

# **Living the Map: Mobile Mapping in Post/colonial Cities**

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## **Abstract**

### **Living the Map: Mobile Mapping in Post/colonial Cities – 2016**

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University of Manchester– PhD in Human Geography 2016

This thesis is concerned with mobile mapping practices in Sydney and Hong Kong. Since the development of mobile media technology, there has been widespread proliferation of geo-locative, quasi-cartographic mapping practices in which people use applications (apps) on their mobile phones to narrate and navigate their way through urban spaces. This has raised questions within scholarly communities about the impact that these new technologies are having on everyday practices and everyday lives. As such, this thesis seeks to contribute to a growing field of knowledge surrounding the transformation of wayfinding, navigational and spatial mapping in the wake of these developments. Focusing an empirical investigation in two post/colonial cities – Sydney and Hong Kong – it draws on ethnographic, archival and geographical data in order to situate mobile mapping in an everyday context.

Building upon Foucault's work on order (2002b), knowledge (2002a) and discipline (1995), this thesis seeks to address the issue of power-knowledge relations within and without mobile mapping practices as political and generative contestations over the meaning of space, the potentiality of practice and the indeterminacy of the past. It does so by considering an overarching discourse of cartographic reason, best articulated by Farinelli (1998) and Olsson (1998) as a rationalist, universalist and geometrical approach to spatial understanding. Moving beyond the Cartesian interpretation of cartographic reason, it argues that in an increasingly digitised and monadic world, analyses of cartographic discourse must expand into an investigation of the role of Leibnizian binary systems, universal characteristics and elasticity.

As such, this thesis engages three heuristic lenses – space, technology and people - with which to understand the empirical material from different perspectives. It argues that digital mobile mapping practices can be understood as expanded and transformative descendents of the rationalist, universalist and scientific impulses that have characterised cartographic reason since the Enlightenment. However, where continuity can be traced across many different cartographic and mapping practices, as the power of cartographic reason continues to reassert authority and territorialise space and knowledge, equally, the contestations which were borne of initial and early colonial encounters continue to generate contestation, conflict and hauntings.

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# 1. Introduction

## Beyond maps and mappers: mobile mapping in a digital age

'In the interface between knowledge and power lies the art of mapping.' (Olsson, 2010: 8)

*'Living the map: mobile mapping in post/colonial cities'* is concerned with 'moving-through' and being 'situated-in' the folds of cartographic discourses, heterogeneous spaces and everyday mapping activities. It employs an overarching framework of mobile mapping; a loose assortment of situated, paradoxical and performative practices of navigating the relations between people, technologies and spaces in an age of digital, mobile media. Working from Foucault's writings on discursive formations, it assembles a network of complementary, supplementary and sometimes contradictory theories to build a 'more-than-representational' approach (Lorimer, 2005) towards mobile mapping. As such, this thesis specifically speaks to everyday practices of mobile mapping from the perspective of an 'experienced' space, addressing the emergence of local and embodied knowledges, affects and hauntings. In doing so, it furthers a field of emerging research that brings together critical geography and media studies in order to analyse mobile mapping as an everyday *in situ* phenomenon with historical, geographical and discursive implications.

Key to this investigation is an analysis of the role that cartographic reason plays in power/knowledge relations. This is best articulated by Farinelli (1998; 2009), Olsson (1998; 2007) and Pickles (2004) as the representation, modelling and ordering of the material world according to a form of abstracted western, geometric rationalism. As such, this thesis asks:

1. How can experiences of contemporary mobile mapping in Sydney and Hong Kong be situated in and beyond cartographic reason?
2. In what ways are the power/knowledge relations of cartographic reason shaped and reshaped through everyday mobile mapping?
3. To what degree are new media technologies re-forming mobile mapping practices, in the context of cartographic reason in Sydney and Hong Kong?

Focussing on an empirical investigation in two post/colonial cities, this research uses ethnographic and archival data to investigate the discursive boundaries of cartographic reason in everyday life. In order to do so, it follows the wanderings of seventeen people - nine in Sydney and eight in Hong Kong - to understand the folding of the representational and the more-than-representational, and the discursive and the more-than-discursive, in everyday moments of encounter. By experimenting with mapping practices in ways that underscore their situated and performative nature, this thesis aims to contribute to on-going theoretical debates surrounding cartographic representation and materialism in geography.

Throughout, this thesis recounts these wanderings - these moments of encounter - as spatial stories (de Certeau, 1984), attentive to everyday life and considerate of the contingency and agency of mappers in the face of powerful discourses. Each of these spatial stories reflects life in moving worlds and unmoving lines, and the power/knowledge relations between the embodied, spatial and technological. Although these stories could be told about any place in the world, Hong Kong and Sydney offer an alternative to North American and Euro-centric perspectives. Here, the question of a post/colonial spatiality and spatial knowledge comes to the fore. The paradoxical and ambiguous status of such post/colonial spaces presents a cartographical power/knowledge relations inaugurated at first encounter between western reason and unfamiliar landscapes and spatial cultures. Furthermore, these relations become embedded – but never resolved – into urban infrastructures and imaginaries, offering the opportunity to trace how the theoretical underpinnings of working between space and representation come to be materialised into everyday life.

As cities in the Asia-Pacific region, they both bear particular manifestations of a shared phenomenon - a colonial geographical imagination (Gregory, 1994) borne out of the order of the British Empire at its most expansive. These sites speak to ambiguous and often paradoxical constellations of forces - sacred, ghostly, intuitive - that fold and unfold in the emergence of cartographic reason. As Jacobs suggests:

‘In contemporary cities people connected by imperial histories are thrust together in assemblages barely predicted, and often guarded against, during the inaugural phases of colonialism. Often this is a meeting not simply augmented by Imperialism but still regulated by its constructs of privilege and difference’  
(Jacobs, 1996: 3)

Both Hong Kong and Sydney are port cities established at the edges of empire (Carroll, 2007; Hoskins, 2009). They are heterogeneous cities with irreconcilable cultures drawn from the reaches of the same empire - shared circulatory systems and transnational imaginations (Allon, 2006). In the limits and structure of each city erupts a particular mode of post/colonial modernity, shaped by discursive orderings of the British Empire that privilege specific epistemologies, cultures and bodies over others (Carter, 1988; Munn, 2001). The resonances of the systems through which colonisation was undertaken bleed into present mobile mapping practices. Yet, despite the shared directive and regulatory constructs of imperialism, the assemblages that constellate in places like Sydney and Hong Kong are, as Jacobs suggests, 'barely predicted' (1996: 3). Such assemblages are entirely unique to each location and rife with situated conflicts between cartographic reason and other ways of comprehending space, technology and navigation.

For this reason, this writing also takes on the use of the term "post/colonial". In -/-, Olsson writes:

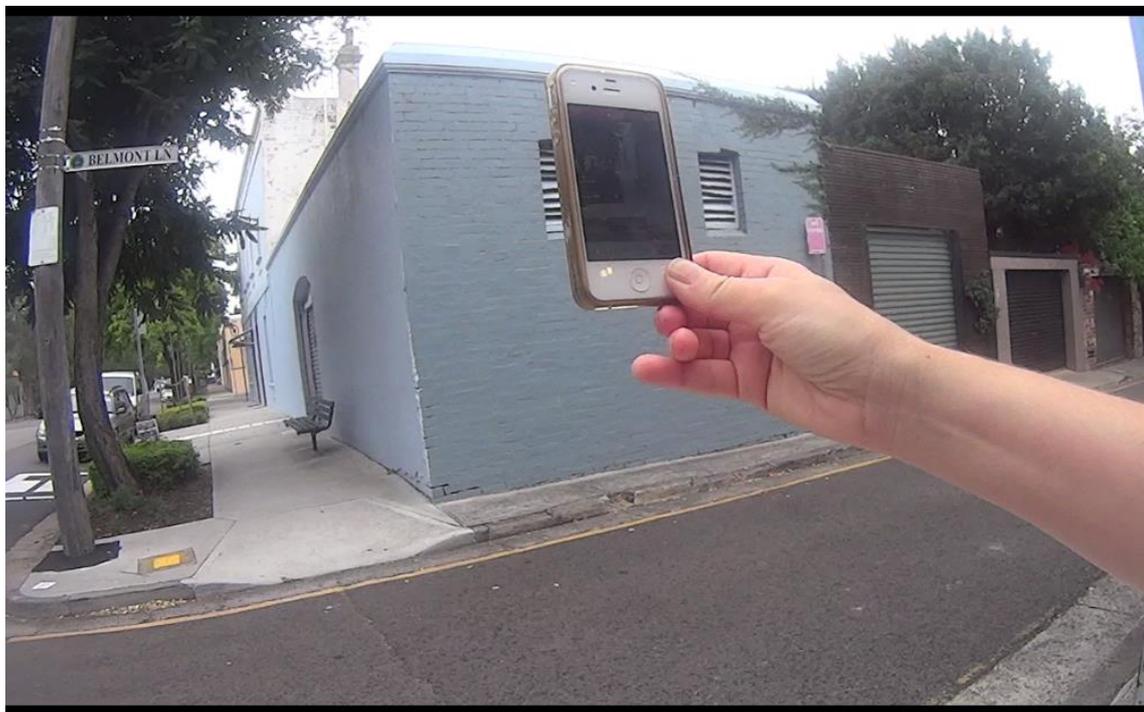
"[t]he essence of power is thus in the slanted /, its appearance in the repetitive - -... we ask not about the relation /, but about the categories -- ... In the movement from / to --, questions of epistemology turn to questions of ontology." (Olsson, 1982: 228).

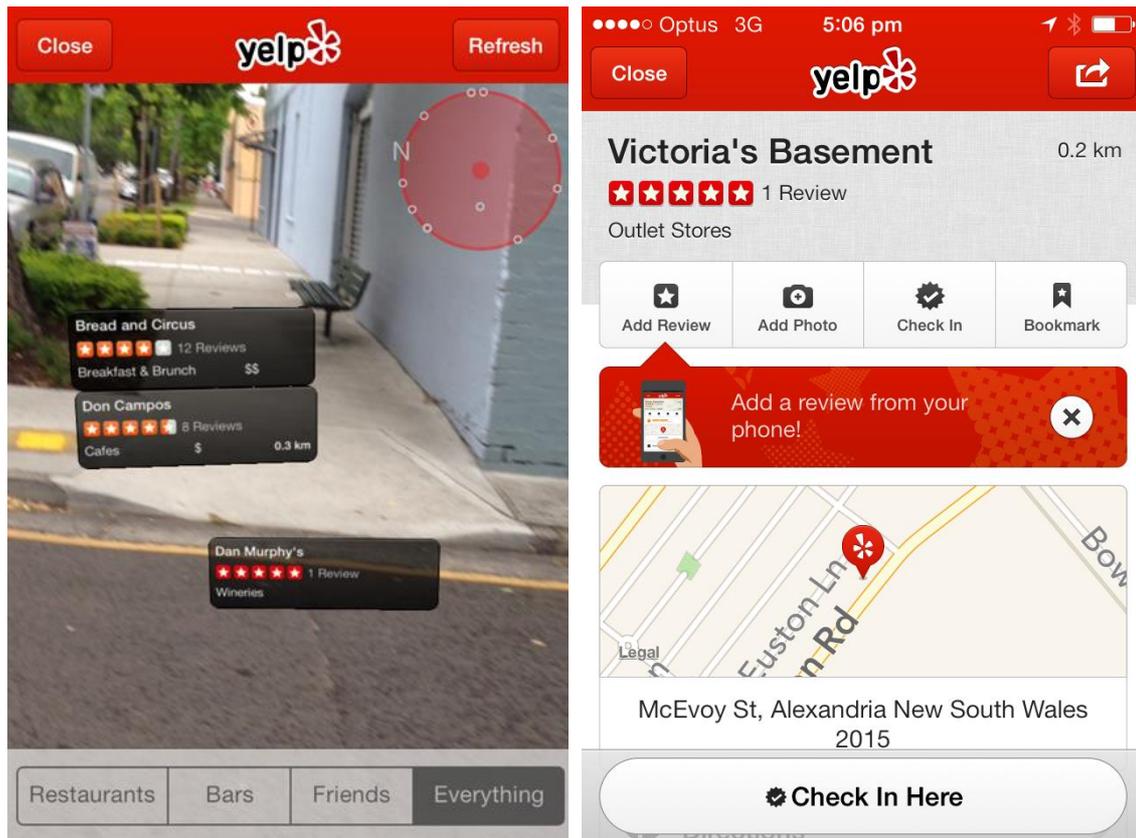
This is the crux of why these cities have been chosen: their post/colonial present sits somewhere between epistemology and ontology, caught in a battle of spatial power/knowledge that has not yet conquered the experience of being and living in these landscapes (Hall, 1996). Sydney and Hong Kong are cities that are both colonial and postcolonial, cities which cannot be decolonised, where "colonial pasts continue to organize experience in the present" (Braun, 1997: 4). At the same time, for settler-colonial societies in which these cities have grown their urban fabric and their geographic imaginations, the epistemological processes of the colonial have never been fully relinquished (Povinelli, 2011). This term is a reminder: post/colonial points to the irretrievability of the past but its lack of resolution in the present: ghosts (Gordon, 2001) in the encounter.

It is because of the shared structures and unique practices in each city that the everyday and situated emergence of mobile mapping is of vital importance. By researching mobile mapping encounters in Hong Kong and Sydney, what Doreen Massey (2005) refers to as an inevitable friction between the fixity of representation and the coevalness of space is revisited as a post/colonial conflict, embedded in

everyday negotiations between spaces, technologies and people. In the everyday, mediations between cartographic reason and more-than-representational practices are traced. Such practices are steeped in unresolved hauntings (Gordon, 2008) and ghostly apparitions of trauma, cultural conflict and power/knowledge struggles.

In the past fifty years, a swathe of new digital and computational cartographic technologies have been introduced into these sites of continuing contestation. Geographic Information Systems (GIS) allow for large volumes of geographic data to be gathered, sorted, analysed and presented quickly and easily; opening up debates about the potential democratisation of cartographic practices (Sheppard, 2005; Cidell, 2008, Haklay; 2013b) through geographic information science and the geospatial web (Elwood, 2010; 2011). Advances in satellite and radio telemetry have allowed the horizontal and vertical plane to be measured and anchored with increasing accuracy using Global Positioning Systems (GPS) that can measure location, distance, speed and elevation (Proven, 2005). Coupled with the development of 3G and 4G mobile-phone internet, these technologies have entered into the sphere of the everyday. Millions of users worldwide (not least in Sydney and Hong Kong) can access advanced technological means of determining an increasing range of cartographic information (Clarke, 2004; Gerlach, 2014; Glasze and Perkins, 2015) presented in a variety of ways (see Figure 1.1).





**Figure 1.1** *Three points of view.* Examples of different kinds of digital map views as Marianna shows me the Yelp overlay on the phone, through the screen, and then the place marker for Victoria's basement (Source: ActionCam Footage and screenshots provided by Marianna). For the sake of clarity, this thesis uses three lenses - (1) space, (2) technology and (3) people - as heuristic starting-points for analysing and retelling the ethnographic stories of mobile mapping. As the research progressed, these categories proved messy, yet they persisted with inexorable force; lending a critical eye to other categories (such as 'material/discursive' or 'map/space') that had often been axiomatically established as dialectic, oppositional or hybridised. Given the intertwining stories of the fixity of representation and the coevalness of space in Sydney and Hong Kong, this thesis argues that it is short-sighted to consider the cartographic without the non-cartographic, the representational without the more-than-representational (Lorimer, 2005) or non-representational (Thrift, 2008), or the discursive without the more-than-discursive (cf. Grossberg, 1997) or pre-discursive (cf. Kristeva, 1987). These lenses work to disperse the primacy of the cartographic in this research so that other 'side-by-side' forces can also be considered as crucial to everyday mobile mappings in post/colonial cities. Furthermore, this trialectic of lenses does not necessarily suggest that one phenomena must preclude another, but rather, that co-existence is central to the constellation of moments of encounter, and that mobile mapping assemblages in Sydney and Hong Kong may appear as paradoxical, ambiguous and non-dialectic.

By way of contribution, this thesis uses co-emergence, coformation and contradiction (Massey, 2005) as essential concepts for understanding the complexity of mobile mapping in post/colonial spaces. Rather than emphasising the technologies of the map; the mapped; or the mappers, this thesis seeks to examine the relations between them, drawing together important work in critical cartography, digital media and spatial practice to simultaneously advance our understanding spatial representation and practice in a digital cartographic era. This is where a practice of *mobile mapping* offers a key conceptual contribution to the fields of both critical cartography (and critical geography more broadly) as well as digital geography and mobile media studies. Defined not by objects (i.e. maps) nor subjects (the mapped), nor solely by human actors (mappers), mobile mapping entails tentative conversations between spaces, technologies and people, coforming, and co-constituting across materialities and representation, digital and analogue systems, between the personal and the social, the local and the global. It is a practice centred on movement through space, the act of mapping in the everyday and the power/knowledge relations established through the post/colonial cartographic apparatus. Increasingly, as the representational structures of geography become ambiguous, convoluted and abstracted under digital regimes, mobile mapping offers a way back to the critical questions asked by critical cartographers such as JB Harley, Gunnar Olsson, Franco Farinelli, John Pickles and Jeremy Crampton about power nested within regimes of spatial representation.

Furthermore, as Dagmar Reichert (1998b) suggests, the role of graphism (or *Geo-Graphie*) in geography, world-making and spatial writing is increasingly ambiguous. She wonders if, in order to express the complexity of spatiality, we may need to shift '*Geo-Graphie*' to '*Geo-?*' (Reichert, 1998b: 14) to allow for more-than-representational ways of worlding. Following Reichert's lead, this thesis returns to these seminal questions of more-than-representation and space, by approaching mapping and cartography at the level of discursive practice, a continuity across modes of representation at the level of cartographic reason (rather than object-status or graphism) traced across multiple moments. This contribution is centered as much on the methodological, as well as the theoretical, in a return to the empirical, the lived and the experimental. Here, this thesis also offers a methodological contribution to the study of spatial and representational practices. Using situated visual mobile ethnography and archival research read through Foucault's archaeological method, it offers an experimental methodology to work across the representational and the more-than-representational, the discursive and the more-than-discursive, the material, embodied, structured and the affective.

This is the spirit in which this thesis takes up the relationship between the empirical and the theoretical; the material and the discursive (Barad, 2007), and is its most central contribution. This is also the spirit in which the concepts of cartographic reason, of practice, of space have been incorporated. Contradiction, co-emergence and coformation in mobile mapping means that it is possible to consider technology as both digital - with a long history of GIS, code and binary languages - and also as cartographic, with its semiotics, its taxonomies and its silences. This thesis argues, then, that it is also possible to understand people and space as contradictory, and that the agency and contingency of lived realities may work alongside cartographic reason in the practice of mobile mapping. This is not to say that these categories are absolute, nor are they universally applicable, especially in spaces of post/colonial modernity. Indeed, the points at which it becomes impossible to find difference between a space and a technology (like a moving walkway or a prison, for instance), or between people and spaces (in myth and memory, for example), offer immense potential to examine the depth of cartographic reason and geometric axioms as they are constituted through everyday life.

The following section, '*Chapter 2: The (New) Technological Order of Things*', starts by problematising universal definitions of space and representation. It then explores the *dispositif* of cartographic reason (Farinelli, 1998) as intertwining Cartesian and Leibnizian rationalities in their materialisation. I argue, by way of Bollnow (2011), that there are different kinds of space with different kinds of functions: spatialities which fall into the mathematical variety of homogeneity and absolute equality, and spatialities which are experienced as heterogeneous, material and affective. This results in a 'coformation' (Massey, 2005: 147) of contradictions and impossibilities in spatial assemblages. Coformation emphasises an emergent quality, a folding, where forming is as equally important as form. Then, building on a Foucauldian analysis of discursive formations (Foucault, 2002a; 2002b), I suggest that, by reconsidering cartographic reason under a discursive lens, a more adaptive and nuanced understanding of the role of cartographic discourses in producing mathematical and experienced post/colonial urban spaces can be developed. I describe the way in which the apparatus of cartographic reason embeds and normalises cartographic reason as an axiomatic spatial formation through the technologies described. In so doing, cartographic reason works towards establishing systems of order and control through universality, calculability, and categorisation by way of geometric and digital systems of abstraction and representation.

*'Chapter 3: More-Than-Representational Mobile Mapping'* establishes a radical basis for understanding the spatiality and embodiment of mobile mapping practices in an age of digital-mobile cartographic media. This chapter argues for a more-than-representational approach, foregrounding the *'more-than'* elements that will be explored in the empirically-focused *Chapters 5, 6 and 7*. Firstly, I consider how digital technologies have reframed the relationship between Cartesian and Leibnizian technologies, as well as the transformation of fixed and fluid mathematical spaces into more-than-representational, situated and everyday mobile mapping practices. Drawing on de Certeau's (1984) use of Foucault's 'speech-act', I then examine how, like digital technologies, mobile mapping practices also move beyond the dichotomisation of words and things and can be reconceptualised as discursive and material (Barad, 2007), as well as thought and action (Olsson, 1993). For mobile mapping, this means departing from conventional distinctions between map/space and instead considering the discursive entanglements of cartographic reason and other more-than-discursive forces as they constellate into affective assemblages.

Moving from theory into method(ology), *'Chapter 4: Prismic Methods'* considers how mobile mapping practices may be researched according to a more-than-representational approach from multiple angles - spaces, technologies, people - whilst embracing the importance and critical potential of contradiction, heterogeneity and openness. I argue here that considering the research process through a prismic lens (Richardson, 2000), cultivating disconcertment (Law and Lin, 2010) and undertaking a tender empiricism (Wahl, 2005), helps to reassert the ambiguity of what I call the 'unreasonable field', a more-than-Foucauldian space, keeping the door open for unpredictability, messiness, surprise and failure. I describe how I undertook an 'on-the-move' visual ethnography, which underscored how certain kinds of fixity and un-fixity afford generative potential in research. I also build further on the idea of the 'example' and mobile mapping assemblages through the concept of the encounter (Wilson, 2016); a not-quite-event (cf. Deleuze, 1992a; Foucault, 2002a) that gathers the forces of space, cartographic technologies and people into momentary assemblages.

Finally, I move on to the empirical chapters, which have been organised according to the three heuristic lenses described above. The organisation of these chapters according to individual stories is important. I follow the lead of Massey (2005) in examining the 'simultaneity of stories-so-far' (Massey, 2005: 10), and of Massumi (2002) in using the example as a way to think through the concept, to connect or rearrange, to transform. The seventeen examples included in this thesis - one for

each interviewee - intertwine ethnographic material with archival documents. The connections between these stories, through coded fragments, images, sounds, affects and spatialities, produce a larger story of situated encounters and heterogeneous mobile mappings.

'*Chapter 5: Mobile Mapping and Spaces*' (the first empirical chapter) examines the spatial politics of mobile mapping encounters between the cartographic imagination (Pickles, 2004), the Cartesian grid-form (*res extensia*) (Grant, 2001) and intuitions, affects and hauntings (Gordon, 2008). This chapter begins in Sydney with Cliff, as he describes the deceit of the map along the shores of Botany Bay, and then travels ten kilometres north into the city with Kyja, as she struggles with the trickery of the GPS and the spatial legacy of the Tank Stream in Sydney. Moving to Hong Kong, the next story describes how Mohammed searches for the 'Bank of China' building and measures hypermodern skyscraper landscapes against the vertical datum. Then, I discuss how Vicki stays within the geographical and historical confines of the path whilst climbing Victoria Peak. Finally, I return to Sydney and to Shaun, who sees post/colonial forgetting and the annihilation of spatial contradiction in the introduction of alphanumeric road signs. Across these stories, the muddy slippage between quantification and qualification (*mathesis* and *taxonomia*) and the slow appearance of codification emerges in everyday mobile mapping practices. This establishes particular expectations of what it means to 'know' space and gives rise to disobedient landscapes that shift between reason and unreason.

Transitioning from the Cartesian to the Leibnizian, '*Chapter Six: Mobile mapping and technologies: relations, the monadic digital and the network of Hermes*' considers how the technological network operates as a directive device in everyday mobile mapping. In particular, this chapter explores how the network channels bodies and spaces through material/immaterial modes of classification and regulation. This chapter deals with the consequences of monadic digital thinking in defining the rational and ordered conditions of appearance in the spatial and subjective world. I start with the relationality of the point as both fixed and fluid with Marianna in Sydney. Next is Nick, as he explains what it means to plan, practice and measure the movement of bikes in the city. Then, I turn to Ellen, as she navigates the digital-material regulation of movement in Hong Kong, before I recount travelling along the escalator system with Camille and the collapsing of mobility. I then return to Tanija's mobile navigation of Sydney where she tells me about the ways in which proximity becomes relational and approximated in the crowded Central Business District (CBD). Finally, I end the chapter back in Hong Kong with Ravi, as he dreams of an efficient

and pragmatic world that is made with numbers. Considering the relationalities between fixity and fluidity, this chapter addresses the *technological* in mobile mapping and everyday experiences of moving through digitised spaces while encountering the technological legacies of cartographic reason in its monadic, Leibnizian, networked form.

The final empirical chapter, '*Chapter 7: Mobile mapping and people: hauntings, making-do, and the affective dreams of the unreasonable field*' returns to the role of people in mobile mapping practices, as they negotiate the limits of cartographic reason. It considers the political and more-than-representational practices of 'making-do' in the everyday. The chapter further explores how generative potential, indeterminacy and imminence may afford alternatives to subjugation in haunted spaces. As such, these stories rethink cartographic reason in more-than-representational terms to reshape the discussion of agency and democracy in the face of cartographic technologies. Meeting Taylor, I trace the endurance of memory and then I catch the ferry and walk through Kowloon with Magdalena as we discuss the affective experience of moving. Next, I walk with Cassie as we imagine the *inside* of houses, looking through windows and transgressing boundaries, before I find hidden spaces and secret semaphores in back-alleys with Ben in what he describes as an 'architecture of dreams'. Returning to Hong Kong, this chapter subsequently discusses the role of gaps in the urban frame, as Daren asserts the importance of the ground plane as a site of action and secrets. Finally, the chapter ends with Sarah in Sydney, as she walks through Hyde Park and mourns the gradual erasure of heterogeneity and Aboriginal presence, which continues to haunt our contemporary mapping experiences. These are stories from the 'other side' of mobile mapping, where mappings at once deny and afford possibilities by slipping in out of the Enlightenment systems of grids and relations.

All of these stories were disobedient - they did not necessarily say the things I hoped they would. Rather, they started to 'deviate under the force' (Massumi, 2002: 19) of vital and vibrant practices of the people with whom I walked. Thus, in the readings given here, the empirical work emphasises heterogeneity and unresolved issues often veiled by the unequivocal clarity of theory. As a result, this thesis does not collect together lists of examples that coagulate easily, so that I may build a neat theoretical account. Instead, theory and empirics coalesce in these chapters, oriented by exemplary individual narratives - stories-so-far - which say something about the relationship between spaces, bodies and technologies in mobile mapping. This has

resulted in an 'incipient system' (Massumi, 2002: 19) rather than a synthesis - as the relations from the spatial, the technological and the embodied intertwine.

The final chapter, *Conclusion: Mobile mapping and the gaps in the fold* draws together collections of practices emerging from the empirics, which emphasise the polyvocality of in mobile mapping within and beyond cartographic reason. Here, three key collections of practices - stabilisations, elasticities and gaps - offer us a way to think beyond the binaries implicitly interrogated by the empirical examples that appear throughout each of the stories. Beyond points and lines, fixities and fluidities, and Cartesian (gridded) and Leibnizian (monadic or topological) forms, these three constellations are gathered at the level of more-than-discursive practices across spaces, technologies and everyday life. They point at three of the impulses in and beyond cartographic reason; to stabilise, to stretch, and to find gaps in a crowded world.

Overall, this thesis tells a story of mobile mapping, of messy and dispersed interactions that emerge in tandem. It tells a story of spaces, technologies and bodies in constant negotiation between the mirrored sorting of the Cartesian and the Leibnizian, and the '*more-than*' – the indeterminate, the affective and the haunted. Shifting between Hong Kong and Sydney, it traces the emergence of difference/repetition across global empires in local spaces: the regularities in cartographic reason that emerge; and the differences that speak to unique urban experiences. None of the structures of mobile mapping described through this thesis are necessarily static: rather, they lean into one another, creating a contrapuntal (Sparke, 1998), non-progressive view (Edney, 1993) of cartographic reason; a discourse that has been dispersed and engaged in myriad and unpredictable ways.

## 2. Fixity and fluidity: cartographic reason, mathematical space and geo-rationalism

'Modernity begins when the real space of the world becomes a stage, and when this stage, mastered by a stage manager, turns inside out like a glove or simple geometrical line-drawing to the eye and collapses into the utopia of a knowing, interior, intimate subject. This black hole swallows up the whole world.'<sup>1</sup> (Serres, 1989: 80)

This chapter reviews literature on discourse, cartographic reason and post/colonial cartographies to consider the historico-geographical phenomena that structure and stabilise moments of mobile mapping. It foregrounds the following chapter (Chapter 3) - which considers the development and contemporary use of digital technologies in post/colonial spaces - by arguing for an extended reading of *cartographic reason* (Farinelli, 1998; Olsson, 1998; Reichert, 1998a) as a rational discursive formation (Foucault, 2002a). As such, the materialisation of cartographic reason can be traced through geographical ordering practices in the cartographic *dispositif* (Foucault, 1980) and the transcendental dreams of Enlightenment spatiality. Here, cartographic reason becomes transformed by the meshing of order, mathematics and territory (Elden, 2013a) - specifically through the work of René Descartes and Gottfried Wilhelm Leibniz – into the delimiting modernity of the cartographic imagination (Pickles, 2004).

In everyday instances of mobile mapping, as digital technologies like mobile phones merge with the material legacies of cartographic reason in calculating and classifying space, this chapter situates *cartographic reason* as a specific frame that relates to fundamentally 'Western' and mathematical ways of knowing space. I situate cartographic reason as a geometrical mode of reasoning (Olsson, 2007), fundamentally intertwined with Western order (Pickles, 2004) and the material manifestation of mathematical space. The will towards order characterised by cartographic reason after the Enlightenment, is a shift away from empirical description, revising concepts of fixity and fluidity under the stable geometries of mathematical space (Bollnow, 2011). This shift, contemporarily, speaks to the valuation of mathematical space over experienced space (Bollnow, 2011), or the separation between the political force of the representational (Foucault, 2002b), and

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<sup>1</sup> Translated by Ola Söderström (1996: 254)

the abject and obfuscated force of the non-representational (Thrift, 2008), the more-than-representational (Lorimer, 2005) and the more-than-discursive (Grossberg, 1997).

Building on this expanded definition of cartographic reason, this chapter explores the shift towards universal order during the Enlightenment. Typified by Descartes and Leibniz, the ways in which this shift occurred have resulted in the expansion of cartographic reason through colonialism, acting as a political tool for the territorialisation and subjugation of local spaces, knowledges and practices (Gregory, 1994; Edney, 1997; Sparke, 1998a; Carter, 2009). Such exploration in this chapter foregrounds an empirical analysis in Chapters 5, 6 and 7. As such, I consider how power/knowledge relations of cartographic reason came to be situated in a post/colonial world by locating this investigation specifically in Sydney and Hong Kong. In Sydney and Hong Kong, cartographic reason gives authority to the cartographic impulse to establish colonial and imperial control by measuring and stabilising the experienced spaces of the world (Said, 1993). As such, this chapter maps how, in post/colonial cities like Sydney and Hong Kong, these ambitions are not necessarily a question of a binary between positivistic or critical readings of cartographic technologies or discourses, but rather one of simultaneity and coformation between mathematical/experienced spaces, and between different discursive approaches towards what I term geographic fixity/fluidity.

In order to highlight how cartographic reason has transformed into its contemporary manifestation in digital and mobile mapping, I work with the concept of *discursive formations* - described by Foucault (2002a) as sets of statements unified by rules that allow things to be said (rather than the form that statements may take). I also work with the intertwined concept of the *dispositif* (Foucault, 1998b; 2003b), which frames the formalisation of discursive formations through forces of power like institutions and governments. Considering cartographic reason under a Foucauldian lens allows for the analysis of a multiform mode of thinking at the level of philosophical continuities. Such an approach appreciates how the on-going relationship between the work of Descartes and Leibniz can be traced in contemporary manifestations of mobile mapping in digital environments through geometric and numeric principles of reasoning.

## **Cartographic reason, discourse and the dispositif**

To understand the power/knowledge relations embedded in mobile mapping, this thesis draws upon Foucault's writings on discourse, archaeology and order (Foucault, 2002a; Foucault, 2002b). These writings offer a platform from which to consider how cartographic reason is bound with the specific will to understand and shape the world according to stable, calculable and controllable systems. Foucault's work further serves to operationalise how other knowledges may be subjugated, erased or consumed (Foucault, 1980; 2003b). This means tracing instances of cartographic reason where-ever they may appear - in geographic imaginations (Gregory, 1994), the cartographic eye (Ryan, 1996), cartographic impulses (Said, 1990), cartographic anxieties (Gregory, 1994), cartographic identities (Harvey, 2001), cartographic strategies (Mitchell, 2008) and cartographic calculations (Crampton, 2011). By focusing on regularity - repetitions, transformations, transductions and impulses - this section foregrounds how the power-relations of cartographic reason have flowed through into the widespread use of digital mobile media, including mapping applications (or, apps). This focus also helps to reflect upon how the inscriptions of cartographic reason can be considered beyond the binary of digital and analogue, maps and space.

This thesis, however, does not try to find some 'essential Foucault', for as Hannah (2007) rightly points out, Foucault rejected an authorial *oeuvre*. Instead, I turn here towards Crampton's (2001) and Anderson's (2006) use of Foucault, which *supplements* and *extends* his work, rather than searches for an 'authentic' critical reading. Because of the wide-ranging influence of Foucault's writings, it is possible to then use this grounding to tie in the various extensions, rethinkings and critiques of the relationship between representation and materiality. This includes Barad's (2007) work on matter, de Certeau (1984) on practice, Deleuze on the body and control (1992b) and assemblages (1987; and Hand, 1988), Gregory (1994; 1995) on geographical imaginations, Massumi (2002) and Anderson on affect (2006; 2014), Gordon (2008) on haunting and Said (1990; 1993; 1997) on post/colonialism. Furthermore, as Foucault described himself as a scholar who was far too Nietzschean to be a communist (Foucault, 2001b), it is also possible to find commonalities in the genealogical analysis of cartographic reason and geometric rationalism through scholars who were also deeply influenced by Nietzsche's writings, in particular, Olsson (1988; 2007), Pickles (2000; 2004), and Serres (1968; 1982a). Thus, by starting with the work of Foucault on discourse, order and science, and then

considering it through mobile mapping practices, I argue (both in this chapter and throughout the thesis generally) that it is possible to reconsider the concept of cartographic reason on discursive terms. In particular, I present an understanding of cartographic reason as an Enlightenment desire for transcendental universality that continues to emerge in contemporary mobile mapping, and which broaches a *dispositif* of post/colonial institutions, technologies, landscapes, bodies, disciplines and languages.

### *Discourse and the dispositif*

Discursive formations, Foucault (2002a) argues, are formed through epistemic unities that determine the conditions and principles of thought under which certain statements may be said, or what he terms 'the conditions of possibility' (Foucault, 2002a: 130). These unities are defined by commonalities in their 'simultaneous or successive emergence' (Foucault, 2002a: 38), the persistence of certain themes and styles - what might be generally understood in cartographic terms as 'cartographic logics' (Casti, 2015; Cosgrove, 2003; Kim, 2015). Such logics underpin the way in which knowledge about the world may come into existence - the composition of images, the rules of classification, or the way in which language is spoken – and are fundamental to the cartographic process of description and inscription of space (Ryan, 1996; Barad, 2007).

Central to the power of cartographic reason is *formalisation through materialisation*, whereby discourse and structures of power appear *a priori*, as if they have always existed thus, in what Olsson (Olsson, 1987: 59) terms the 'revolting ambiguity of the taken-for-granted'. Formalisation occurs through the *dispositif* (or apparatus), generally understood as a network, as 'relations of force' (Foucault, 1998b: 140) that pre-empt continuity in the perpetual formation, transformation and disintegration of discourse:

'What I'm trying to pick out with this term is, firstly, a thoroughly heterogeneous ensemble consisting of discourses, institutions, architectural forms, regulatory decisions, laws, administrative measures, scientific statements, philosophical, moral and philanthropic propositions - in short, the said as much as the unsaid. Such are the elements of the apparatus. The apparatus

itself is the system of relations that can be established between these elements.’ (Foucault, 1980: 194)

The *dispositif* is a stable choreographer in a world in flux: It orients power, orders relations and arranges forces in particular ways. In terms of the cartographic *dispositif*, this can be seen across multiple scales and trajectories: from the drawing and reading of a line (Olsson, 1991b) to the classification and alteration of landscapes (Braun, 2000; Carter, 2009), and cultures of exploration, science and geographical knowledge (Ryan, 1996; Driver, 2001; Gregory, 1994). Cartographic *dispositifs* aid this materialisation, mediating between the abstracted realm of geometry and cartography and the everyday lived landscapes that are planned, surveyed and altered between digital systems, pens on paper, and in physical reconstruction.

Using Foucault’s emphasis on discourse and order, we can also trace trends of spatial thinking - for instance, between Cartesian and Leibnizian space - without needing to absolutely separate the material and the imagined into clearly delineated categories for convenience. The *dispositif* is implicated in the naturalisation of discourses like cartographic reason, as a mode of thinking, and the obfuscation of its continued role in shaping of everyday experiences across both analogue and digital planes in the substrate of matter. At the same time, this matter also has material elements that allow it to have its own agency and indeterminacy, which makes it difficult to produce order; a world that is ‘more-than-discursive’ (Grossberg, 1997). Here, matter - objects, things, landscapes - can be understood as material-discursive (Barad, 2007) phenomena, played out across a field of materiality, which may contain non-discursive practices that cannot be described solely by poststructuralist theory or theories of signification (Grossberg, 1997). This will be explored in greater detail in the next chapter on digital technologies and practice. The limits of language (Olsson, 1991b), or the limits of representation (Farinelli *et al.*, 1994) are the interstice between cartographic reason and the more-than-discursive in their rhizomatic processes of negotiation (Olsson, 1980).

