. It is based in action rather than in the distinction between subject (mapper) and object (map). It is a practice of drawing relations together in and through movement, of moderating our everyday lives between what Doreen Massey (2005) describes as the fixity of representation and the openness of space. Maps have historically and geographically borne this intermediary role: mappings may be carvings in rock walls, pliable sticks strung together, songs or stories describing a landscape, naval charts, urban plans, or digital applications on mobile phones. 'Mobile mapping' is specifically an embodied practice: it requires movement (Carter, 2009) (even though many maps only express stillness), the sensation of going through, around, along, above or under space and then the re-presentation of the information collected through lines, or contours or sounds. However, maps, we have learned since J.B. Harley's (1992) seminal text, *Deconstructing the Map*, are more than simple spatial representations – they are political *objets*, performative practices, always in becoming and always out of date. Maps are imbued with ideologies and discourses, filled with empty silences and vast absences, cultural remnants of the enunciators who shape the world (Black, 1997). Cartography is one such example, filled with desires to capture and preserve the world in image – cartographic images (Farinelli, 1992) and cartographical reason

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(Farinelli, 1998), cartographic impulses (Said, 1990), cartographic strategies (Mitchell, 2008), geographical imaginations (Gregory, 1994), resonant images (Cosgrove and Daniels, 1988), or fixed representations, an imposed stillness against the transformative potential of space, which is always open and filled with possibility (Massey, 2005).

Today, we barely recognise the maps that we use on our mobile devices (Chen, 2017). As digital media like smartphones and tablets usher in new forms of mobile mapping through geographic applications (digital maps) on mobile devices, we are once again left to stare in wonderment at the new complexity of old tools. Digital maps (geographic applications), as they appear on mobile phones, hide algorithmic workings and smooth scrolling surfaces that give the illusion of a representational flatness while hiding integral architectures of binary logic, digital codes and coordinates, and lines of commands (Thielmann, 2010). The digital map is a fluid map, a mutable map that updates into another as you read it, a Möbius strip without sides or edges that can be scrolled ad infinitum: a map that is not fixed but is always becoming. The digital map becomes as software interacts with device and screens bleed into code. However, these workings are not immune to the discourses in cartographic forms so critiqued by digital and cartographic theorists (Schuurman, 2009; Schuurman, 2000). Every day across the world millions of applications are opened on millions of phones, by millions of people located in millions of places. Where mappings were once precious informational resources they are now deployed throughout the world, in what Warf and Sui (2010) argue is an increasing democratisation of geographic data. Much of this data is gathered and aggregated in cartographic terms through coordinate locations embedded in geocode, a specific kind of code that deals with geographic information. The process of mapping and finding where you are is dissolved into sets of algorithms, built from lines of code drawn from servers all over the world. These data networks are combined to display a cumulative representation that constantly updates, using new information fed at a continuous rate as algorithms track the speed of hundreds of thousands of individuals to tell you if the traffic is heavy or light. Sometimes we appear on these maps – as blue dots or red markers – a unique relationship between our screens and global positioning systems (GPS), which accounts for how your mobile phone reads where you are. Much has been made of this digital transition from coordinates to code (cf. Pickles, 2004; Pickles, 2000), from cartography to geographic information systems (GIS), and now, from navigation to global positioning systems (GPS) or, location-based-services (LBS) (Spinney, 2003).

Whether digital maps manifest as check-in apps like Foursquare or Facebook, micro-chat services like Twitter or Weibo, or mapping applications like Open Street Map, Google Maps, Apple Maps or Baidu Maps, there seems to be a consensus that something new within cartography, technology and media is happening – that it is now performative, participatory and political (Crampton, 2009). Automation, algorithms, interfaces, code spaces, big data, computability are the buzzwords of the digital transition (Crampton, 2011a; Crampton, 2011b) – not least of all for the new age of digital cartography and geographic information systems. What is mapping in the digital age? What does it mean when networks of geocoding and satellite transmissions, coordinate systems and binary languages are free from the representational fixities described by Massey (2005) and the cartographic impulses described by Said (1990)? How can such a map fix the world, when its design is to be situated and mutable, to be *unfixed*?