On the question of qualities of recognition, Foucault offers little advice regarding how to identify a map or image (a statement or *énoncé*), or even a moment or event within a wider strategic field of discourse like cartographic reason. Such identification becomes more difficult because of Foucault’s (2002a) continuing emphasis on (trans)formation and emergence. As a point of definition, then, throughout this thesis,

I distinguish between cartography<sup>2</sup> and mapping. Wilson (2014c) argues that drawing and tracing are distinct practices, an argument that I would like to link back to Foucault's understanding of order and reason in modernity. For Wilson, the drawing of a line is an affective *tour-de-force*, assembled across the permutations of mapping practice. Tracing, however, is the reiteration of the drawn line, a copy and paste (perhaps with some minor changes) of an idea from one situation into another. Here, we can also begin to see a comparison of how mapping and cartography can be discursively distinguished. For Foucault, the impetus or desire to order and control - from the taxonomies created out of grammar and science (Foucault, 2002b), to the biopolitical spaces created by planning (Foucault, 1984a; 2003a) or spaces of incarceration (Foucault, 1995) - is as important as the way in which that control becomes affected through language, signs or material forms (Foucault, 2001b; 2001d; 2002a). This is the function of the discursive formation as Foucault sees it, in its materialisation as situated discursive statements, and then in the *dispositif* of technologies, institutions and spaces. The materialisation of Enlightenment cartographic discourses sees the *dispositif* manifest rationality (as cartographic reason) into and through landscapes via Cartesian geometry in charting, planning, surveying and GIS, and Leibnizian models in circulation, topology and digital technologies.

Mapping does extend into other kinds of world-making activities, including: embodied mapping (Sparke, 1998b; Perkins, 2009), emotional mapping (Nold, 2009), affective mapping (Flatley, 2009) and some forms of cognitive mapping (Kitchin and Freundschuh, 2000). Yet, a focus on discourse becomes increasingly important, as cartographic reason, an explicitly *Western* reason (Farinelli, 1998), is drawn from particular interpretations of mathematics and the reasoning which saw these epistemological structures materialised through the alteration of landscapes (Carter, 1988; Braun, 2000), the construction of the urban form (Dühr, 2006), the formalisation of perspective and gaze (Cosgrove, 2003) and the coordination of the body (de Certeau, 1984). Certainly, aspects of the imagination, affect, and corporeality may be cartographic in their predilection towards the scientific method and order. What is crucial is when cartographic reason stands at odds with other kinds of knowing and mapping spatiality, particularly in global and post/colonial contexts, in which particular ideas - choropleths, clines, calculations, coordinates, codes - increasingly seek to define the cultural plane of identity, subjectivity,

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<sup>2</sup> It is, however, important to note that Crampton (2010; see also, Gregory, 1994; Braun, 2000) makes it clear that the word cartography came into popular use as a terminology in the nineteenth century and has been retrospectively applied to describe certain geo-graphic practices including geometrically-informed mapping, as has been done here.

experience (Crampton, 2009b) and the everyday. The distinction between mapping and cartography can be seen in the privileging of cartographic techniques and technologies, establishing often unequal power-relations (cf. Crampton, 2001) against the validity of, for instance, sea-charts in the Marshall Islands (Davenport, 1960), songlines in Australia (Perkins and Cole, 2008; James, 2013), Ameridian maps in North America (Belyea, 1992; 1996), Afro-Caribbean dance (Noxolo, 2016) or fit-for-purpose mappings of underground dwellings (Pérez, 2013).

The point of friction between ways of knowing gives further reason for analysing cartographic reason at the level of discourse, an argument that I will explore in greater detail in the next chapter. It is important to note, however, that Foucault was particularly interested in the limits of human order, and what might exist outside:

‘Order is never fixed or universal and never exists beyond certain limitations of culture, time and space.’ (O’Farrell, 2005: 56)

There is a detachment between the conditions of possibility set by discursive formations (and the will to order of the *dispositif*), and the emergence of discourse, *in situ*. The space of local knowledges (Foucault, 2003c) is a chaotic, messy and contradictory space that sets up multiple epistemes against each other (Turnbull, 2000). It is not a *tabula rasa* or a blank table that contains no trace of conflict accumulated over time, entirely open to discursive inscription (Foucault, 2002b). Thus, the will to order - of the cartographical and the colonial - stands at odds with the (im)possibility of total order and universality.

### *Cartographic(al) reason*

The world of post-representational mapping sees in the map a semi-coherent, emergent object which is deeply relational (Latour, 1986), metaphoric (Mitchell, 2008), discursive (Pickles, 2000), propositional (Harley, 1992; Edney, 1997; Wood and Fels, 2008), political (Crampton, 2008; 2009a), post/colonial (Sparke, 1998a; Belyea, 1996), hybrid (Del Casino and Hanna, 2005), performative (Perkins, 2006; 2009), calculative (Crampton, 2011), and always ‘in-becoming’ (Ingold, 2000). In order to understand the way in which contemporary cartographic systems of control and surveillance occur (and by association, the possibilities for resistance and democratisation), Crampton (2011) argues that a critical understanding of the relationship between technology and rationality is required. Rationality operates at a

discursive level - in the calculatory and classificatory systems of cartographic thinking. At a discursive level, I suggest that *cartographic reason* offers the possibility for a critical understanding, that is not only embedded in the relationship between rationality and technology, but also rationality and space, bodies, materiality, matter and the order of things.

Farinelli (1998) traces the roots of western cartographic reason in Anaximander's pinax (the first map), and the amalgam of representation and materiality in his astronomical model:

'...it would mean *logos* [sign] and *table* [pinax] are the same thing, and therefore that Western thought (reason) is nothing else than the protocol of geographical representation, that is of the cartographical image.' (Farinelli, 1998: 34)

In this interpretation, the astronomical model of Anaximander (the pinax) is both signification (*logos*) and structure (*table*), whereby the material form of the model sets certain fixities and relations - the conditions of possibility - by virtue of its form. On an experiential level, Olsson (1998) approaches cartographical reason as a shared mode of understanding, part of the process of unearthing the 'taken-for-granted', the *a priori*, and the ways in which geometry has *formalised* the 'intuition of the tactile' (Olsson, 1998: 148). For Olsson, analyses of cartographic reason lie in the Saussurean principles of signification, the drawing of lines in order to bind, the casting of grids across the world in order to make equivocations and to unify (Olsson, 2007). Thus, we can see in cartographic reason the stabilisation of the relationship between material and abstract phenomena in which the conditions of possibility are set either by the rules of signs (the laws of signs, geometry, mathematics), or by the rules of structure (the structure of the table, the laws of the model).

Within Anaximander's pinax, arguably, the conditions of possibility for the Age of Reason were set in the move away from the descriptive qualities of empiricism towards the prescriptive qualities of reasoning (Elden, 2013a; Foucault, 2014). Farinelli (1998) argues that our ability to reason - even in everyday mobile mapping - is predicated upon the 'protocol of cartographic reason'; a focus on materialisation, where language becomes subjugated to systems that emphasise the taken for granted 'internal nature of the geometric order' (Farinelli, 1998: 136). Thus, it is fundamental to the outward projections of geometric space in the Age of Reason (Cosgrove, 2008). Rather than language being the system that produces the map,

the map (in Anaximander's pinax) and production of transcendental geometrical relations inscribed in image-form, produces language:

'...this would imply that our rationality is determined from a cartographical point of view, that is, already contained and produced by the cartographic image. Western reason is nothing but cartographical reason, its relentless unwinding and development.' (Farinelli, 1998: 134)

For Pickles (2004), however, the unwinding of cartographic reason is not just a question of the drawing and reading of a line, but the over-coding of spaces, bodies and practices through a discursive continuity of cartographic reason:

'...the very structure of cartographic reason that - far from inscribing a single determinate line - draws and redraws our world, erases and inscribes again, decodes and recodes, in a ceaseless and complex array of forms of deterritorialization and reterritorialization producing the multiple and shifting identities (or assemblages) we take as ourselves.' (Pickles, 2004: 23)

Living within the folds of cartographic reason is not just a question of materialisation. It is also a question of how cartographic reason territorialises and deterritorialises space by formalising the cartographic gaze, coding identities and rationalising the geo-body. Pickles (2004) argues that this process continues on in GIS, and through 'techno-spaces' and cyber-empires established by the new imperialism of digital mapping and the phantasmagoria of digital media. This transition has been an ongoing process of transformation, translation and absorption, where shifting dispositifs adapt new technologies to the rules of formation and the ordering logic of cartographic reason. Such a shift results in an array of cartographic techniques including charting, surveying, planning, and (increasingly) geo-coding.

### **The age of (cartographic) reason: mathematical space and rationalism**

The discursive-materialisations of cartographic reason since the seventeenth century are characterised by a specific group of Enlightenment philosophies that formalise the tactile and the material in particular ways. Given the broad-ranging definition of cartographic reason described above, I argue that an analysis of cartographic reason in mobile mapping *must* move beyond form-based separations of digital and

analogue technologies. It must also move past abstract and material knowledges, by finding common ground in what Foucault (2002b) terms 'the Age of Reason'. This term denotes the development of stable, universal world models based upon systems of reason, which Farinelli (1992; 2009) argues are distinctly cartographic. Like any discursive formation, cartographic reason has transformed significantly since Anaximander's pinax.

This section explores how the networked, spherical and relational form of digital space has been implicit in cartographic reason since the Enlightenment. This can be found in the interrelations between Cartesian and Leibnizian philosophy and the twin desire for stable, flexible, systems that occupied ordered, pure spaces (Farinelli, 2009). Here, cartographic reason becomes implicit in the shift towards modernity, which Serres (1989) characterises by the development technologies of scientific knowledge from Enlightenment, or Age of Reason (Foucault, 2002b) - the use of telescopes and charts, plans and maps to intercept and mediate between the empirical and the process of reasoning, and vice-versa (Serres, 1989). This includes the deployment of Cartesian algebraic and coordinate geometries into extension *ad infinitum* through planning, surveying, charting and increasingly, geo-code (Pickles, 2004). It also includes the regulation and shaping of Leibnizian elasticities in binary systems, curvatures and vectors and the infinity which exists within a bounded space (cf. Deleuze, 1992a; Gerlach, 2014). As both Cartesian and Leibnizian spatiality have been materialised and formalised through the cartographic dispositif prior to digital technologies, this establishes an unprecedented discursive interoperability with 'pre-digital' spaces. I argue that the development of digital and mobile maps sees a transformation, but not a discontinuity, in the fraternity between these two rationalist philosophies. This is particularly evident in the spatial irruption of power-knowledge politics, as the expansionist and universalist philosophies of cartographic reason continue to heavily influence the emergence of everyday mapping.

Bollnow (1952) identified two clusters of spatial philosophy - that of mathematical and of experienced space - which underscore the different ways in which space might be produced. I argue that Cartesian and Leibnizian geometries may be collated under the single banner of cartographic reason through the concept of mathematical space (Bollnow, 2011). Here, the braiding of Leibnizian and Cartesian systems enables the materialisation of cartographic reason into post/colonial spaces through impulses to calculate, conquer and control, developed via a cartographic imagination that saw 'undeveloped' landscapes as empty and homogenous. By doing so, cartographic reason can be considered as central to the development of a specifically

mathematical and particularly *modern* spatiality that is at once fixed and fluid, enduring and fleeting.

### *Mathematical space*

Bollnow (2011) makes a useful heuristic distinction between two interpretations of spatiality in philosophical literature: *mathematical space* and *experienced space*. Bollnow's writings attempted to reconcile significant thinking on space, dwelling and memory by writers like Bachelard (1994), with mathematical interpretations of space by philosophers such as Descartes (1982). Such mathematical interpretations consider Euclidean<sup>3</sup> space as geometric (Carter, 2009), Cartesian space between mind, body and God (Descartes, 1982) and Leibnizian space as co-existence (Leibniz *et al.*, 2007). There is little room in this discussion for the massive undertaking of tracing the philosophy of space, nor is there sufficient reason to do so: a history of spaces has already been written many times in relation to poetics (Bachelard, 1994), place (Casey, 1998), geo-coding (Pickles, 2004), cartographic reason (Olsson, 2007), modernity (Berman, 2010) and geography (Crang and Thrift, 2000).

According to Bollnow (2011), 'the decisive quality of mathematical space is its homogeneity' (Bollnow, 2011: 18). Mathematical space exists on the level of universal systems of operability and pragmatism, comparable to the equality of all coordinates on the number plane or the equality of all binary digits (if they existed without social meaning, purely outside of experienced space). Mathematical space has no subjective inclination towards specific points, like that of the home for Bachelard (1994) or the social predisposition towards the north for Black (1997). Kinds of mathematical space include linear space, topological space, metric space, projective space, measurable space and non-commutative space (see Table 2.1).

Both Cartesian and Leibnizian space are mathematical in their classical, abstracted and rational structure. As shown in the table above, mathematical space is a geometric space, abstracted, where all points have theoretically equal weighting because they exist without context or meaning. In mobile mapping, examples of *mathematical space* may include the infinity of the coordinate plane or the relationality of the binary system: the kind of geometric space described by Farinelli

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<sup>3</sup> Although Elden (2005) argues the term Euclidean space was conceived retrospectively to distinguish abstract spatiality from 'experienced' space, this term has been used in a widespread manner to denote this particular view of spatiality. Therefore, whilst I acknowledge its relatively recent emergence, I continue to deploy the term for this purpose.

(1998) when he states that modern space is determined from a cartographic point of view.

**Table 2.1.** Mathematical and experienced space according to Bollnow.

Mathematical Space	Experienced Space
Geometric	Remembered
Cartographic	Dreamed
Anchor points are equal	Anchor points are personal
Uniform	Contradictory
Classical	Domesticity
Rational	Home
Abstract	Euphoric
Drawn or Imagined	Emotional
System	Myth

Experienced space, however, is the realm of domestic or personal lives. It is something that is lived and remembered, housed *in situ* where meanings may not be read on the mathematical plane of points, but are still produced and persist nonetheless through dwelling. Mobile mapping is not just about how cartographic reason has produced (mathematical) spatial relations through cartographic, colonial and digital technologies. It is also about the complexities and multiplicities of lived experiences formed through spatial practices. Experienced space foregrounds the work of authors such as Massey (2005) in insisting that space is always open and full of possibility, and Thrift (2008) in describing affect and embodiment beyond cognition. It also speaks to Gordon's (2008) account of presence and persistence in the form of social and spatial hauntings, corporeality (Grosz, 1994), matter (Barad, 2003) and sensation (Massumi, 2002); all of which have culminated in the 'new-materialist turn' (Dolphijn and van der Tuin, 2012).

Mobile mapping is enacted in both of these kinds of space, as the digital systems of the internet and geometries of the dispositif emerge in everyday encounters. Yet, as Bollnow (2011) argues, space is bound deeply to emergent situations, and the juxtaposition between mathematical space and experienced space is suggestive rather than deterministic. As this thesis contends, the slippages between spaces, technologies and people are far more complex and muddled than can be expressed by any universal model of space, experience and representation.

At the same time, the distinction between mathematical and experienced space is useful on several fronts. Firstly, it acknowledges that representations and

experiences are coforming in spatial encounters, and that spatiality can be organised in ways that are inclusive rather than exclusive. This means that where Massey (2005), for instance, juxtaposes *space as opening* against *representation as fixing*, or where Elden (2007; 2013a) argues that space in the Cartesian sense does not exist but is a necessarily Westphalian construct, we can say that both those claims are possible, simultaneously, without need for resolution. This encourages a complex understanding of spatiality between geometry and living. In mobile mapping, complexity erupts between cartographic reason, or what Bollnow (2011: 98) terms 'altered space' (or planned space), and kinds of affective and open spaces described by Massumi (2002) and Massey (2005). It also allows a practice of spatial ordering which may be able to sit side-by-side with everyday practices of moving, mapping and navigating. This research is interested in situating space in the present towards what Foucault (1984a: 22) calls 'simultaneity' and 'juxtaposition', what Said (2004:153) views as an 'infinity of traces', or Massey (2005: 13) considers 'coevalness' - distanced (but not removed from) Eurocentric models of space which focus on classical geometry and universal systems (cf. Farinelli, 2009). This, of course, strikes at the limits of representation itself between mathematical and experienced space (Farinelli *et al.*, 1994), for as Olsson (1991a) suggests, what else is the practice of delimitation, but the drawing and the reading of a line?

#### *Fixities and fluidities: the order of mathematical space*

Central to the development of cartographic reason is the transformation of the cartographic image in the Age of Reason (and the philosophies of Descartes and Leibniz) during the seventeenth century (Foucault, 2002b). Foucault (2002b) identifies four modes of order in the European classical period: representation, speaking, classification, and exchange. This, he argues, leads a transition from empiricism to rationalism and later, to the reification of language through history (Foucault, 2002b), science (Foucault, 2001f), interpretation (Foucault, 2001e), grammar (Foucault, 2002b) and the positioning of people in the centre of their own universe. These changes shift cartographic reason from an empirical observational model, towards an expansionist, transcendental and universal philosophical system that renders the natural world fixed, inert and stable:

'the material substance of physical structures is essentially inert; a body cannot operate where it is not; objects and

physical processes cannot think or reason; God has combined natural objects in stable systems.<sup>4</sup> (Farinelli, 2009: 113)

For both Descartes and Leibniz, the limit of infinity - either inwards or outwards - was God, who had created the world according to stable systems that could be realised through the purity of mathematics. The ordered stabilisation of space - either by God, or through mathematics – sees cartographic reason determine the landscape as ordered, inert and without agency. Yet, the Cartesian and Leibnizian view of space was more relative than the absolutist idea of space as a ‘container’ in the mode of Newton, Kant and Berkeley (Lévy, 2008: np) (see Table 2.2).

**Table 2.2** *Four categories of rational space: Newton, Berkeley, Descartes and Leibniz.* Of particular interest is the grouping together of Cartesian and Leibnizian spatiality under a position-oriented, or relation-oriented relativism. (Source: Adapted from Jacques Lévy (2012))

	Position-oriented	Relation-oriented
Absolute	<p><b>Newton</b></p> <p>‘Classical geography’, traditional geopolitics</p>	<p><b>Berkeley</b></p> <p>Sensualism, structural anthropology</p>
Relative	<p><b>Descartes</b></p> <p>‘Spatial analysis’, ‘Cognitive sciences’</p>	<p><b>Leibniz</b></p> <p>Social Sciences of Space</p>

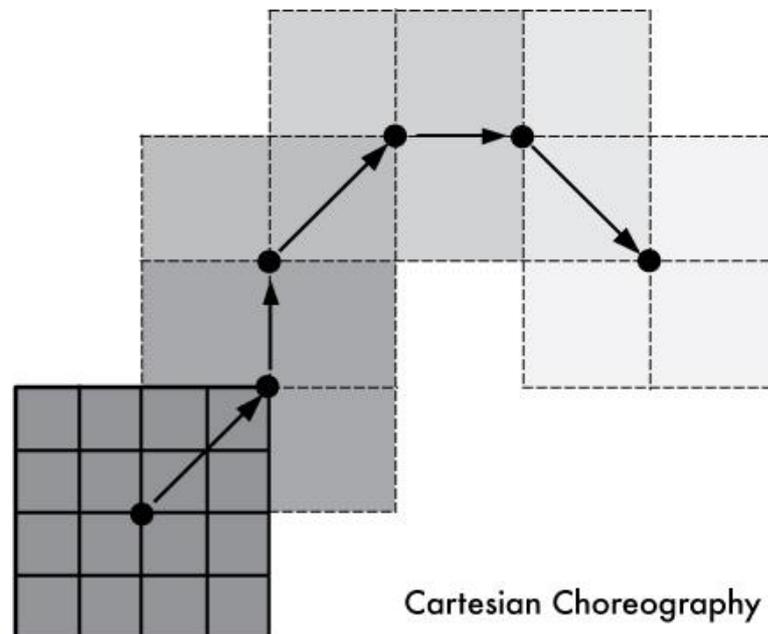
The philosophical works of Descartes and Leibniz see a transformation of cartographic reason: a remodelling of space from an absolute to a relative extension; a rethinking of the line from series of points to a series of coordinates; the development of the idea of universal basic matter; and the illusory representation of the Baroque image. These changes are also foundational to understanding the contemporary structure of digital mobile cartography as a geocoded, position-oriented and illusory medium, which carries on the principles of spatial order and spatial rationalism established during this period.

In 1644, Descartes described what he considered to be a dualism between the material, physical world (*res extensa*) and the abstract, immaterial space of the mind (*res cogitans*) (Elden, 2005). The *res extensa* is a constant mode of extension, understood as a grid spreading outwards from the body, which, as the body crosses it, continues to be laid out *ad infinitum* (Figure 2.1). It is also both universal, where

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<sup>4</sup> Translated by author

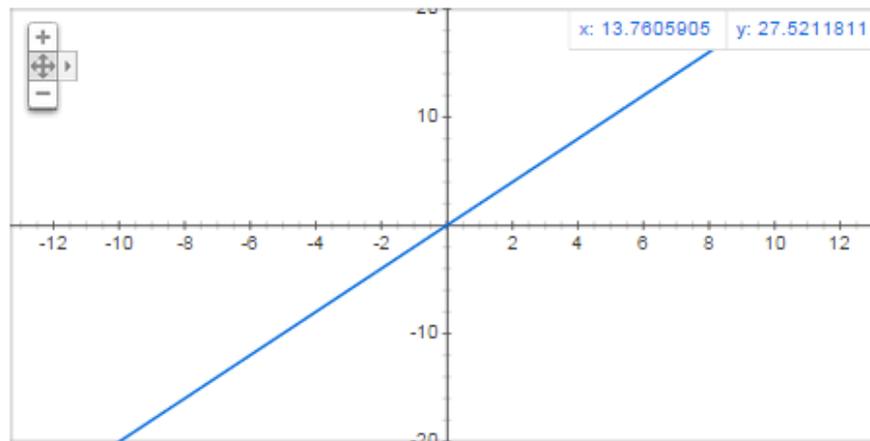
infinity, or God, lies at the edges of a limitless grid, and ego-centric, with the subject positioned firmly at the centre (Andrews, 2002).



**Figure 2.1** *Cartesian Choreography*. The extension of gridded space as the body moves towards the edge of the limit of the grid. As the coordinate system can be established spherically on the world, this mode of extension can continue infinitely, doubling-back upon itself, and redrawing the grid. (Source: Author)

It was the development of coordinate geometry that saw Descartes' system of extension, the grid, become numerical, and thus space, including the order of space itself, became constituted through mathematics (Elden, 2005). Prior to the Enlightenment, the mathematical concepts of geometry and arithmetic were quite separate (Livingstone, 1992). Geometry was the realm of lines, angles and dimensionality (Olsson, 1991b; Philo, 1994) and arithmetic, a site of sequences, one after the other (Bergson, 2001). Here, along the gridded number plane, Descartes reconfigured the line from a continuum of points (what Casey (1993) calls a *locus*), into a series of numbers; an equation (Figure 2.2) which can be transformed, calculated and integrated. Each point of intersection between two lines can be given a coordinate location -  $(x, y)$  - in the earliest instance of modern coordinate systems that exist contemporarily in geo-code.

## Graph for $2 \cdot x$



**Figure 2.2**  $y = 2x$  Google graph showing the linear solution to the equation  $y = 2x$  to 7 decimal points derived from search terms. (Source: Google Search Engine)

In this, we can see how space itself can appear on a coordinate number plane, a universal model across which distances can be measured. Geometry becomes arithmetical, and arithmetic becomes geometrical, and the coordinate grid enabled the solving of problems using unknown quantities along a numbered plane across which the body moved (Elden, 2005). The line - or, the successive space of movement - becomes at once a unit and continuum, which can then be transformed by a series of equations or functions to make the line transform and curve.

Where Descartes links number and geometry to reflect the stable external system of the world, Leibniz dismisses the Cartesian dualism, and brings the notion of space and mind to the stability of matter (Elden, 2013b). Leibniz argues that while space and matter may not be equivocal, they are inseparable: 'there is no space where there is no matter' (Leibniz, 1989: 708). The cartographic technologies of the Leibnizian do not fix on the distinction between mentality and physicality, but rather on their co-constitution, their simultaneous existence under a single ordering principle. In the correspondences between Samuel Clarke and himself, Leibniz states:

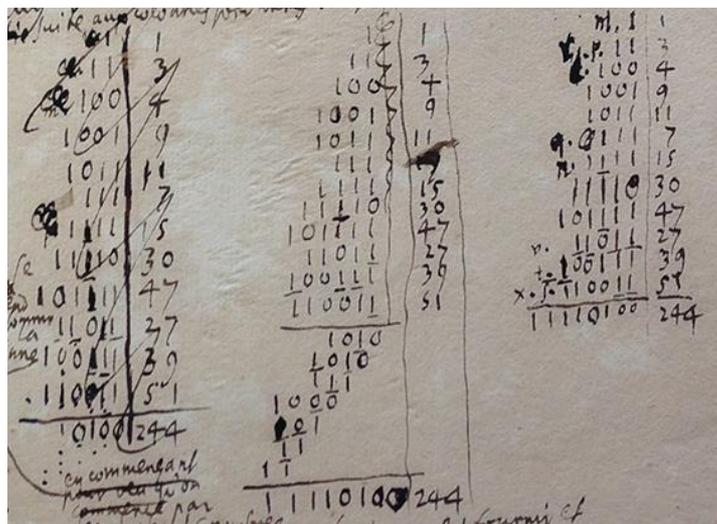
'for my part, I have said several times that I hold space to be something merely relative, as time is, taking space to be an order of coexistences, as time is an order of successions. For space indicates an order of things<sup>5</sup> existing at the same time,

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<sup>5</sup> Leibniz uses the phrase 'en termes de possibilité'. Bennett (Leibniz *et al.*, 2007) has translated this as 'an order of things' but it can also be 'terms of possibility', or "conditions of possibility".

considered just as existing together, without bringing in any details about what they are like. When we see a number of things together, one becomes aware of this order among them.’ (Leibniz in Leibniz *et al.*, 2007: 9)

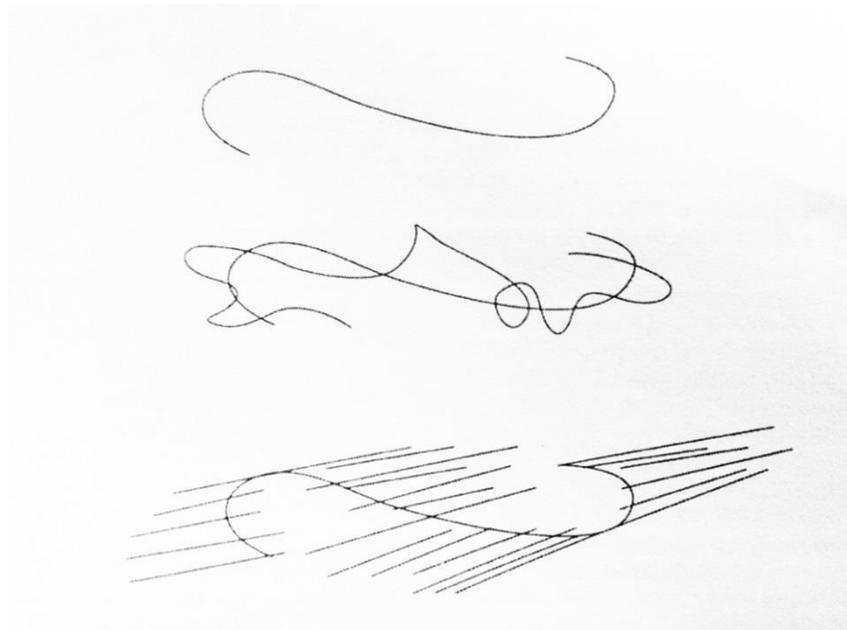
For Leibniz, the principle of substitution is that words which are the same can refer to phenomena which are the same:  $a = b$ , in any context (de Risi, 2007; Rescher, 2013). This means that while space can be ‘an order of things existing at the same time’ (Leibniz, 2007: 9), it remains *an order*, a system which is stable, predictable and therefore, classifiable and calculable: a *mathesis universalis* (Batchelor, 2004). Furthermore, rather than a universal geometry like Descartes, Leibniz sought a universal characteristic that was irreducible, an ordering phenomenon that could be found co-existing across all systems (Leibniz and Loptson, 2012). Such a characteristic could be combined and recombined in order to build the structures that we consider to be the world. Leibniz’s God (Baudrillard, 1993) was to be found at the limit of the smallest (not the largest) infinity, within this irreducible force, which he called the *monad*, and its representation, which he called the *characteristica universalis*. This led to the development of a proto-enigma calculating machine, which used a base 2 (0/1) counting system as its universal characteristic (Rescher, 2013), the same system from which much of contemporary computing runs (Figure 2.3).



**Figure 2.3 Binary Calculations.** Leibniz’s early sketches with binary code. (Source: Gottfried Wilhelm Leibniz Bibliothek)

Leibniz was an avid builder of models that experimented with topology, calculation and the basis of the universal characteristic (Serres, 2014). His models are often

posited as antithetical to Cartesian order (cf. Deleuze, 1992a; Farinelli, 2009; Serres, 2014), a descent away from the grid into the smallest atom of the monad, the development of the binary code system, and the fluid, malleable realm of the Baroque. Deleuze states that '[t]he definition of Baroque mathematics is born with Leibniz' (Deleuze, 1992a: 17). In contrast to the straight lines of the Cartesian grid, the mathematical space of Leibniz is that of folds. Deleuze (1992a) notes that, for Leibniz, all straight lines have curves intertwined. There is no precise surface or point in the Leibnizian space: 'Inflection is the authentic atom, the elastic point' (Deleuze, 1992a: 14). Inflections do not have coordinates, or verticalities, egocentric directionalities, or progressive qualities. Inflection is the *event* of geometry, in transformative movement (Figure 2.4): it is ideal and it is virtual (Deleuze, 1992a).



**Figure 2.4** *Inflection*. This image by Deleuze expresses three virtual transformations of inflection. The first (top) has a tangential plane of reflection, operated by symmetry. The second (middle) is a 'morphology of living matter' (16), which he takes from René Thom (the fold, the crease, the dovetail, the butterfly, the hyperbolic, elliptical, and parabolic umbilicus). Finally, the third (bottom) is a point of homothesis. (Source: Deleuze, 1992a)

The influence of Leibnizian philosophy becomes increasingly evident as mobile devices reshape space and time within urban environments, and as mobility between global and local becomes more compressed (Hjorth *et al.*, 2012). The Baroque saw the production of a geometric perspectivism - a trickster (Turnbull,

2000) - that did not offer the certitude of the Cartesian grid, but instead hid its structures under folds, billows, pleats and illusions:

‘It is the privileged age of *trompe-l’oeil* painting, of the comic illusion, of the play that duplicates itself by representing another play, of the *qui pro quo*, of dreams and visions; it is the age of the deceiving senses.’ (Foucault, 2002b: 57).

Such illusions sneak dimensionality into flatness (in the case of the *trompe-l’oeil*), creating systems of self-referentiality, using their own internal rules to produce transformative geometries that overcome space (Latour, 1987). Even within static representations, the bounds of geometry may become contradictory, in Escher-like lines and the folding-in of space and times. Binary code also operates in such a way, an on-going symbolic exchange that orders the world under two digits (Baudrillard, 1993). Furthermore, the immense striation of levels of representation within digital, networked systems (and in particular, cartographic systems) continues to hold the spirit of the *trompe-l’oeil*. The *mathesis universalis* of the Leibnizian universal characteristic results therefore in an illusion of dimensionality, against the force of homogeneity, in which ‘Leibniz, eternally running after the untotalizable sum of ichnographies succeeded in closing his system with Universal Harmony’ (Serres, 2008: 48).

Therefore, while the Cartesian workers of the technological dispositif fix a firm zero-point, the Leibnizian workers equally fix it on the subject, the viewer, the every-point (Bollnow, 2011). The senses are deceived, as new points emerge and disappear (Serres, 2008). As Conley (1992a), in the forward to Deleuze’s *The Fold*, states:

‘A similar politics emerges from comparison of Descartes’s and Leibniz’s views on extension. For the former, the material world can be mapped out from the axis of the thinking subject, in rectilinear fashion, and can be divided into discrete units.... For the latter, neither the self nor the world can work so schematically. Everywhere the subject swirls in the midst of forces they exert [sic] stress that defines the individual body, its elasticity, and its bending motions in volumes that produce movement in and of extension.’ (Conley, 1992: xvii)

In the Baroque, the illusion and universality come together in reason through the work of Descartes and Leibniz, with a long-lasting consequence for a contemporary cartographic analysis. Counterpoising Cartesian and Leibnizian spaces has

produced a particular dichotomy - where the representational qualities of cartographic reason are considered to 'fix' fluidity and flows:

'To the degree we are oriented to the material landscape and its social organization, and conditioned by the visual and cartographic, our theories and representations of urban life often can't help but fix space and time.... But all the objects of urban and geographic inquiry, mapping, and theorization are but immanences temporarily embodying the dynamic flows or relations.' (Prytherch and Cidell, 2015: 20)

I argue, however, that the foundation of cartographic reason is not based on the dichotomisation of fixity and fluidity, but rather on the rationalisation of both fixities and fluidities through cartographic reason, or what Pickles calls 'the technologies of the social body' (Pickles, 2004: 124). The stabilisation and *regulation* of relationality is entirely in keeping with the logics of cartographic reason - albeit along a fraternal trajectory of Leibnizian philosophy.

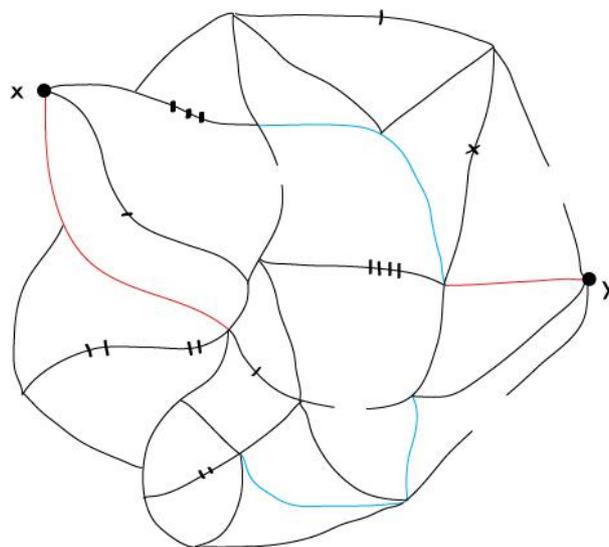
#### *Hermes, the exchanger and translator*

Serres argues that 'the beginnings of politics' (Serres, 1982b: 44) arrives in the shift from the perfect ordered systems of Leibniz and Descartes to the networked, ambivalent system of *Hermes*. This system, claims Serres, is comprised of 'stations and paths', '[p]oints and lines', 'beings and relations' (Serres, 1982b: 10), less interested in universal order than universal translatability:

'The second system is that of Hermes. He is a polytheist, is multi-centered, a chain of hourglasses, a network of such chains. The angels that pass, be they gods or demons, occupy the crossroads: knots of exchange, changes, cuts, bifurcations of decision, spindles, bundles, where the many come in one single hand. The beginnings of politics....The system of Leibniz is a limit of this system.' (Serres, 1982b: 44)

Beyond the binaries and even beyond the hybrid, the system of Hermes encompasses the Cartesian and the Leibnizian, the fixed and the fluid, the location

and the relation. Hermes transcends conversations about the benefits and detriments of digital technologies on socio-cultural and spatial processes, specifically in terms of cartographic reason (Serres and Latour, 1995). The network of Hermes is not fixated on form, but flow, or 'the formation and distribution of the lines, paths, and stations, their borders, edges, and forms' (Serres, 1982b: 11). Hermes is the communicator who gives angels messages to carry between stations. Such messages metamorphose through this network, encountering parasites that alter, add to or detract from them. Foucault (1995; 2003b) and Deleuze and Guattari (1987) describe two types of power: as confining (*potestas*) or empowering (*potentia*); or in Serres' (Serres, 1982b: 44) more literary terms, *gods* and *demons*. The system of Hermes is a system of translation and exchange, allowing angels – both god and demons - to work relationally between fixities, bringing together the various threads of what can be argued is the contemporary iteration of cartographic reason (Figure 2.5). As digital systems produce territories, the expression of power shifts as communications are co-opted by other systems of knowledge/power (such as capital), or what Serres (Serres, 1982b: 52) calls 'the parasites'.



Hermes

**Figure 2.5** *The network of Hermes.* Visualisation showing the bifurcations, parasites, obstacles, paths of angels (blue) and demons (red) between two points - x and y. (Source: Author)

Serres recognises a productive transformation between the system of Leibniz and the system of Hermes - between the clean rationalism of Enlightenment desire and the messy politics of a globalised world - the transformation in which this research

takes hold. Yet still, from the moment an anticipatory cartography is projected onto post/colonial landscapes, the birth of politics arises through the parasites in ways which still emerge and transform contrapuntally in contemporary mobile mapping, messy in their acquisitions but have yet to be examined and assessed.

### ***Formalising cartographic reason: materiality, rationalism and the post/colonial city***

For Pickles (2004), the production of images through digital technologies illustrates how geocoding, in tandem with cartographic reason, becomes central to the geographical imaginations that produce spatial identities through social inscription:

‘... while Farinelli sees these as determinate of certain forms of rationality, I want to investigate in what ways this cartographic imaginary proliferates spaces and the ways in which we can live in them.’ (Pickles, 2004: 23)

Thus, as the cartographical image is applied to mathematical principles to solve more general problems of nature, society and culture ( $a = a$ ,  $a \neq b$ ), during the Enlightenment, cartographic reason shifted from a reflective empirical description to become an ordering tool that transforms and stabilises nature according to the map, the territory and the state. This transformation foregrounds the continued abstraction of knowledge from materiality, the perception that the world - matter - is inherently ordered through stable systems which can be harnessed through representation and classification, and transformed into units of exchange (Kornwolf and Kornwolf, 2002).

The impulse to produce choreographies of flows through fixities of form - the disassembling and reassembling of circulations - is central to the realisation of what Gregory (1994: 70) terms a ‘cartographic anxiety’ in the stability of Cartesian forms of rationalisation. Such realisation was important in the culmination of the system of Hermes. Farinelli (2009: 120) measures the neo-Classical, Cartesian structures of ‘the map, the territory and the state’ in the sixteenth century against ‘the globe, the network and the myth’ in worldwide (globalised) digital communication. He argues that Cartesian, Ptolemaic and other modern structures of space fixated on a firm centre the basis of cartographic reason (Farinelli, 2009). Yet, as I have argued, even where the systems of fixity and flow themselves may differ - from universal structures to universal characteristics - they share a founding discursive interoperability in the desire for stability in order and reason. These stable systems, in the case of Leibnizian globes, networks and myths, are what Farinelli calls a ‘topological reason’

(2009: 152). At the same time, topology is implicit in the mathematical scaling and modelling of space, based, like the coordinate system, between shape and number. The Cartesian technologies of the grid become interoperable through Leibnizian desires for universality: to find a common basis for all phenomena:

‘Imperialism is not “the art of transforming spheres into flat surfaces” (Sloterdijk, 1999: 909-911), of flattening the world, but rather *of translating an infinite series of maps that are incompatible into a single terrestrial sphere* (Galison, 2003: 77-152), according to the single major project of late modernity.<sup>6</sup> (Farinelli, 2009: 152, author’s emphasis)

The major project of late modernity that sought to conquer according to universal systems, whereby disobedient landscapes were wrenched, altered and reformed into unitary cartographic systems, can be traced as far back as these early Baroque ideas and the period of the Enlightenment (Harvey, 1989a). On a discursive level, the *universal* in the Leibnizian *characteristica universalis*, together with its topological and inflective elasticities, can be considered a central part of cartographic reason. Furthermore, it is embedded in the functioning imperial ideologies of modernity that cohere and homogenise space into a single order. Here, I consider the formalisation of cartographic reason through the conceptual development of the ‘ordered’ social landscape, residing in a state between fixity of flow. I discuss how the cartographic technologies of illusory grids, choreographed flows and space-as-numbers, became materialised from an abstracted mathematical space into the experienced space of the post/colonial city.