Mobile Mapping considers how the fixity of the digital map extends beyond the representational and the interfacial – beyond media and map; beyond digital map – into a vast field of discursive statements found embedded in landscapes and spaces, and are constantly encountered and brought forth by people in the course of their everyday lives. It tells the stories of how discourses, imaginations and impulses can bring together spaces, cartographies and codes to sit side by side in everyday life. Through seventeen walks with seventeen people in two cities – Sydney and Hong Kong – it points towards how people navigate between the discourses imposed upon them and the ‘ghosts’ (Gordon, 2008) of postcolonial landscapes. It discusses how cousins in cartographic order might have different representational appearances but similar rules, and how, against the powerful discourses that govern representations, space can still be open, heterogeneous and filled with possibilities (Massey, 2005) – especially in postcolonial contexts. Sydney and Hong Kong, two cities that are undergoing a transition from outposts on the edges of the British Empire that centred on Europe to global cities that are gateways to the vastly productive Asia-Pacific region, offered specific insight into the global impact of cartographic thinking, digital transitions and this archaeology of mobile mapping. At once centre and periphery, the mobile mapping practices engaged by each of the people in each of the stories in each city say something fundamental about the way in which the digital, the cartographic, and the otherwise and haunted come into contact. In an ongoing conversation about representation and space, this contact occurs – even at the most local, banal and every day of scales.

Historically, cartographic forms have a complex relationship with the notion of ‘truth’, representation and transcendence, born out of the scientific methods of the Enlightenment (Harley, 1988a; Harley, 1988b), what Farinelli (1992) calls the ‘modern age’ (*età moderna*),¹ and Foucault (2002b) the ‘Age of Reason’. The maps that we find on our mobile phones in are the descendants of the hydrographs of the coast of the South China Sea by Alexander Dalrymple, and the charts that Lt James Cook made of the east coast of Australia.² Although the tools have changed from sextants to software, stars to satellites, and magnetism to media interfaces, the cartographic lines drawn on paper were made by early explorers and colonialists – who made these maps for the purpose of navigation and conquest and through the discursive power of the geographical imagination (cf. Gregory, 1994). In this imagination, space becomes a resource, which can be taxonomised categorically, parcelled up and distributed, exploited and capitalised. Thus, the digital transition from cartography as understood by the geographical imagination to the geocoded maps and applications that we find on mobile phones has been made possible by an ambient relationship between geometry, mathematics and cartography at the founding of systems of spatial rationalisation.

As new modes of surveillance and the anxieties they encourage are cautiously criticised (the Apollonian eye of government and capital staring down at its digital subjects), plaudits of increasing democratisation, grassroots knowledge generation and *sousveillance* also appear. The realm of digital mapping is pitched as a battlefield against opposing forces, and a key corner is reserved for mobile personal devices, the most intimate of digital technologies. Such devices are carried on your person, become symbiotic with touch and tactility: personal, portable intermediaries between bodies, memories, situations and locations – and their shadows in the world of networked representation. However, in amongst the complexity of representation and the zeitgeist of new methods and new technology (Marvin, 1990), it is important to ask: What exactly has changed? To what degree is ‘the new’ *actually* new and to what degree have we accepted the digital and the mobile as the axiomatic and unchallenged avant-garde of a total revolution in cartography, in representation and in space?

1 This is my translation of the term ‘*età moderna*’ from Farinelli, *I segni del mondo. Immagine cartografica e discorso geografico in età moderna* (The signs of the world: The cartographic image and geographic discourse in the modern age, 1992).

2 See, for instance, Pickles, who argues that ‘instead of focusing how we can map the subject. [we could] focus on the ways in which mapping and the cartographic gaze have coded subjects and produced identities’ (2004: 12).

Representations, discourses, hauntings

For geographers and those interested in space, it is as difficult to move away from the plan and the map, as it is for media theorists to move away from media. Instead, the world tends to turn *into* the plan and the map as opposed to an iterative coproduction. Pickles (2004) works hard to set up an early discussion of the performativity and fluidity of 'drawing lines' and 'geo-coding the world', yet still falls back on the imaginary analysed through the digital textuality of GIS maps. Massey (2005) cites maps as a key reason that she became a geographer, but chases her experiences of space and place against the lack of temporality in the map. Olsson (2007) teeters on the limits of representation and finds himself at the appearance of the grid in the stories of Marduk and Babylon in the Epic of Gilgamesh. In one sense we can also see how the forms of cartography may be considered mediums that construct their own spatial coordinates – for such coordinates, in the mind of Foucault, are always constructed. If we consider mobile mapping as a performative cartography, what might that mean here, in terms of spatiotemporal coordinates and a 'performative act' for space and memory?

Mobile mapping is an interpretative practice that makes and unmakes worlds in a continuous flow of reading and reproducing, yet in doing so pulls together semi-stable objects like communication infrastructure, policy and language systems that exist externally to the moment of mobile mapping, makes them integral to the process of mapping, and so stabilises them and their power. Mobile mapping defies dialectical rules of formation because it can contain inherent contradictions: it does not present a world view of all spaces at all times, but fragments and snippets of knowledge and experience, as and when it irrupts (Mitchell, 2008). Therefore, this analysis of mobile mapping engages with modes of thinking that are less interested in boundaries and limits between objects, or the ontological limit in its smallest capacity, and instead undertakes an open-ended discussion that points to suggestions rather than conclusions of how such practices unfold in the everyday and what the social, cultural and political consequences may be. Thus mobile mapping is, in Gunnar Olsson's (2007) words, a chiasm of thought-and-action, thinking, being and doing all at once.