The previous section provided a point of encounter during the Enlightenment between two major contemporary phenomena emergent in digital cartographic technologies and mobile mapping more generally: the Cartesian coordinate system and the Leibnizian binary system. Table 2.3 (below) presents a sketch of the transformations of cartographic reason, which have accumulated into the empirical research in this thesis, and underscores fundamental questions of regularity, continuity and discontinuity of cartographic reason housed within the research framework. In doing so, this table gives an impression of the various transformations of cartographic reason since the Age of Reason, drawing from Foucault’s description of discursive formations (Foucault, 2002a; Foucault, 2002b) and Deleuze’s supplementary reading (Deleuze, 1988).

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<sup>6</sup> Translated by author

**Table 2.3** *Cartographic reason since the seventeenth century.*

<b>Episteme</b>	Medieval Period (c. 600-1660)	Age of Reason (1660-1775)	Age of History (1775-1825)	Age of Language (1825-unspecified)	'something new is about to begin, something that we glimpse only as a thin line of light low on the horizon' (Foucault: 2002b: p. 384)
<b>Conditions of Possibility</b>	Classical Era	Renaissance	Enlightenment	Modernity	Post-modernity
<b>Discourse</b>	<b>Cartographic Reason</b>				
<b>Dispositif</b>	Military Imperialism/ Exploration	Colonial Empires	Industrial Capitalism	Globalisation	Hermes (Serres)
<b>Assemblage</b>	Terrain	Territory	Grids	Networks	Discursive-Materiality (Barad)
<b>Statements</b>	Lines and Curves (Euclid)	Coordinate Geometry (Descartes)	Navigational Charts	Binary Languages (Leibniz)	The monadic digital
<b>Objets</b>	Cartographic Gaze (Charting)	Cartographic Taxonomy (Surveying)	Cartographic Materialism (Planning)	Cartographic Information (GIS)	Cartographic Tracking (GPS)
<b>Enunciation</b>	Pinax (Farinelli)	Cartographic Impulse (Said)	Cartographic Anxiety (Gregory)	Cartographic classification and calculation (Crampton)	Algorithmic computation

At the top, the table describes the epistemic periods described by Foucault (2002b). This is followed by the conditions of possibility, the groundwork which sets the limits and rules for the establishment of durable epistemes that are characterised by trends in thinking: reasoning, historicising, interpreting, and so on. It then shows (from top to bottom) the transformation of the cartographic *dispositif*, the constellations of the cartographic assemblage (or what Foucault terms 'mechanisms'), kinds of statements typical of this period, practices (or *objets*<sup>7</sup>), and modes of enunciating statements. As power/knowledge relations shift, the *dispositif* becomes rearranged. The appearance of cartographic reason in assemblages moves from pens to pixels, and the objects of cartographic reason transform both in form and function.

Because of its equivocation of sign and structure, I suggest that cartographic reason supersedes the epistemic distinctions between language, reason and history described by Foucault. Instead, I argue that cartographic reason becomes malleable, transformed to emphasise different discursive potentials of its formation. At the same time, despite the fixity of the table, the categories between *dispositifs*, assemblages, statements and objects are not totalising, the transformations across history are not linear, nor are the lines between periods or levels absolute. As Foucault outlines on numerous occasions (Foucault, 2002b; 2001f), there is no clear boundary between stages of transformation of discourses. Indeed, discursive formations frequently shift simultaneously in different ways, or in the same way in different spaces and times, or operate across multiple levels at once. Furthermore, some preconditions - for instance, Leibnizian monadology - lie dormant for significant periods before coming into dominance. Edney (1993) has also argued the same for an anti-chronological, non-progressive rethinking of mapping. For this reason, this table is best read as a suggestion rather than a history. Furthermore, I have chosen a dashed line to illuminate the fluidity and ambiguity of these thematic illuminations, whilst underscoring that it is the complexities *not* housed in this table, the space between the lines, the slippages and the absences with which this research is especially concerned.

### *Modern space*

The technology of planning instigates two paradigms of cartographic reason described by Farinelli (2009): dehumanised points of view - or perspectives that

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<sup>7</sup> The use of the French word, *objets*, here is to specifically demarcate Foucault's platonic conceptual object rather than the awkward English reduction of 'object' as a material thing (in which case Foucault uses the word *choses*). See the publisher's notes in Foucault (2002a) and Vandaele (2016) for more information.

cannot be seen with the human eye, either as a top-down planimetric view of an impossibly flat elevation; and the stultification of material space, rationalised into inertness, comprised of stable systems. Like the pinax, these abstracted viewpoints were materialised in early forms of planning and urban design, in the straight lines and grid patterns of Greek cities (Elliot, 1987) or the struggles of Roman surveyors between grids and topography (Dilke, 1987).

However, the Renaissance, argues Söderström (1996: 254), 'constitutes the beginning of a new regime in the history of representation'. This is the result of new dimensions and viewpoints, in particular, the reinvention of the linear perspective and the planimetry seen in Roman-era planning: the stabilisation of representation, 'a radical reconstruction' (Harvey, 1989a: 240) towards an era of modernity. Renaissance Europe is also the point at which Foucault (2002b) identifies the conditions of possibility for the emergence of the Enlightenment, and at which Farinelli (2009) traces the adoption of the vertical, gridded Ptolemaic geography to a horizontal perspective (Harvey, 1989a; see also, della Dora, 2016): the point at which empiricism becomes replaced by rationalism (see Table 2.2).

**Table 2.4** Empiricism and Rationalism

<b>Empiricism</b>	Materiality > Representation
<b>Rationalism</b>	Materiality < Representation

This shift was accompanied by an increased emphasis on the use of maps for the purposes of wealth-acquisition and conquest (Miller, 2003). Furthermore, image and plan started to achieve a centrality in urban design. Urban military fortifications, typical at the end of renaissance, had to be designed in totality before construction (Pollack, 1998). These structures were designed to such a degree that, in Genoa, the triangular defence fortifications still 'formed the definitive cartographic image of the city for more than two centuries, despite the fact that the fortifications could not be efficiently defended' (Pollack, 1998: 121).

The Cartesian model of relative extension formed a basis in the conception of territory in modern Europe. Elden (2005) explains how Leibniz came to theorise a relativistic model of divine governance, where absolute authority only existed internally within territorial realms. As a result, a relative mathematical model of territory became embedded in the political machinations of territoriality in Europe,

where both geometry and cartography became central to the establishment of bureaucratic and administrative control (Elden, 2005; 2013a; Harley, 2001). This was the point where space came into political usage, where boundedness and territory became axiomatic (Elden, 2007), and where mapping became calculative and territorial (Crampton, 2003a; 2011; Crampton and Elden, 2006). For the purpose of politics, if these systems could be harnessed - through cartography, for instance - then the geo-body could be mapped and controlled (Winichakul, 1994).

Within these shifts, it is possible to see the emergence of the Cartesian city (Geyh, 2009). The Cartesian city is characterised by a proliferation of grids. It is also characterised by the imagination of space as plane of numbers; a numeric field *ad infinitum* through which social problems can be mapped and solved. Furthermore, the Cartesian city is an ordered city, drawn in the imagination of an individual surveyor who is able to cohere the urban form to a single vision:

‘The essence of the Cartesian city consists in the geometrical principle which unifies and dominates the totality of the city, and which excludes all forms of contingency.’  
(Sasaki, 2000: 37)

This is the point where cartographic reason becomes contentious, long before digital cartographies and the mobile phone. It was the geometric shift towards the Baroque city that led to universalist urban technologies being transplanted into American and Asian cities (Elliot, 1987), usually in the form of grid or rectilinear patterns that focused as much on flow and networks as on fixity and form (cf. Mumford, 2011). In terms of the cartographic dispositif, during the Baroque period, two styles of cartographic representation emerged: the plan and the view (Akkerman, 2001). This was influenced by the increased power of centralised governments in Europe who needed maps that served militaristic purposes and consolidated their dominance as imperial and colonial powers (Harley, 1988; Sparke, 1998b; Cohen and Szabo, 2008).

The application of numbers to this space, according to the principles of Cartesian coordinate system and Leibnizian topologies, sees the abstraction of contingency and fluidity into fixed pathways (Serres, 1982a). Movement becomes represented as a series of points, a line of flight becomes an equation, a place becomes a set of coordinates, all locations can be abstracted into numbers that remain stable, regardless of the changes that occur on the landscape. Here, territories and state powers become measured according to abstracted criteria on an invisible number plane (Rose-Redwood, 2012a; 2012b), and the bodies which live within them

become disciplined into the rules formed through the materialisation of mathematical space (Pile and Thrift, 1995; Legg, 2005).

During the eighteenth and nineteenth centuries, the evolution of the grid pattern also accompanied a rapid industrialisation and global movement. Jones (2006: 179) comments on Haussmann's design practice that 'legend had it that he arrived at the Gare du Nord in 1848 with a rolled map under his arm containing the future new boulevards sketched out in coloured pencil'. In his memoirs on the expansion of the Paris Map Service during his renovation of Paris, Haussmann, himself, stated that 'geometry and graphic design play a more important role than architecture itself' (Marshall, 2009: 11). The expansion of governmental technologies during this era (Huxley, 2006) also foregrounded the rise of what Hannah (2000) terms the 'mastery' of territory through the use of social statistics. This was coupled with the centralisation of urban knowledge according to Enlightenment values and the production of moral geographies, social conduct and the governmental disciplining of bodies (Legg and Brown, 2013). Thus, social space becomes subjected to what Foucault (1995) terms *quadriller* or 'gridding' of space according to governmental and disciplinary spatial technologies, conceived through geometric reason.

The speed of global growth and movement towards cities saw cartographic technologies used to redesign and restructure spaces by way of encouraging some flows (capital, goods, military) and discouraging others (protest, resistance, crime) (Harvey, 1989b; Edney, 1997). Cartographic reason was central to this process, expanding from Europe as a rationalising force through which viaducts were created and circulatory systems directed. It was also embedded in the cartographic eye (Ryan, 1996), the documentation movement and exploration in new colonies, building roads to move armies and goods, orientalising narratives and attentiveness toward the progression of the colony while obscuring practices of displacing local traditional owners (Sparke, 1998a). Such processes were predicated on an 'anticipatory geography' (Harley, 1992: 532), in which the map appropriated territory into colonial rule from the outset of 'discovery', inscribing abstract mathematical principles into the landscape and using cartographic practices as camouflage for other political goals.

*Geography's myth: colonialism and cartographic reason*

The imperial project of establishing 'a single terrestrial sphere' (Farinelli, 2009: 152) between the network and the grid (the sphere and the table), was not a simple case of a two-way flow between coloniser and colonised. Rather, the process was global in scale and 'messy in its local effects' (Jacobs, 1996: 7). The ordering of fixities and fluidities according to Cartesian and Leibnizian philosophies are central to the processes of colonialism, especially the kinds of settler-colonialism seen in Sydney and the merchant colonialism of Hong Kong. The overarching philosophy of cartographic reason, which sees space as a mathematical *tabula rasa* devoid of heterogeneity, ties in with the colonial shaping of landscapes that are, in fact, palimpsests (Byrnes, 2001). In contemporary mobile mapping, then, we see competing experiences of the *tabula rasa* imagined by western reason, and the palimpsest landscapes that constitute a post/colonial present filled with trauma and memory. As a result, the rationalisation of space in both Cartesian and Leibnizian forms - either as an imperial or a civic project of the materialisation of cartographic reason - resulted in persistent uneven geographies in settler-cities, like Sydney and Hong Kong, which still erupt in contemporary mapping.

In the case of Sydney and Hong Kong, colonial processes were inscribed through a landscape, rendered empty by power-relations, which were, in turn, governed by the dispositif of cartographic reason (Abbas, 1997). *Terra Nullius* in Australia obliterated a thriving Aboriginal presence of the Eora and the Tharawal in the Sydney Basin by arguing that the land had no occupants (Karskens, 2009). In Hong Kong, the 'barren rock' of the island was gradually planted with trees while the presence of the Tanka and Hakka people was largely ignored until the latter half of the twentieth century (Ngo, 1999). Thus, Hong Kong and Sydney are both 'heterogenetic' cities (Kim *et al.*, 1997: 4), whose cross-cultural encounters arose in tandem with an urban vision. They are thus distinct from other colonial cities like Delhi, where there was already an orthogenetic urban form, pre-existing colonisation.

This is the point at which the cases of Sydney and Hong Kong emerge as particularities, linked by their shared experiences on the edges of the British Empire. The discursive formations of cartographic reason, as it was brought to their 'empty' shores, reside still in the material structures of the city and the signifying architectures that form contemporary discourse. As Jacobs observes:

'The relations of power and difference established through nineteenth-century British imperialism linger on and are

frequently reactivated in many contemporary First World cities.' (Jacobs, 1996: 2)

These relations can be archaeologically traced through certain sites and constellations where the durability of the *dispositif* becomes illuminated (Foucault, 1995). The *dispositif* inscribes discourse into the landscape through a series of technologies, which, in turn, define a plane of encounter (which is durable, recombinable and alterable). Cartesian and Leibnizian universalisms transform in this plane of encounter (for example, at the moment of emergence of mobile mapping practices), into 'an impulse which is decidedly cartographic' (Said, 1993b: 226), the desire for control through cartographic reason.

Geometries also appear in perspectives, in landscape paintings, sketches and drawings, which capture the muted presence of local inhabitants, in huts, or canoes, or around fires. The composition of these texts is burdened with what Ryan (1996) calls 'the cartographic eye'; the exploratory gaze of 'the universal space of empire' (Ryan, 1996: 5). The cartographic eye goes beyond the cartographic identification of geographic tradition (Harvey, 2001) into the picturesque and the sublime, rendered by countless texts of explorers. These texts reinforce a gaze of ownership, of surveillance, which Foucault (1995; 2002b; 2003a) describes as the rearrangement of the world according to the rationalised order of things. Following this assertion, I argue that such ordering is based deeply in the geometrical premise and mensuration of cartographic reason. The cartographic eye saw the landscape as a system of signs in the combination of science and art - mirrored again in the plan and the view. Thus, the landscape and the subject could at once be racialised and gendered, subjugated to an exploratory gaze developed through Enlightenment geography, and still maintain the taxonomic and calculative rationalisations of cartographic reason (Gregory, 1994).

Furthermore, the etching of history into spatiality through toponymy (Rose-Redwood, 2006; Rose-Redwood and Tantner, 2012) presents multiplicity on the same plane, universalising representational structures and abstracting signs from their meanings. Therefore, the survey, the chart and the plan become colonial technologies of the cartographic *dispositif*. With them come expert figures with renewed authority - cartographers, navigators, explorers, planners, architects - who form the multiple prongs of the *dispositif* in cartographic reason, specifically in the colonial world

(Branch, 2011). Importantly, they lay the groundwork for cartographic reason to maintain regularities while transforming in a digital era.

The cartographic eye draws indigenous territories into global power-geometries (cf. Massey, 1993) reiterated through the dispositif of cartographic reason:

‘These imaginative geographies of Reason regulated, bounded and secured space as a precondition for the embodied occupations which followed and the subsequent incorporation of these territories into the global grid of power.’

(Jacobs, 1996: 3-4)

Colonial technologies were regimenting, using myriad cartographic dispositifs to order and rationalise spatial processes (Yeoh, 2001). As post/colonial nodes in imperial networks and geographic brokers between land and sea-trade, the economically-significant spaces of Sydney and Hong Kong have been particularly susceptible to global flows through globalisation from the seventeenth century through to the present (Empson, 1992; Clancy, 1995; Bishop *et al.*, 2003; Clancy, 2011). The regulation of circulatory systems was of crucial importance in setting out the terms of control, governance and discipline in these new colonies (Söderström, 2013). This is because from their blueprints, Hong Kong and Sydney have been global cities - either as a trading port or a penal colony - with trends of development less affected by linear histories than homogenising globalism (Pickles, 2004; King, 2012; King, 2016). From grids to spheres, globalisation and the control of flow still enacts a rationalisation and universalisation of experience. This disintegrates geopolitical and geo-cultural differences between cities on one hand (Bishop *et al.*, 2003), and messy, bespoke practices on the other (Amin and Graham, 1997; Legg and McFarlane, 2008).

The funnelling of movement and widening of expansion was a central part of the colonial project (Munn, 2001; Carroll, 2005; Thalís and Cantrill, 2013), from the early sketches of new roads and the zoning of land for commercial auctions to the charts that provided information on the depth of harbours, and the primacy of the Royal Navy (over the military, for instance). As seen in Africa (Bassett, 1994), cartographic technologies played a role in the development of commerce, ports, customs and immigration, which will be explored in Chapters Five, Six and Seven. Table 2.2 maps the institutional structures of this dispositif in Sydney and Hong Kong during the early years of colonial settlement and urban development. It includes the interweaving

interests of government and commerce, which was key to the development of new colonies.

**Table 2.5** *The dispositif of cartographic reason in Sydney (1788-1900) and Hong Kong (1842-1900)*

	<b>Sydney</b>	<b>Hong Kong</b>
Governance	<p><b>Governor/Government of NSW</b></p> <ul style="list-style-type: none"> <li>- The Colonial Secretary's Office</li> <li>- The Lands Office</li> <li>- The Colonial Architect's Office</li> <li>- Surveyor-General's Office</li> <li>- Colonial Engineer's Office</li> <li>- The NSW Police</li> <li>- Public Works Department</li> </ul> <p><b>The Royal Navy</b></p> <ul style="list-style-type: none"> <li>- Survey and Exploration</li> <li>- Circumnavigation</li> </ul> <p><b>The NSW Corps (1789-)</b></p> <ul style="list-style-type: none"> <li>- Prisons</li> <li>- Defence and Fortification</li> </ul> <p><b>Sydney City Council (1840-)</b></p> <ul style="list-style-type: none"> <li>- Planning</li> <li>- Residential Services</li> </ul>	<p><b>The Colonial Office/Governor of HK</b></p> <ul style="list-style-type: none"> <li>- Urban Planning and Design</li> <li>- Land Allocations and Zoning</li> <li>- Urban Development and</li> <li>- Transport (harbour, hills)</li> <li>- Population and Immigration</li> </ul> <p><b>The Royal Navy</b></p> <ul style="list-style-type: none"> <li>- Surveying</li> <li>- Defence and fortification</li> </ul> <p><b>Judiciary</b></p> <ul style="list-style-type: none"> <li>- European District Preservation ordinance 1888</li> <li>- Curfews</li> <li>- Lands court</li> </ul>
Commercial	<p><b>Banks</b></p> <ul style="list-style-type: none"> <li>- Bank of NSW</li> <li>- Bank of Australia</li> <li>- Sydney Banking Company</li> <li>- Commercial Banking Company of Sydney</li> </ul> <p><b>Trade</b></p> <ul style="list-style-type: none"> <li>- The Rum Corps (The NSW Corps)</li> <li>- The East India Company</li> <li>- Darling Harbour Docks</li> <li>- Port Botany</li> </ul> <p><b>Agriculture</b></p> <ul style="list-style-type: none"> <li>- Experiment Farm (James Ruse)</li> </ul> <p><b>Industrial Production</b></p> <ul style="list-style-type: none"> <li>- Brickfield Hill</li> </ul>	<p><b>Banks</b></p> <ul style="list-style-type: none"> <li>- Hong Kong Shanghai Banking Corporation</li> <li>- Bank of China</li> </ul> <p><b>Trade</b></p> <ul style="list-style-type: none"> <li>- The East India Company</li> <li>- Western Market</li> <li>- Stonecutters Island</li> <li>- Container Terminal</li> <li>- Repulse Bay fishing</li> </ul> <p><b>Transportation</b></p> <ul style="list-style-type: none"> <li>- Star Ferry</li> <li>- Peak Tram</li> <li>- Kowloon Railway</li> <li>- China Ferry Terminal</li> </ul> <p><b>Agriculture</b></p> <ul style="list-style-type: none"> <li>- Happy Valley</li> <li>- Stanley</li> </ul> <p><b>Industrial Production</b></p> <ul style="list-style-type: none"> <li>- Stonecutters Island</li> </ul>

Despite the general 'laissez-faire' administration of Hong Kong (Chiu and Hung, 1999), and the slow development of the colony of Sydney (Ashton, 1995), both cities still centralised practices of urban design and planning, often referring back to London for authorisation (Freestone, 2010). Large avenues and squares (and the

dreams of Parisian-style boulevards) served as marching grounds for the armies and cities were designed to optimise defence fortifications. This included a design to allow for quick and easy military access and navigation within the city, as well as the centralisation of governmental buildings in places of power and surveillance (i.e. on Victoria Peak, or looking out to the mouth of Port Jackson). As space became rationalised, it also became moralised and the act of movement became bio-political, subjugated to 'relentlessly generate[d] models of the proper use of place and time - where to be-in, where to go, what to become in between' (Bishop *et al.*, 2003).

In the Cartesian philosophy of extension, the grid pattern, which in theory allowed for growth, as it did in Chicago (Morris, 1988: 35) and other North American cities, was limited only by the topography of landscapes and the capacity to be flattened (Elliot, 1987). Grant (2001) suggests that, despite the utopianism to which it aspired, the geometrics of the grid pattern was an inherently hegemonic force:

'in every instance, however, the grid clearly signifies that planners were at work. It denies spontaneity and indigenous landscape traditions. It imposes a rational conceptual order that transcends time and space and proclaims the control and power of central authorities.' (Grant, 2001: 237)

The grid pattern did not simply alter the urban spatial form. In colonial spaces, it overwrote indigenous epistemologies and ontologies and implanted European authoritarian structures into urban spaces from their inception, and even before habitation (Sparke, 1998a), as an anticipatory geography (Harley, 1992), which constructed the colonial landscape before a foot was even set on land. It also created what Söderström (referring to ichnography or ground plans) identifies as 'code naturalisation' (Söderström, 1996: 259): the production of what Winichakul (1994) calls a 'geo-body', or the overwriting of indigenous or local knowledges in favour of Western, rational modes of territory. These practices disrupt the inclination towards the empirical, the vernacular (cf. Gerlach, 2010) and the material by way of truth-making, and replace it with a new overarching hegemon: the geometric graphic inscription, a *geography*. In Sydney and Hong Kong, the *geography* mutes and erodes the presence of local practices, setting in motion a continuing period of loss, eradication and haunting.

This chapter has discussed how cartographic reason intertwined the rationalist philosophies of Leibniz and Descartes in colonial and imperial projects of modernity in Sydney and Hong Kong. The underlying foundation was the perception that both

Sydney and Hong Kong were built on regular, predictable geographic blank slates, where 'unconformities' (Carter, 2009) to the universal mode of reason - or landscapes unique to each region - could be either be ignored or eradicated. Furthermore, there was special governmental interest in the cartographic erasure of indigenous cultures and knowledges to produce this blank slate - upon which cities could then be imagined in Cartesian order, exploited through Leibnizian relations and materialised in meticulous planning, sub-dividing and auctioning.

This chapter has suggested that the perpetual formation of cartographic reason, and its foundational underpinning for western spatial philosophy, has not entirely been undermined by topological and relational modes of representation. Rather, it has become reified by the expanded, networked and relational potential of Cartesian and Leibnizian technologies combined. Furthermore, as I explore deeper in the next chapter and then through empirical fieldwork, this relationship continues to emerge in contemporary mapping practices through digital mobile media and the transforming *dispositif*. As cartographic reason became fundamental to modern colonialism in Sydney and Hong Kong, the contemporary role played by digital mobile technologies is not an ambivalent actor. Instead, it is political - structurally and culturally bound up in raw and seething settler-colonial presents (Veracini, 2015). Before the mobile phone even appears in Sydney and Hong Kong, the technologies of Descartes and Leibniz have already been transformed into a *dispositif* of cartographic reason, based in ordering systems of technology and the contouring of space to shape global flows. Even where the formation of discourses moves on, and even where the shape of the city may have changed, the residual *dispositif* of cartographic reason continues the myth of space as a *tabula rasa*, transformed in name, perhaps more topological, but no less invasive, dominating and colonial.

### **3. More-than-representational mobile mapping: practices, digital technologies and affective assemblages.**

'For Foucault, not everything is discourse; reality encompasses more than discursive practices, more than the signifying, and the more than significant.' (Grossberg, 1997: 92)

This chapter situates contemporary mobile mapping as an more-than-representational assemblage produced through everyday digital technologies, embodied practices and affective space, and embedded in the legacies of cartographic reason discussed in the previous chapter. As the dispositif of cartographic reason becomes formalised through the cartographic imagination, so digital mobile maps materialise through technological assemblages between bodies, spaces and technologies. Yet, as this chapter argues, approaches that focus solely on the discursive potency and potential of cartographic technologies are not adequate as means of addressing the situated, mobile and everyday assemblages which form in mobile mapping (Perkins, 2006). In the spirit of the potential of contradiction and coformation, this research seeks to investigate mobile mapping as a heterogeneous assemblage (cf. Anderson and McFarlane, 2011) - a more-than-representational co-emergence of mathematical and experienced spaces. As such, this chapter foregrounds some of the possibilities offered by a more-than-discursive (Grossberg, 1997) conceptualisation of mobile mapping practices, as well as a more-than-representational approach (Lorimer, 2005) to understanding cartographic reason in a digital age.

In 2004, Nigel Thrift predicted that the introduction of mobile technologies and their continued pervasiveness in everyday practices would change the way in which knowledge/space power relations are produced (Thrift, 2004a). This would be guided by what he called a 'calculative sense' (Thrift, 2004a: 592) - a new mode of spatial awareness (predicated on Euro-American cultures) between bodies, sensoriums and quantitative calculations augured by digital, mobile technologies. As mobile mapping increasingly comes to resemble Thrift's (2004a) predictions, unexpected digital logics and extensions have also emerged. Therefore, an analysis of the *digital* is equally important as analysing the *geographic*. Mobile mapping is intrinsically dependent upon digital reckonings situated in particular moments and spaces. However, the situatedness of mobile mapping means that it is also the product of an affective,

indeterminate and emergent assemblage. From the inception of the mobile map (its semiotics, content, coders and its networks) (Farman, 2012), to the input (or not) of user information, and experiences (Evans, 2015) and the traces of other mapping practices across space and time (Wilmott, 2012), mobile mapping becomes a fundamental question of the relationship between systems of representation - lines, codes, coordinates - and the notion of spatiality itself.

At the end of the previous chapter, I discussed how the transcendental dreams of Enlightenment - ordered in the systems of Descartes and Leibniz - became materialised through the birth of politics and territory (Elden, 2013a) in colonial urban projects. Cartographic reason takes on an expanded role in colonial processes, where the spatial rationalisms described by Farinelli (2009) become political tools to territorialise and subjugate local spaces, knowledges and practices (Gregory, 1994; Edney, 1997; Sparke, 1998b; Carter, 1999). The universalism of cartographic reason represents a colonial desire, a cartographic impulse, to measure and classify, calculate and categorise the living spaces of the world (Pickles, 2000), to establish control through orders of fixity and fluidity. With the advent of digital technologies, mobile mapping draws in expanded tools to (re)produce power/knowledge relations: mobile phones and other mobile devices; satellites and navigational systems; geographic databases and information systems; software, algorithms and digital code; and millions of datasets always-in-production by the millions of people who use their phones *in situ* everyday day.

I start by building from de Certeau's (1984) writing on practice, then go on to map how a more-than-representational approach (Lorimer, 2005) can encompass a broader analysis of the relations between mathematical and experienced space in mobile mapping practices. Then, I outline the shifting technological dispositifs of cartographic reason in a digital age, exploring literature on digital geographies (Ash *et al.*, 2016), mobile media (Hjorth *et al.*, 2012) and calculative politics (Crampton and Elden, 2006). Finally, working towards a definition of everyday mobile mapping practices that draw in and constellate diverse and often contradictory elements between digital technologies, mathematical and experienced spaces, I explore more-than-representational and more-than-discursive frameworks such as affect (Massumi, 2002) and haunting (Gordon, 2008). This chapter discusses how, in moments of space and time, the digital map is bound up in intuitive, affective and uncanny modes of knowing beyond cartographic reason. The purpose, here, is to grasp at an indefinite ambition put forth by Massey (2005) and Gordon (2008): to move beyond

the debates between modernism and post-modernism, and instead find possibility in productive and generative creation in ordinary, local circumstances.

### **Mobile mapping practices**

Mobile mapping practices are not sites of singularity, but rather of spatial-knowledge politics (c.f. Elwood and Leszczynski, 2013) mediated between thinking/doing, between image/body, and between ephemerality, lingering and persistence. This research specifically focuses on the practices of mapping, or what Kitchin, Perkins and Dodge have called 'a suite of cultural practices involving action and affects' (Kitchin *et al.*, 2009: 17). Such practices 'emerge in contexts and through a mix of the creative, reflexive, playful, tactile and habitual practices, affected by the knowledge, experience and skill of the individual to perform' (Kitchin *et al.*, 2009: 21). This section emphasises the situatedness of such practices, the inimitable and distinctive emergence and dissipation of spatial, technological and bodied forces and their momentary encounters. 'Situatedness' and situated knowledges (Haraway, 1988) are central to the definition of spatiality throughout this thesis. As a result, my interpretation of practice means that mobile mappings thread beyond single moments or encounters, and braid into what I understand to be a broader practice of cultural 'knowing-doing-space'. Mobile mapping practices have inertia - lives of their own. In considering practice as a cultural spatial poetics (Stewart, 1996), it is important to lend voice to the slipperiness of meaning, to ambiguity, to the spaces not only by the roadside, but between words, lines, points and steps.

Massey (2005: 49-54) describes space as always open and never closed, brimming with potential, heterogeneity and productivity. The concept of contradiction was central in the previous chapter as a way of understanding how multiple, paradoxical spatialities can sit side by side. Here, in heterogeneity, spatiality encompasses both experienced spaces (Bollnow, 2011) that are liminal (Turner, 1986), abject (Kristeva, 1982) and dwelled (Bachelard, 1994), as well as rational geometric or mathematical space (Bollnow, 2011). Here, the assemblages between bodies, spaces and technologies (re)produce spatialities in constant emergence, or as Massey (2005) suggests, coformation, influencing and shaping the relationalities and interactions between cartographic reason and other heterogeneous ways of knowing - including the more-than-representational and the more-than-discursive.

As such, this section positions an understanding of practice somewhere between the writings of Foucault (Foucault, 2002a; 2003c; see also Dreyfus and Rabinow, 1983), and the later interpolation of his work with Bourdieu's theory of habitus by de Certeau (1984). In doing so, the concept of practice is reoriented away from the Cartesian dualism between mind and body, towards a far more iterative, relational and material reading - a 'speech-act' as Foucault (2002a: 93) and de Certeau (1984: 20) term it, or 'a chiasm of thought-and-action' as described repeatedly by Olsson (1993; 2001; 2007) in his work on cartographic reason and geometric spatial representation. The increasing mutability of digital maps means that the text is consistently becoming dissolved (Perkins, 2013; Lammes, 2016). Practices, however, whilst not perpetual, leave ghostly traces of themselves in the contemporary habitus and spaces of an ever transforming and fast-moving world.

Hence, as this chapter argues, practices can help us understand how mobile mapping assemblages emerge and constellate. Thrift (2008) suggests that *practices* are the 'stable feature of a world that is continually in meltdown' (Thrift, 2008: 8). Lorimer (2008) argues however, despite the shift towards the non- and post-representational - and valuation of the affective, embodied and performative (Anderson and Harrison, 2010) - the role of words (or representation) is still a force with reckoning and potency. Despite its new technological complexity in the folds of digital coordinates and codes, the map also maintains a certain level of signification and exchange. Some philosophers, like Baudrillard (1993) and Serres (2008), suggest that, increasingly, the world is nothing but representations. Therefore, mobile mapping cannot be wholly served by a theory that cannot accommodate the representational. Furthermore, the aims of post-representational approaches (Caquard, 2015) can be just as problematic as approaches that privilege representation above all else.

In this light, mobile mapping practices are best understood as assemblages constellated in a 'more-than-representational' way (Lorimer, 2005), in that they *go beyond the text* into situated material-discursive speech-acts, which engage socio-cultural, physical and political forces. This invokes a nuanced multiplicity in Sydney and Hong Kong whereby 'a map' or 'a mapper' are no longer singular, bounded entities that can be de-situated or abstracted from the colonial history of mapping. Nor can practices be detached from the vast materialisations of cartographic reason, or from the subjective memories and practices of those who bring encounters into emergence.

### *Material-discursive practices*

Mobile mapping practices are collections of localised speech-acts, transformations of how a statement appears. They are linked by the regularities that govern the rules of the discourse and the possibilities of its inscription and transcription through both discursive and more-than-discursive actions. By emphasising mapping as an assemblage, the relationship between the material and the discursive comes to the fore, rather than the structure of the representational (Legg, 2011). As I have argued, cartographic reason is not defined by how it appears, but rather by the rationalist conditions of possibility that continue to offer validity and power to cartographic technologies. Deleuze (1988) measures the idea of the assemblage against what Foucault terms 'mechanisms' (Deleuze, 1988: 37): the concrete materialisations of discourse through the functions of *dispositif*, rather than regularities in the appearance (Deleuze, 1988). As a more grounded version of the *dispositif*, or a discursive version of the 'actor-network' (Law, 2009; Müller, 2015), the assemblage emerges while also underscoring the continuity of discourses across time and space. The assemblage also allows for fluidity and transformation in the appearance of the map, and emphasises exchangeability at the level of signification from symbols, to codes, to numbers, the basis of Leibnizian reason. Thus, the power-knowledge relations between cartographic reason and other forms of understanding described in the history of colonial spaces (Gregory, 2004), are still manifest in mobile mapping practices, as mobile applications shape everyday trajectories, paths and rhythms (Wilmott, 2016b).

For Foucault, practice is discursive (Dreyfus and Rabinow, 1983). Foucault (2002a) argues that discourse forms by establishing rules at the level of *strategies*, or the resolution of diffractions, incompatibilities and contradictions across the discursive constellation. The strategic field is where discourse is understood as an iterative practice - it does not freeze or become arrested in space and time, but rather emerges as a constant articulation through a series of discursive events, or speech-acts (statements or enunciations). The speech-act is a formulation, a statement in the moment of its emergence 'what occurred by the very fact that a statement was made - and precisely this statement (and no other) in specific circumstances' (Foucault, 2002a: 93). Speech-acts gather into an archive; more simply, they are situated at the multiple points in which they are said and restated. Such speech-acts may be interpreted as, for instance, propositions (Wood and Fels, 2008; Krygier and Wood, 2009), classifications (Leszczynski, 2009b), calculations (Crampton and Elden,

2006; Crampton and Krygier, 2006; Crampton, 2011), equations (Olsson, 1991b; 2010) or signs or symbols (Cosgrove, 1999). Statements may or may not have clear enunciators (i.e. map-makers or map readers) (Foucault, 2002a), or may gather within an archive or collection of statements as a plan, an image, a piece of architecture - or even, as de Certeau (1984) expands, the toponymy and vernacular topography of a city such as Paris. For instance, a cartographic map is, in and of itself, a speech-act already at the time of its printing, or at its point of appearance on a server. Yet, it becomes reiterated with subsequent reading, updating, use on different mobile phones, reprints or other moments of enunciation. The discursive elements that emerge through a speech-act then become intertwined and refolded as it is re-read, re-deployed, reinterpreted, remade in space and time (Latour, 1986).

The act of enunciation is not merely representational, but also embodied by the material form of the enunciator, or the person or object who 'speaks'. For people, habits, as Massumi (2002) explains, 'reside in the matter of body, in the muscles, nerves, and skin, where they operate autonomously' (Massumi, 2002: 236). From footsteps to emotions, affects and sensations, in mobile mapping, it is possible to see how practice becomes a cross-pollination of other practices involving meaning-making and spatial production. *Acting* is as important as speech, and this is where de Certeau's (1984) analysis of practice expands into the realm of embodied tactics of resistance against the groundswell of spatial discourses. As de Certeau (1984) described in the labour practices of workers, and Foucault (2003c) proclaimed in his lectures, there are many practices that resist, avoid, disassemble and ignore the hegemonies of discourse in their materiality. Each statement can be located at its 'spatio-temporal coordinates, which can always be related to an author, and which may constitute in itself a specific act' (Foucault, 2002a: 120). Practice, then, is considered as being deeply linked with the production of material-discursive knowledges (Barad, 2007) via spatial or temporal stories (de Certeau, 1984), and also with the enunciation of discourse (Foucault, 2002a; Foucault, 2002b), the gridding (*quadriller*) of space (Foucault, 1995: 145) and the subjugation of other knowledges (Foucault, 2003c).

#### *More-than-discursive residues and resiliences*

By defining practice through the residues and resilience of discourses, embodiments, and systems (Massumi, 2002; Thrift, 2008) as speech-acts are situated and

materialised in space (de Certeau, 1984; Foucault, 2002a) requires a rethinking of mobile mapping. Maps have always had long-standing recursive discourses, as Latour (1986) points out, where one set of maps informs another, or is built upon a *priori* epistemological systems. Furthermore, the transportation of these systems through time and space, from one point of history to another and from one place in geography to another (Carter, 2009), has been a critical question to the Foucauldian projects of archaeology (Foucault, 2002a; Foucault, 2002b) and genealogy (Foucault, 1977; Visker, 1995). In terms of digital spatial practices, the constitution of a mobile phone map, in comparison to a paper or mental map, becomes a point of discourse. The same can be said for the role of the coder, or the user, or the corporation who owns the software, or the system according to which the speech-act emerges (and also the possibilities afforded by it) (Crampton *et al.*, 2013; Wilson, 2014c). The concertina of digital practices (and their anchor points in space through mobile maps and mobile devices) are obvious points of contention. The distant folding and repetition of statements into this emergence also becomes a key point of consideration.