This research was originally designed as a way to trace the tendrils of cartography as it wound itself into and around everyday life. I wanted to demarcate how, when and why cartographic discourses erupted into practices in the wake of mobile phones and digital maps. Further, I sought to situate this everyday cartography within a history of scientific and technological

knowledges entangled with processes of colonialism and dispossession: not a digital without a past, but a digital made of the past. In much the same way that Shannon Mattern (2017) has recently traced the process of inscriptions in urban media from clay and dirt into code and clay, I wished to revisit the idea of a performative cartography with the simple acknowledgement that the maps that we use are not *tabula rasa*, but haunted by the past, and this folds into mapping practices. However, it shortly became apparent that the momentary encounter of mobile mapping in practice was supported (and even constituted) by a vast cartographic apparatus of institutions, built landscapes, tools of measurement and calculation, axioms, controls, systems, infrastructures and ideologies (Deleuze, 1992b). From scientific structures of knowledge to the engineering of stone and rock, the labelling of places and demarcation of spaces, the immensity of the ordering of things, people and spaces in these cities was overwhelming. Partly, this stemmed from my choice of a Foucauldian-inspired archaeological method (Foucault, 2002a; Foucault, 2001f) by way of dealing with the lack of representational fixity in maps, while accounting for common underpinning logic. Through archaeology, the fixity of ideas and epistemes could be traced equally across multiple presentations of the same digital map, digital map or data source, as new information appeared, formats changed, data was re-entered and re-aggregated, and localisations shifted between parts of Sydney and Hong Kong.

Despite this flexibility, things – people – kept cropping up and offering regularities to the anterior and exterior of cartographic discourses. These interruptions were unexpected, born of the open spatiality of mobile mapping practices. Each statement has its referent, each digital map has its mechanism in space and its system in time, every digital iteration has its enunciator, and every assemblage has its own unique set of complex components that gather and disperse according to different logics, different rules and different rhythms. Yet, as this research progressed out of interfaces and digital codes into ethnographies and archives, it became clear that the assemblages of maps and spaces and people in situated moments (what we can broadly call mobile mapping) is based not in objects, but in interrelations – both fixed and fluid – across space and time. In these interrelations, discourse and language, geography and history assemble from the far to the near, the distant to the present and into the future: conversations were brought forth which troubled the way in which we thought about the completeness of mediation (or even the way in which we imagine it being localised through networks) (i.e. Thielmann, 2010).

Two central ideas to Foucault's description of the discursive formation – transformation and dispersion (across time and space) – troubled the way

in which I had conceived of the digital map as a collection of statements, separate (or at least untangled) from the discourses of cartography, geography and Western rationalism – as inseparably material and a textual processes. First, Foucault does not see the formation of discourse as a teleological process that happens through history: rather, discourses constitute history (2002a). Influenced by Nietzsche, Foucault maintains an antithetical stance against the imagined linearity of time in archaeology. In the context of the digital map and mobile mapping, this means that each appearance of the map is not an individual point on a timeline, and therefore ‘the problem is not therefore to ask oneself how and why it was able to emerge and become embodied at this point in time’ (Foucault, 2002a: 131). Each instance and each map could be conceived as a multitude of spatial and temporal connections: it was already being formed in discourse before it even came to be, the possibility of its appearance housed within the discourses that produced it. So, what we see in digital maps (and mobile mapping) is not a historical period distinct from others, a digital revolution, so to speak, but rather a phenomenon presaged – to some degree – in the networks of discursivities and positivities as they have stretched across the modern age/world and dispersed through colonial enterprise. Second, this means that when considering the discourses of the digital map, it is impossible to draw a line around the media interface of the phone, or the boundaries of the screen and say ‘this here, is a discursive product of cartography’, while all around us the shape of the city, the lines on the pavement, the telecommunications networks and the memories that linger and erupt in everyday mapping practices are considered something else, something other.