As these associated practices fold into and expand from mobile mapping practices, finding one's way, or drawing out a territory, is not just contained within a single moment of practice. Rather, mobile mapping is an assemblage embedded in uneven dispostifs, across which the strategic field of cartographic reason transforms. De Certeau (1984) considers the stories and the structures of spaces (of consumption, of labour, of movement) as integral to the political formulation of the practices of everyday life. Cartographic practices in geographic imaginations and discursive materialisations are also not devoid of this politics (Pickles, 2004), especially practices of taxonomisation, surveying, resource-allocation and development (Gregory, 1994), and more recently, calculation and territorialisation (Legg, 2007; Crampton, 2011) in post/colonial societies, as the fieldwork in Sydney and Hong Kong will show.

The corporeal residue of practice balances unevenly across and beyond cartographic reason, depending on the material-discursive speech-acts that constellate in the assemblage. Each encounter has ghostly traces, whose form spontaneously doubles the affects felt by bodies, and which gravitate towards spaces and sites (Riedner, 2007; Berlant, 2008). Old statements fold into new speech-acts. These, in turn, form networks of re-presentation across space and time, producing spaces, and transforming through bodies and objects (Latour, 1986). Another set of relations,

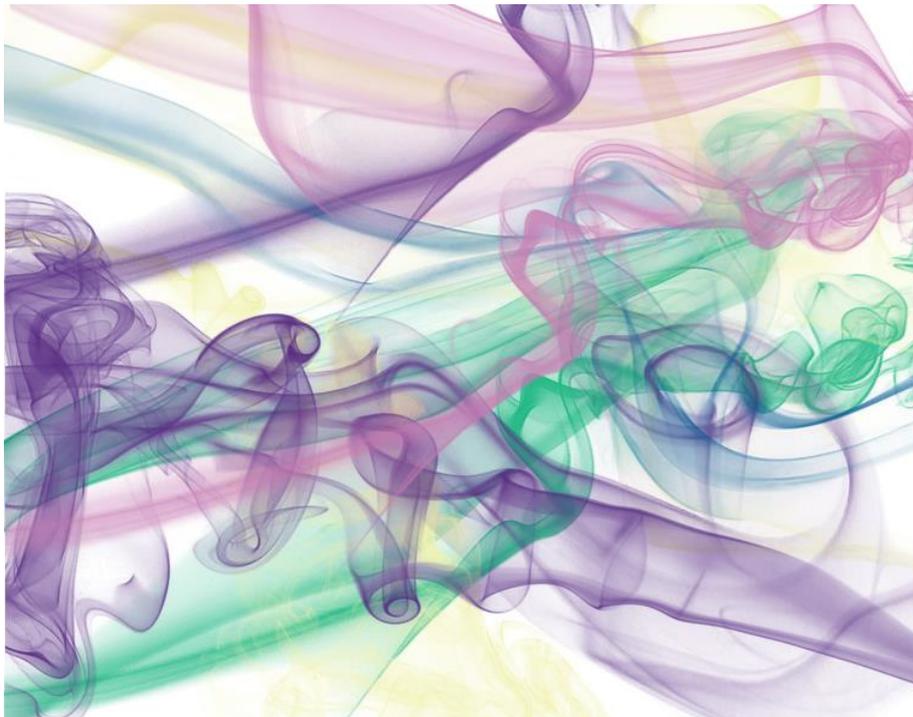
then, pour out from practice at the level of a speech-act, colliding or absorbing into the formation of cartographic reason. Ulterior to the formation of discourse, 'non-discursive practices' (Foucault, 2002a: 76) have a different authority, where desire (Caluya, 2008), phantasmagorias (Pile, 2005; 2011), affects (Massumi, 2002; Stewart, 2007), intuitions (Berlant, 2008), embodiments (Carter, 2009) and appropriations (Serres, 1982b) hold the possibility to shift and transform discourses like cartographic reason. In mobile mapping, the encounter becomes a site of situated coevalness (Massey, 2005), as knowledge practices and spatial speech-acts coform together as assemblages. Mobile mapping assemblages operate across materiality and representation in a swirling osmosis between the discursive and the non-discursive.

Where boundaries become situated, or embodied within the assemblage is the central site of analysis of this research project: to trace the complex relations as they appear, and to ask how else mobile mapping may be understood through and beyond the discursive strictures of cartographic reason. This is important on two fronts: first, a single speech-act neither stands in for nor represents all other speech-acts in that discourse - it is uniquely situated; secondly, it is the regularities and irregularities across these speech acts which trace the modalities and transformation of discourse, not the specificities of linguistics or semiotics (Foucault, 2002a). Furthermore, practices, institutions and theories can also be considered as integral to the same systems, which also sheds light on our own practices of researching and conceptualising mobile mapping. As Foucault (1998a) states:

'...I deal with practices, institutions and theories on the same plan and according to the same isomorphisms, and I look for the underlying knowledge [*savoir*] that makes them possible, the stratum of knowledge that constitutes them historically. Rather than try to explain this knowledge from the point of view of the practico-inert, I try to formulate an analysis from the position of what one could call the "theoretico-active".' (Foucault, 1998a: 262)

Thus, moving away from maps and mappers towards a practice of mobile mapping becomes more than an approach for understanding empirical data - it is also a method for rethinking theoretical frameworks, using practice as a way to construct a field that is "theoretico-active" (Foucault, 1998a: 262).

By considering mapping practices as more-than-discursive, using a more-than-representational approach, we can situate the heterogeneity of practices within a rich geographical and historical corpus of associated practices. Such an approach reaches beyond the simple remit of one person using one map at one moment. Figure 3.1 shows how the trajectories of mobile mappings may flow and form, intersecting and becoming detoured or rerouted by others, where each colour represents a different, embodied and situated set of practices.



**Figure 3.1** *Mobile mapping as a spatial practice.* The discursive (violet) and the more-than-discursive (pink) cross-pollinate, between trajectories of cartographic reason (green), spaces (yellow) and bodies (blue). (Source: Author).

Certain repetitions appear - the curling or folding in, for instance - and yet, like smoke as it rises, the trajectories of practices become disordered, unpredictable and radical. Local knowledges are passed down between people, into and out of institutions and across archives of material-discursive speech-acts (Foucault, 2003c), the said and then resaid. Underlying knowledges - the tactics of the pedestrian, for instance (de Certeau, 1984) - are also the space of non-discursive practices, anterior to the cartographies that have built the city on a grid line using the strategies of cartographic reason. One person moving through space creates a chain reaction

(Barad, 2007). Maps direct people onto certain roads, people redirect flows off those roads and the historical monumentality and strangeness of the city creates magnetisms that draw people in or turn them away (Crang and Travlou, 2001). The everyday becomes a political encounter and the grand visions of cartographic reason can be traced: starting from the dissipating, reforming and detouring practices of mobile mapping. Therefore, it is possible to see how a statement of discourse exists in and beyond the material, and the material exists in and beyond the discursive as they emerge through words and things, speaking and doing: *more-than-discursive practices*.

### *Spatial Stories*

For de Certeau (1984), practices are the actions of translation through which stories are made, either as acts of thought, or description, or by moving through space:

‘Every story is a travel story - a spatial practice. For this reason, spatial practices concern everyday tactics, are part of them, from the alphabet of spatial indication (“It’s to the right,” “Take a left”), the beginning of a story the rest of which is written by footsteps....’ (de Certeau, 1984: 115-116)

Central to mobile mapping is the translation between speaking and doing (or between *speech* and *act*); a role that occurs in mappings at a vernacular level (Gerlach, 2014) and is formalised by cartographic reason and acts of repetition or tracing (Wilson, 2014c). Cartographic practices are discursive practices that limit the concept of practice itself to that which can be said or framed through geometry, surveying, data collecting, taxonomising and quantifying. Mapping practices, on the other hand, are performed by feet, within and beyond the limits of representation, into the non-discursive, the more-than-representational. Given the ontogenetic nature of mapping (Crampton, 2009c; Kitchin, Perkins and Dodge, 2009), mobile mapping practices are not simply the translation between stories and spaces, but the embodied production of ‘a ‘spatial story’ (de Certeau, 1984: 130).

Rather than being supplementary to language, these spatial stories can be found ‘simultaneously producing geographies of actions and drifting into the commonplaces of an order’ (de Certeau, 1984: 115-116). Journeys performed dynamically between

speaking and doing, through words or feet, are not without power-relations. The grand strategies of discourse, capital and discipline work to outline the scopes and paths across which practices can occur (Lefebvre, 1991; Foucault, 1995). However, as Stewart (2002) and Buchanan (1996) suggest (drawing from de Certeau), this is gridding does not achieve total domination. Hermes (Serres, 1982a), as described in the last chapter, is not the only exchanger or translator in the mobile mapping assemblage. The distant imaginations of discourse and information become folded into the everyday 'tactics' of banal and ad-hoc actions (whether this is moving, working, bounding, coding or computing) (de Certeau, 1984). Therefore, when I talk of stories, I talk not only of the specific empirical encounters with my participants, but the narratives of cartographic and spatial practices that weave through these encounters, perhaps started at different times and in different spaces, but now bound up in these moments of negotiation between powerful discourses and everyday practices.

### **Digital technologies**

Rather than being singularly 'new' or 'novel', the use of mapping applications on mobile phones manifests itself as a culmination of a number of separate technological substitutions (Latour, 1999), which allow hitherto unprecedented mapping capabilities to occur *in simultaneous convergence* (Jenkins, 2007). This section articulates how contemporary mobile forms of digital cartographic technology can be considered as the latest and most prolific iteration in the gradual merging of the Leibnizian and Cartesian rationalities discussed in the previous chapter. Considering the idea of a 'digital speech-act', this discussion expands from the idea of fixed-fluid rationalities in the system of Hermes, to frame how the totalising form of topological cartographic reason has begun to shift - although not entirely transform - in digital geographies, mobile media and networked, calculative and classificatory relationalities.

Firstly, I consider recent work in *digital geographies* (cf. Ash *et al.*, 2016), including critical GIS (Schuurman, 2000) and critical data studies (Dalton and Thatcher, 2014) to understand the durability of cartographic practice. Then, I go on to consider the role of situatedness (Tuters, 2012) and navigation (trajectories) (Verhoeff, 2012) expressed through media and cultural studies research on *mobile and motile media* (Goggin and Hjorth, 2009). Finally, I discuss the impact of scientific discourses on

the production of digital technologies, including protocols, algorithms and software; specifically, the calculation and control augured by the network, or Hermes (Serres, 1982a).

The positioning of cartographic traditions within cartographic reason, results in a complex filigree of digitisations, trajectories and networks within post/colonial cities like Sydney and Hong Kong. I adopt a broader perspective of what constitutes a 'mapping application' or 'mobile map' as an assemblage (Deleuze and Guattari, 1987; Deleuze, 1988), rather than a text. This is based upon the increasing ubiquity of geo-code in applications that may not have geographical navigation as their specific purpose (for instance, Google Maps, Garmin Maps or Open Street Map) (Schoorman, 2009; Wilken and Goggin, 2012; Evans, 2015). For instance, applications such as the photo-sharing app 'Instagram', or the social media app 'Facebook' (or even, increasingly, the entirety of the Google suite of applications from Gmail to Google Calendar) habitually use forms of geo-code to geo-tag images, status updates or other digital objects (cf. Leszczynski and Wilson, 2013). Such technological substitutions also expand, not only replacing current cartographic systems, but also adding geographic data to applications with other primary purposes (Wilson, 2014a).

In this section, the mobility of the digital map becomes important, as it changes how, when and where mapping occurs (Gartner *et al.*, 2007; Wilken and Goggin, 2012; Wilmott, 2012), and the constitution of the map itself. No longer limited to immutable mobiles on paper (Lammes, 2016), nor spatial arrangements in the mind (Kitchin and Freundschuh, 2000), digital mobile technologies have woven a skein of *vernacular* (Gerlach, 2010), *participatory* (Elwood, 2006; 2008), *networked* (Haklay *et al.*, 2008a; Warf and Sui, 2010), *automated* (Tobler, 1959) *mutable* (Perkins, 2013; Lammes, 2016) and *situated* (Perkins, 2006) performances, as multiple aspects of the cartographic dispositif constellate into moments of mobile mapping practices. The mobile map is specifically tailored via GPS to update and accommodate future alterations, as it changes to reflect the surrounding environment, and absorbs geographic information from millions of users (Wilson, 2012; Hind and Gekker, 2014). In addition to these shifts, landscape and geographic imagination coalesce in the use of augmented reality applications that layer data over the screen (Schmalstieg and Reitmayr, 2007), reflecting and merging experienced space with mathematical space, opening it up to expanded forms of calculation and classification.

## *Digital geographies*

Ash, Kitchin and Leszczynski argue (2016) that a digital 'turn' within geography is occurring, centred on the rising ubiquity of computing technologies and their relationship with space and time. Digital geographies are consistently engaged through mobile mapping across a number of trajectories described by Ash *et al.*: the geographies of the digital, geographies produced by the digital, and geographies produced through the digital (Ash *et al.*, 2016). This trialectic of digital geography encompasses the materiality of digital systems (Kinsley, 2014) and their automatic production (Thrift and French, 2002), their virtual politics as virtual/cyber spaces (Dodge and Kitchin, 2000; Crampton, 2003b; Ash, 2009; Ash and Gallacher, 2011), and the hybridised status standpoint of mobile, cultural phenomena (de Souza e Silva, 2006; de Souza e Silva and Sutko, 2009; Zook and Graham, 2007; Berry and Hamilton, 2010; Wilson, 2014b).

As digital technologies disintegrate boundaries, they have become so ubiquitous (Galloway, 2004; Rose, 2016) that some, like Berry (2014), have ruminated that the 'digital' has become almost meaningless as a category of research. This thesis, in part, investigates this claim on a discursive level while at the same time critiquing the emphasis placed on the technological above that of the digital. In geographic research, the role of spatial media (Elwood and Leszczynski, 2013; Leszczynski, 2015b; Leszczynski and Elwood, 2015) and the potential of critical approaches towards GIS (Schuurman, 2000; Wilson, 2015) have been central to reformulating how the relationship between spaces, technologies and practices can be approached. Key to this discussion has been acknowledging shifting practices around the technological production of geographic knowledge and a democratic 'neogeography' (Turner, 2006; Wilson and Graham, 2013). The rise of 'neogeography' has foregrounded increasing amateur involvement, by way of crowd-sourcing (Zook *et al.*, 2010; Dodge and Kitchin, 2013), citizen-science (Haklay, 2013a) or volunteered geographic information (VGI) (Elwood, 2008; Elwood *et al.*, 2011) and the emergence of new online platforms in which to do so (Haklay *et al.*, 2008b). Furthermore, the new dynamism of the ever-changing, updateable map (Gartner, 2003; 2007) is significant, to the point where the map's status as a stable, immutable object has changed (Perkins, 2013).

As debates around digital geographies have emerged, they have been met with positions that have established binaries between the positive democratisation or critical authoritarianism of ubiquitous spatial media and GIS practices (Cinnamon, 2014). In terms of mobile media, these debates come to be engaged on a mobile, quotidian and corporeal level, which makes them crucial to understanding the political potential of mobile mapping. The democratisation of GIS (Butler, 2006) has, arguably, allowed for community-led interventions in local (Goodchild, 2007), feminist (Elwood, 2008; Leszczynski and Elwood, 2015) and environmental (Connors *et al.*, 2012) issues, questioning the nature and seclusion of cartographic expertise (Rana and Joliveau, 2009). Significantly included in these initiatives is the political potential of indigenous knowledge-gathering (Taylor and Lauriault, 2014), vernacular mapping (Gerlach, 2010), counter-mapping (Counter Cartographies Collective *et al.*, 2012) and challenges against digital and data divides (Sui *et al.*, 2012; Cinnamon and Schuurman, 2013) in countering mainstream or institutional perspectives on territorial land claims, conservation and culture (Warf, 1997). Warf and Sui (2010), for instance argue that the democratisation of neogeography has resulted in a multiplicity of truth-claims, leading to a broadened ontological scope of GIS. This is supplemented by the promise of cheap and effective community engagement in urban planning (Foth *et al.*, 2009). At the same time, this discourse of democratisation has been met with scepticism (Haklay, 2013b), given the epistemological, material, and cultural limitations of digital geographic systems. Similarly, the continued importance of the role of GIS professionals in producing geographic systems used by planning and environment management institutions is convincing (Goodchild, 2009).

Leszczynski (2014) also has been critical of ongoing claims of 'newness', where novelty acts as a discursive device to obfuscate the way in which spatial media is embedded in discursive-material practices. The promise of digital tools produces certain discourses that tie into urban imaginations of constant, instant connectivity (Wilson, 2014a) and with it, constant surveillance (Wood and Graham, 2006). These discourses include the abstraction between information and its material forms (Wilson, 2011b), and leads to the reification of particular rationalist modes of geographic knowledge above the affective, embodied and intuitive. The power-geometries of cartographic reason in digital environments bear special relation to digital technological practices and their qualities of geo-surveillance (Crampton, 2003a). This brings to the fore an ethics of forgetting data (Dodge and Kitchin, 2005), or perhaps not knowing data in the first place.

The question of ethics, however, shifts slightly in a post/colonial environment. In spaces like Sydney and Hong Kong, power-knowledge politics are formed at the question of representation itself. Here, as this thesis investigates, the question is not if data can be forgotten, but the ethics of not creating data in the first place and turning lives into cartographies, and experienced spaces into mathematical spaces. This is why it is important to reconceptualise the digital along discursive lines. Zook *et al.* (2004) foreground that digital technologies are a balancing act between authoritarianism and chaos, or as Berry (2014) suggests, a dialectic between potential democratisation and totalising technical power. However, in contrast to this view, I argue that the specifically spatial focus of the digital in cartographic practices produces anomalous contradictions that make singular interpretations of the digital, or the political potential of digital geographies, impossible.

Here, I aim to decentre the technological artefact or interface (Wilson, 2014c) to consider the broader social and cultural implications of how cartographic reason does and does not maintain continuity of discourse in a digital era. This means moving into a consideration of how digital systems privilege particular modes of knowledge production over others and the formation of knowledge, not just its presentation (Graham *et al.*, 2012). This includes an investigation of how the mechanics of digital geographies have often acted as substitutions for previous models of discursive-material practices (Leszczynski, 2009a), creating questions about whether the 'neo' in neogeography is actually novel (Leszczynski, 2014). As Perkins argues, despite the democratisation of open-source mapping the social, cultural and signifying elements of the cartographic system itself are 'performed in ways that respond to powerfully fixed forces' (Perkins, 2014: 12). These forces remain resolutely bound by the social. This is not as simple as the paper map being replaced by the digital map, for instance, but rather the cartographic structures of survey and cartography being subsumed by Geographic Information Science, or empirical observational methods being replaced by data-driven practices (Dalton and Thatcher, 2014). Given the discussion in the previous chapter about the fixed-fluid dynamics of cartographic reason, as it becomes formalised through the dispositif, the question about the on-going role of digital geographies and geographic information science in post/colonial spaces is not merely about new forms of communication. Rather, it is about the continuation of legacies of a power/knowledge spatial politics that are simply bearing a more situated, mobile mantle.

### *Mobile, motile media*

Alongside recent discussions in geography about implications of digital technologies and spatial media, (particularly, the 'neo' in neogeography), there have been ongoing discussions in media and cultural studies about the 'new' in new media (Livingstone, 1999), or whether such technologies can even be considered 'new' in a post-digital world (Berry and Dieter, 2015). Whereas research on digital geographies and critical GIS tends to focus on the politics of spatial technologies in a digital age, this section specifically focuses on the mobility of computational devices like smartphones (Hjorth *et al.*, 2012), tablets and other handheld (Richardson, 2005) or mobile media (Goggin and Hjorth, 2014). In particular, this section attends to the relationship between such devices and the movement of people through space.

Key to the investigation of this literature are approaches that emphasise embodiment, corporeality and materiality (Richardson, 2007). Wilson (2014a) argues that mobile computing constitutes a bodily performance, which creates new relationships between software and hardware. In this relationship, the 'body is raised to the level of hardware' (Wilson, 2014a: 6) through discursive-materialities of 'connectivity'. Using mobile screens can be considered as a navigational practice, and digital mapping as particularly playful in its affordances. However, while November *et al.* (2010) argue that the mimetic representation of digital maps differs to their navigational structure, Verhoeff (2012) argues that the screen itself augurs navigation regardless of mimesis. This becomes more profound when enmeshed in the practice of moving through space with a screen, as everyday mappers often do whilst walking or in cars. By shaping trajectories, the deictic relations of the mobile screen produce a performative cartography, whereby the user becomes embroiled in a visual regime of navigation through space and time (Verhoeff, 2012). Furthermore, the intimacy of the mobile screen plays a particular role in place-making through body-screen relations, where place becomes attuned 'between' (Richardson and Wilken, 2012), through storytelling (Farman, 2015) and practices of digital wayfaring mediated through camera phones (Hjorth and Pink, 2014).

Through the mobility of mobile mapping, then, the navigational technology of the digital, mobile map becomes two-fold: firstly, it is embedded in the deployment of the map and the way in which it invites movement and travel (Perkins, 2006). Secondly,

it is entrenched in the embodied haptic capacity of the device, which also asks for a particularly navigational and tactile unfolding of practice (Farman, 2012; Verhoeff, 2012; Ash, 2013). As such, mobile media have a unique set of poetics and practices (Crow *et al.*, 2010), produced through the rhizomatic hybridisation of the geo-spatial into the body (Richardson, 2010), enveloping space and time (Ash, 2015). Mobile media also produce a mode of sociability through social media platforms (Humphreys, 2013; Katz and Lai, 2014), whereby - for instance - the disclosure of the location of users, or the presentation of self, becomes a social activity through eponymous and anonymous interfaces (Sutko and de Souza e Silva, 2011). Digital media allow for activities that compress space and time, bringing distant events near in almost real-time, creating more complex networks within mobile mapping. This is achieved through the production, dissemination and consumption of news (Sheller, 2015a), location-based updates on social media like Facebook (Wilken, 2014), recording through camera-phone practices (Gye, 2007; Pink and Hjorth, 2012; Hjorth and Hendry, 2015) and mobile, online political participation (Martin, 2014). The use of mobile media also produces particular orchestrations of spatial practices within mobile mapping, including the ordering of how people move through the city on transportation (Ng-Chan, 2014; Wilmott, 2016a).

In spatial terms, media convergence between technologies, bodies and spaces is predicated upon dispersed, invisible digital infrastructures and, in particular, the Hertzian landscape (Mitchell, 1995; Mackenzie, 2006). This term denotes the spatial plane comprised of Hertzian frequencies (signals, soundwaves, electromagnetic frequencies, radio-frequency IDs) (Dunne, 1999). Hertzian space supports the mobile technologies of the city (Urry and Sheller, 2006; Burke and Tierney, 2007), facilitating spatial media practices through localised Wi-Fi connections in public spaces, data roaming (Mackenzie, 2006; 2010) and now through radio-frequency IDs (RFID) (Frith, 2015) and other ambient media transmissions (Thielmann, 2010). Digital infrastructure is also produced through particular economic and political structures - geographies of the digital - which, in the context of post/colonial spaces, remain embedded in lingering colonial structures that form particular modes of domination and hegemony (Horst, 2013; Cubitt, 2014). Such structures also accelerate the commercialisation of mobile media (Leorke, 2015) through markets (Fisher, 2010; Goggin and Hjorth, 2014) and informal economies (Lobato and Thomas, 2014).

With mobile technologies, the political debate surrounding new media extends to haptics and questions of touch, as wearable technologies encourage intimate contact between bodies and data mediated through hardware (Hind and Lammes, 2016). Body-technology relations appear across a number of practices, often termed the 'quantified self' (Swan, 2013; Nafus and Sherman, 2014; Lupton, 2016). Such relations gather the expression of embodiment - from heartbeats to footsteps - into quantifiable, calculable data which can often be understood cartographically or locatively. Digital technologies are no longer considered only as portals to the internet (through data roaming) or repositories for data (for instance, geographic information systems), as they were in the early emergence of online technologies (Manovich, 2001; Jenkins, 2006) but accompany people on their daily routines. They quantify bodies and movements, and therefore intrinsically link motility to mobile mapping practices:

'There seems little doubt that the mobile device's delivery of peripatetic yet present-at-hand communication and interactive media content has evoked a number of altered medium-specific ways of being-in-the-world.' (Richardson, 2005: para 24)

As a way of 'being-in-the-world', the intimacy of the mobile device is cemented in familiarity, a connection to 'home' and, in turn, the 'self' (Hjorth, 2012; Schwartz and Halegoua, 2015). Therefore, mobile media offer opportunities for cultural mapping (Hemmersam *et al.*, 2015), and the restructuring of notions of place as relationally programmed (Doyle, 2015) and deeply locational (Özkul, 2015).

To return to previous descriptions of cartographic reason, it is possible to see how technologies and sociologies act as phases of the same networks of actions (Latour, 1999), whether cartographically or digitally. The shift from cyber to hybrid, prompted by mobility and ubiquitous media (de Souza e Silva, 2006), is the mark of a much greater shift in the understanding of technology as a site of everyday politics. Moving away from social or technological determinism, the theoretical debate has shifted decisively toward the hybridised nature of bodies within what are, now, hybridised spaces. The cyborg no longer enters cyberspace (Hakken, 2002). The hybrid user wanders in hybrid spaces, replete with information and experience, moving in reality *and* virtuality (de Souza e Silva and Sheller, 2014; Freeman and Sheller, 2015). Furthermore, walking in the city becomes walking in the hybrid city (Van Den Akker,

2015), and we return to a more mutable, and transformative pinax, where technological devices become central to cartographic reasoning.

Images have long-mapped the city one way or another (Lynch, 1960). Yet, the technological - and in particular, the digital and computational - has abetted the cartographic rearrangement of spatial, temporal and bodily organisation. Such rearrangement operates according to the intimate intertwining of big data systems (boyd and Crawford, 2012; Crawford *et al.*, 2014) and the experience of being in the city:

‘Changes in urban form that have diminished the coherence of traditional means of urban representation have also levied increased demands on technological images to “map” the city, and thereby make it available to perception, cognition and action.’  
(McQuire, 2008: ix)

Technological images, like cartographies, illuminate the processes and everydayness of the city. Yet, between the forms of peripatetic action described by Richardson and Wilken (2009), and the images described by McQuire (2008), we see the compression of geographic information systems and corporeal, personal, locational mobility, pointing to a number of pressing questions regarding privacy, surveillance and everyday life. The cartographies produced through mobile media operate as models for understanding the world, yet, because of their hybrid status and corporeal intimacies, they often act in unpredictable and barely operational ways. In light of the enduring discursive materialisation of cartographic reason in positioning systems and geo-code (Pickles, 2004), and the appearance of cartographic reason in everyday mobile mapping practices, the extent to which digital technologies are cartographic structures is not entirely clear.

### *Calculations, classifications and controls*

What does it mean to be located in the ‘location-aware future’ (Wilson, 2012: 1272), given the geographical restructuring by digital maps, infrastructures and hybrid spaces? Like any digital artifice, digital maps key into complex language logics and codes, which remain under the graphic surface of the map (Lessig, 1999). Furthermore, the usability of the map becomes defined by factors including: the kind of coding system, the relationship between infrastructure systems such as satellites,

mobile devices, Wi-Fi networks and transmission towers. This affords a plurality in cartographic representation, where universal and hegemonic cartographies have been challenged by the relational reading of truth by democratized GIS practices (Knigge and Cope, 2006; Cope and Elwood, 2009). This has, perhaps, culminated in 'a new knowledge politics' (Elwood and Leszczynski, 2013: 545) where authoritative and governmental meanings of spaces, places and location can be contested. At the same time, Crampton (2003a) urges a critical eye, cautious to the governmentality and surveillance reproduced through the cartographic rationalism of digital technologies (see also Crampton, 2011) – a warning that is crucially important in post/colonial spaces.

Understanding how cartographic discourses are transferred to and transformed by digital computing requires a return to the principles of cartographic reason, an analysis of the (dis)continuity of certain practices of reasoning, and the politics of the cartographic dispositif in post/colonial spaces. The manifold nature of digital geographies and mobile media, as they become networked, has, according to Serres (1982b), seen the displacement of the Apollonian and Dionysian (cf. Kingsbury and Jones, 2009) into the system of 'Hermes' (Serres, 1968; 1982a). As I explained in the previous chapter, Hermes is a translator and an exchanger, a social agent of relationality. The path of Hermes, arguably, in the scope of cartographic reason across digital computation, is the cultural logic of metrics and mathematics, of algorithmic transformation. Supporting discursive-material relations between bodies, technologies and spaces, the system of Hermes shifts and redraws socio-spatial boundaries through predictability and exchange. Hermes, thereby, translates from the map to the computer in self-referential signification. Yet cartographic reason is more than translation, relation or mediation. The power of digital technologies lies as much in hidden material and technological architecture - in code, signals, space and time - as it does in semiotic graphical appearances. The logic of cartographic reason is analogous to the logic of code (Pickles, 2005). As Farinelli writes:

'...[T]he nature of the computer is that of being a map that continuously produces other maps, 'the square of a map' with the purpose, which is proper to all maps, of making the world more and more predictable through the application of a binary logic, a sort of logic that directly springs out of the map.'  
(Farinelli, 1998: 143)

In digital geographies, the map and the computer join forces to order space. Cartographic control, like *mathesis*, can be either quantitative or qualitative. Such control is predicated upon the social construction of space as a mathematical, numerable quality, and an earth that can be calculated (measured) and classified (described):

‘Here are the conditions or fundamentals of science: there exists to us a transcendental that has for an object, a transcendental earth (*terre*), which can be measured or described, in fact, according to all the geometries and topologies of history, ancient or to come.<sup>8</sup>’ (Serres, 1993: 306)

The conditions of transcendence, increasingly, are linked to digital technological developments and scientific achievements. Furthermore, as fixity and fluidity become increasingly relational, and the Leibnizian and Cartesian further intertwine, territorialisation becomes predicated upon inchoate bounding (Jones, 2009) and the smoothness of flows. Here, the settlement model of industrial capitalism begins to transform into the fluid disintegrating quality of contemporary capitalist motility (Brighenti, 2012). The hybridisation of space produces new territories that can be classified and calculated, and in turn, expands digital geographic imaginations that behold more situated, embodied and perceptive frontiers.

This contemporary, digital hybridisation, I argue, is the result of a continuing relationship between order and space from the Enlightenment through to the age of digital cartographies by way of cartographical reasoning - through *mathesis* and *taxonomia* (Foucault, 2002b), or *calculable order* (Crampton, 2011) and *systems of classification* (Leszczynski, 2009b). There is a continuity between the way in which surveying and planning was articulated as scientific (Dühr, 2006), and the ratification of digital binary-code systems in digital maps (Pickles, 2000). Wilson (2014c) argues that this occurs on a discursive-material level, where the continuing traditions of cartography in GIS reflect power-knowledge hierarchies inscribed into the processes of spatial meaning-making. Like Wilson, Crampton (2009a; 2011) sees this mode of reasoning as not ruptured by the advent of digital technologies - either in regards to

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<sup>8</sup> Translated by author.

GIS, big data or volunteered geographic information - but as a continuation of modes of calculation. He elucidates that the danger here is 'that we already approach the world in a predetermined, calculative manner; where to be, is to be calculable' (Crampton, 2011: 94).

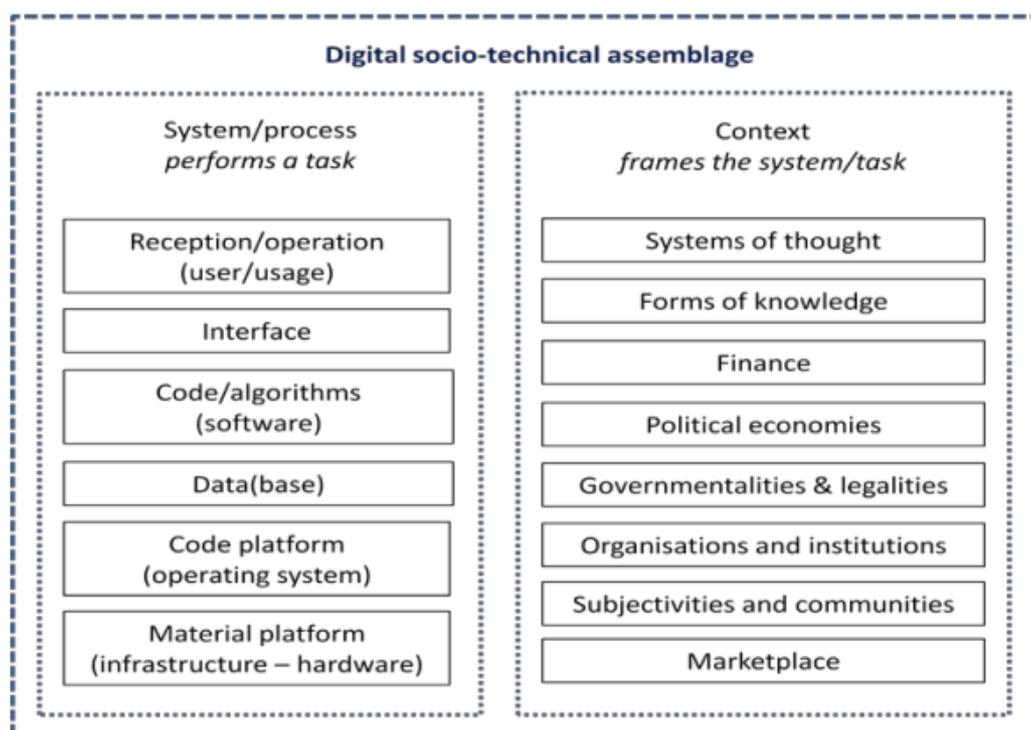
To fulfil the role of translator in a digital age, Hermes must also be a classifier and a calculator. In doing so, Hermes becomes subsumed by the noise - or parasites - which see relations fixed to create systems of predictable order. Here, Hermes becomes bound into the Enlightenment systems of Leibniz, which sees compatibilities between mathematics, natural order, and God (Serres, 2014):

'The first known system of communication is that of Leibniz. It is both radical and simple. No one relates to anyone or anything; doors and windows are not only closed but absent; everything and everyone relates to everything else by the intermediate of God...This system is perfect, can be mathematically determined in its parts, de jure and de facto. Inversely, this mathematics is optimal communication.' (Serres, 1982b: 43)

Through order, the calculative impulses of Cartesian structures are folded into the network of Hermes: 'mathematics is optional communication' (Serres, 1982b: 43). Crampton (2011) describes calculation in mapping as a mode of mathematical reasoning - an 'arithmetic information' (Crampton, 2011: 93) - which sees the formalisation of space according to numeric reasoning, or what I argue is the transformation of cartographic reason during the Enlightenment. This becomes at once territorial and indeterminate, as systems of rationality impact upon indigenous knowledge systems and territorial land claims (Crampton, 2011). Here, criticality towards the implicit systems of calculation in participatory mapping and VGI is important, since such systems allow traditional owners or local Aboriginal groups in post/colonial societies the chance to (re)map and (re)claim landscape, but also are restrictive to western paradigms of knowing and being (Sparke, 1998a; 1994; Crampton, 2011).

Classification also continues to occur at the operative level of the map in digital cartography. As Leszczynski (2009b) suggests: '[c]lassification cannot be avoided in the digital realm. One of the ways that we know the world is through naming, and

naming always implies classification' (Leszczynski, 2009b: 613). Furthermore, she notes that even at the level of the binary system itself, the process of formalisation is one of classification, whereby the very structure requires the attribution of an either (0) or (1) to material phenomena. The taxonomies described by Foucault (2002b), and the absences described by Harley (1992), can be equally found sequestered in legends, lines, polygons and algorithms, place-ids, geo-tags and data packets. This occurs as quotidian cartographers are faced with necessary decisions of classification at all levels of software/code infrastructures and the social structures of the cartographic dispositif (Figure 3.2).



**Figure 3.2.** *Digital socio-technical assemblage.* This figure shows the various levels of infrastructure embedded in the social and technical nodes of coded assemblages. (Source: Kitchin, 2014).

Classification is also a territorialisation. This occurs by fixing space through toponymy (Rose-Redwood, 2006; 2012b) or graphism (Braun, 2000), which then leaks into the control of populations through rational surveillance (Legg, 2005) and the bio-political control of bodies as they move (Huxley, 2006).

With the advent of the Internet (and then mobile media), networked urban spaces are new frontiers wherein representation and experience become mingled into situated performative encounters, representing a breakdown of traditional boundaries

between representation and reality (Sassen, 2011). Through the classificatory and calculative systems of cartographic reason discussed in the previous chapter, geographic information systems continue to filter in and out of urban spaces. This occurs through networked manifestation on mobile devices and the role of geographic information systems in urban planning. By braiding Cartesian geometries and Leibnizian topologies together, digital systems of classification and calculation can operate across multiple scales at once; from global geo-politics to local, lived experiences. Place becomes rewritable (Graham, 2010), bodies become on-going sites of surveillance (Crampton, 2003a; Crampton and Elden, 2007), and anxieties of control over data are established (Leszczynski, 2015a). The practice of extracting data fumes (Thatcher, 2014) or sweat (Gregg, 2015) left by users becomes a global politic localised in the everyday. Furthermore, the transformation across scales is often underpinned by the discursive mechanics of systems that are often black-boxed or otherwise difficult to access (Latour, 1999). In light of contradictory philosophical understandings of the relationship between knowledge and space, Leszczynski (2009a) suggests that there cannot be consensus between the critical and quantitative within geographic information systems. Here, once again, Hermes is revealed to exchange for both gods and demons, dependent on perspective, in an on-going network of multiplicity and simultaneity. It is in this network that technology and calculation appear together, in modes of action, which are inextricably based in the ordering impulses of Western reason.

### *Digital speech-acts?*

A study of mobile mapping practices, technologies, spaces and bodies becomes more complex with the development of digital mobile mapping technologies (or what I call 'mobile maps') and their integration with geographic information systems and global positioning systems. In mobile mapping practices, every speech-act requires an enunciator and an enunciation (Foucault, 2002a). In a digital and globalised age, there is more indeterminacy about who is the mapper and what is the map. The mappers may be the invisible coders and the algorithms they leave within the map, the corporations and individuals that gather data and copyright it (or leave it open), or they may be the people on the street, who tentatively decide when to use the map, to centre it on their position, who navigate the interface and move through space, who remember space and deploy cartography. By the same token, the map might be the lines on the screen, the lines of code, the appearance of screen itself, the totality of the server on which it sits, or it may be the culmination of invisible signals across the

world, the interplay between visible lines and binary logics, or merely a collection of fragmented signs; part of a wider discourse. Speech-acts fold into cartographic systems that are deeply embedded within algorithmic calculations. They also engage perceptions of space, the materiality of moving, spatial data systems, radio signals. Calculations, then, embody movements, co-produce navigations, trouble hard and soft edges of the landscape and see the quickening of the past into the present.