Digital maps, even in their absences, are revealed in this book to be haunted by the presence of cartographies and their roles in processes of cultural and spatial colonialism, creating uneven textures of experience, which sometimes float across the surface of encounters, and other times pierce into the wounded heart of ‘the raw memory of fights’ (Foucault, 2003: 8) and subjugated knowledges. This uneven texture can be seen across interactions with digital maps and cartographic discourses, in the strategic field of statements as they appear, and the uneven terrains, paths and traces found in the landscapes and spatialities of both Hong Kong and Sydney. As processes of colonialism, imperialism and capitalism reshape both cities, transformations appear all over the globe, each space producing its own genus and networks of power. This friction produced a mode of disjoint and disequilibrium as the temporally near and far were brought together to stand side by side – media, myth, maps, mayhem – somewhere between space and representation, in what Avery Gordon (2008) has come to call a haunting:

Indeed, it seemed to me that haunting was precisely the domain of turmoil and trouble, that moment (of however long duration) when things are not in their assigned places, when the cracks and rigging are exposed, when the people who are meant to be invisible show up without any sign of leaving, when disturbed feelings cannot be put away, when something else, something different from before, seems like it must be done. (Gordon, 2008: xvi)

That troublesome presence for this research was a combination of people, and their modes of making-do (De Certeau, 1984) and what Massey (2005) calls the openness of space. What was more important (and somewhere outside that remit of archaeology) was that space, if it is not 'dead and fixed' as Foucault suggests, appeared to be something different again. Space was not a strategic field that faithfully followed the laws of discourse as Foucault set them out, and perhaps even beyond the grasp of the society of control (Deleuze, 1992b), or decentralised protocols (Galloway, 2004). There are many histories written of both Hong Kong and Sydney (Chu, 2013; Chu, 2012; Carroll, 2007; Ashton, 1995; Flannery, 2000; Hoskins, 2009; Patrikeeff, 1989), many of which consider the past in the present as a facet of deep time (cf. Karskens, 2009). This project does not seek to replicate such an endeavour – it is not a history, and it does not present an analysis of deep time, even as it is lived in the present. Rather, somewhere between Massey's quest for hope and Foucault's insistence on regularity, this ethnoarchaeology focuses on *deep space*, the accumulation of the past in space that bubbles up with disruptive force into the surfaces of encounter across which we live our lives: mapping beyond the map.

Geometries of power

There is no clear consensus on what space is, or what purpose it serves – and there is even less consensus on its relationship with representation, especially in the mutable cartographies of digital mobile media. *Mapping occurs in space-times*, and these space-times are imbued with lingering discourses and, with them, systems of power. This book was somewhat of an experiment in archaeologically tracing the convergence of the digital and the cartographic in space through moments of ethnographic encounter. Yet, from the immediacy of phones tracking locations along streets to the earliest surveys of the urban landscapes of Sydney and Hong Kong, certain discursive regularities appear, folding in upon themselves, as power-geometries (Massey, 1993) that affect people in different ways. Cartography is a power-geometry embedded

in geometric representation. Since the modern era, mapping has reasserted its roots in geometric measurement, coordinate geometry, and algebraic geometry through the technologies of surveying, charting, hydrography and navigation: practices central to the development of digital mapping technology, geographic information systems (GIS) and global positioning systems (GPS). Straight lines and curves, distances and depths: cartographies fix the stable image of the world, through the repetition of perspectives and viewpoints inherited from surveyors and the colonial gaze – or what Simon Ryan (1996) calls the ‘cartographic eye’.

Geometry is crucial to understanding the regularities between cartographic power-geometries and how they order the world. Geometric thought obeys certain mathematical rules and adheres to strict logics that enable the production of *operations*, systems not just designed to describe *but also to reason and to build* (Farinelli, 2009; Farinelli, 1998; Serres, 2011). Where representations fix, geometries act; where representations are often static,³ geometries are constructed to be deployed, to calculate, to scale ad infinitum. Triangles can be measured, resized, compared and turned into other shapes, curves have equations that determine their shape, yet the smallest algorithmic change to their function can result in a critical change in their appearance. Digital maps operate according to these logics – through the flat cartographical interface of the screen combined with the operational codes and commands that enable its mutability. When considering the disintegrating fixity of digital representation or text, we can see how cartography works not only by framing and completion of what we currently comprehend as representation but also prescribing how we look, fixing viewpoints through what Verhoeff (2012) has called ‘a visual regime of navigation’. This haptic visuality combines embodiment with image, encouraging a navigational ‘performative cartography’ (Verhoeff, 2012) – a prescription of how and in which way bodies can move through spaces through seeing.