This complexity muddies how emergence is understood in mapping practices. Arguably, in the endless cycle of representation that constitutes digital technologies, techno-social actors become distanced from the realms of responsibility as the dispositif becomes further buried under lines of code and modernist models of progress (Baudrillard, 1993). The 'unfolding' of mapping practices is supported by powerful discourses and semiotics appearing at the surface of the representation. It is also supported by inter-penetrating mathematical systems that bring the calculation and production of geographic information closer to bodies. The surface representations of the digital map, as well as geographic databases that populate the map with information, are situated through networks that hold and restore information to the mobile screen in different rhythms. This occurs through databases that categorise spatiality according to specific taxonomies and so offer different results. Where Del Casino and Hanna (2005) argue that maps and spaces emerge together in constant iteration as hybridised 'map-spaces', in digital environments the relationship between maps, mappers and mapping instead comes to resemble a concertina.

Therefore, in digital mobile mapping, the emergence of 'the map' is not as simple as always 'becoming' (Kitchin *et al.*, 2009), nor is the status of the mapper as easily defined as a co-producer of 'map-space' (Del Casino and Hanna, 2005). Rather, mapping in this environment involves different levels of residue, resilience and rhythms. Servers retain information longer than screens do, whilst at the same time reifying simultaneity and co-presence in everyday life (Hjorth, 2005; Pink and Hjorth, 2012). This is the nature of Hermes, both fixed and fluid, wherein the network becomes a translator and exchanger by establishing common denominators to assist in these digital practices through calculation and classification. Here, universalism shifts from the sign towards the system. The sheer volume of information sees data become less important than its exchangeability, knowledge less important than its epistemological form (Serres, 2008).

As cartographic reason takes on the system of Hermes, classification and calculation become temporary actions of control. As the Leibnizian structures of digital systems (Serres, 1982b; Baudrillard, 1993; Serres, 2014;) transform the Cartesian structures in the city into localised, context-driven mappings, they create a field of *simultaneity*, where contradictory information can exist side-by-side *according to the same universal systems of representation under Enlightenment rationality*. Contradiction proliferates: digital technologies can operate simultaneously as chaotic and authoritative, rather than being dichotomised along a spectrum (Wilson, 2015). Notions of resilience and ephemerality, described in the earlier section on 'practice', become more convoluted as calculations are carried out *in situ* from informational databases long-established (Dalton and Thatcher, 2014) in tandem with persistent binary and geometric logics. The residual traces of practice in digital technologies become re-combinable and flexible, as the repetition of action becomes embedded in the possibilities of automation and computation.

This brings me to my last point on why a study of mobile mapping practices is important. It is not only towards the strategies of the institution - to governments and the legislations of planning, of privacy or copyright laws - that research must turn. Nor, should research only focus on Google or Apple, or even open source equivalents like Open Street Map. Although these broad-scale institutional and commercial practices of territorialisation, marketisation and governance are important, they also operate as forces of homogenisation that, in turn, blind us to where we may look for possibility rather than critique. To move away from the inert towards the active (in theory and practice), it is important to focus upon the forces of heterogeneity. This means focusing on the emergence of mobile mapping practices, bespoke to people, spaces and technologies, and considering how they illuminate the possibility of a dialogic resistance.

In light of these stalemates, this research into the everyday activity of mobile mapping asks if contradiction cannot be maintained, side-by-side, in simultaneous, coeval heterogeneity (Massey, 2005) without the need for universality. The question of practice becomes crucial, then, as the multiplicity of the Leibnizian system absorbs the dialectic formed by lines in the Cartesian system to produce a discourse of cartographic reason. Such an understanding can see the coformation of information without the need for synthesis. In this way, calculations and categories are paradoxical: at once bounding and opening, reducing and producing complexity. Serres (1982b) suggests that the universal God of the Enlightenment has been killed

and replaced with other ordering forces - science, politics, or perhaps economics. Hermes has no single God and is easily co-opted by the parasites. He is a polytheist, a 'chain of hourglasses' (Serres, 1982b: 44) ambivalent to power. Subsequently, we have a messy reduction - coordinates and codes speak through Hermes - not only a translator, but also as a calculator and a categoriser, finding equivalencies between points, regimenting systems against each other. But since angels (gods and demons) may both pass - restrictions and freedoms, restraints and affordances, subjugations and empowerments, *potestas* and *potentia* - all that is left in this research is to trace the knots of exchange, the politics of calculation and classification, and to ask: who is in control?

### **Affective assemblages**

Mobile mapping specifically relates to the movement of the body through space, more specifically, through mathematical spaces produced by cartographic and (now) digital technologies. Cartographic reason only operates as one unfolding of potential (Massumi, 2002) in mobile mapping. This lies in stark contrast to the desire for predictability and calculability of cartographic reason in mathematical space. Yet, where mathematical spaces like grids and topologies are, as Massumi (2002: 207) argues, 'carnally challenged', this section will trace how the *experienced* space of mobile mapping can equally be situated in the everyday vitalities and affects emerging between space, technologies and people. The previous section discussed how the cartographic impulse, the universal imagination, stretches into the network - with the Cartesian God as the architect, and the Leibnizian God as the arbitrator. I foregrounded some of the consequences of inhabiting a digital, cartographic world comprised fluid fix-points: the flat surface as well as the globe (the table as well as the sphere). This section re-routes back to the question of situatedness, the 'mobile' in mobile media, and the role of cartographic reason in structuring everyday experiences in a digital age. The age of colonialism, described at the end of the previous chapter, has not ended in Sydney and Hong Kong. Rather, as the dispositif of cartographic reason continues to calculate and classify, contrapuntal and *otherwise* knowledges continue to emerge as residues of colonial legacies.

The agency of Leibnizian universality has turned the cartographic gaze inward, shifting the power/knowledge relations between bodies, spaces and technologies. No longer engrossed in the extension into space *ad infinitum* of the grid, the miniscule

status of the universal characteristic champions opening the atomic, molecular and quantum levels of experience to cartographic reasoning. However, the problem, argues Olsson (1980), is that 'some facets of reality can be perfectly delimited, while others cannot. The former case fits well into the Leibnizian assumption. The latter does not' (Olsson, 1980: 21b). Embedded in moments of mapping, or 'making-do' to use de Certeau's (1984: 29) phrase, are constellations of other kinds of knowledge which are not necessarily able to be delimited. Nor can said knowledge constellations exist below the level of erudition, outside classifications and exterior to calculability. Foucault (2003c) highlights this in his lectures on subjugated knowledges (Foucault, 2003c: 7) where he queried the politics of bringing such knowledges to the fore:

'... [A]fter all, once we have excavated our genealogical fragments, once we begin to exploit them and to put in circulation these elements of knowledge that we have been trying to dig out of the sand, isn't there a danger that they will be recoded, recolonized by these unitary discourses which, having first disqualified them and having then ignored them when they reappeared, may now be ready to reannex them and include them in their own discourses and their own power-knowledge effects?' (Foucault, 2003c: 11)

Therefore, in this section I sketch a way of thinking about 'otherwise' knowledges and foreground how they may constellate alongside the mechanics of cartographic reason. To do so, I emphasise the role of coformation and mobility in mobile mappings as continually emergent practices, before considering the role of affect in providing alternative modes of negotiating the relationship between spaces, bodies and technologies. Finally, I introduce the idea of haunting as a way of thinking about the lingering role of memory and erasure, as well as politicising the irruptive dissonance that occurs when the fixity-fluidities of cartographic reason are ruptured.

### *Coformation contra stasis*

Massumi (2002) argues that orientation emerges in the memory between the map and the bodily sensation of travel, rather than in cartographic technologies themselves. It is not always the case that maps are orienting, he suggests, but rather the shape of the space, its contingency and its bodily affects may also orient people.

He points back to continuum rather than a series of points, to movement rather than position:

‘When we think of space as “extensive,” as being measurable, divisible, and composed of points plotting the possible positions that objects may occupy, we are stopping the world in thought. We are thinking away its dynamic unity, the continuity of its movements.’ (Massumi, 2002: 6)

Movement, Massumi argues, is not indexed according to the position of the body. Rather, position emerges from movement. Despite the influence of Leibnizian spatialities on theoretical work regarding space, bodies and technologies, the momentary provisional stasis of co-existence has a reductive quality to the vitality of everyday life and experienced space. In part, this is because of its measurability in the monadic and the topological. Contrary to Foucault, for whom power-knowledge relations are a sign of homogenisation, the subjugation of other knowledges and the primacy of discursive formations, Massey (2005) suggests that the conflicts they form actually serve to illuminate processes of heterogenisation:

‘[T]he term coexistence is perhaps inadequate: stress needs to be laid also on *coformation*, and on the inevitability of conflict’ (Massey, 2005: 78).

Coformation, rather than form, is the crux of experienced space. Often, and foundationally, the emergence of one force does not preclude the emergence of another. Cartographic reason does not subsume the entirety of space, and the movement of bodies does not annihilate the dispositifs of cartographic reason. Here, *coformation* becomes a crucial term, a kind of emergence, which, in turn, makes room for immanence and for *indeterminacy* (Massumi, 2002). This is where my deployment of affect becomes more attuned to the work of Massumi (2002), Stewart (2007), and Gordon (2008), and the way in which the ordinary, the mundane and the everyday may also have a *disruptive* and *discontinuous* political force. With coformation comes ordinary potentials, drawn from indeterminacies and affects (Massumi, 2002), contradictions (Massey, 2005), absorption and malabsorption, discontinuities and continuities (Foucault, 2002a), becomings and unbecomings (Deleuze and Guattari, 1987). This is where the ‘*more-than*’ in ‘*more-than-representational*’ mobile mapping can be situated.

Indeterminacy, or what Stewart (2007: 21) calls 'the potential stored in ordinary things', is a 'network of transfers and relays ... [f]leeting and amorphous, it lives as a residue or resonance in an emergent assemblage of disparate forms and realms of life.' (Stewart, 2007: 21). In disparity and residue, indeterminacy sits contrary to the universality of cartographic reason, forming spaces where multiple possibilities may still come forth:

'The heterogeneous nature of the world's articulation into these temporary time-space constellations serves to highlight, rather than indicate the elimination of, the significance of multiplicity'. (Massey, 2005: 77)

Reorganising space, then, in Leibnizian co-existences or Cartesian extensions, reduces space to a depthless, interconnected instantaneity (Massey, 2005). It ignores the indeterminacy of coformation and multiplicity - the foundational heterogeneity of space and a relational politics of the spatial. Coformation is exemplary of mobile mapping in specifically post/colonial spaces, where the on-going contradictions between the mathematical spaces of cartographic reason and experienced spaces of everyday life become absorbed by the colonial present.

In Bollnow's (2011) estimation, the body is a key facet of experienced space. It may thus be possible that the multiplicities of moving bodies could contribute to the heterogeneous and coforming space produced by mobile mapping. To think about space in a way that gives credence to multiplicity in temporary time-space constellations, Massumi (2002) turns to the affective relation between movement and rest. It has already been widely argued that stillness and movement constitute two poles of the same processes (Bissell, 2007). Affect is deeply relational, a bodily intensity that is *felt* between movement and rest. It can be found in the relationality of the body to its own movement - not to its speed. For Massumi (2002), the body is more than a corporeality that is determined and inscribed by discourse, or comprised entirely of signs. It is 'real-but-abstract', and occupies what Foucault (1972: 231) calls 'incorporeal materialism'. This ambiguous 'real-but-abstract' materialism has a charge of indeterminacy because it coincides and refers to itself in the process of movement. Therefore, as the body moves in mobile mapping, it links with multiple referents including the real-but-abstract of cartographic reason in mathematical

spaces and fixed-fluidities, as well as the real-but-abstract of itself, embedded in movement, experience and immanence.

Against the mathematisation of space, Massumi (2002) denies that the body should either be coded, or inherently and a-critically positioned on a gridded surface. In this case, positioning is akin to a cultural freeze-frame, a zero-point of stasis. A parallel argument can be applied here: Serres (1982b) points us not only to the nodes in the system of Hermes, but the movement in-between them. In the passage between nodes the messenger transmutes the message, a mediated metamorphosis from point to point. Therefore, across both the discursive and the material, politics can be found residing in movement as well as destination. Given the multiplicity of mobile mapping and its many strands, the singular understanding of mapping as a text-body or text-space process becomes complicated. So, this thesis investigates how, as mobile mappings form mathematical spaces with their abstract lines and material channels, as well as lived space, underscore not only movement rather than stasis, but also *(co)formation* rather than *form*, *folding* rather than *the fold*.

#### *Indeterminate, ghostly affects*

To return to the post/colonial concerns of the previous chapter, as post/colonial processes are produced through cartographies, so they also produce geographies of anger (Appadurai, 1996) in the form of affects. Such affects intensify across the scalars of the global and the local, a point of encounter between mathematical and experienced space. 'Ordinary affects', Stewart (2007) writes, are 'intensities of the ordinary' (Stewart, 2007: 5), 'the uncanny sensation of a half-known influence' (Stewart, 2007: 60), trajectories, eruptions, swarms. Anderson (2006; 2014) describes affect as both inside and outside, interior and anterior to the process of discourse - more-than-rational and less-than-rational forces. Foucault (2002a), as noted earlier, also alludes to pre-discursive space and non-discursive practice; spaces where subjugated knowledges reside. In colonised space - and in Foucauldian space - it is hard to see how there could be anything other than discourse: language becomes a modality of power, and the process of imperialism sees the decline of local knowledges and the languages that house them. Reason becomes reproduced through the cartographic eye - to the point where all forms of looking become a colonisation. Yet, there must be hope because – generally and

especially in the interviews carried out in this research - people are more complex than passive automatons of discourse (Anderson, 2009).

As well as residing in-between movement and rest, affects can also be found in the distance between institutional, governmental, *colonial*, descriptions and the meanings made at the local, corporeal, dwelled level:

‘These spatial struggles are not simply about control of territory articulated through the clear binaries of colonialist constructs. They are formed out of the cohabitation of variously empowered people and the meanings they ascribe to localities and places. They are constituted from the way in which the global and the local always already inhabit one another.’ (Jacobs, 1996: 5)

In post/colonial spaces, the scalar entanglements of colonisations become sites of encounter and co-existence between categories. In mobile mapping, as it inhabits both mathematical and experienced space, the politics of representation and power/knowledge relations become shaped within and beyond cartographic reason. Barad (2010) describes dis/continuities in what she terms ‘spacetime mattering’<sup>9</sup>, where dis/jointedness and reconfigurings characterise quantum entanglements and enfoldings as material space-time-matter. This transgresses the binaries of maps and spaces, or materiality and discourse, to consider them at the same level; as interconnected yet with their own forces. This thesis investigates how, inside and outside, practices coform across the body between the map and the landscape. They do so through discursive dispostifs, spatial stories, ordinary potentials and indeterminate affects. This occurs beyond the map in a rhizomatic assemblage of forces (Deleuze and Guattari, 1987), a situated, constellated moment of encounter. Forces touch each other in quantum entanglements and enfoldings (Barad, 2010), slightly shifting trajectories, reshaping spatial emergences, as cartographic reason writes bodies and spaces in a reciprocal process.

This mobile mapping assemblage is, perhaps, contrapuntal (Sparke, 1998a), a ‘liminal signifying space that is *internally* marked by the discourses of minorities, the heterogeneous histories of contending peoples, antagonistic authorities and tense locations of cultural difference’ (Bhabha, 1994: 147). Again, the concept of a

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<sup>9</sup> Barad (2010) also describes spacetime as being often called ‘history’; arguably, it may also be called ‘geography’ (Whatmore, 2006).

heterogeneous coforming space arises at the point of post/colonial liminality, wherein a single subject can be both inside and outside the structures of cartographic or governmental power. For this reason, mobile mapping assemblages cannot solely encompass mathematical or experienced spaces, but rather, they *must encompass both at once*. As Massumi suggests: 'no single logic, geometric or otherwise, is flexible enough to encompass the concrete abstractness of experience in all its ins and outs' (Massumi, 2002: 205).

Harley (1992) argues that absences on maps speak as loudly as inclusions. Carter (2009) argues that the movement and liminality inherent to mapping practices is erased from the map through geography's myth of ordered space. The creation of new territories, in their calculable extensiveness is the result of an accumulative transformation of mapping practices since the Enlightenment. The expansion since, of scientific modes of spatial, cartographic measurement and reason (from sextant to GPS) through colonialism has resulted in a 'historical legerdemain' (Carter, 2009: 17) that has erased these processes from collective memory. Maps are precisely a technology of *visibility*, and, since they cannot represent everything, they become bound as technologies of *invisibility*. This tension between (in)visibility echoes what Gordon (2008) articulates as ghosts; the apparitions of a social haunting, or invisible forces. Hauntings 'meddle with taken-for-granted realities' (Gordon, 2008: 8), and ghosts – 'seething absences and muted presences' (Gordon, 2008: 21) like the absence of journeys in maps - are signals that a haunting is occurring. At the same time, it is possible to see how maps also produce what Gordon (2008: 16) terms 'hypervisibility' through the hints towards journeys that Carter (1988) describes as lingering in the toponymy or graphism of the map. If the ghost is a sign of haunting, a persistent and oppressive force, notable as much in its absences as its presence, then maps of post/colonial cities are filled with ghosts. The absences, flattening and silences in such cities point to haunted landscapes that are indeed, 'seething'. In mobile mapping in Sydney and Hong Kong, hyper/in/visibility can be seen in the tracings of landmarks that are named after Indigenous people or monuments and discourses that sanitise historical narratives into nationalist iconography (Schlunke, 2005). Ghosts can be seen in the proliferation of maps, as cartography attempts to bring all stories of un-mappable spaces into cartographic calculability and categorisation. These particular descriptions of absence, presence and hyper-presence, also, arguably, indicate that the ghost is as much a spatial figure, as it is a social figure.

Of course, it is nearly impossible to see forces - affective or otherwise. The forces that assemble in mobile mapping are only visible in their effects (Massumi, 2002), such as the faster beating of a heart, the rhythmic flow of many bodies, the construction and ruination of cartographic architectures. Crucially, the universality of the cartographic imagination has the 'operationally convenient but ultimately haunting ability to reduce the world to one great repetition' (Carter, 2009: 17), erasing the possibility of paradox. Therefore, in order to understand how multiplicity, coexistence and coformation might appear in mobile mapping practices, it is crucial to go beyond the map. In doing so, it is important to reveal how the foundation of mobile mapping rests on a heterogeneous and open space, through which the embodied forces of cartographic reason and hauntings provoke and limit (each other's) emergences (Figure 3.4):

'Space can never be definitively purified. If space is the sphere of multiplicity, the product of social relations, and those relations are real material practices, and always ongoing, then space can never be closed, there will always be loose ends, always relations with the beyond, always potential elements of chance.' (Massey, 2005: 95)

The openness of space, its inability to be purified according to the laws of cartographic reason and geometric logic, or to be reduced to universal mathematical interpretations, creates affects, indeterminacy and hauntings. Affects, indeterminacies and hauntings are spatial as much as social; contingent and potential transformations that have not yet been realised and so cannot yet be ordered.

Indeterminacies are both exterior and interior to discursive formations or the assembling of the apparatus of cartographic reason. They may be absent in presence and present in absence, invisible in hypervisibility. Such potential is housed in transgression, in the openness of space, the affective relations of the body and the playful foldings of technologies. Therefore, this thesis moves forward into mobile mapping in the everyday practice of wayfinding, navigating, and moving-through as a more-than-representational affective assemblage. This assemblage affords the co-existence of mathematical and experienced spaces, the tension between discourses and subjugated knowledges, and the encounter between cartographic technologies and ordinary affects. This means attending to the more-than-visible, the more-than-

representational and the more-than-discursive. Affects, hauntings and paradoxes are indeterminate intensities - force-effects.



**Figure 3.3** *Constellation of a mobile mapping assemblage.* This image models a mobile mapping assemblage constellating, in a space filled with lingering discourses like cartographic reason (purple), residues and hauntings (yellow) and emerging affects (blue). This assemblage is a momentary gathering, a darkening, where the swirling and interacting forces of the apparatus and of dis/continuities assemble. Zooming out from Figure 3.1, the yellow markings indicate ghosts that linger in these slipstreams, while the white are gaps – spaces of contingency, open to possibility, unformed, lingering and liminal at limits of representation. (Source: Author).

The methods deployed in this thesis, which are the key concern of the following chapter, aim to be attentive to heterogeneous, more-than-representational and more-than-discursive nature of mobile mapping in order to encourage a research practice that is reflexive, attuned and open to potential. As mobile mappings unfold, these forces linger in the body, in space, and in digital geographies. In these moments of mobile mapping, the forces of homogeneity and heterogeneity assemble, constellating and connecting without necessarily cohering (Figure 3.4), revealing sets of everyday practices that are generative, powerful and always surprising.

#### **4. Prismic methods: unreasonable fields, visual-ethnographies and the 'every-where archive'.**

In keeping with the push of this project towards a 'more-than-representational' (Lorimer, 2005) approach to mobile mapping, the research methods used throughout this research are also 'more-than-representational'. The research questions outlined in the introduction aim to contribute to the shift from cartographic textuality towards cartographic practices, experiences and the ontogenetic 'becoming' of mapping (Dodge *et al.*, 2009a). At the same time, by choosing the leitmotif of more-than-representation rather than non-representation (Thrift, 2008), I wanted to assert the continuing importance of metaphor, image and textuality in the ways in which we perceive and experience the world. Therefore, this project interlaces the myriad potentials of representational and more-than-representational methods to engage with a more complicated and intuitive toolset for understanding mobile mapping practices.

This project is implicitly critical of the restrictive nature of unified theories regarding knowledge and the tendency towards cohesive, univocal epistemologies that act as colonising forces (Foucault, 2003c; Massey, 2005). Through searching for ways out of the fixity of representation, this thesis asks how methods can illuminate the momentary, multi-pronged assemblage of heterogeneous spaces, bodies and technologies. This was the focus of the methodological design of the project - to see if it was possible to trace a path into a mode of research that was one of valuation, not evaluation (Manning, 2015). This was a process that at once focused towards the embedded and porous, sibylline and delicate.

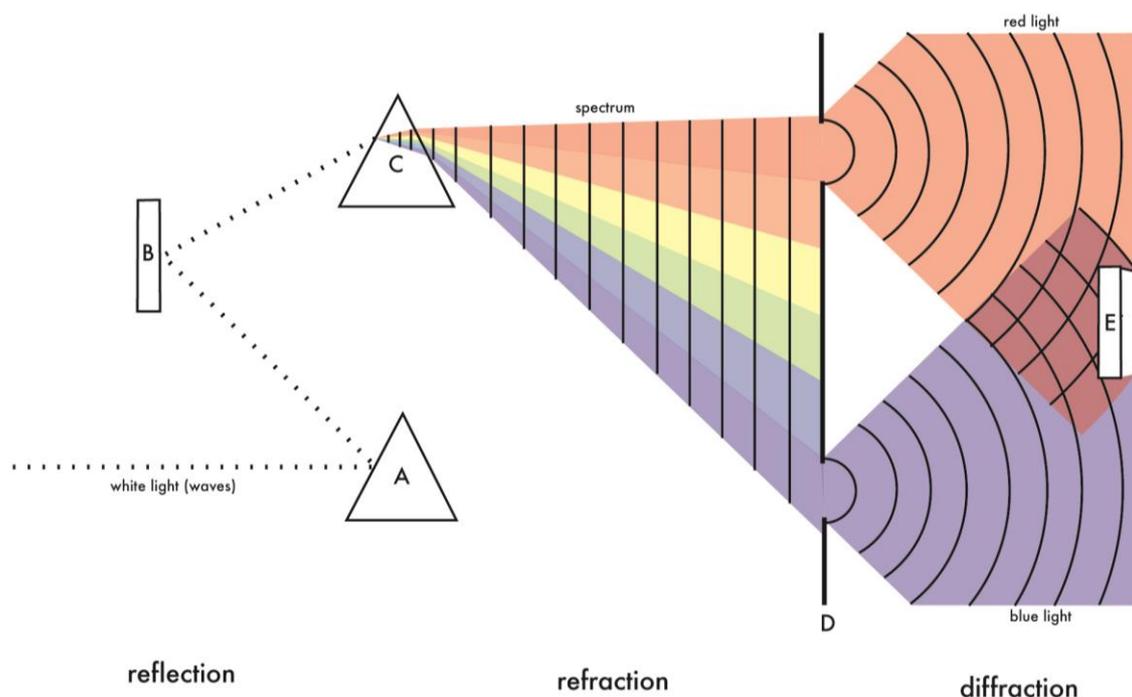
To do this, this research engaged mobile visual ethnographies (Pink, 2013), archival research (L'Eplattenier, 2009) and the retelling of spatial stories through encounters (Wilson, 2016 ). Mobile visual ethnographies combined participatory walking interviews (Evans and Jones, 2011) in both Sydney and Hong Kong as participants mapped with mobile and other media, with audio-visual and GPS recordings taken by head-mounted action cameras. This ethnographic information was diffracted with archival research in collections related to the history of urban development and landscapes in both Sydney and Hong Kong, and also with analysis of the visual and GPS data. These analyses turned into stories, which elaborate upon how technologies, spaces and people may come together to transform, to disconcert, to

make possible, and to produce experiential knowledges that work towards answering the questions of this research. This method of research – across the visual, the mobile, the ethnographic, the cartographic, the spatio-temporal, the material, the affective and embodied – is perhaps the first of its kind to be used as a mode of critical cartographic analysis. Working away from the binary of map and space described by Del Casino and Hanna (2005) it understands mobile mapping as an emergent assemblage of spatial practices, encounters and apparatuses, and seeks to forge a way forward for researching material-discursive practices between space, technology and people. For this reason, this is not easy to express in narrative form. Given the choice, I would represent these processes side by side, in columns, as threads that intersect and depart in different spaces and different patterns. As it is, I have only one voice on a portrait-oriented page and so I ask that this is read in the spirit, if not the format, in which it is intended. Firstly, I explain how I used the irrational, post/colonial spatialities of Sydney and Hong Kong to construct unreasonable fields of research in order to destabilise the primacy of cartographic reason in western metaphysics. Then, considering the ethnographic and the spatial, I go on to explain the design of an ethnographic, visual process (Hockings, 1995) that, at once, opened up and fettered the question of cartographic thinking and experience in post/colonial cities by inviting participation, and encouraging this research to be diffracted by the experiences of participants. Finally, I argue that the Foucauldian concept of the archive (Foucault, 2002a) can be expanded out of a traditional reading of statements into an ‘everywhere-archive’; encapsulating visual ethnographic data, landscape architectures (and follies) and embodied paths through space, so that the power of cartographic reason may be understood more broadly. *Crystallisation: reflection, refraction, diffraction*

To understand how the interrelations of the methods in this research created a fluid, shifting and rhizomatic research process, we can use Richardson’s (2000: 934) concept of ‘crystallisation’, because it is less calculative and more refractive than modes of triangulation (Denzin, 1989; Flick, 1998). Since crystals are prismic, they grow, melt and shift the flow of light depending on the surface through which the gaze is directed - reflecting, refracting and diffracting (Richardson, 2000). Prisms change the direction of the research process. Reflection, in this case, is not simply the return of the same light rebounding off a surface, but more rhizomatic, in which the surface itself changes the beam, letting some frequencies through and returning others. Refraction is where a light beam bends and becomes redirected (Abawi, 2012); the dispersion of light as it moves through the prism. Diffraction is ‘the

production of different patterns' (Haraway, 1997: 34), a rippling permutation of waves that opens, flows and intersects (Barad, 2003; Seghal, 2014).

Figure 4.1 is a graphic example of how this might work. As the research process becomes redirected, separated and sharpened, it illuminates some ideas, and traps others behind obstacles.



**Figure 4.1** *Reflection, refraction and diffraction as method.* Example of a single strand of research. Each prism reflects a different mode of crystallisation with the accident or aim of producing a particular effect within the research process. A and B are reflective prisms, C refractive, D diffractive and E an obstacle. (Source: Author)

As Barad suggests, '[d]iffractive readings bring inventive provocations; they are good to think with' (Barad, 2012: 50). Yet, diffractions and refractions are not just 'readings' of a current state of affairs; they are productive approximations and material engagements, entangling subject and object, downplaying divisions in which past and future collide and changing the space of research (Barad, 2009). Throughout the course of this research, simultaneous, accidental and unexpected crystallisations occurred across the breadth of ethnographic and archival methods. Furthermore, sometimes aspects of different methods crystallised *at once* in tandem with each other, and sometimes, in a more iterative progression, diffracting, reflecting and refracting through each other.

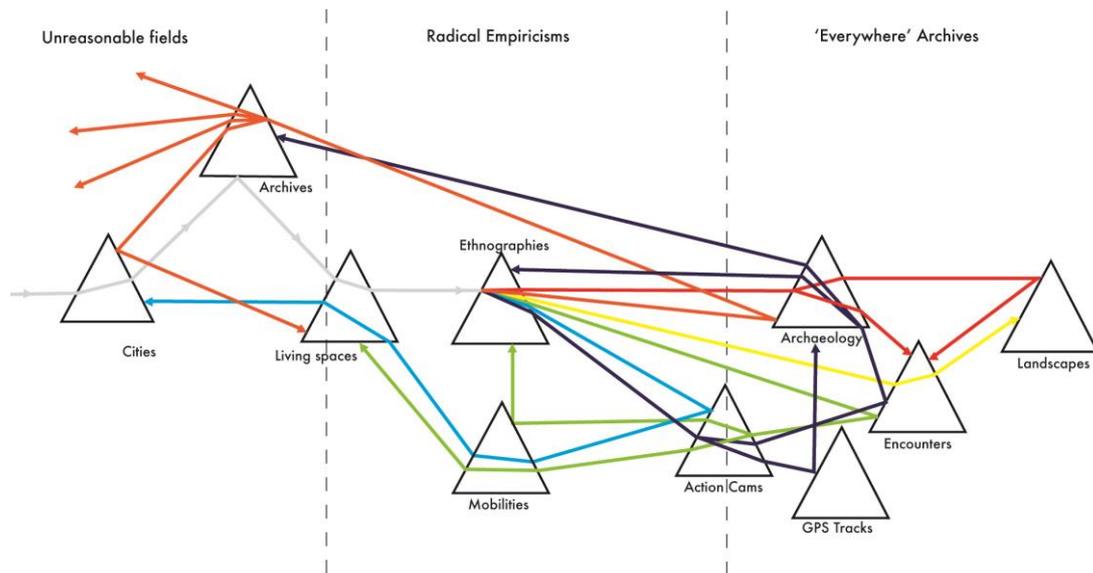
Therefore, the crystallisation of methods was designed not to cohere or abstract, but to diffract, refract and redirect - in short, to do what Law and Lin (2010: 137) call 'cultivating disconcertment' – central to destabilising the power of the cartographic gaze discussed in the previous two chapters. Moving from the idea that 'large issues can be detected in small practices' (Law and Lin, 2010: 117), disconcertment is what occurs when subaltern subjectivities and dominant hegemonies move through moments of encounter: when western metaphysics don't make sense in certain post/colonial spaces and times, when mathematical space collides with experienced space, when affects intertwine with technologies. Disconcertment vibrated through the unexpected and ambiguous nature of this ethnographic research (Amit, 2000), the parallaxes established through archives and the multimodal digital recording methods. The point of friction generated through methods in this research was more than a cultural clash - it was a bodily, intuitive and imaginative process that fundamentally reshaped the argumentation of this thesis. It opened up the research to unexpected 'radical empiricisms' (Manning, 2015: 64), intuitions and gravities that then folded back into the emergence of the research.

Through crystallisation, the messy, the divergent, the ambiguous and the inexplicable, the ghostly, and the 'radical' empirical were welcomed. Figure 4.2 demonstrates how the simultaneous paths and leakages of this research transmuted - vocabularies shifted, potential from the limits of representation arose, and haunted indeterminacies surfaced and became materialised. This resulted in a multitude of data, which became refracted through this research methodology, including:

- 17 sets of participatory walking interview ethnographic data
- 16 audio-visual action camera recordings including gestures, landscapes and architectures
- 1 audio recording
- 12 sets of viable GPS data (9 in Sydney, 3 in Hong Kong)
- 4 sets of non-viable GPS data (4 in Hong Kong)
- 41 maps of Sydney, and a collection of journals, sketches and images from 1770-1900 from four archives – the Mitchell Library, the City of Sydney archives, the National Library of Australia and the Museum of Sydney archives;
- 53 maps of Hong Kong, as well as correspondence, sketches and photographs from 1843-1997 from three archives: the Central Library archives, the Public Records Office and the Survey and Mapping Office.

- A collection of 200 photographs from Sydney and Hong Kong documenting historical, architectural and infrastructural ghosts.

Sydney and Hong Kong were originally conceptualised as multi-sited ethnographies, eventually, in their post/colonial present, were reconceptualised as unreasonable fields. Thus, as we walked and talked, both cities, for all their terms and boundaries, became absorbed into radical empiricisms of the living spaces of seventeen people, as I followed them in their irreproducible always-fluid specificity.



**Figure 4.2** *Prismic Methods*. Spectrums emitting from white light, colliding, refracting, reflecting and diffracting. (Source: Author)

These walks were diffracted through the recordings of action-cameras, voice recorders, screen capture and GPS trackers, which skewed, altered and absorbed the empirical, creating an 'everywhere' archive. Finally, reflecting back, the emergence of this diffracted audio-visual archive opened-up spaces and bodies to archaeological methods, and back again to libraries and dusty archives.

### Unreasonable fields

This section deals with unreasonable fields using a methodological approach devised to bring the post/colonial spatiality of materiality, experience and theory together. The unreasonable field was an implicit critique of arguments that took space, in universal terms, to be either *a priori* rationalist construction (cf. Elden, 2005) or as a humanist *tabula rasa* without room for spatial intervention or agency (cf. Del Casino and

Hanna, 2005). In Massey's (2005) estimation, space is heterogeneous; it can hold contradiction and is not limited to the singularity of cartographic representation. As seen in Law and Lin's (2010) work on disconcertment, cultivating contradictions and bringing radically different metaphysics into contact is a productive method through which to underscore the undulating boundaries between experiences, materialities and ideas in post/colonial spaces.

Clifford (1997) argues that sociological 'street-corners', or 'sub-cultures', and anthropological 'villages' are no longer isolated, no longer distant enough from the transnational forces of globalisation where the local and global collide in immersive ethnographic work. Humans may be, as Olsson (1991a) suggests, still bound to thrash within the epistemological limits of representation as we struggle to imperfectly conceive and communicate our bodily lives in a world shaped by cartographic reason. Such limitations are also housed in within the paradigms of methods. In a digital age, two lines - 0 and 1 - have come to increasingly define the scope of research and representation, from the archive to the village to the street<sup>10</sup>, in a symbolic exchange that Baudrillard (1993) argues is entirely self-referential. But not all lines are the same; even vectors can be transformed and systems warped. As Haraway (1991) suggests, we still maintain the possibility of shaping our research and our concepts into regenerative politics, journeys towards elsewhere, and relentless artifactualism (Haraway, 1991). Against the fetishisation of modern, rational, scientific methods, and their manifestation in cartographic desires for calculation, categorisation and homogenous systems of order, we can instead focus our methods on *movement* rather than fixity (Sheller and Urry, 2006), *possibility* rather than validity (Denzin, 1989), *knowledges* rather than facts (Saukko, 2003), as they emerge in the course of heterogeneous experiences.

I had originally chosen three case studies for this research - Sydney, Hong Kong and Los Angeles - which embodied different models of urbanism that had developed at the periphery of the imperial world (Harris, 2004). Yet, having visited Los Angeles and undertaken research into its historical and contemporary urbanism, I concluded that the duality of imperial legacies - that of Spain and of the United States (which has its own legacy in British and French urbanism) (Davis, 2006) - made it difficult to research within the restrictions of a doctoral project. So, I refocused on Sydney and

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Hong Kong. Rather than finding similarities between cities based on geography, culture or economy, I concluded that it was better to trace across spaces where compatible cartographic and technological phenomena had been implemented in the urban form through comparative colonial regimes (Said, 1993; Jacobs, 1996).

In the early stages of exploring the literature, working through the writings of Edward Said (1978; 1990; 1993; 1997; 2003) and Gayatri Chakravorty Spivak (1988; 1999; 1990), it became clear that the history of colonialism in both cities was fundamentally a history of a clash between what is perceived as 'Western' reason, and subaltern unreason.<sup>11</sup> These cities are also both sites that had clear incursions into the landscape by colonial forces: Sydney, with the arrival of Cook in 1770 and later, the First Fleet in 1788; and Hong Kong with Treaty of Nanking in 1842 and the construction of the city of Victoria - with complex socio-cultural encounters between polycultural communities (Prashad, 2003; Pugliese, 2007). Furthermore, in terms of space, popular mythologies of both cities suggest that they were built through ordering devices typical of the British Empire (Carter, 1988; Abbas, 1997; see also Arendt, 1950; Bhabha, 1994; Gregory, 1994) primarily during the nineteenth century, (albeit for different purposes). The role of cartographic reason had not been greatly explored in terms of cartographic reason in either city, and not with attention to situated ethnographic encounters deploying mobile media from this particular frame.

The porosity of post/colonial processes in both cities meant that the fields into which I was going to do research were already fuzzy (Nadai and Maeder, 2005) and irresolvably slippery (Law and Lien, 2013). To this end, Massey's (2005) idea of heterogeneous, conforming space, and the utility of disconcertment, was a useful place from which to conceptualise a 'field' (Amit, 2000: 6). Furthermore, because of waxing and waning spatial, temporal and social limitations that retained slippery and fuzzy qualities, the 'field' slipped outside cartographic reason into everyday unreason. Thus, the unreasonable field became 'unreasonable' because its scope was limited neither by reason nor representation. Instead, it was limited by flows of the city, the appearance of discursive statements and their fields of relations, as well as the haphazard trajectories of the research participants themselves.

As with diffraction, reflection and refraction, the formation of the unreasonable field occurred in the light of the specification and fine-tuning of the methods design. The

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<sup>11</sup> 'Unreason' here is taken from Foucault's writings on Freud (2001a; b; 2003a), where he criticised psychoanalysis for being unable to comprehend the 'voices of unreason'.

unreasonable field allowed more translucent and diaphanous presences and hauntings to emerge within the scope of the method. In a field of unreason, sites of coformation, fields of experience, fields of statements, fields of data and fields of whatever else could appear - disruption, contradiction, openness and heterogeneity - became the pre-thought and the through-thought, not the afterthought of method. If lines (of light, of flight, of power) could not be avoided, they could be diffracted, refracted and reflected in a chiasmic field of tender perception, intuition, imagination and creativity - or what Wolfgang von Goethe calls 'Zarte Empirie' (Wahl, 2005: 74). *Zarte Empirie* or 'delicate empiricism'<sup>12</sup> is a methodological tool that combines art and science, which Wahl argues offers balance to the 'conventional scientific practice and its underlying dualistic and rationalistic epistemology that categorically separates the observer and the observed' (Wahl, 2005: 74).