It is the scalability of geometry, its transformability and adaptability according to common rules, that makes it particularly peculiar to this situation. It is not just that the digital map, for instance, tells you how and which way to move through space in an embodiment of cartographic principles: it’s that geometry provides the applicability and re-applicability of these principles to reduce all spaces into unified grids, plane figures, and calculations. In this way, cartography is both representational and

3 Even film is a series of static frames run after one another to give the impression of movement (much like GPS maps) (see Wilmott, 2016).

geometric. It represents space, while also ordering it under singular, modular knowledge systems. However, the axiomatic emphasis of Graeco-European mathematical traditions in geographical analysis of geometry, including the work of Farinelli and Olsson, conceals a broader problem. Geometry has never been a uniquely European pursuit. Joseph (2011) details rich geometric scholarship from the Mayans to Kerala and argues that for other mathematical traditions “[t]he aim was not to build an imposing edifice on a few self-evident axioms but to validate a result by any suitable method” (Joseph, 2011: xiii). He claims that this Eurocentric focus instead reifies two ideological positions, even in their invisibility: firstly, that mathematics should be ideal, rather than pragmatic; and secondly, that it should be scholarly rather than tacit, improvised or everyday. Finally, it also enforces an assumption of uni-directionality geographically – from Europe outwards – and temporally – from ‘primitive’ to ‘developed’ – in the transmission of geometric knowledges, rather than acknowledging the contrapuntuality of mathematical achievements as they emerged, and especially the influence of Islamic mathematical traditions on Christian scholarship.

What, therefore, is particular to the geometry discussed here is the way in which the European tradition embraced universalities (and infinities) within geometric thought, and used them as reasoning tools to both describe and inscribe space. It is this use of geometry which is the power of what Farinelli (1998) first described as ‘cartographic reason’, a discourse that is central to understanding how maps operate in digital media environments. Reason, geometry, cartography: bedfellows in the philosophical shaping of this world, and the desire to create interoperable systems (compatible symbols) and increasingly universal narratives in universal languages. ‘Cartographic reason’, explains Farinelli, arrived out of the advances in scientific rationalism, the cartographic imagination and geographic discourse of modern age from the Enlightenment onwards:

[O]ur rationality is determined from a cartographic point of view. [...] [I]t is already contained and produced by the cartographical image. Western reason is nothing but cartographical reason, its relentless unwinding and development. In other words, the idea of language as a set of compatible symbols is directly derived from the map. (Farinelli, 1998: 135)

The modern era that developed this mode of cartographic rationality was the time in which René Descartes (1596-1650) developed an algebraic geometry, combining numbers with lines, and after which naval charts, surveys, urban plans played an increasing role in geographies across the globe (Cosgrove,

1999). It was also the age during which Leibniz developed a binary number system, transforming topological and mathematical systems (Serres, 2014) into multiplicities, schemas and fix-points and ultimately producing what we understand as modern computing. Through these epistemological transformations, the history of reason and cartography intertwine in geometry, loose threads melding into shared thoughts, shared points and shared lines that expressed space through geometric and mathematical means.

So, cartographic reason is a discursive path across which we can trace the regularities between old and new, near and far – a path that makes its way through each of the stories in the chapters of this book. It is also linked to other ideas through its participation in the Western geographic tradition or geographical imagination (Gregory, 1994), arriving in the Age of Exploration and repurposed as a colonial weapon crafted by the European academies. The early imperial maps of Hong Kong (from both a Chinese and a British perspective) carefully measured the harbour and cautiously surveyed the mountain peaks (Empson, 1992), while in Sydney, the early images of landscapes became taxonomies (Clancy, 2011; Thalís and Cantrill, 2013). In each city, through cartographic reason, the local populations of the Hakka and the Eora died, were killed, driven away or ignored, and their presence erased, while land allocations were drawn and distributed, roads were built, shorelines were circumnavigated, and the urban form began to emerge. In this mode of reasoning, cataloguing and categorising space was a way to develop more efficient modes of controlling and exploiting both the landscape and the people who live upon it to be more profitable and governable under colonial rule.

How this might be done is based in the way in which discourse operates – at least according to Foucault. Foucault argues that discourse is a practice (2002b). Thus, discourse is open to contestation as a transformative and fluid multiplicity, in constant formation rather than a static group of ideas and concepts. These discursive formations are comprised of ‘statements’, which are both material and, most importantly, have an ‘enunciative function’, in that they are *said*, that they are *statements*, ‘speech-acts’ (italics added for emphasis). Just as Massey (2005) talks of *coformation* of spatial multiplicity, it is important to distinguish between discourse and a *discursive formation*, a far more active terminology that seeks to emphasise the transformational properties of discourse. This means that while, to borrow from Mattern (2017) for a minute, code and data might look and feel different to clay and dirt, they can be linked to a continuity of thought and action which has been dispersed and reassembled across space and time. Therefore, discursive statements do not appear in a predetermined form (for instance, as a map or a piece of