Figure 4.3 is an example of Goethe's (1810) delicate empiricisms on colour theory (*Zur Farbenlehre*), experimenting with Newton's ideas on light. Goethe's asks us to see how phenomena are already theoretical (that theory, objects and subjects are not separate entities) and that we are not objective observers who can freeze the 'flowing processes' of the world without consequence for the veracity of our research.

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<sup>12</sup> This has also been translated as 'tender' empiricism (Wahl, 2005).

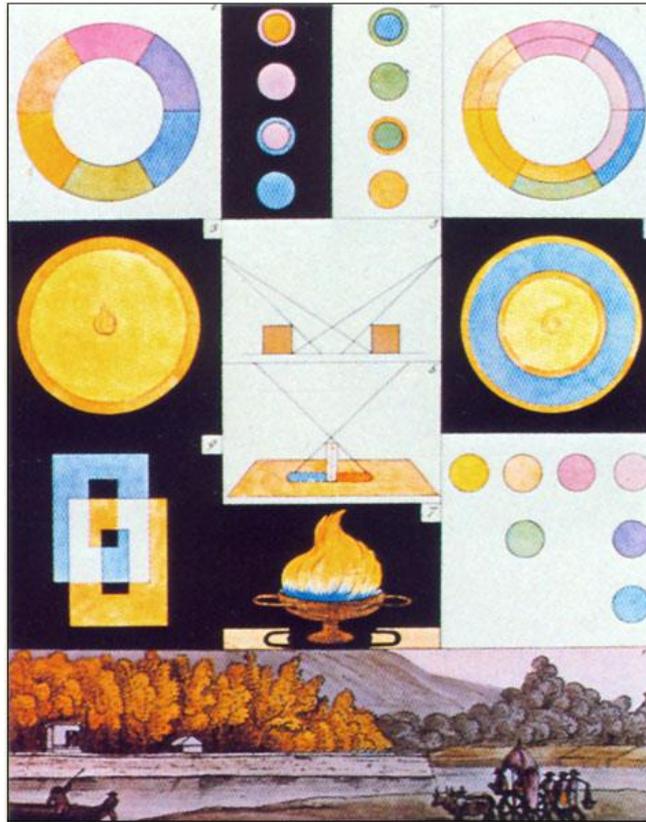


Figure 4.3 Goethe's (1810) *Zur Farbenlehre Plate 1*. Experimentation with blue and yellow. Bottom plate is an imagination of what an observer would see if they could not see blue or yellow. (Source: von Goethe, 1810)

On a more contemporary and political note, Goethe's delicate empiricisms can be reconsidered as 'radical empiricisms' and 'immanent critiques' (Manning, 2015: 64). Manning (2015: 64) argues that 'radical empiricism' attends to the 'quality' of experience and its assemblage-like field of relations, rather than emphasising reason, the differentiation between real and unreal, or subject and object. By critically engaging digital, geographic and audio-visual technologies and using them to critique, intuit, imagine perception, I found that it was possible to become more attuned to the ambiguities and fluidities of the unreasonable field.

Research thrusts ideas into the world, creating its own assemblages and diffractions. It is important to be careful where and how to begin, and keep the question of creative alignments balanced between opposing forces. Attunement alone, is not sufficient. As the research participants and I became attuned to the unreasonable field, we also co-produced and reproduced it: shaped it, bounded it, and opened it up. The edge of the city, the paths through space, the affective assemblages, the practices of making-do and the ghostly tendrils of haunting - ideas discussed in the previous chapter - were open communal negotiations of our qualities of perception.

In this process, edges shifted, fixities were placed, practice was interpreted and hauntings felt. Critical fixities - the action-camera, for instance - became tools for probing the limits of representation and experimenting with how cutting off flows can tell us something about their trajectories.

Furthermore, where there are only misalignments rising out of irreconcilable post/colonial metaphysics, within the unreasonable field, it was possible to, as Law (2004) suggests, use messiness, disconcertment and contingency as productive and creative allies. Amit writes on the open-endedness of ethnography:

‘Changes wrought by time, unfolding spatial configurations, the intricacies of even the most contained and continuous of relationships ensure that we are always chasing context but never squaring it off.’ (Amit, 2000: 16)

Thus, ‘unreason’ stood in dialogue with ‘field’ to create a spatial and temporal mode of research that is both limited and unlimited. The unreasonable field is a field without the need for synthesis, where the heterogeneity of space and practice can be understood in simultaneity with the rationalising force of cartographic reason. Sydney and Hong Kong became the material expression of these fields - their boundaries yet to be delimited - vital spaces (Sheller, 2015b) that were not beholden to the scientific prejudice of rationalism, but did not exclude it in its entirety.

### **Visual Ethnographies**

Understanding Sydney and Hong Kong as distinct, but comparable, empirical (unreasonable) fields, I moved towards a multi-sited ethnographic approach to ascertain what kinds of practices might emerge in those spaces (Marcus, 1995; Hine, 2007; Falzon, 2009). Not only does multi-sited ethnography disrupt the anthropological romanticisation of the ‘subaltern’, it addresses the heterogeneity of experience in both cities (Gupta and Ferguson, 1997). In turn, this also foregrounds a heterogeneity of space-times. Moving into comparative ethnographies of urban mobile mapping practices meant underscoring the *living* space of Sydney and Hong Kong in motion, as city-spaces shift and transform (Amin and Thrift, 2002).

It was important that the ethnographic methods I used allowed for prisms that diffracted, refracted and reflected the unexpected, the important or the disconcerting within the unreasonable field. Ethnography is not necessarily restricted to participant

observation - it can also be 'participatory qualitative research' (Hockey and Forsey, 2012: 69). Participatory research encourages the reassertion of other voices as active shapers of the research processes (Manning, 2015), rather than the creation of passive subjects from whom data can be extracted. This approach ties into ongoing debates within ethnographic literature about the delicate relations of theory and description (Clifford, 1981; Hammersley, 1990; 1992).

### *Talking, walking partnerships in coformation*

I only had a short period of time for research in each city - six to eight weeks at most - due to logistical and budgetary constraints. Furthermore, as I would begin in October 2013 and finish in February 2014, this period of research would fall over a number of key holidays in both the Australian and the Hong Kongese calendar. This compressed the temporality of the fieldwork greatly. Since the breadth of understanding achieved through long-term immersive ethnographies was not possible, I aimed for a deep understanding of subjective practices *within the city* instead of an ethnographic overview of the practices and cultures of larger groups.

Interviews can be conceived as a 'talking-partnership' (Rapport, 2012: 56) that is dialectical, focussed and ambiguous (rather than a data-gathering exercise). Through the interview, problems with both the conceptual and methodological design of research can be actively and openly questioned (Skinner, 2012), and addressed. Using concise, unstructured interviews, I was able to condense and frame the ethnographic material according to the spatio-temporality of the interview, without sacrificing the principles of openness, surprise and the unexpected. In short, the interviews themselves became unreasonable fields, bounding and opening the space of the city, gathering and delimiting discourses, while also pointing to discursive appearances across space and time.

However, it was not just talking that was important. Mobile mapping is situated, performative and navigational. As such, mobility (Sheller and Urry, 2006; Urry, 2007; Cresswell, 2011) and motility (Brighenti, 2012) play a crucial role in the coformation of both cartographic and heterogeneous spaces. Undertaking interviews in a siloed room would be paradoxical, when it was the experiential and embodied aspects of moving through space which were most interesting for this research. To concentrate on how this might work, I began to explore the possibility of mobile methodologies and methods (Hein *et al.*, 2008; Büscher and Urry, 2009), specifically the use of

walking interviews (Jones *et al.*, 2008; Evans and Jones, 2011) or walking as an urban ethnographic practice (Ingold and Vergunst, 2008; Vergunst, 2011). Despite walking interviews often being situated within the body of non-representational theory (cf. Vannini, 2015), they are not necessarily counter-posed to representational research (Merriman, 2013). By crystallising archival and ethnographic research, I decided that it could be possible to see the intertwining of cartographies and of bodies through post/colonial space (Blunt and Rose, 1994).

Thus, the bodily performativities of spatial modernity and postmodernity with relation to cartography also became possible to investigate: the flow of mapping and being in the world (Castleden, 2013), corporeality (Urry, 2002), immobility (Adey, 2006; Bissell, 2007; 2008), rhythmanalysis (Edensor, 2010a; 2010b) and mobility as a meaningful but also discursive practice (Jensen, 2013). If participants could choose their own paths, then the interview might work as a productive detour, to challenge and reroute the flow of the research and to offer new ways of illuminating the boundaries between cartographic reason and space. Sadler (1999) writes that the Situationists and Surrealists used chance and ambulation as a disruptive spatial method against the ordering of the city. Taking on the spirit of this work (through chance, serendipity, messiness and radical empiricism), walking also became a tool to reassert the vitality of living spaces against the fixity of the map (Vaughan, 2009).

Reasserting the ad-hoc, prismic and critical potential of the unreasonable field, I asked participants to structure their own interviews - and I would simply 'go-along' (Carpiano, 2009) with them as they did what they wanted, needed, or had decided to do (Figure 4.4 presents an excerpt from the Extended Participants' Guide). The 'go-along' walking interview was conceptualised as a way to undo my own tendencies towards certain kinds of navigation and movement, and as a way to immerse myself in other people's mobile mapping practices - to invite disconcertment (Law and Lin, 2010).

**'...there is no set of questions that you are being asked to answer - instead, you're in charge. You get to decide which places you'd like to go and how you'd like to discuss how you use mobile mapping in your daily life.'**

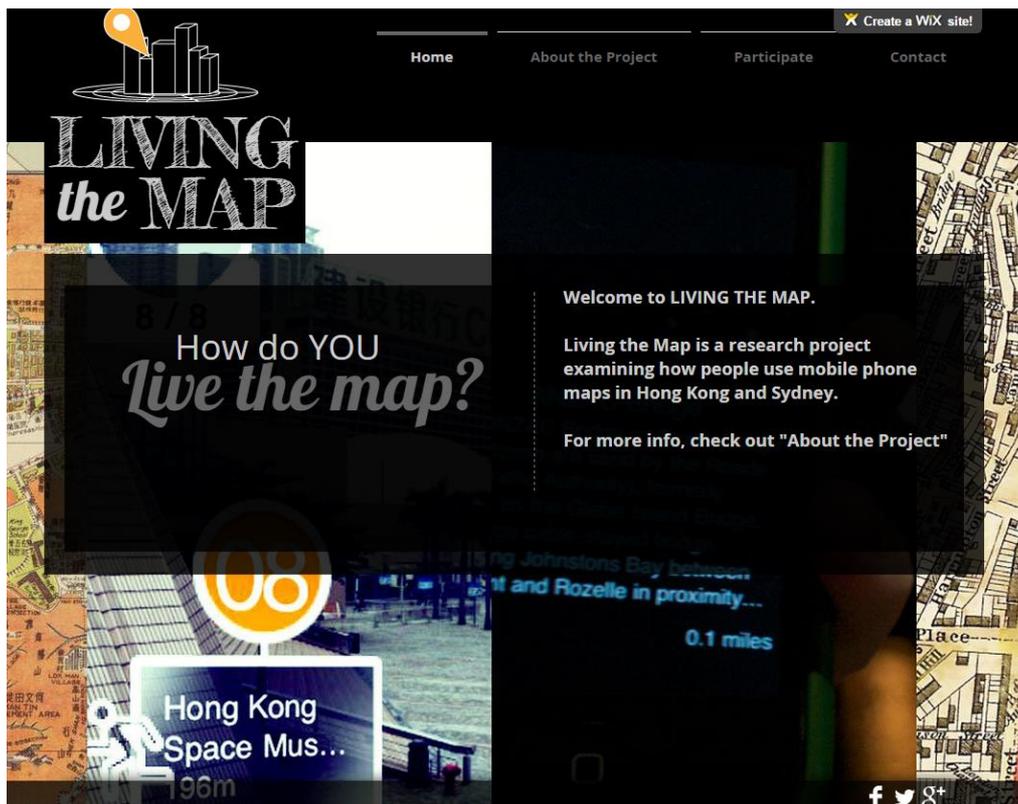
Figure 4.4 Excerpt from *Extended Participant's Guide* (2013: 5).

This style of research constituted a partnership not only in 'talking', but also in 'doing'. Together, the research participants and I coformed unreasonable fields, as the dialogic and ambiguous nature of the interview was transferred into embodied and situated practices of navigating, moving, thinking, dreaming and anything else as it occurred *in situ*. Thus, the walking interviews were more prismic than observational, amended into 'go-alongs' that were also street phenomenologies (Kusenbach, 2003), and a way of 'deep hanging-out' (Wogan, 2004: 129). The embodiment, scattered memories and spatial embeddedness of the multiplicity of paths, and their heterogeneous tactics, also resisted the pull towards comprehending mobility primarily through representation.

*In the unreasonable field: refractions towards unreason*

After gaining ethical clearance through the university research ethics committee, and spending an initial period of two weeks in each city, I made a website and put out a call for participants (Figure 4.8). I also created a Facebook page, a 'WhatsApp' account, and a Twitter account, and advertised through free local classifieds like Gumtree and Couchsurfing. Since the interviews were as open as they could be (with only the participants' paths through the city as a bounding frame), I made a specific effort to outline the initial justification of the research on the website and to ask them to challenge, as well as contribute to, the scope of the research.

This was of particular importance – although the research itself focused on the use of mobile digital maps, given the critique of the centrality of the digital object discussed in Chapter 3, participants were encouraged to simply use mobile phone maps as and when they would. This produced an interesting array of responses, where a significant portion of participants did not use mobile phone maps, requiring a reconceptualization of mobile mapping from being technologically to socially defined, ambiguous and practiced – the crux of the argument in Chapter Seven.



**Figure 4.8** *How do YOU live the map?* Website front page showing logo, links to social media (bottom right) and tabs for more information (top). (Source: Author)

Participants were told that they could do anything they liked, within the realms of health and safety - not late at night, not in neighbourhoods known to be dangerous, not in private space, and not to or from their house or mine (Appendix 1). They were also encouraged to read the documents and the consent forms before the interview (available via the website), and I made certain that we met for half an hour at least beforehand so that I could answer any questions. Little attention was paid to recruiting participants from particular backgrounds - the sample would be far too small to say anything resolute or generalisable about gender, race, class or sexuality (cf. Rabinow, 1985: 7) and this was not the focus of the research. I viewed this mode of deep, intense ethnography as a testing ground for moderating between discourse and experience in a concentrated spatial arena - a geographical rather than a sociological research project. Furthermore, deliberately seeking participants who 'fit' certain minority criteria also risked the uneasy territory of searching for 'native informants', anticipating that the culmination of unique experiences in one persons' life could speak for the experiences of all people who fit that criteria (Spivak, 1999: 5-6, 9; Devadas and Nicholls, 2015). Instead, and in line with the overall methodology, it made the most sense to respond to issues of cultural identity as they appeared in

the interview, and allow participants to decide if it was important enough to be included within the scope of their interview.

Cultural politics did become a factor in some research interviews – Sarah’s Aboriginal heritage, for instance. However, it is important to note that this was volunteered information, and something that Sarah herself identified as playing a role in her mobile mapping practices and not something that formed the scope of the ethnographic method. Shaun, on the other hand, made little point of his Aboriginality until the very end of the interview. Race and class too emerged with Ellen, but again this cultural politics was not something that I specifically sought – rather, it emerged again during the interview, and thus became gravitational. By the same token, many participants said little about their cultural identity in terms of gender, sexuality and class (although I know from early conversations with participants that there was a significant amount of diversity). The decision at the stage of method design was that it would only be included if the participants themselves brought it up because they felt that it was important to their story.

I recommended that each interview be about an hour - long enough to have depth, short enough to not tire us out and to allow flexibility for mobility issues. Leaving it open would allow participants to determine their own pace, distance and timescale. Due to the uncertain length and distance of each interview, I limited the total number to ten in each city, so that each interview could be given the time and attention that was needed during both the interview itself as well as the subsequent analysis of the data. I also knew from personal experience in media production that twenty hours of audio-visual material takes a significant time to process (even just in terms of computing power and loading time). In the end, I recruited *nine participants in Sydney and eight in Hong Kong*. In Sydney, all participants were recruited via Facebook, using the ‘snowball-sampling’ model (Noy, 2008) through networks I had already established. In Hong Kong, the pattern was somewhat different - four participants were recruited through expansions of academic networks, and four through posts on online classifieds or the ‘Couchsurfing’ website.

These interviews became the crux of the research, acting as a spatial and temporal bounding device to demarcate a field of analysis, and also as a tool to interrupt the univocality of theoretical work (Levine, 1988; Amit, 2003). Table 4.1 shows the list of participants recruited, the date of the interviews, the length of the interview, the

general locations of our walk and the kinds of data collected. The interviews occurred within a relatively compact timeframe of two weeks in each city.

**Table 4.1** *List of walking interviews* including names, dates and locations, as well as recording methods.

Name	Date	Length	Location	Data Collected
<b>Sydney</b>				
Marianna	02/01/2014	01:03:38	Alexandria	Video/Screenshots
Kyja	07/01/2014	01:15:50	City/Moore Park	Video/Screenshots
Tanija	07/01/2014	01:03:24	City	Video/Screenshots
Sarah	08/01/2014	00:58:46	City/Hyde Park	Video
Shaun	11/01/2014	01:43:12	City/Collaroy	Video
Nick	11/01/2014	00:52:27	Chippendale	Video/Tracking Maps
Cliff	12/01/2014	01:23:26	Ramsgate Beach/Botany Bay	Video
Ben	15/01/2014	01:09:21	Newtown/Camperdown	Video/Screenshots
Cassie	15/01/2014	00:37:32	Surry Hills	Video/Hand-Drawn Map
<b>Hong Kong</b>				
Daren	02/02/2014	00:52:34	Central/Sheung Wan/Soho	Video/Screenshots

(Table 4.1 continued)

Name	Date	Length	Location	Data Collected
------	------	--------	----------	----------------

Ellen	03/02/2014	01:12:24	New Territories, LOHAS Park	Video
Ravi	07/02/2014		Kowloon Peninsula	Audio
Vicki	08/02/2014	01:10:25	Central/Mid Levels/Peak	Video/Screenshots
Taylor	11/02/2014	02:54:48	Kowloon City to Yau Tong	Video/Screenshots
Camille	13/02/2014	00:20:57	Central/Soho	Video/Screenshots
Magdalena	14/02/2014	01:15:09	Central to Mong Kok	Video
Mohammed	15/02/2014	01:26:13	Central to The Peak	Video/Screenshots

Length, location and data collected are of particular interest here, since these aspects were largely participant-led. Most participants kept within the recommended time-limit. Some participants arrived with certain tasks already decided - places to walk to, chores or duties that they had to carry out. Others, unexpectedly, were excited by the opportunity to have someone *to adventure with*, and so took the chance to diverge from normal paths into unfamiliar spaces. It became clear that these 'adventures' were a crucial part of everyday life (de Certeau, 1984). Already, the everyday had shifted: the researcher is an interloper and a re-arranger who creates a conflict between research space and an imagined 'ordinary' life (Garfinkel, 1964). Furthermore, the manner in which people navigated, and walked, and chose their paths was deeply embedded in the practice of everyday life: Tanija's curiosity, Shaun's relationship with his GPS, Ben's desire to explore, Cliff's search to find what 'home' is, Ellen's hope to visit something beautiful, Ravi's compulsion to *be-in* the city, Taylor's love of long distances, and Mohammed's impulse to tour (for example). The ensuing result of this heterogeneity was a fascinating array of activities: from fitness regimes, shopping for roller-skate wheels, looking for graffiti and commuting home, to hiking and sight-seeing or exploring and waiting. Mobile mapping in the everyday was not limited to the realm of the familiar, but habitually included new experiences, learning trajectories and surprises. This shift informed a large section of the third empirical chapter, which was originally planned as an analysis of

subjugations in an age of digital cartographic reason, but instead became something more heterogeneous and hopeful.

*Critical fixities: screens, frames and tracks*

To conceptualise mapping as a situated practice, the recording method needed to apprehend a discursive-material ethnography with as much information as possible across the representational and the non-representational. Audio-visual devices with GPS capabilities offered the most holistic solution to capture gestures, architectures, landscapes, sounds, images, rhythms, technologies, words and things. There is a strong emphasis in visual sociology (Harper, 2012), visual anthropology (MacDougall, 2001), visual ethnography (Pink, 2013) and videographic methods in geography (Garrett, 2011) on the resistance of the image against teleological structures of written narrative. However, as Henley (2006) argues, narrative still remains within the conventions of videographic or filmic methods. The spatiality of the image presented an opportunity to combine visual methodologies (Rose, 2007) with non-representational methods (Vannini, 2015). Furthermore, GPS reflected and incorporated the situatedness of the ethnography, refracting spatio-temporal data between image/sound and coordinates/time-stamps. As such, I chose a triplicate mode of recording - visual, audio and GPS - as the most amenable and low-maintenance way of recording these ethnographic experiences.

This research was implicitly critical of how cartographic reason overemphasises calculation and classification in understanding spatial experiences. For Goethe, the artist uses imagination to paint - or 'cut' (Manning, 2015: 58) - between fixities and fluidity (Wahl, 2005). To 'cut' (Manning, 2015: 58) is to append a kind of fixity in research, either towards organisation or openness, in the hope of generating immanent critique. In an unreasonable field, coformed through walking interviews, modes of recording represented that 'cut'. Yet, it was difficult to find modes of recording that do not bear the hallmarks of calculation - especially in a digital age. Literature in both anthropology (Coleman and Collins, 2011) and the social sciences (Williams and May, 1996) underscores the problems of positionality, gaze and authenticity within interview techniques, especially in light of the ethnographic criticisms of traditional pseudo-objective anthropological research methods (Clifford and Marcus, 1986). Furthermore, visual anthropology encompasses more media theory which reflected the role 'documentary' evidence, such as film and

photographs, played in constructing subjects and viewers, or audiences (Devereaux and Hillman, 1995). Furthermore, even in digital video there is a 'seductive veracity' (Banks, 1990: 16) to the use of audio-visual or photographic recording methods: an illusion of verisimilitude interpreted as 'the pure voice of the "other"' (Banks, 1990: 16). To moderate the invisibility of the "cut", I developed 'critical' fixities that established two ways of diffracting, refracting and reflecting critical concerns of veracity, authenticity and ownership in this research. The first target was the content of the material itself: names, voices, faces, places and lives. The second target was the mode of recording itself - diegetic space, aspect ratios, definition, perspective, and in the end, digital imperfections.

As I understood the unreasonable field to be coformed, I placed the question of 'whose voice, whose words, whose image?' at the forefront of my mind. Given the open nature of the interviews, the majority of the stories, experiences, vernacular epistemologies, philosophies and mapping practices were not mine to claim. I subsequently aimed to directly attribute content to participants, unless they chose otherwise. I also did not wish to participate in the axiom of anonymisation that comes with institutional research. This practice, in specific situations, sets vernacular knowledges against academic and scientific authority, without recourse for talking-back or claiming knowledge by participants (cf. Nespor, 2000). After consultation with colleagues in visual anthropology, the University Ethics Committee and the University Legal Department, I managed to produce a combination of a Consent Form and an Audio-Visual Release Form via which participants could opt out of any or all of the methods of recording (Figure 4.5). They also had the option to sign a release on both their first name and any of the material recorded. This had a clause for the redaction of material within specific time frames that participants wished to keep off the record.

**MANCHESTER**  
1824

Research Participant's Consent Form

The University of Manchester

**Living the map**  
Research conducted by Clancy Wilmott, PhD Candidate at the University of Manchester

**CONSENT FORM**

This form underlines your consent to participate in the research. If you are happy to participate please initial each box and sign the consent form below

	Please initial box
1. I confirm that I have read the Participant's Guide about the above study and have had the opportunity to consider the information and ask questions and had these answered satisfactorily.	_____
2. I understand that my participation in the study is voluntary and that I am free to withdraw at any time without giving a reason.	_____
3. I understand and agree that the interviews will be recorded in the following ways: <ul style="list-style-type: none"> <li>• Audio-visual recording using a video camera</li> <li>• GPS tracking</li> <li>• Screenshots of mobile phone/tablet</li> </ul>	_____ _____ _____
4. I agree that any data collected may be made anonymous and passed to other researchers	_____
5. I agree that any data collected may be made anonymous and published in academic books or journals.	_____

I agree to take part in the above project.

\_\_\_\_\_  
Name of participant                      Date                      Signature

\_\_\_\_\_  
Name of researcher                      Date                      Signature

**MANCHESTER**  
1824

Audio-visual release form for research participants

The University of Manchester

**Living the map: mobile mapping in postcolonial cities**  
Research conducted by Clancy Wilmott, PhD Candidate at the University of Manchester

**AUDIO-VISUAL RELEASE FORM**

This form outlines your agreement for the footage recorded via video camera to be released in a non-anonymous format, to be used for academic presentations and publications. You **DO NOT** have to agree to this. Please tick one option, and sign at the bottom of the form. If you do agree, at the end of the form is a section (Attachment 1) where you can list all the footage that you do not want released.

---

**Option 1**  
 I consent and agree that Clancy Wilmott, PhD Candidate at the University of Manchester has the right to take photographs or record audio/video of me (and/or my property) and to use any and all material subject to my further approval excluding that specified by me in Attachment 1 of this consent form, with my identity withheld, in any and all media, now or hereafter known, and for academic purposes. (See attachment 1).  
 I do hereby release all rights to Clancy Wilmott to exhibit this work in print and electronic form publicly or privately. I waive any rights, claims or interest I may have to control the use of my identity or likeness in the images and agree that any uses described herein may be made without compensation or additional consideration of me.

---

**Option 2**  
 I do not consent and agree that the Clancy Wilmott, PhD Candidate at the University of Manchester has right to take photographs or record audio/video of me (and/or my property) and to use these in any and all media, now or hereafter known, and for any purpose whatsoever.

---

I am at least 18 years of age, have read and understand this statement, and am competent to execute this agreement.

Name: \_\_\_\_\_  
 Email address: \_\_\_\_\_

Signed: \_\_\_\_\_  
 Date: \_\_\_\_\_

**Figure 4.5** Consent (left) and Audio-Visual Release Form (right). These forms were distributed in a two stage process. The consent form was signed before the interview as an agreement to anonymised research recording. The audio-visual release form was designed to be signed at a later stage after the participant had seen the interview data (or the interview had at least taken place). Participants were free to amend the material they wanted protected, or to change their mind at any time. If they did not want their information released, participants were further encouraged to select the second option by way of their protection. (Source: Author) (See also Appendix 1 and Appendix 2)

Within the context of a bureaucratic and social scientific view of 'ethics', protection of data is emphasised, rather than control. This approach was somewhat rare and given the university 'default' on this matter was to protect personal data, creating controlled openings for its dissemination was a delicate process that relied on intuitions and attentiveness, as opposed to general policies or legal frameworks. This formed a crucial part of the 'pre-interview' meeting with participants where I went through the forms. I was surprised by the relaxed manner in which participants approached this departure from traditional research and the oscillating authority between us. All participants, except one, were happy to be filmed. The names of three participants were changed due to their closeness to the field or their precarious status. Some participants were completely ambivalent, even several years later when I contacted them to make sure it was still okay to use their first names, and others refused to watch the film back and said that they trusted me to be sensitive.

The second aspect in terms of the media and mode of recording, was bound up in limitations and potentialities of current audio-visual technologies. The decision to use an 'action-camera' (a small digital video camera designed for recording extreme sports) was also quite pragmatic. I had undertaken some preliminary testing during a student field course - which required following after students with a hand-held video camera. This experience revealed logistical and conceptual flaws in using hand-held video cameras that were not explicit in literature on mobile video methods (cf. Pink, 2007). The camera required a constant embodied attention, holding the weight in one or both hands and mediating between the view-finder (and the seductive veracity of the screen), the subject of the film and my own movement through space. Furthermore, the material presence of the camera between the students and myself was a constant reminder that that they were being watched and recorded, as the surveillant gaze consumed the conversation until it became stifling and claustrophobic.

However, packaged under a number of names (action cameras, head-mounted cameras (headcams)) are small, lightweight and weather-resistant devices that addressed many of the issues involved with hand-held cameras. They can be worn attached to the head leaving the hands free to use mobile phones, to press buttons, to drink water or whatever else was required during the interview. Action cameras have also already been used in field research where researchers and participants were required to undertake active or laborious activities (Brown *et al.*, 2008). I chose to use a Sony® Action Camera (Figure 4.6) because of the 'Steadyshot' shake-reduction technology. The 'Steadyshot' set the field angle to 120 degrees rather than 170 degrees, and artificially smoothed the jarring. Video was shot as MP4 at a mid-range resolution (or standard definition) of 1280x720 with a frame and playback rate of 30 frames per second - any higher in definition and the file size was too large, any less and it was unwatchable and inaudible. A higher aspect ratio allowed more spatial data to be included and reduced the risk of the participant disappearing from the frame. I habitually carried spare batteries and on rare occasions, had to interrupt the interview in order to change batteries. This led to multiple video files for single continuous interviews that I grouped together and moved to a secure drive after each interview.

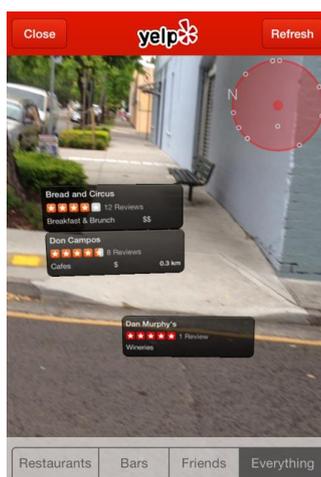


**Figure 4.6** *Action Camera*. Image shows the video-recording equipment used for the research, including: the action camera in its waterproof case (A), head mount (B1, B2), spare battery (C) with converter (D), handycam screen attachment (E) and charger (F) and waterproof case (G). (Source: Author)

The limitations to the action camera could, at once, reinforce and trouble the construction of cinematographic perspectives. Not quite compositional, accidentally framed, often off-centre, the recordings of the action camera are simultaneously structured by the logics of film but also the accidents of the blinded amateur. Action cameras have no viewfinder in their all-weather mode, and so the cut of the gaze offered generative potential in uncertainty - in other words, I had little idea what the camera was filming. To speak to the seductive veracity of the camera, later during the analysis, I found myself wilfully desiring to re-centre or straighten up the camera, or to redirect it to see something more closely or create a better screenshot. In the moment of interview, through to rewatching, the limitations of the action camera provided a critical view of fixity, where imperfection underscored my positionality, when I accidentally naturalised representation with mobility (Manning, 2015) and became seduced by the veracity of audio-visual technologies (Simpson, 2011).

Since action cameras require very little technical knowledge to use, it would have been possible to ask the participants to wear the camera themselves, so that I could

view the world through their perspective (at least, through the camera). However, the question of 'seductive veracity' again haunted this decision. I would never be able to view the world as other people see it - the camera only offered an approximation at best, and a colonisation at worst (Deger, 2006). Furthermore, the intention of this research was not to 'capture' experiences in the search for an 'authentic other', or objective validity. Rather, it was to trace the intersections of, and relationships between, space, technology and people in the experience of mobile mapping. This was already being refracted by the radical empiricisms of the unreasonable field, the trajectories of the interviews and the imperfect shots of the camera - all of which cultivated disconcertment (Law and Lin, 2010). Ultimately, I chose to wear the camera myself in order to reinforce my own presence in the research process, and to remind myself and the viewer of the analytic and scientific gaze of the researcher in visual ethnography (Morely, 1996) through hypervisibility, rather than invisibility. I complemented the use of the action-cam with occasional requests for screenshots from participants' phones (Figure 4.7). For many interviewees, this was a transformative moment wherein they took control and periodically (or sometimes constantly) offered to take screenshots, or simply took them and sent them to me, producing a collection of shots that was largely participant-directed, and became an important source of material for Chapter Six. One participant also sent me several sets of .kml data that he had collected during a newly implemented fitness regime so that I could see precisely where he had gone on a bigger screen.



**Figure 4.7** Screenshot of Yelp from Marianna (Source: Marianna's phone)

Finally, given the unpredictability of the audio-visual data, I needed a way to remember the path that we had taken without overly interrupting the flow of the interview. The decision to use GPS was functional - I did not want to have to take the

trouble to remember our path and so the GPS track meant that I could focus more deeply on the interview and the issues that arose. Furthermore, the action camera was already fitted with a GPS. I had also hoped that GPS-enabled video would provide a way to see the invisible plane of digital coordinates and digital cartographic systems alongside footage of the location. It did, to a degree. In a pendulum between accuracy and inaccuracy, the failures of the GPS (like the video technology) unexpectedly provided insight and critical potential.

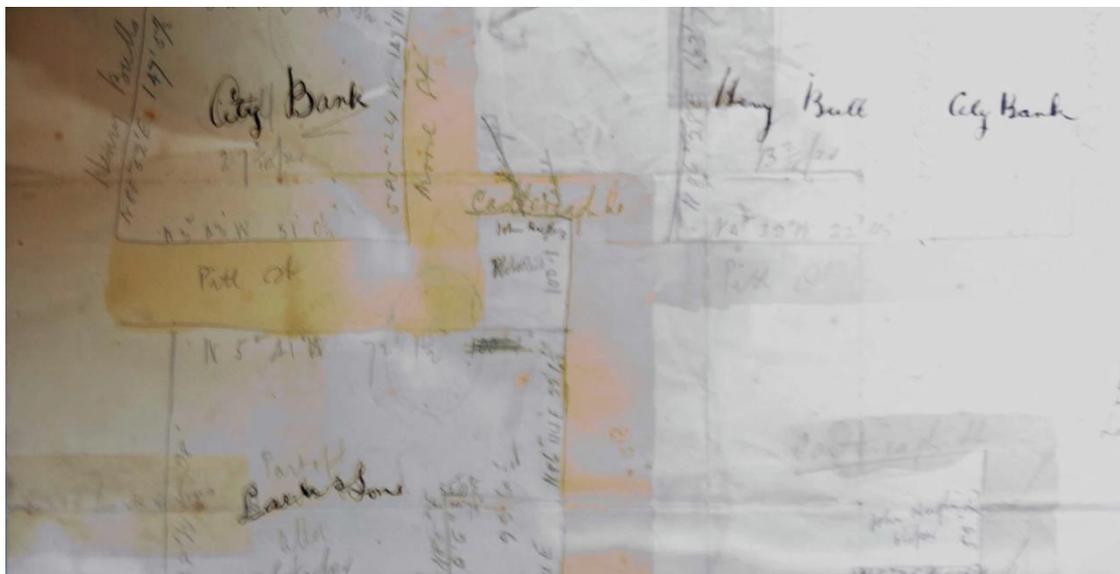
### **Watching and writing: the 'every-where archive', archaeology and encounters**

Once the interviews had been completed, the process of watching and writing, identifying points of intersection between space, technology and people, began to fragment and collapse the research process into something more rhizomatic (cf. Saukko, 2003). At this point, a significant body of multi-modal material had been collected. However, none of this resembled anything like 'data', but was rather a disparate collection of stories, thoughts, reflections and materialities embedded in imperfect textualities, with their own considerations and systems of power. This section explains how I made sense of this information, returning to a tender empiricism, whereby the archive became expanded according to Foucault's (2002a) archaeological method, read through moments of 'encounter' (Wilson, 2016 ).

#### *The 'everywhere archive'*

Key to understanding mobile mapping practices as situated between spaces, technologies and people was comprehending how the formalisation of cartographic reason (described in Chapter 2) may already have material-discursive residues which linger in the *dispositif*, to be encountered within the mobile mapping assemblage. Such phenomena included urban structures (such as streets, plans and pathways), toponymies, architectures, monuments and landscapes, many of which reside within the urban cartographic *dispositif*, governed by the logic of the map, whose documentary origins may be found within archives and traced into the present space of the research. As such, period of archival research in both Hong Kong and Sydney was outlined in the original research design as a way of familiarising myself with each city, its changing landscape and also its cartographic history (Lorimer, 2009). Through archival research, the process of the cartographic inscription into space

could also be traced: what kinds of discourses appeared in the archive at the point of ‘conceiving’ space and how they were then inscribed into the landscape. This focused on the role of the ‘representational’ in the ‘more-than-representational’, or ‘putting maps back into ethnographic mapping’ (Brennan-Horley *et al.*, 2010: 92). Dodge *et al.* (2009b) emphasise the processual aspects of mapping - or how maps and plans (and in turn, landscapes) come into being. Although many of the early maps of Hong Kong and Sydney were either available online in digitised archives or in historical atlases, I was particularly interested in any earlier ‘draft’ versions of these maps that might be available and the kinds of cartographic techniques that planners and map-makers used.



**Figure 4.9** *Draft Sketch*, somewhat restored by author through digital corrections, discovered in the State Library of NSW. Sketch is of preliminary plans of Pitt Street Mall – of particular interest is the use of coordinate geometry in establishing the relationality of the streets. (Source: Mitchell Library)

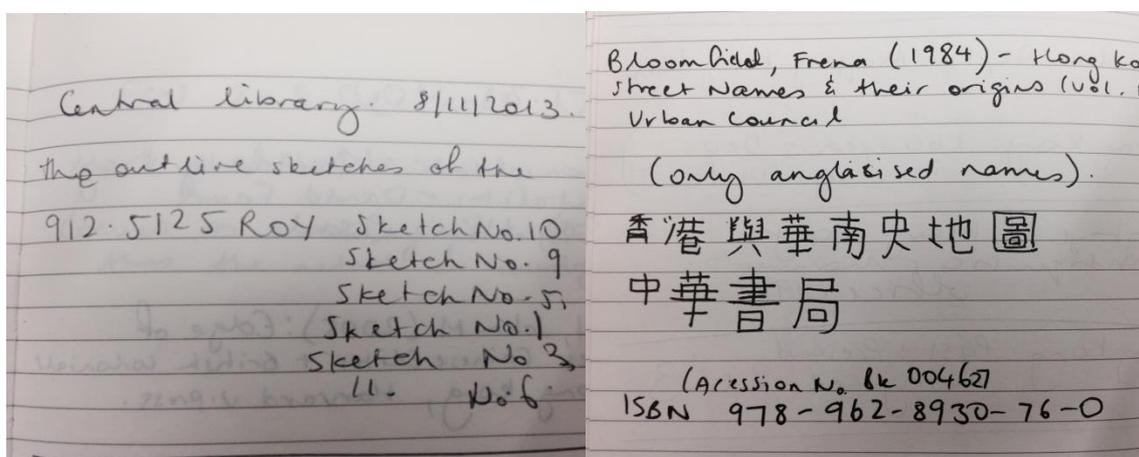
By considering largely forgotten sketches, it was possible to also reconsider the archive as ‘epistemological experiments’ (Stoler, 2002: 87). That is, in effect, to view the archive as something living (Hall, 2001) which produces varied affects and evokes memories in different spaces and at different times, which can be reworked into a critical tool for reimagining everyday life (Kirsch and Rohan, 2008).

Archive	City	Time Spent	Documents Examined

Mitchell Library/SLNSW	Sydney	21 hours	Maps of Sydney, 1770-1850 including Thomas Mitchell and Fawke Maps; Journals including those of Lt. Cook, J.Banks, W. Bradley, W. Tench; Sketches, including George Raper's;
National Library of Australia		3 hours	Maps of Sydney, 1770-1950, including Higinbotham and Robinson borough maps; Sydney Gazette archives.
City of Sydney Archives		7 hours	Plans and sketches 1788-1900, including from City Engineers dept, City Section Surveys, City Planning; Correspondence from City Commissioner's Office.
Museum of Sydney Archives		3 hours	Archaeological material pertaining to Argyle Cut; images from colonial plants database and early architecture, including C. Martins; documents pertaining to J. Macle hose: Low's Directory of the City
Central Library	Hong Kong	21 hours	Maps 1840-1997, including Collinson's maps and sketches; photographs of Sacred Hill.
Public Records Office		14 hours	Correspondence between Land Office and Colonial Office 1843-1870.
Survey and Mapping Office		3 hours	Assorted documents and correspondence regarding vertical datum and Rifleman's Bolt.

In Hong Kong, I visited the Central Map Library, the Survey and Mapping Office and the Public Records Office. In Sydney, I visited the Mitchell Library at the State Library of New South Wales (NSW), the City of Sydney Archives, and the Museum of Sydney archives. I also visited the National Library of Australia in Canberra, where I spoke to archivists about their collections. Moving through the catalogues of primary materials dating from 1770 in Sydney, and 1830 in Hong Kong, I requested documents from collections that specifically focused on the urban design of each city. I kept notes of documents from archives that I had viewed (Figure 4.10), and information given to me by archivists, curators and map librarians about where I could find information if the

archives were not available. Many sketches were not digitised and so no preview was available. The complexities of colonial archiving (and post/colonial control over documentation) at times, thus created a frustrating skein, as archives maintained maps that were copies (and sometimes photocopies) of the originals. Furthermore, the semantic meaning of what a 'sketch' was changed from archive to archive (and indeed from document to document). Given that many of the more official historical maps in Hong Kong had been relocated to Kew as part of the British withdrawal, it was far easier to find sketches and correspondences, because this was mostly what had been left behind. These uneven processes created uneven levels of depth.

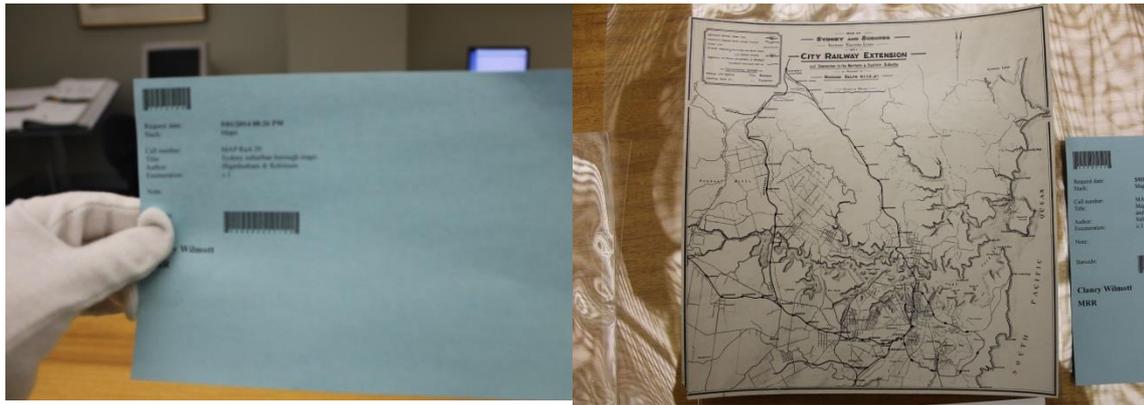


**Figure 4.10** *Taking Notes*. Handwritten notes on the archive, abstract taxonomies of maps and getting lost in translation. (Source: Author)

Foucault (2002a: 145) writes that an archive is a 'density' of discursive practices made up of statements - that is, a collection of things that have been said: the role of the scholar is to do what Nitecki calls 'making connections' (Nitecki, 2008: 37). Yet, Foucault's (2002a: 135) exposition on archaeology argues for a focus on *what is said*, rather than what is not said, with ambiguity resting on what constitutes being 'said'. With reproducibility of media, artefacts or objects do not always need a clear enunciator to be able to speak: their existence is an archaeological statement (Huhtamo and Parikka, 2011). Furthermore, both Foucault (2002a), and Parikka and Huhtamo (Huhtamo and Parikka, 2011; Parikka, 2013) argue that the archaeological is not only located in institutions that keep, store and maintain inscriptions or data, but rather can also be considered in the 'moment' as practice. By 'moment', the authors refer to the spaces and times at which statements were made.

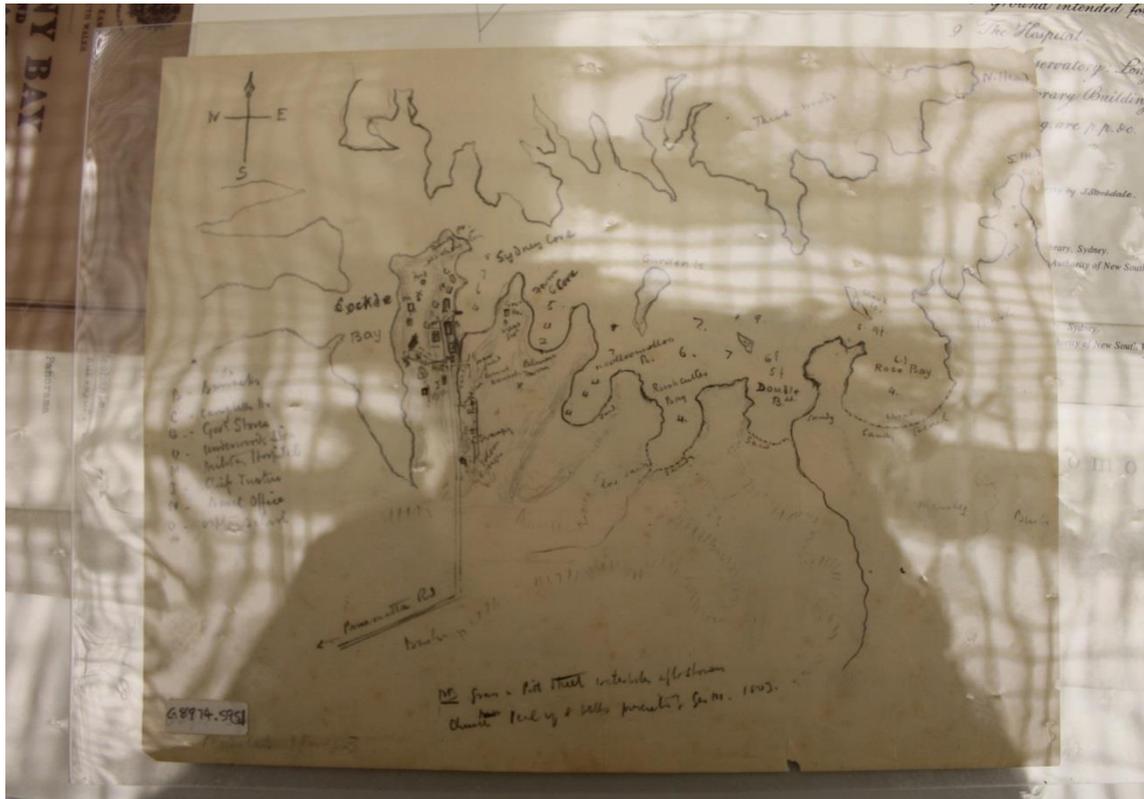
Watching the interview data, I realised that archival material across the scope of documents, the interviews and material collected played shifting roles in the production of assemblages of spatialities and mapping as they cast light on the apparatus of cartographic reason and the fluidity of the unreasonable field. Could then, the landscape, multiple spatialities, the video footage and glimpses off the side of the camera, be considered as 'said'? As such, the ethnographies themselves were starting points for archival research. The utterances of participants, landscapes and technologies were reframed into archaeological statements, and all the materials collected (from video to manuscript), as archival in nature. This was a geographical archaeology in the moment, digital speech-acts *in situ*, a moving archive (Anderson, 2004), where, during the interviews, the cartographic apparatus branched out into time and appeared altogether at once in space and spatial encounters (Dittmer, 2014). The statements of the apparatus formed fragments of a living archive in mobile mapping assemblages. These fragments - cartographic imaginations petrified in landscape, images and architectures, and embodied in contemporary practices - then directed me back towards the archive itself.

With new purpose in mind I returned to the archives. I drew upon Foucault's (2001g) writings on Deleuze where he cites difference and repetition, recurrence and phantasm, becoming and return – 'the materiality of incorporeal things' (Foucault, 2001g: 347) - as key modes of considering representation. Watching each interview and tracing differences and repetitions, recurrences, phantasms, I searched through the archives looking for discursive regularities or dissonances in the irruption of cartographic reason, for material enunciations of abstracted ideas; the difficult border between mathematical and experienced space. Such a search was not limited to the form of statements, but rather to epistemic and discursive formations: numbers, geometries, quantifications and taxonomies as they appeared in maps, sketches and plans. The documents obtained from the search therefore included journals, newspapers, paintings, sculptures, architectures, correspondence and fiction.



**Figure 4.11** *Recording records.* Unfocused and too-distant photographs taken at the State Library of NSW. (Source: Author/National Library of Australia)

As the volume of documents grew, I resorted to more efficient methods of note taking using photography – since the call numbers and document numbers did little to demarcate the visual differences between documents. Some archives, like the Hong Kong Public Records Office, only allowed photocopying under strict supervision and every page of photocopy required a new slip to be filled out. While photography opened up a more visual way of recording my journey through the archive, with new technologies came new imperfections - I had borrowed an old-style digital SLR, with a temperamental auto-focus, and no screen enabled. Every photograph was a lottery, with no ability to look back and see if the image worked. Furthermore, the map reading desk at the Mitchell Library was positioned directly under a skylight, whilst at the same time preventing the documents to be taken out of their plastic protective sleeves. This made it especially difficult to take photographs (Figure 4.12), resulting in a strange diversion of the researcher’s gaze as the light was reflected back into the lens.



**Figure 4.12** Skylights, broken LCDs, my reflection, and plastic sheets in the Mitchell Library of the State Library of NSW. Sketch of early plans for the expansion of Sydney, including bay depths (before corrections)(Source: Author/Mitchell Library).

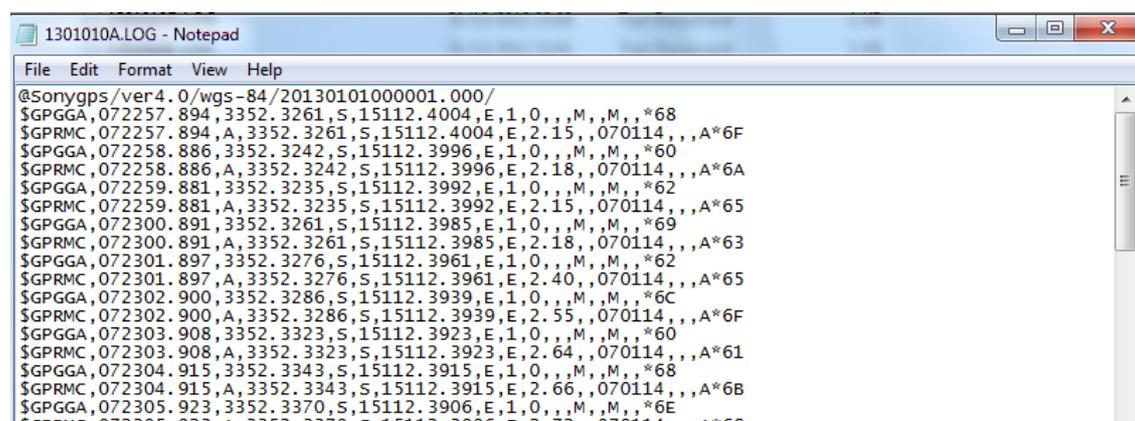
I also reconceptualised the videos as archival (albeit not archives). In the audio-visual recordings of the interview, it was possible to catch glimpses of the shifting apparatus of cartographic reason in the unreasonable field. The audio-visual and GPS materials were imperfect. Free from the constraints of the ethnographic gaze and bound to the limitations of amateur techniques, the shots of the camera can only be described as dissonant (Figure 4.13) technological failure.



**Figure 4.13** *Imperfect shots and wayward waypoints* - revealing visual and cartographic logics through recording materials. (Left) ActionCam Footage of Cassie at Central Station in Sydney. (Right) GPS Data showing the waypoints of the interviews with Kyja (red), Nick (green), Tanija (dark purple) and Cassie (pink). (Source: ActionCam Footage and ActionCam GPS/MapBox)

Yet wonderfully, that seductive veracity (Banks, 1990) was troubled in this dissonance through embodied reactions. Replicating my own perspective through the camera consequently meant that later, as I was rewatching the footage, I would turn my head to look the other way. Absorbed in the recording, I would forget that I was watching a screen, and then would be abruptly being reminded when the shot swung in a different direction.

Furthermore, the GPS did not work as well as hoped - particularly in the dense centres of the city - giving data that was somewhere between a rough approximation and a wildly incorrect reading. It took hours to convert too - from Sony's platform-specific '.LOG files' (Figure 4.14) that were designed to be read by their propriety software, to .kml or .csv, so that I could import the points into an open source platform like Map Box or Open Street Map. At the same time, as demonstrated in Chapter Five, the scattering of way-points and the various failures of the GPS offered a useful analysis of the limitations regarding the discursive structures of cartographic reason in digital radio form. Seeing waypoints scattered across both cities also produced fascinating maps of GPS signals in the Hertzian landscape during the walks themselves. This subsequently was useful in providing secondary insight into the trialectic relationship of space, technology and people discussed in Chapter Five.



**Figure 4.14** *Incomprehensible*. The above image shows the GPS LOG file before conversion to .kml. It is possible to make out the time stamps in the second row from left, and the coordinates in the middle, but the data was not tabulated in such a way that made it possible to transfer the information without a complex process of conversion. An open source platform was used to convert the files, which were then cleaned in a spreadsheet program before

being uploaded to MapBox. (Source: Author)

I developed a way of note-taking, inspired by Clifford's (1990) *Notes on (field)notes* that aimed to speak to the processes between theory and experience, between spaces, technologies and people, and the audio-visual data itself. Often, methods of transcription, anonymity and coding are grounded in a socio-scientific framework of how to draw information out of interview material in order to establish theory. Yet, given the unreasonable fields that the participants and I formed together, I hesitated to qualify and quantify on quite those terms. Transcribing and anonymising, arguably, is a 'method of control' that asserts a complicated politics of evidence (Denzin and Giardina, 2008: 182). In turn, this generates exclusion and reinforces imperialist codes of the modern subject (Alldred and Gillies, 2002). Furthermore, the impetus behind coding is to apply methods of order - to turn material into data and to taxonomise it into clearly delineated categories that group together into theories (Scheurich, 1995). Arguably, this sweeping approach is akin to data mining, and to my mind, is disrespectful to the delicacy of the material with which I was entrusted. The participants in this research did not consent to being subjugated under such scientific discourses. Moreover, since several of those involved identified as Aboriginal, and others were already burdened with the contemporary legacies of racial colonial ordering, I understood this subjugation to be a re-enactment of those same brutalities in process, a 'violence of abstraction' (Comaroff and Comaroff, 2003, 279), which I wanted to avoid. Where possible, I have included the recordings themselves as appendices, so that you may hear the digitised rendering of people's voices, see the strange light of both cities and imagine the noisy soundscapes that spring to life while walking, breathing, talking. The audio soundtrack of an interview (even more so when audio-visual) contains a wealth of context-specific information that does not retain its complexity, nor its veracity (however seductive) when reduced to words on a page (Portelli, 1991; Farnell and Wood, 2011).

It was always the case that during writing, I would write alongside the audio-visual material, and supply that material wherever possible. For this purpose, I developed a system of five (slightly contradictory) columns to highlight the unreasonable field (Figure 4.15).

	A	B	C	D	E	F	G	H	I
1	Ben								
2	Time	Words	Performance	Landscape					
17	0:16:30	[me] "So when you walk do you prefer laneways as well?" [Ben] "Yeah, it depends. It really depends on that, like the area and the feeling of the place. And I think sometimes, like, silly enough I get a little afraid of laneways or dark places as well..." [me] "Where, in particular?" [Ben] "Any place that is kind of unknown with a demographic that I'm not sure about or not." [me] "Do you find when you navigate there is a correlation between the way the laneway appears on a map and the way it feels, or is there a disjuncture - how does that relationship unfold?" [Ben] "That's the interesting thing about Google Maps - it has no social demographic, right. So it can put you down a path where, like, more, like, streets that would normally be avoided by..." [me] "So, it doesn't tell you where the bad part of town is?"		Mallet St					
18	0:17:35	[me] "So, where are we?" [Ben] [looks at phone] "So we are at that park. And it is boring." [me] "Did you think it would be more interesting?" [Ben] "I did think it would be more interesting." [me] "Why?" [Ben] "I don't know. Because it was green. I thought there would be more shade... and less, sort-of, sporting grounds."	looking at phone and talking. Stopped in shade	Camperdown Park - shade					
19	0:18:37	Discussing where we are, and where to go - finds more sporting grounds at Usyd. Rugby players. [Ben] "We are there [points to phone]. Where are the little green patches? I think we may be at - tch - this is the biggest green patch around..."							
20	0:20:00	Discussing my prior experiences at Camperdown Park with photographic studio -	Walking	Though Camperdown park, in sun. Anzac memorial	<a href="http://cargocollective.com/sq">http://cargocollective.com/sq</a>				
		Discussing a street sign pointing to gallery and deciding to change course - "It would take us right off course - is it okay to change course? I think maybe it is" and [me] "Why did you check your phone?" [Ben] "I don't know. I guess I wanted to see what was around me." Discussing habits of navigation and how this is similar to how he operates in overseas cities - "radar" - talking about how Google Maps instills a sense of "...", needing to	stopped to check phone then walking	Street sign, turn left onto Podger St - then walked straight past gallery, through park and on to Australia Street	Map as reassurance - no sign of cotter gallery on Google				



**Figure 4.15** Notes on Ben's interview in five columns. (From far left) Time, Words, Performance, Landscapes and 'Everything Else'. (Source: Author)

The first column, a time-stamp, was a rigid structuring device used to catalogue when events occurred. The second, third and fourth columns encompassed the trialectic of people, technology and space, by way of 'words', 'performance' and 'landscape'. These were imperfect terms and categories, as later chapters here will reveal, but they were based foremost in the imagination of delicate empiricism as I experimented with mapping archaeological paths. Words mostly focused on what was being talked about at the time, along with other verbal cues and facial expressions - the realm of the immediately ethnographic. Performance focused on gesture and movement - using the phone, using traffic lights, pointing - or interactions with the indexicality of space and technology. Next, landscape pointed towards the convergence of spaces of possibility and spaces of materiality - what was happening in, through and around the momentary encounter. Finally, the fifth column was a space for general thoughts and ideas, supplementary materials that were lost in the chaos of the shot but were important for clarification. Anything that troubled or reified cartographic reason was highlighted in yellow.

As the videos became archival, so too did the field, and so I also returned to the street and the landscape. The statements that appeared in the audio-visual material and GPS 'data' were sometimes hard to read because of the erratic nature of the action camera. Where displaced screenshots were once revealing for collecting research material, for clarity, I often had to organise for a more apparent photograph to be taken. While supervising undergraduate field trips, I was able to return to Hong Kong twice to collect such material. In Sydney, I used familial and other networks to

take better photographs of objects that appeared in the videos, further adding to the heterogeneity of voices involved in this research. This also added new layers to the messy accidents and the delicate empiricism of the research process itself. The landscape was thus reinterpreted imaginatively by and between other people, cut into tender series of photographs that continued to reaffirm the fluidity of space (Figure 4.16).



**Figure 4.16** *Negotiating the shot.* A sequence of photographs shot by *Lee Wilmott*, as she tries to get an uninterrupted view of the Tank Stream artwork, which was then packaged as an uncurated file and sent to me via email. (Source: Lee Wilmott)

Surprises abounded in these new archives - as others began to also input their interpretations into the research process, critiquing my aesthetic gaze. For instance, others were less bound by the 'rule of thirds' and geometric framing than I was. Figure 4.17 is a comparison of a temporary artwork 'Potential Spaces' in Sydney taken by a family member, and the geometric perspectivism of my curated photographic shots.



**Figure 4.17** *Found objects and not-quite thirds.* Unexpected image on the left taken by *Lee Wilmott* in Sydney. Highly curated image on the right taken by me in Hong Kong. (Source: Lee

Thus, as the 'everywhere archive' assembled and reassembled, diffracted, fragmented and detoured, the critical fixities and 'cuts' began to appear through recording, note-taking and writing. However, these fixities were not necessarily where they were expected, appearing in surprising, critical and productive places. Therefore, as the ethnographies and archives intersected, curling chaotic paths of relations between cartographic reason and everyday mobile mapping began to emerge.

### *Writing encounters*

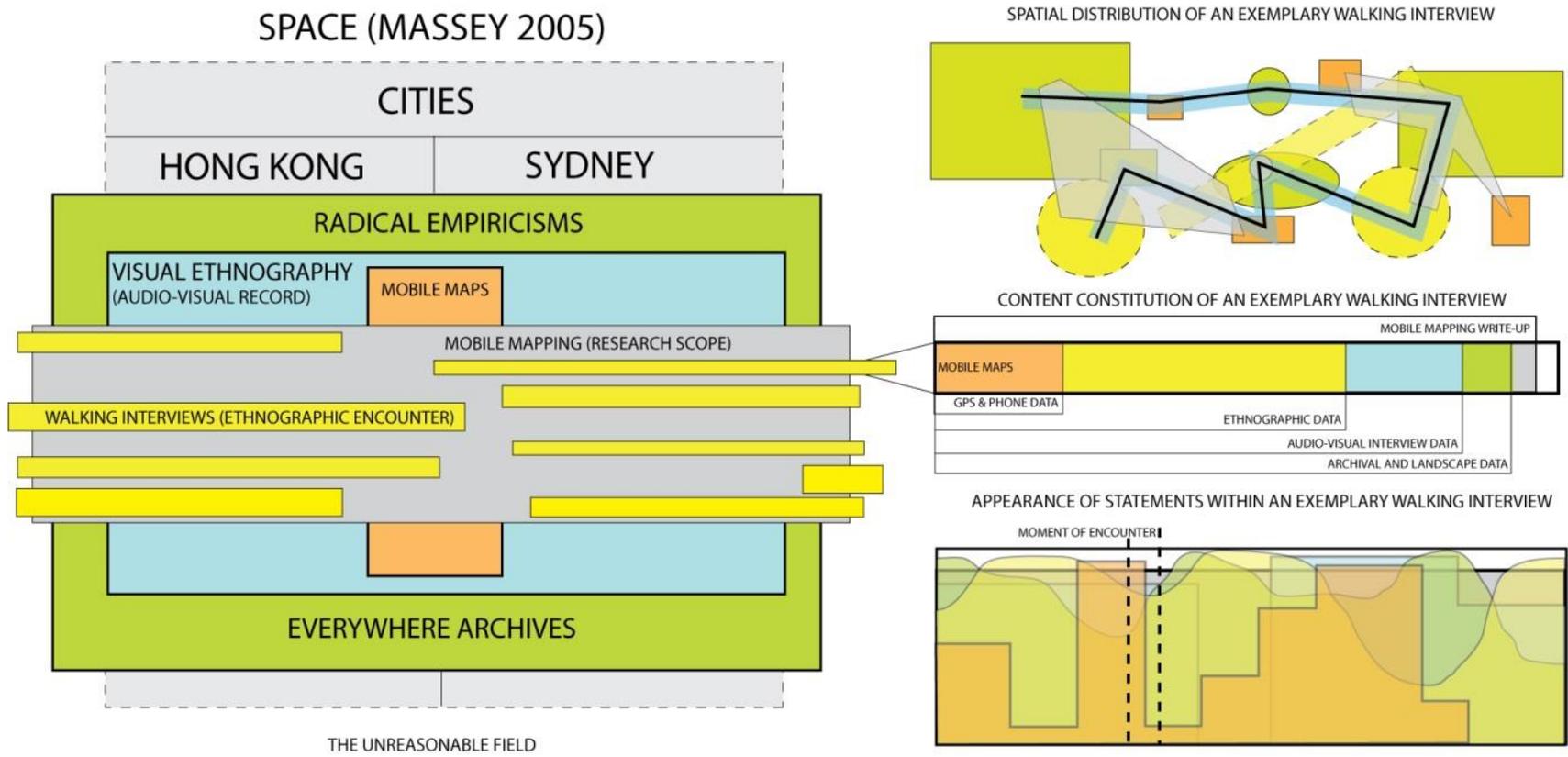
Beyond critical fixities and every-where archives, it was important to acknowledge that space also forms in affects, indeterminacies and hauntings beyond the fragmentary archives collected through critical fixities. So I began to redraw the unreasonable field and radical empiricism with writing, rather than reading, in mind. More than the materials collected, the unreasonable field also comprised: open space in the sense that Massey describes (or the space of possibility; unreason; irrationality; challenge and failure); the scope of the city and its histories and geographies; the assemblage of the interview (including the audio-visual material, spaces, bodies, mobilities, logics etc.); and within that, the networks of personal mobile maps; mobile mapping practices themselves (as archives); and finally, the finite space of the walking interview which reached across all of these aspects, but acted as its own spatio-temporal cartography, bounding, opening.

The question remained, however, which parts to choose; which overlapping of traces and spaces to write about? At this point, I turned back to two ideas that appeared in Foucault's (2002a) description of the archive: events and continuity. The archive is also the system that materialises (or at least establishes) discursive statements as *events* and *things*. It determines the spaces and times in which statements appear. However, the more-than-representational also coforms mobile mapping practices. So, drawing on the concept of the event, I began to frame the assemblage using the concept of 'encounter' (Wilson, 2011a; 2016) as a spatial, post/colonial, mobile and more-than-human moment. According to Wilson (2016), encounters are a specific 'genre of contact' (Wilson, 2016: 6), and hinge upon ambiguity and events of relation in the formation of subjects and objects. Encounters are distinct from events or moments in its spatial specificity – the contact here emphasises bodies and borders,

adversaries and opposition, through the negotiation of similarity and difference 'in the moment' (Wilson, 2016: 6).

Encounter is the negotiation within the assemblage and the everyday - the moment in the interview when things take on an air of mal-assembly or non-reconciliation. Therefore, thick (archaeological) descriptions (Geertz, 1994) of encounter became a writing tool to excavate the depths of discourses, materialities, possibilities, emotions etc. Furthermore, the material in the interviews could not be cleanly defined as 'situated' - rather, encounters pulled in assemblages of memories, technologies, objects, place-makings, landscapes, cartographies, images, affects, semiotics and other knowledges, drawn between the here-now and other times and spaces.

Figure 4.18 outlines an attempt to map the contact zones of encounter. Each colour represents a different modality of archival fragment - more-than-representational cartographies (conceived spaces), audio-visual records from the visual ethnography, mobile maps (media archaeology) and the ethnographic material itself (lived realities). Greys and whites represent conceptual (permeable) boundaries based on limitation - cities and mobile mapping practices. The four diagrams are four prismic surfaces through which the fragments could be collated and related in a kind of bricolage or thick description (Geertz, 1994). On the left is a graphic representation of the field (in design and analysis) as it is constructed methodologically (through theory and method). This is a space of layers through which the field is constructed, and the levels across which archival fragments may be traced in their mode of enunciation.



**Figure 4.18** *Modes of analysis.* This figure shows modes of analysis drawing from an exemplary unreasonable field (left) into an exemplary interview (right) based on the situated origin of material gathered. (Source: Author).

While in representation the diagrammatic visual hierarchy is fixed, in practice it was much more like the cross section on the bottom right. The layers on the diagram to the right are better read in their reach to left and right, as they expand or contract, relative to the layers above and below. On the top right is the space of writing across the interview in spatial terms - or where fragments might be encountered in the space of the interview and the city. Grey establishes the conceptual encounter through space, as an assemblage of multiple, connected spatio-temporalities. Bottom right shows the encounter gathered temporally together at a moment of intensity as they appear. Middle right is the breadth of the interview in terms of how it might be written up and the kinds of archival fragments that may appear, as well as what may appear in a moment of encounter.

Working with these prismic interpretations of the unreasonable field through the everywhere archive, it was then possible to identify a series of encounters. Identifying these encounters was a largely intuitive process (Mastrangelo and L'Eplattenier, 2008). It may be possible to draw out and identify key characteristics of how the story may be portrayed by the participants - voice, expression, emotion - but arguably, this would just be another kind of coding. Instead, I returned to Goethe's original philosophy of a delicate empiricism (Wahl, 2005). These encounters are examples of tender irrupting and threading, moments around which the flows of the ethnographies, the spaces, the media and the archives, gravitate. Imagination was required to be able to catch such encounters, to represent the details and the image as whole, to show how they might move while at the same time pinning them to the paper in a spatial story (de Certeau, 1984). Thus, looking more closely at the diagrams on the right, this was the point at which the analysis diverged from an emphasis on what was said (Foucault, 2002a) or the means of representation (Olsson, 1991b) and into the work of Gordon (1997), and the various saturations of what is and is *not* said. The realm of white is the muted presences, seething absences and the ways in which ghosts appear against cartographic reason, rather than the way in which cartographic reason overshadows all other spatial knowledges and experiences.

### *Conclusion*

Working from this framework, writing and analysis blended into each other. It also became clear that this research was different from traditional participatory research - it was not quite inclusive nor was it quite participant-led. Rather, it was constructed

entirely out of the experiences between the participants and myself, and then my private process of watching, of analysing, of thinking, of mapping and of writing. Figure 4.2 (above: 95) was an early attempt at encapsulating the prismic nature of this research, how it stretched across unreasonable fields, delicate empiricisms and everywhere archives; something by way of a conclusion to this chapter. Yet this network of paths does not obey the geometric laws of prisms. Spectrums of light refract out of the ethnographic prism, rebounding, realigning and reflecting in angles that are odd, irregular, and not quite in keeping with the expectations of physics.

Methodological ideas are represented as prismic triangles - when in fact, they could have been other shapes. This shed light on the complications of representation, the constant desire to return to cartographic reason and the comfortable boundaries that geometric thinking produces. These stories were not data to be mined but constellations of living spaces that collided, collapsed and expanded through the apparatuses, limitations and failures of methodological tools I had used to research them. The cyclical process of research returned back to the archive, and the question of representation. Lines on paper necessarily create a politics (Olsson, 2007), and I realised that my methods had become a project to defend the generosity of those stories from the hubris' of discourses that tried to reduce and calculate them into quantifiable, taxonomisable parcels. I had fought hard to avoid tearing the stories away from the participants in the way that cartographic reason tears possibility away from space. In the end, I became the participant. Sitting in Manchester, watching the videos, I found myself smelling the wet market in Hong Kong and the eucalypts in Sydney. I realised that I had torn myself away from these spaces into the discursive realm of science, method and academic research. As I wrote, immersed in videos archives and soundtracks, the office felt glossy and abstracted from the bright, living spaces of these cities. I realised that hope in scholarship was equally subjugated by the discourses that Foucault critiqued and the rationalism against which these living spaces rallied. A project focused on mobile phone maps, became – through the participation, determination and practice of others – a project on mobile mapping as and when it occurs, where past and present collide, where power is contested. From this realisation, the final empirical chapter – Chapter 7 - was formed to give voice to hope, to consider the cartographic without the map, and to better hear stories against the discourses I had drawn upon them.

## 5. Mobile mapping and space: systems, gridded logics and the order of the cartographic imagination

'What does it mean to draw and interpret a line, to make and use a map, to dwell in the cartographic imagination?' (Pickles, 2004: 9)

In mobile mapping, the kinds of post/colonial conflicts that emerge are often foundationally at the intersection of space and cartographic reason. The first of the empirically-focused chapters, this chapter considers how the spatial logic of cartographic reason, the order of the cartographic imagination, and the disobedience of space and landscape conform in mobile mapping practices. It traces how the process of structuring space, inscribing landscapes and setting up networks of calculation and classification in Hong Kong and Sydney (according to 'Western' cartographic reason) has resulted in irreconcilable, eruptive and volatile post/colonial geographies in both cities. Drawing upon the more-than-representational approach described in the second and third chapters, and using the 'prismic' methods described in the fourth chapter, this analysis discusses how, in contemporary mobile mappings, cartographic reason becomes transformed through the cartographic dispositif. In particular, the chapter explores how this process shifts cartographic reason into a practiced, inscriptive cartographic 'imagination' that continues to populate situated spatial encounters.

In mobile mapping, geographic imaginations (Gregory, 1994) dissolve into cartographic imaginations (Farinelli, 1992) enacted through the cartographic dispositif. This reflects a mode of cartographic reason wherein cartographic anxieties, as well as cartographic impulses, see the formation of cartographic imaginations. In the cartographic imagination, myths are materialised through the regimentation of planning and the alteration and production of landscapes without paying heed to the uncanny abstraction between landscapes and cartography. The cartographic imagination is a system of self-referential signs and actions; it cannot imagine the world any other way (Guarrasi, 2001). The material manifestation of cartographic imaginations through the cartographic dispositif is central here. In the cartographic imagination, cartographic reason does not merely reflect the landscape and abstract or rationalise from subject to object. Rather, through the cartographic dispositif, *it shapes and produces urban spaces through western, colonialist planning ideologies and discourses*. Thus, at least in Sydney and Hong Kong, from the moment that the

landscape is mapped, cartography has a preformed relationship with the landscape that seeks to produce order through standardised tools, homogenous images, repetitious toponymy and control through planning.

Through five ethnographic encounters with the cartographic imagination - Cliff, Kyja, Mohammed, Vicki and Shaun - this chapter discusses how the logics of signs, grids, datums, roads, and numbers assemble in interpretative, regimenting and dissenting everyday practices. Through imaginaries, lines, systems and numbers, mobile mapping maintains the weight of the historical and geographical relationships between cartographic reason and post/colonial landscapes. With the proliferation of GIS and GPS into the realm of the 'everyday present', cartography no longer sits in the backseat nor acts as a cog in the machine of Western geographical imaginations. The gathering of this cartographic relationship irrupts within these stories, assembling into the everyday and generating encounters between the past and the present and the near and the far.

The cartographic functionality and interoperability of geometries, scientific description, coordinates and algorithms are exhaustively being supported by the regimentation of space into adherence with these systems; through signs, grids, datums, zones and codes. In short, in the age of digital and mobile media, the cartographic imagination of numbers and lines is encroaching more and more into spatial and landscape discourses. This occurs to the point where the cartographic imagination (with its impulses and anxieties) is becoming synonymous with digital regimes of spatialisation (Pickles, 2004), which have supported computing and binary logics since the foundation of modern computing. Through these encounters, we can uncover how the cartographic imagination is also bound-up in the material world, interconnected across spaces and times as circulatory discourses that shape and build a multitude of urban spaces. These discourses linger, arguably, beyond Foucault's (2002a; 2002b) emphasis on the episteme - in the archaeological fabric of the material world, in toponymy, in buildings, in landscape formations and in the soft rumbling of the empty spaces that their disappearances leave behind.

*'Land today more barren in appearance that we hade [sic] before seen it: it consisted cheifly [sic] of Chalky [sic] cliffs something resembling those of old England; within these it was flat and might be no doubt as fertile.'* (Banks, 1770: 242)

*'In the Governor's commission, the extent of this authority is defined to reach from the latitude of 43°49' South, to the latitude of 10°37' South, being the north and southern extremities of New Holland.'* (Tench, 1789: 67)

Cliff and I are walking along the shores of Botany Bay, staring out towards the headland, a narrow opening facing the Pacific Ocean. This is the site where Lieutenant Cook and the Endeavour made first landfall in the Sydney Basin, the (not-quite-final) destination of the First Fleet<sup>14</sup> on their journey to *Terra Australis*, and the final landing of French explorer La Pérouse before his death. Standing on the shore of Botany Bay, overlooking the same waters where the *Gweagal* people of the *Eora* nation first laid eyes on the Endeavour, we can see planes fly in across the bay, coming to land at the airport on its northern edge. Cliff describes how he never felt at home in this landscape.

'I grew up hating gum trees and dust and people. I loathed them. I thought gum trees were the most horrible, stunted looking things.'

He stares across the bay as another plane lands against the whipping wind.

'But when I came back after living in the States for 10 or 11 years,' he continues, 'and went out to the bush, I felt much better then. It felt much more like *home*. The smells - the sorts of things that make you think about home, that I think about - the sky,' he points upwards, 'it's different. It's higher and bluer... You think, mm-hm<sup>15</sup>, southern skies again.'