code), but as a formation which shares a 'group of rules' (Foucault 2002a: 37), that have an interlocking, interdependent, systematic and transformational relationship. Geometry or mathematics are perhaps two examples of such rules, principles that determine how and where mobile mapping may occur (although, arguably not in totality). Cartography, too, uses sets of instruments and calculations, engages large-scale international institutional regulations⁴ to produce such maps, and the many languages of algorithms and codes in software engineering, too, have these characteristics. Increasingly, we can see also how digitalities become collected under systems of binary numbers, algorithmic logics, machine learning and computer vision, and how material urban landscapes are once again reformed to become more hospitable to a digital, as well as cartographic, eye. Under this description, mobile mapping is more than a gathering of technologies, epistemologies and institutions: it is contradictory, situated and performed. Before a phone is picked up, before a digital map is opened, before a search query is entered, statements have already populated the world, articulating and structuring the discourses, which govern lives. Each iteration of the mobile map, each time a phone is touched, a pin placed or a geo-tagged uploaded constitutes one of a group of statements, in an increasingly complex coformation with material and lived worlds.

To understand how this may work in the context of mobile mapping, consider this: mobile mapping is a deeply complex enactment of multiple words and things (statements). You take out your phone and open an application, and before you have even entered in a search query you have already engaged these statements which occur through the code, the interface, the technology and the signal. The map says this is how the world is, the signal says here you are, the interface demands certain modes of engagement and the technology lies silently, yet heavily in your hand, carrying this all along. There have been a number of excellent pieces of research that have already discussed mobile maps on this particular level (cf. Verhoeff, 2012; Farman, 2012; Evans, 2015). But what we are investigating here is not the media of the map, nor its textuality, but the discursive conditions of possibility which have allowed certain constellations of mobile mapping activities to take place. The contemporary iteration of digital mapping is not without history. It was not found, nor did it arise in spaces where humans are not, or in the times before there were people. Thus, this project of uncovering

4 Even in participatory forms of cartography, such as Open Street Map, there is still a complex and highly regulated iconographic standardisation process that occurs (Glasze and Perkins, 2015).

the tender tendrils of material-discursive relations is perhaps more akin Mattern's (2017) work, in which she unfurls a long spatial history of the tools that have been used to mediate urban information.

What we see emerge in this book is that these practices are not so far from the order of things manufactured by new digital databased cartographies. Furthermore, mobile phones become intimate mediators between bodies, spaces and the systems of knowledge that determine the limits of our representations. After the Second World War, cartography expanded from the realm of geographers, explorers and navigators and, through geographic information systems (GIS), became embedded in computing, science and engineering (Rankin, 2016; Wilson, 2017). The shift from space to science meant that cartographic representations, data and calculations embraced notions of authority and truth-as-fact, even beyond the realms of earlier iterations of cartography (Pickles, 2004). The maps we see on mobile phones have inherited this relationship and expanded it into the quotidian, the mobile and the embodied, as digital maps and any number of other kinds of geographic information systems intersect with everyday navigations. The discourses in cartography (transferred to codes) suggest that the information displayed on digital maps *are a higher truth*, truth in scientific, and more recently big data, methods deployed towards the delimitation and calculation of spatiality and experience, and that such information can be trusted more than the perception of the user or the fallibility of the landscape (Wilmott, 2017). Such discourses lean on the authority of cartographic principles that Harley (1992) so criticised for their appearance as a 'seemingly neutral science': taxonomy, measurement, calculation. This authority is palpable when maps and navigational devices make absolute claims about distances between places or the journey time that will be taken through algorithmic practices, and when drivers follow their GPS devices into rivers or the wrong way down streets.

The reiterated relationship expressed through digital and mobile maps between cartography, geometry and rationality is a phenomenon keenly felt in the postcolonial spaces of the world: spaces that have become a tug-of-war between cultures, landscapes and people. As spaces and (power-)geometries collide, postcolonial cities become sites of contestation, where the urban infrastructure becomes a site of reification towards, and resistance to, the rationalisation of space and spatial experience. Sydney and Hong Kong are now complex multicultural⁵ cities teeming with contradictory practices,

5 This is intended with the full weight of Povinelli's (2002) critique of multiculturalism – especially in Australia – as reifying liberal regimes at the expense of cultural democracy.

cultures and spatialities (Chu, 2012; Jakubowicz and Ho, 2012). These are spaces that are not at the heart of empires old and new (like Beijing, London or New York). Instead, these cities are fields of contention, constructed out of a sudden rupture at the moment of colonisation (which can be traced back to specific dates of incursion), in which the meaning of the landscape was swiftly reframed in terms of modernity and rationalisation through a clash of epistememes that continues today. Hong Kong and Sydney are cities where digital maps and mobile media are situated in political claims over spatial and cultural meaning that underscore positive absences and negative presences. While Abbas (1997), for instance, draws on the philosophies of Walter Benjamin when this is considered in the situation of Hong Kong, something slightly different appears: 'a culture of disappearance' in the face of global modernity – absences, erasures, forgetting, hauntings – which slips from film to media to literature, landscape and space. The disquiet and the cunning felt and expressed in the post-(and still)-colonial places and spaces of the world is defiant against overarching theories that fix what media and cartographies mean.

The particular kind of research in this book offers an experimental way of comprehending theory and theoretical output not as appearing upon high from an abstract position (much like that of the discourses erupting in cartographic forms) but as experientially grounded and generated in and through everyday encounters between space and representation. Olsson (1988) aimed to undo this fixing of representation, before the map, before the lines of power and the bounding of space, in the indexicality of the finger and the eye. The finger points to what the eye sees (because the eye cannot point and the finger cannot see), and so we have established a set of representational relations embedded in the distance between the body and the object. Furthermore, like Said's beginnings, the line does not begin with the contact between a pencil and paper (or in the case of the mobile map, the application of an algorithm into an equation) but rather begins in the outwards gaze of the eye, a cartographic gaze (Ryan, 1996) and a geographical imagination (Gregory, 1994). The limits of representation are peri-representational, relational and embodied, but become fixed at the index finger of representation. Thus the problem of representation and space comes from two sides, like Olsson's *Birds in Egg/Eggs in Bird* (1980): space enables representation through the fluid possibility of relations, heterogeneity and openness; yet representation expresses space through drawing those relations, its indexicality and the embodiment of an imagination. The ubiquity of the forces of cartographic reason means that such practices become deeply embedded in the subsumed and emerging

contestations of everyday lived spaces, which then become represented through cartographic or other means. In situations where space has been a space of conflict and violence, the impact of representations, and the incursion of Western rationalities into the habitual, the embodied and the lived is bound up with historical and geographical struggles.

The space of the book

How do we find space beyond representation but at the limits of representation itself? This is country in which Gunnar Olsson dwells, where representation dissolves into space, as he follows lines into dark politics (1991b), abseils into the abyss of rationalist philosophy (1980), and traces cartographic reason back to the emergence of the grid (2007). In *Birds in Egg/Eggs in Bird*, Olsson (1980) hopes first to undo language:

The message is that the society's words are fixed and anchored in the strictures of law and order. But to bring them into full Bloom, the must be so screwed up that their inherent ambiguity is brought forth: the communicable of Leibniz's *salva veritate* and Descartes' categories yields to the silence of Beckett's manifolds. (Olsson, 1980: 45e-46e)

But he goes on, then, towards a project of truth – towards writing in 'dream-like states [...] for truth emerges when identities are violated and opposites unified' (Olsson, 1980: 47e). Truth, here, we see again in its Hegelian optimism – for at this time Olsson humbly admits that he is 'a coherentist'. But as is the way with such things, the closer Olsson reaches to this asymptotic limit, the more elusive it becomes. By the time Olsson reaches *Abysmal: A Critique of Cartographic Reason* (2007), the imposed Foucauldian limit of discourse becomes tempting, but still, he remains (like Massey) dissatisfied. Pushing these limits towards an unattainable origin, he concludes that he does not know what exists beyond the limit of language, only that something must. Truth, space – what it is we cannot know. Such a journey follows a perilous path; each measure only illuminated as each step finds a foothold in the darkness, as we place faith in increasing abstraction towards an impossible reality. Despite this, he has done his best and that this will always be an unfinished project. Signing off, he says to himself: 'Go home, Professor. GO' (Olsson, 2007: 365)

However, I have often wondered if, by thinking about space from this perspective, we have already determined that heterotopias are not possible – that space is doomed to be structured only by whatever dominant

discourses elbow their way to the front of history and geography? Like Massey, I dearly do not want this to be so, if not for the sake of this argument, then for the millions of voices who every day contribute to a multifaceted and heterogeneous exploration of the world and its multifarious meanings. As the map becomes *unfixed* in digital and mobile forms, we need to ask if drawing is an act of spatialisation or, instead, a spatial act that attempts to limit and define our spatial experiences? What Massey asks, and what I wish to question here, is whether space (and time) always an act of drawing and abstraction – or can something exist beyond the code and the coordinates, the lines and the angles of cartographic reason?

So, at Massey's trumpet, we tread cautiously after Olsson, into the abyss, as we stumble again and again through the intrusions, interruptions and messiness that Gordon describes. And we call again upon Foucault's description of subjugation and heterotopia to move forward into a space that is perhaps, pre-discursive (in Foucault's terms) or pre-visible (in Serres's) – a space which is 'other space' (or more-than-space, or not-space).

The first section of this book, *Part 1: Maps, Mappers, Mapping*, deals with the nomadic journeys of theory and methodology. The next chapter, *Tools: Epistemologies, methodologies, anarchaeologies*, focuses on the triad of epistemology, archaeology and methodology to explain the theoretical and methodical underpinnings of this research. It describes how I came to follow seventeen people in two cities, as they chored and explored, with a small action camera, before entering the archive to trace the ghosts of their steps. It makes an argument for experimental or inventive methods, and for both courage and tenderness in pressing forward into the intersections of empiricism, politics and everyday life.

Then we turn to moments of mobile mapping – seventeen moments with seventeen people, to be precise – across Sydney and Hong Kong. These moments have something to say about the way in which we think about spaces, discourses, cartographies and technologies, as they draw together cartographic reason, landscapes, memories, practices, emotions and desires in ways far more varied and manifold than I could ever have expected. These walks are written in the 'dreamlike-state of Beckett's folds' that Olsson describes, through which the heterogeneity of space and the fixity of cartographic reason collide.

Part 2: Space/Sydney traces the emergence of heterogeneous and unpredictable spatialities across nine walking interviews in Sydney. It discusses how spaces which traditionally considered settled can be paradoxically unsettled, in tensions that erupt through the ordering of landscapes through urban landscapes, grids and infrastructures through moments with

Marianna, Kyja and Tanija. Then, we turn to affective geographies of this space, as these tensions make their way into the mappings of Sarah, Nick and Shaun – hauntings, intuitions and embodiments, which ripple and burst, linger and ghost through their everyday lives. Finally, we discuss how, between ideologies and affects, spaces might come to be imagined through stories, possibilities and daydreams with Cliff, Ben and Cassie.

Next, in *Part 3: Cartography/Cities*, we have a cartographic interlude in *Drawing the line*, and *Here there be digits*. Travelling across space and time, we chart the intertwining tendrils of cartographic reason as dispersed forms, philosophies and desires become discursive unities which are then dispatched across the globe in modes of new and old imperialism. We trace how binary systems travelled from China to Europe (and back again), algebraic geometry shifted mapping from description to order, as coordinates and code travel from the Age of Reason into our mobile phones, the markers on our screens and the digital maps we use on a daily basis.

Then we move on to *Part 4: Digital/Hong Kong* as we invert the equation, and instead see how digital mapping builds spaces imperfectly, haphazardly and asymmetrically through conflicts between cartographic reason and other forms of knowledge. As Cartesian and Leibnizian philosophies come into contact, the question of rationalist fixity might be rethought as topological as well as topographic. First, we consider how digital systems of representation across grids and numbers stabilise urban fluidities into channels in the stories with Daren, Ellen, Ravi, Taylor. Then, we follow how these discourse stretch, retract and break in political elasticities with Vicki, Camille, Magdalena and Mohammed.

Finally, we conclude in *Part 5: Mobile Mapping*, by way of discussing what it means when cartographic reason, discourse, research and mobile mapping is brought close. Away from the far abstractions of theory and theorists, the distant ivory towers and locked doors of the academy, the institution, the planning office and the corporation, the near presences of memory and embodiment, the wind on a face, the reflection on a screen and the intimate journeys of the everyday and the banal retelling of the story of spaces, cartographies and codes in a practice of making and dismantling relations.

This is a book about mapping and the mobile map, or what I term, mobile mapping, in the wake of a 'digital revolution' of the near and far, of simultaneity, of the side-by-side. The purpose of this term is to open up mapping to a practice that is more than the fixity of cartographic reason, but rather, to interpret the process of mapping as a form of encounter, negotiations between, through and despite spaces and representations. Mobile mapping is mapping with situation and the situated at the forefront of the mind. It is

more than maps and mappers, but a heterogeneity of practices of interpreting the openness and possibilities of space through assemblages of memories, institutions, rationalities, spaces, bodies and technologies – which are in constant flux and transformation. Foucault repeated the sentiment throughout his work that '[r]ather than founding a theory [...] my present concern is to *establish* a possibility' (Foucault, 2002a: 128-129). At this point, and after everything we have already discussed, let us try to do the same here and see whether we can establish the possibility for a *spatiotemporal* analysis of mobile mapping, which does not shut down possibility but rather rests on the determined (and perhaps irresponsible) desire for openness, for hope without absolutes, for understanding without subjugation. So, let us return to Olsson's work on representation and cartographic reason from the other side, from space, and to Foucault from the geographic and spatial knowledges subjugated in his own work. Let us not start with representation, but let us start with space and let us find a friend by way of Massey, who insists that it exists beyond representation because representation is fallible, fixated and impossible, and let us cautiously tread after Olsson who seeks to find the limits to this representation: Will lines ever conquer the world?