Cliff has a poetics about him, a way with words. I can see why he brought me here - not just because he lives nearby, but because this is a place wrapped up with meaning, folded over and over. The shoreline of Botany Bay - with its comings and goings - becomes a site of encounter between the cartographic and the lived; a

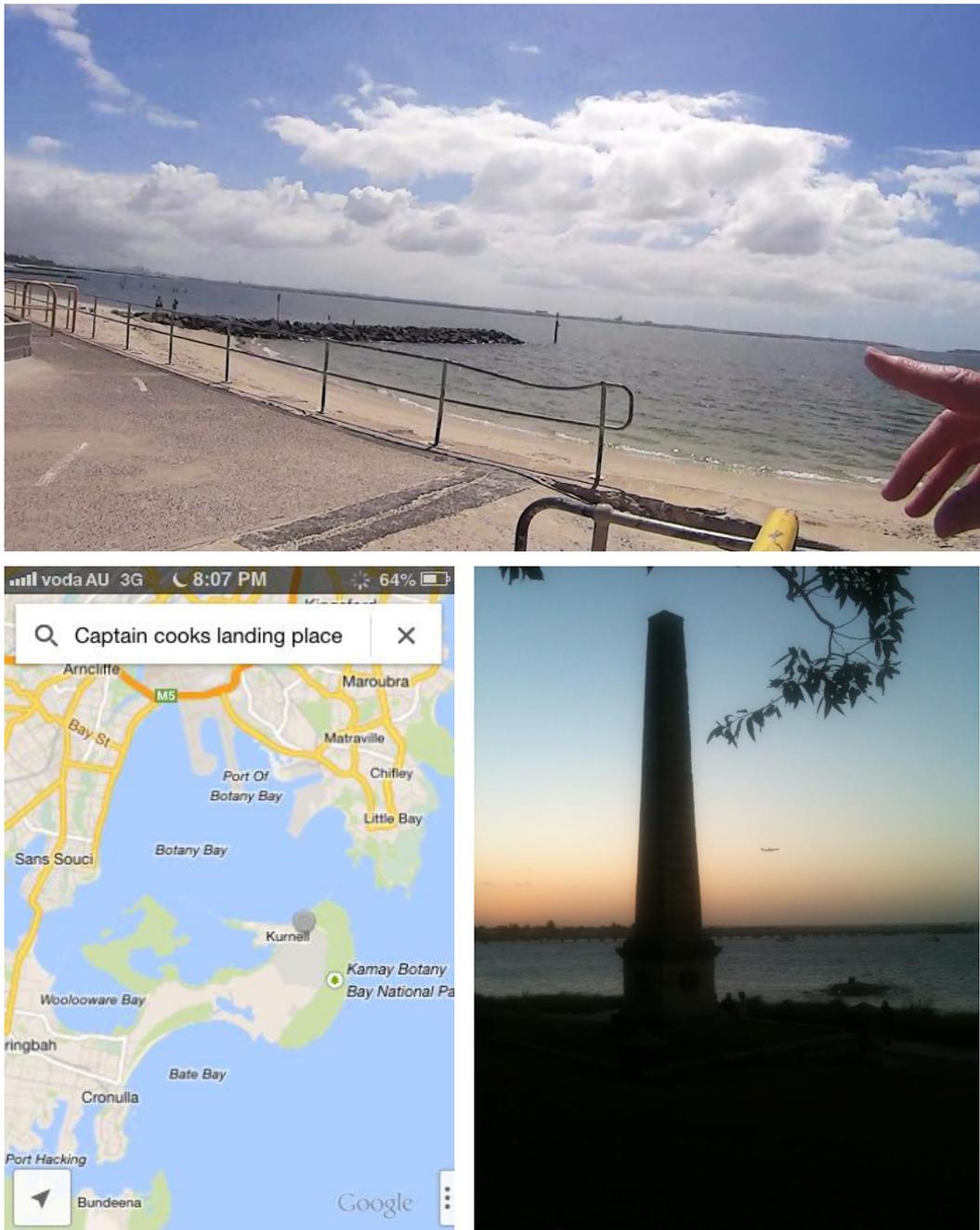
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<sup>13</sup> The graphic in this bar shows the relative 'assembling' of this interview within the chronology of all interviews in Sydney and Hong Kong, the darkly shaded area indicates the position of the interview within the real-time chronology.

<sup>14</sup> 'The First Fleet was the formal name given to the 11 ships that left England on 13 May 1787 to establish the penal colony of Australia.

<sup>15</sup> I have chosen not to correct or otherwise highlight errors in participant's vernacular spoken English - whether related to local quirks, class or education, or proficiency - as this matches the sentiment of the methods used here, enabling participants to speak in their own, particular and personal, ways.

contact zone between the exterior gaze looking inward to the landscape, and the interior business of living, looking outward into the sea.



**Figure 5.1** *Captain Cook's Landing Place*. Cliff pointing towards the airport on the northern shore of Botany Bay, with the north and south heads just above his index finger (top). Google Map showing the location of Captain Cook's landing place in Botany Bay (left), with the monument commemorating the landing (right) (Sources: Action camera (top); author's phone (bottom))

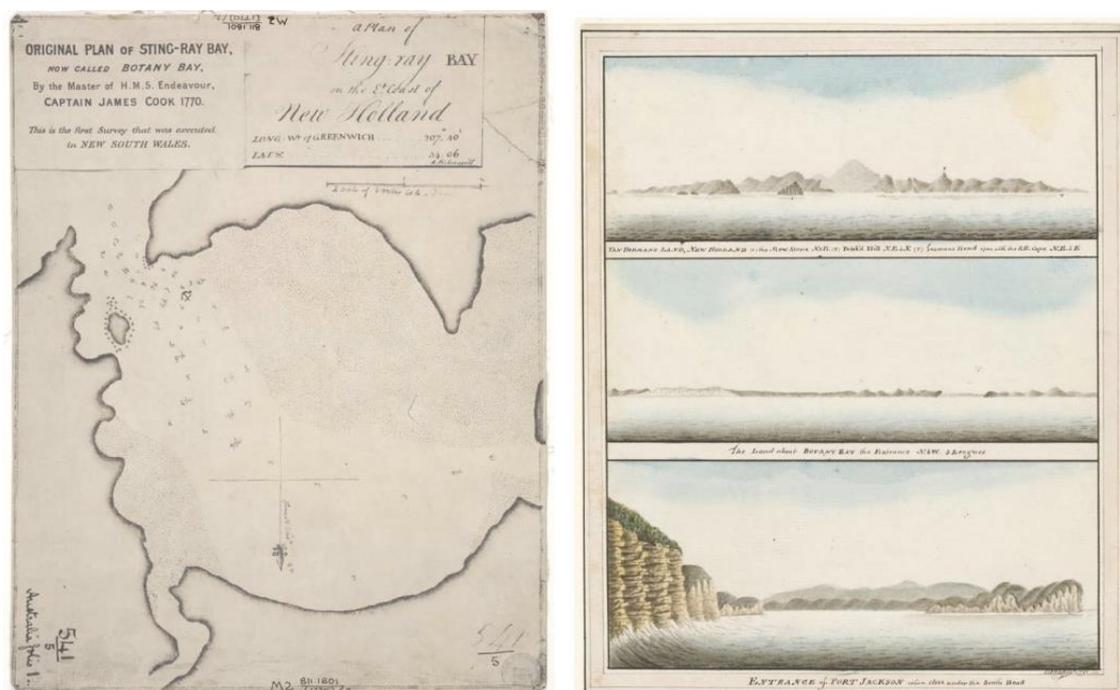
On a mobile map, at first appearance, Botany Bay is nothing special - a large inlet with a small mouth, an airport runway jutting into the centre of the bay (Figure 5.1). This appears as a hard boundary - an opaque blue pantone that slips between

background and foreground, and grey-yellow-green-orange roads. Crossing the line that forms the outline of the bay - either by arriving on these shores by boat, or leaving them for somewhere else and then coming back by plane - is an uncomfortable entanglement that is culturally and physically situated in Botany Bay and its mythology.

'This is the history of discovery,' Cliff tells me, 'whereas Sydney Harbour has a history of development'.

Botany Bay is also a site of rediscovery, as memories gather in different folds of cultural storytelling. The role of Botany Bay in the cultural retelling of British exploration and settlement in Australia results in the bay itself taking on a cultural symbolism that is embedded in, but also transcends, the cartographic imagination (Carter, 1988).

'The first settlers here were English and they wanted it to be like home', Cliff explains. How could Botany Bay ever be like home? For the earliest white explorers, the mythology of Botany Bay took the form of empirical descriptions of the landscape from the sea, the shore, from an exterior into a mysterious interior (Figure 5.2).



**Figure 5.2** *Cartographic imaginations.* The original chart of Botany Bay drawn by Lt Cook in 1788 (left) with a number of sketches by George Raper in 1791 (right). (Source: State Library of NSW)

Without adequate referents to describe the peculiar landscape, such descriptions had tended to fall back on the memories of more familiar places. Joseph Banks

(1770) hoped that the resemblance of the white cliffs preceding Botany Bay to those in Dover, signalled a potential fertility for agriculture and settlement. This was a dream lost in translation, in reality masking an infertile landscape that Flannery (2000: 5) suggests is toxic and fire-prone.

Following Banks eighteen years later, surveyor William Bradley of the First Fleet made note of the same cliffs as they searched for Botany Bay. Bradley was looking for 'a certain mark', a definitive way of measuring space and place - in a landscape that did not adhere to the rules of empire and scientific empiricism. But the 'mark' described by Banks of the white cliffs was misleading, for there were many cliffs coming up the East Coast which could be construed as white. Rather, the mark of the Sydney basin was to be found in the uniqueness of the landscape rather than the homogeneity of cartographic reason, in the fawn coloured cliffs of Sydney, rather than the white cliffs of Dover:

'...[T]he very perfume of the Sydney air is a consequence of sandstone. It is also sandstone that dictates the terms of human settlement. For 40,000 years Aboriginal hunters and gatherers had known how to eat, to sometimes feast here, but the British who began their creeping invasion in 1788 had no clue of where they were. They set out to farm as they might in Kent or Surrey and the sandstone nearly killed them for it. Starvation. That is what the yellow cliffs of Sydney spell if you wish to read them.' (Flannery, 2000: 4)

Driver (1992) suggests that there are a heterogeneity of imaginative geographies which destabilise the orientalisng power structures of geographic and cartographic discourse. Yet, when confronted with the Australian landscape, the cartographic imagination has stumbled at first sight. Here, it is the landscape, not the map, which produces ineffable heterogeneity, in the flux and unpredictability of space.

As he stares at Botany Bay now, Cliff sighs.

'This is the birthplace of the nation, if you like,' he says, 'This is where Captain Cook came and he looked at the Aboriginals and the Aboriginals looked at him.'

This is the place where the map met the landscape, and it all began to unravel. Here, in their inability to comprehend a fundamental shift between lush and verdant European landscapes and the harsh and unforgiving antipodes, the early settlers fell victim to 'geography's myth' (Carter, 2009: 28). Geography's myth is bound up in the

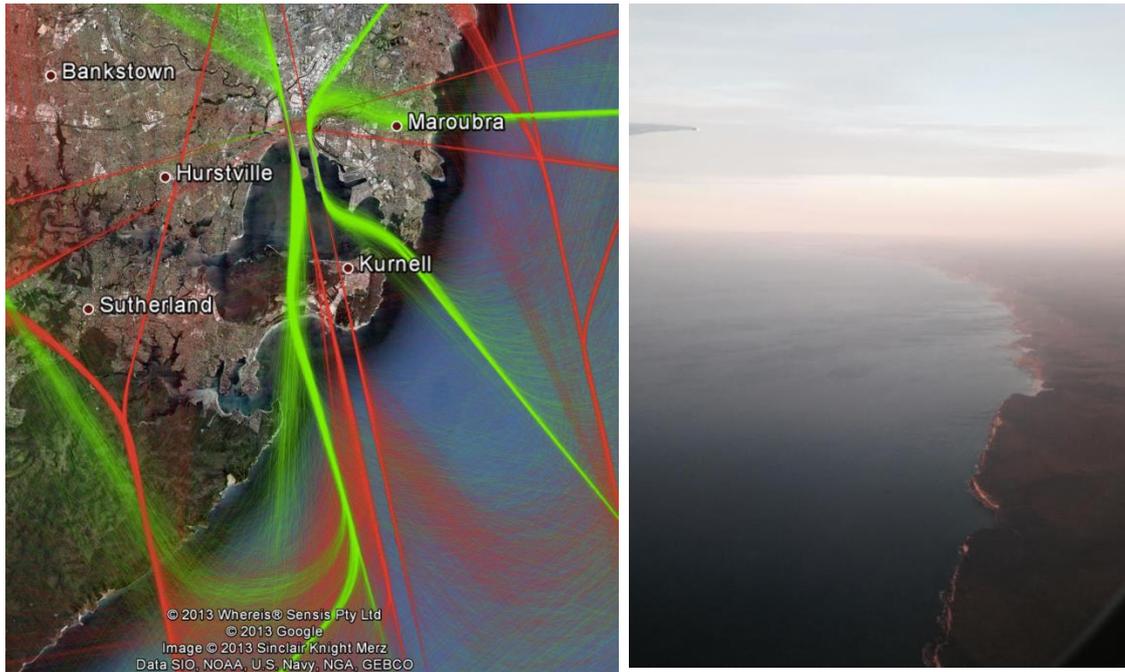
use of 'the tools of inductive reasoning to reduce the variety of the earth's natural features to certain universal principles' (Carter, 2009: 17). This had a paradoxical effect on two fronts: firstly, the imperial occupation of new territories in a physical and epistemological sense; and, secondly, the disappearance of any sense of space and time, reducing difference to 'one great repetition' (Carter, 2009: 17). Thus, the cartographic imagination has the inverse effect of the geographic imagination. In cartographic reason, the geographical imagination that consumes the diversities of the 'world-as-exhibition' (Gregory, 1994: 34) becomes a cartographic imagination which reduces difference and dismisses spectacle in the task of bringing all places into standardisations (Pickles, 2004).

It is, however, not the cartographic imagination that has been punished for its deception. Rather, the landscape itself has been subdued and cast aside due to its failure to conform. 'Botany Bay', Carey (2001) writes:

'[W]as abandoned, and, one feels in looking at it, *punished* for not being what Cook had promised. It became the place where everything and everyone who is not wanted - the dead, mad, criminal, and merely indigenous - could be tucked away safely out of sight. It is the backyard, the back door, the place where human shit is dumped. What better place to site an airport?' (Carey, 2001: 6).

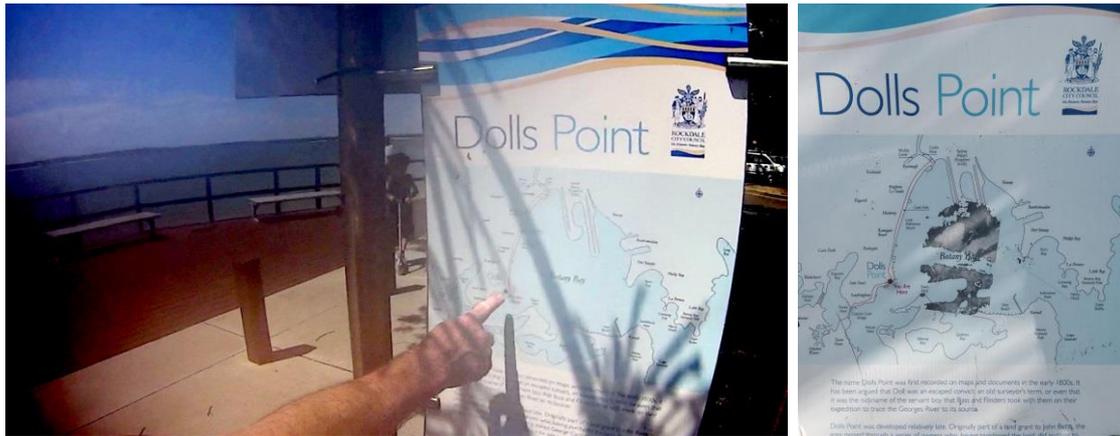
The cliffs described by Banks and by Bradley are the same that greet travellers entering Sydney airport from the south approach (Figure 5.3), across the bay. It is partly coincidence - this repeated trope - that the air traffic is directed this way across the Royal National Park, into the ocean and back past Botany Bay, in order to reduce noise disturbance to residential areas. But in the cartographic imagination, such tropes become signifiers between imaginaries and orders, repetitions of meaning, regularities across multiple discourses.

'We are a nation of aliens', Cliff supplements ruefully, pointing out to the bay, 'postulating timidly on alien shores.'



**Figure 5.3** *Coming home*. Map of flight paths into Sydney (left) with the southern red route being the main approach, juxtaposed with a camera-phone photo taken of the approach showing the white cliffs (right) turned red in the dawn. (Sources: Sinclair Merz Wright © 2013 (right), Author (left))

Later on, Cliff and I find ourselves looking at a fixed way-finding map of Dolls Point (Figure 5.4). An scattering of toponyms, we trace the shoreline of Botany Bay. Carter charges maps as an accessory in the collective crime of forgetting movements and journeys, of losing the qualitative aspects of space and time to the hard quantitative data of longitude and latitude. At the same time, however, whilst '[m]aps seemed to exemplify this spatio-temporal amnesia' (Carter, 2009: 17), the early exploration of Australia and the names ascribed to places can be considered as residues of these travels. Spatial toponymies not only hold the contradictions of multiple encounters, but they organise 'whole regions along the same principles' (Carter, 2009: 25). Thus, as cliffs signal the appearance of Botany Bay from sea and air, two opposing gazes form – inwards from the sea, and outwards from the land – as cornerstones of colonial interactions with the insular imagination (Perera, 2009). So, from the sea, the mythology of order and reason, determinist, repetitive and absolute, was shattered upon the alien and unconforming Australian landscape, which defied reduction and needed new descriptions.



**Figure 5.4** Wayfinding sign at Dolls Point. Cliff and I stare at the wayfinding sign tracing the bay (left), and a later close-up (with a new sticker over the top, right). (Source: ActionCam, Author's iPhone)

This was Cliff's story too, as his own imaginations - of childhood, of home, of history, and now of adventure - struggled with the materiality of the Australian landscape. As someone who has known these shores from birth, Cliff maps instinctively. Yet he is quixotic – he recounts that his first interaction with a GPS prompted him to grab the device and try to measure his speed by running with it in his hand. When asked about how he knows what direction things are in, he points to the water and exclaims "I know damn well that's East!". And yet, the landscape also confounds and challenges him.

'I had this notion in my head', he tells me, 'one of my favourite books of all time, I read it when I was young, was Huckleberry Finn and I had this vision of floating down a wide river on a raft of some kind and lazily chewing a grass straw of some kind and watching the clouds go past and - ah - I had no idea that the Avon River or the Swan River were nothing like the mighty Mississippi.'

I laugh as he tells me this. The Swan and Avon Rivers lie on the other side of the country, in Western Australia, some five thousand kilometres away. He describes how he hitchhiked across the country, staring at the map as he traversed the landscape. But cartography lies, and in its 'neutral' empiricism, its promise for predictability is failed by its inadequate tools. Carter (2009: 33) describes an 'ontological unbalancing', in which multiple cultures fail to comprehend each other's incompatible epistemic systems where the very cultural foundations of knowing the landscape are incompatible, and the languages and discourses irreconcilable. As Cliff continues, he tells a story of his own ontological unbalancing and the anxieties it produced. The long blue line on the map depicted a river was filled with rocks and rapids. From exhaustion, sunstroke and eating packaged foods and berries, Cliff rapidly fell ill.

'But the first night I pitched my tent and the sun fell and that's when I noticed the bush was alive. You could hear roos,' he moves his hand in a bounding motion, 'Phwmp-phwmp-phwmp-phwmp. I'm in there in my little tiny tent thinking god almighty, if they don't see me - phew - they'll flatten me in the dark. And the second night I pitched the tent and,' he pauses, 'um, it was the weirdest thing. There were high trees - a lot of forest where I was - and I could hear the wind coming through the tops of the trees - phww-phww-phww-phww-phww - getting louder and louder and I realised that it was *the front of the wind*,' he turns to me suddenly, 'you've seen those old cartoons of the wind like a face - phww - blowing?' I nod. 'It was like that moving across the land and the trees were snapping over as - bending over as the wind gust hit it. I could hear it coming towards me.'

The Australian landscape, from New South Wales to Western Australia, deviates from European taxonomies of spatiality and temporality. It also deviates from the grasp of cartographic reason and the cartographic imagination - it rumbles in different ways, brings fearsome storm fronts from the south, and is filled with marsupials that move quickly across its ground. Cliff's story is also bound up in an imported imagination, reproduced through a cartography that fails to adequately reproduce the landscape, a normative epistemology that dictates how that landscape should appear. 'On the map,' he explains, 'it looked like a big blue strip the way it - see - this is for your thing - maps mislead you.'

'So,' I ask, 'When you were planning it you actually went and you found the rivers on the map and thought - oh?!'

He laughs.

'That's right. I saw that's a big water going down there. I thought, oh, it looks like a wide river, it's a wide blue strip, it's easily navigable. But it wasn't. I lost about eight kilograms.'

At the same time, the fact that Cliff's tale of woe is proffered along the banks of Botany Bay is perhaps no coincidence. This struggle is repetitive, emblematic of what happens when the homogenising force of the map meets the heterogeneity of the landscape. Arguably, this struggle is not the fault of cartography, nor of the discourses themselves, but rather the promises that they offer - the potential for total geographic omniscience, and the allure of control and power, with which it is accompanied.

In the (re)imagining of the Sydney basin, many literary works - for instance, Carter's (1988) *Road to Botany Bay*, Birmingham's (2000) *Leviathan*, Carey's (2001) *30 Days*

*in Sydney*, and Falconer's (2010) *Sydney* - point to the unpredictability of the Australian landscape and the cities that are built upon it, from the first white settlements to the present day. At the same time, the continued emphasis on Enlightenment and rationalist values verges on bewildering, even against the 'magic' (Taussig, 1997) and affective (Stewart, 1996) coformations of space. Central to the obfuscation of discourse in cartographic realms is the self-serving assumption of neutrality (Harley, 1989: 6) - in other words, not only the expectation that the landscape can be adequately represented, but the expectation that it can be quantified, qualified and codified (Crampton, 2011: 94-95) - or, as Braun (2000: 15) describes 'a history of seeing'. Cliff's experience with the landscape - that 'the bush was alive', the 'roos' and the 'front of the wind' that swept over the landscape - could be read as an irruption of cartographic anxiety, where the landscape failed to meet his expectations with dangerous consequences and imminent disappointment. In his analysis of geography and imperialism, comparing the works of Said and Foucault, Driver argues that 'we must grasp a rather different nettle; less the world of the text than the worldly role of the historian' (Driver, 1992: 36). In geographic terms, rather than historical ones, this sentiment may well be extended to saying that 'less the world of the map than the worldly role of the explorer, navigator and geographer'.

### **Grids: Kyja, when landscapes are (dis)obedient**

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*'The spot was chosen for this purpose (settlement) was at the head of the cove, near the run of fresh water, which stole silently along through a very thick wood, the stillness of which had then, for the first time...been interrupted by the rude sound of the labourer's axe, and the downfall of its ancient inhabitants; a stillness and tranquility [sic] which from that day were to give place to the voice of labour, the confusion of camps and towns, and the busy hum of its new possessors.'* (Collins, 1804: 10)

Kyja and I are wandering down George Street, the main spine of Sydney, searching for a local government office in Wynyard, in the north of the Central Business District (CBD). A relative newcomer to the Sydney landscape, she is attached to her phone, staring intently at the small blue dot which represents her position on the screen.

'It doesn't know exactly where we are,' she murmurs as the little blue dot skips past the Queen Victoria Building. She seems to expect Wynyard to creep up on her, and hesitates because she also knows that the signal in that particular area is unreliable. She begins to worry as the tall skyscrapers block the signal to the phone.

'It [Wynyard] doesn't exist according to general logic', she frowns, 'It sort of exists outside all space and time. It's like its own little island.'

This concern is compounded by the fact that the map's troubles are encompassing all of her attention. We are sitting directly next to Town Hall, perhaps one of the most significant landmarks in the centre of Sydney, and yet the foregrounded worry is, in her mind, that Wynyard is not really a place at all. She describes how Wynyard has a train station, but she has never really managed to cross-reference Wynyard's position with the rest of Sydney. As we draw up close to Wynyard Station, Kyja explains to me how the entire area is like a 'swamp'. I laugh and tell her that strictly speaking, she's not far off the mark. The area around Wynyard was once a swamp with a small fresh water course, the Tank Stream, which bisected the city:

*'Into the head of the cove, on which our establishment is fixed, runs a small stream of fresh water, which serves to divide the adjacent country to a little distance, in the direction of north and south.'* (Tench, 1789: 60-61)

Whilst the depth of Port Jackson (compared to Botany Bay) brought the First Fleet to the shores of what would become the northern edge of the CBD, it was the Tank Stream that attracted them to Sydney Cove. It lies under the ground, not two hundred metres from where Kyja and I sit on the bus. Throughout the city, lingering references to the old Tank Stream can be found in public artworks, street names and local venues (Figure. 5.5) - a muted presence pointing to a history of colonisation.

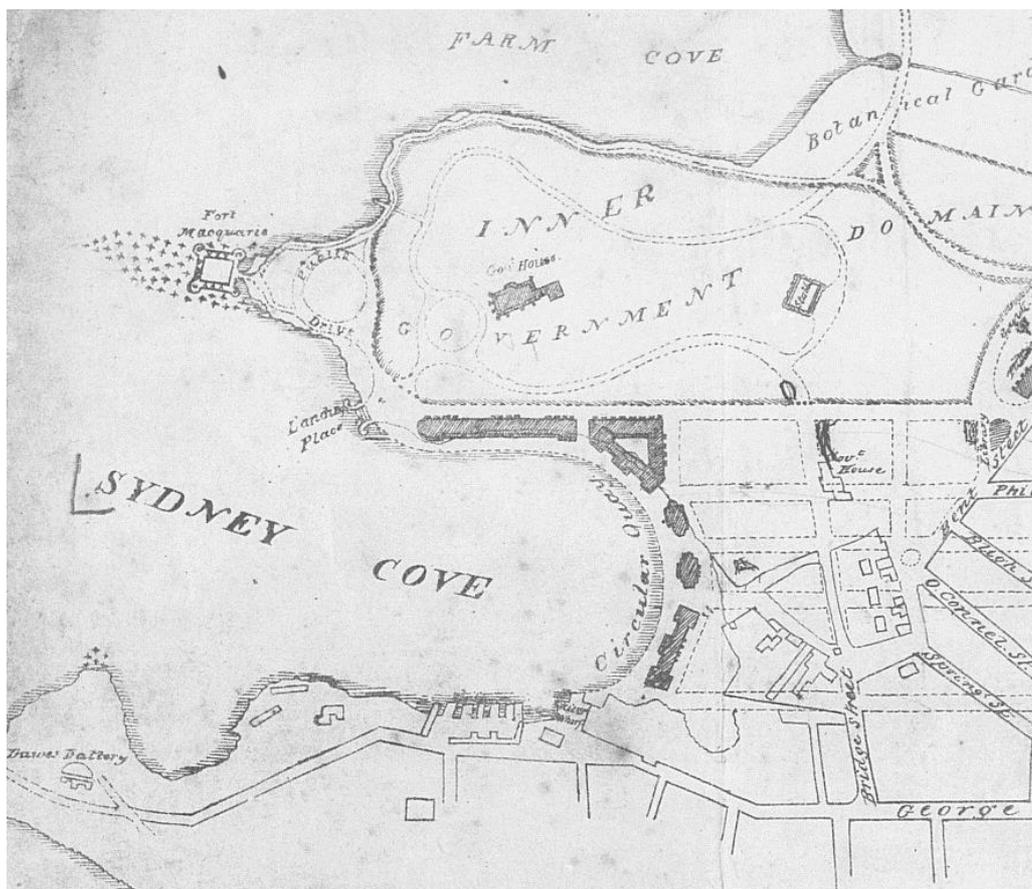


**Figure 5.5** *Traces of the Tank Stream* (Top) Tank Stream Fountain at Circular Quay near Customs House; (bottom left) Tank Stream Way; and (bottom right) Tank Stream Bar in the north of the CBD sits close to the original path of the stream. (Image source: Lee Wilmott)

Sydney’s vernacular history suggests that the city wasn’t planned at all. Put together in a desperate hodgepodge of survival, the regime of colonial settlement first prioritised safety and control: from both a hostile Eora population and the resentful convicts who outnumbered them (Hughes, 2003). However, Thalís and Cantrill (2013) argue that this version of history has been given ‘undue currency’:

‘[W]hat has been misrepresented as “accidental” should more accurately be described as “mistakes, errors and poor decisions”, which some confound as “chaos”.’ (Thalís and Cantrill, 2013: 24)

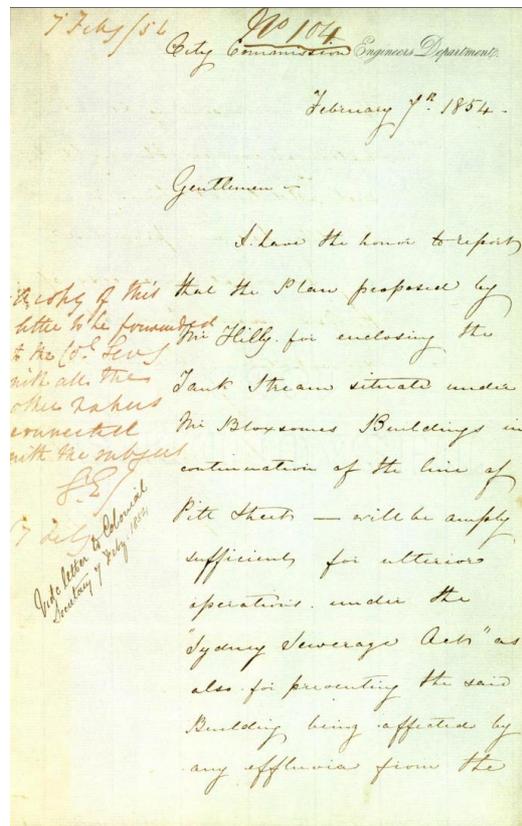
The Tank Stream, which assured the survival of a new colony in a drought-ridden country, was also responsible for creating spatial divisions. Archival documents from the early years of the City of Sydney (1842-onwards) suggest that access to the Tank Stream defined urban planning through the city during the 1840s and 1850s. When later Governors of the colony returned to the first streets and attempted to use cartographic discourses to redraw them into straight lines (Figure 5.6), it resulted in a tangle.



**Figure 5.6** *Circular Quay Improvements*. Plan of Circular Quay improvements in 1840 which never came to fruition. Note the absence of the Tank Stream. (Source: State Library of NSW).

During this period, the Tank Stream was gradually paved over in an attempt to redress the maze of passageways and alleys around the first settlement areas in 'The Rocks', 'Circular Quay' and 'Wynyard', and to help them conform to a more modern nineteenth century grid pattern – with limited success (5.7). Such layout alterations resulted in incoherence on the map, and were incomprehensible to those trying to navigate. The geological formations of Sydney resisted transformation: engineers struggled to blast enough rock from the surrounding quarries to fill the

stream. Indeed, even where it was paved over, the contours formed by the stream continue to define the topology of the landscape in Wynyard.



**Figure 5.7** *Enclosing the Tank Stream*: Correspondence to the City Commissioner from the City Engineers department reading: ‘Gentlemen, I have the honor to impart that the Plan proposed by Mr Hilly for enclosing the Tank Stream situated under Mr Bloxsome’s Buildings in continuation of the line of Pitt Street is more than ample to ensure that there will be no problems re: the Sydney Sewerage Act’. (Source: City of Sydney Archives)

This history leaks directly into Kyja’s experience, as she continues to watch her phone carefully. Yet, she becomes so engrossed in watching the blue dot, that its lag causes her to overshoot the bus stop that would have been most convenient. She thus suddenly slips from the clear rectilinear grid on the map into the swamp and the convoluted urban layout near the quay. Turning the corner, we hop off at the next stop and attempt to back-track the way in which we came, making our way from Tank Stream Way up to George Street and Wynyard. Thalís and Cantrill (2013) state:

‘The material evidence of the dialectic between nature and culture, between memory and erasure, marks and makes the city to an extraordinary extent. Although this foundation lies submerged

beneath today's city, its presence underpins the layout' (Thalis and Cantrill, 2013: 24).

Early maps of Sydney emphasise the Tank Stream to such a degree that, in comparison to contemporary renderings, the harbour is often warped towards the stream. The earliest known European map of Sydney was drawn in 1788, the year of colonisation, by Francis Fowkes (a convict) and depicts Sydney Cove as something resembling the mouth of a large snake. Later maps emphasise streets rather than geologic features, as they were gradually erased by the straight lines and rationalism of planners:

*'The great road from near the landing place to the governor's house is finished, and a very noble one it is, being of great breadth, and a mile long, in a strait [sic] line: in many places it is carried over gullies of considerable depth, which have been filled up with trunks of trees, covered with earth.'* (Tench, 1793: 97)

Tench's comments point to an emerging relationship between pre-colonial landscapes and the forming city. In particular, his comments suggest that the structure of the landscape even in 1791 was already giving shape to the way in which the city was developed as straight lines began to culvert over water catchments.

Later, Kyja and I walk back down George Street from Wynyard to the more ordered rectilinear space of Martin Place. Having completed our first mission, we have moved on to our second - to navigate out to the Eastern suburbs to purchase some roller skate wheels for Kyja. This is a better landscape for her. More used to navigating along Melbourne's predictable grid, this 'southern-end' of Sydney appears to make more sense for her navigational style. Ignoring the convoluted suggested route from Google Maps, Kyja has instead elected to follow the grid along a slightly longer, but simpler path. This path takes us up Martin Place, a major pedestrian through-way, which paves above the buried Tank Stream. Despite this, Kyja stands in the middle of the long promenade extending from our position, tapping her phone and sliding the Google map under her fingers (Figure 5.8).

'So now I'm just being lost,' she says. Looking up, she squints at a street sign ahead.

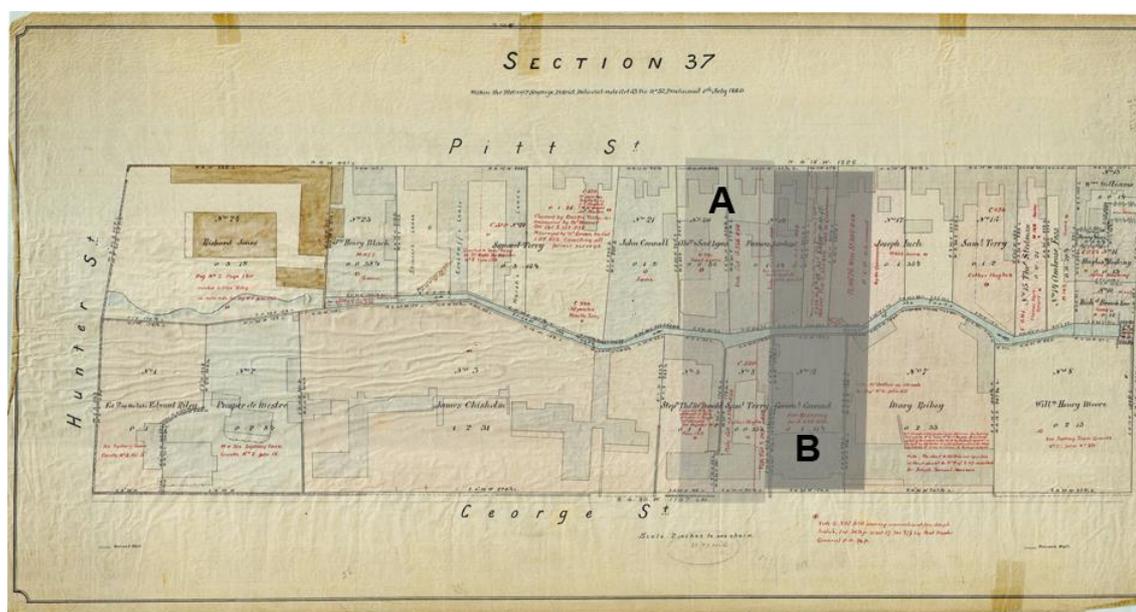
Looking closer at Kyja's map, the blue dot of our position is nowhere near the blue line of the suggested path. Rather, the dot hovers on the screen, south of the jagged blue inscription, just above Martin Place with a little arrow pointing east towards Elizabeth Street. Kyja almost crashes into nearby pedestrians as she twirls around, trying to figure out if this crossroads is Pitt Street, and whether she's heading the right way through Martin Place.



**Figure 5.8** *Mapping Martin Place.* Kyja attempts to navigate Martin Place using her phone, with the General Post Office in the background. (Source: ActionCam)

The shift towards a French nineteenth century ideal of geometric accuracy, which emphasised relationships between, not qualities of, landscapes (Picon and Ponte, 2003) meant that the spaces *in between places* became homogenised and subdued. Rossi (1984) describes how, once certain places, structures or features are instituted within the urban designs, cities tend to continue along those axes, no matter how anachronistic they may appear now. Sydney is one of those particular examples (Thalis and Cantrill, 2013). Through repetition and intersection, the historical axes of the city are revealed; even in absurd correlations between bus lines and polluted streams – and, it seems, unique interpretations of navigational instructions. For example, after a fire destroyed an entire block between Pitt and Castlereagh Streets in 1890, a new street was marked out perpendicular to where the Tank Stream once lay (Figure 5.9). On this street, plans were also made for a General Post Office (GPO) to be located on the new street, with a grand frontage on what was the widest city boulevard at that time. Combined with the GPO, Martin Place could be

understood as ‘a tour de force of public architecture and public placemaking in Sydney’ (Thalis and Cantrill, 2013: 112).



**Figure 5.9** *Martin Place*. City block bounded by Hunter Street in the north (left), King St East in the south (right), George Street to the west (bottom) and Pitt St to the east (top). This plan is a copy drawn in the 1880s of Section 37 of the City Section Survey Plans, 1833, and it is possible to see the Tank Stream through the middle. Overlaid is the future location of Martin Place (A) and the General Post Office (B). (Source: City of Sydney archive).

Martin Place was slowly extended throughout the nineteenth and twentieth centuries, all the way between George Street, where we now stand, and Macquarie Street where the governmental buildings sit at the top of the hill. Through these transformations, it has become a more complicated site of rationalist planning where the tide of pedestrians has now all but erased the tide of the Tank Stream.

‘So, it looks like, it’s Elizabeth there’, says Kyja.

Yet, the green sign on the corner shows ‘Pitt Street’ in white letters. Elizabeth Street is several streets up the hill past a fountain and the Anzac War memorial. The colonnade of the Post Office (sitting just to our right) is now dwarfed by the skyscrapers that surround it. Still, completely absorbed by the phone, Kyja continues in her navigation.

‘The little blue dot seems to be pointing in the right direction,’ she murmurs, ‘but I don’t trust that little blue dot.’

‘Is Pitt Street on the map?’ I ask, pointing towards the sign.

Kyja increases the detail with her thumb and forefinger, and replies.

‘This is the annoying thing about, the annoying thing about this is that the little streets don’t have their names on it, until you zoom in really close...like the laneways, or the

pedestrian streets...? Like, Pitt Street doesn't have a name on it. You have to zoom in that far just to find Pitt Street. And I needed to find Pitt Street to figure out if I was going the right way.'

Peering over Kyja's shoulder and dodging oncoming walkers, I do see that Pitt Street isn't labelled until the scale is increased so far that Kyja's little blue dot has disappeared off the screen and out of view. She sighs.

'Now I have to zoom right out.'

Martin Place embeds itself in the imagination as a space it holds gravitas that not even the 'little blue dot' can shake. Martin Place dominates the spatial orientation of the city. But once there, it appears that it has more influence attracting people to it, than directing them through and away. The first major waypoint on Kyja's suggested path was a bus stop on the corner of Elizabeth Street and Martin Place. Yet, despite the comparative simplicity of the gridded path Kyja has decided to take, the complicated Google Map instructions through the old swamp of the Tank Stream may well have been easier.

'Obviously this would have been much more straightforward if I had followed the walking path as it suggested,' she murmurs. She spins again, and a man in a business suit dodges to avoid her.

'Why didn't you?' I ask.

'I don't know. I just like...'. Her eyes widen in memory, 'Oh - because it said Elizabeth Street near Martin Place, and I was like, I will go to Martin Place and Elizabeth Street will then be nearer. I felt like I didn't need directions to Martin Place because I already know where Martin Place is.'

The Tank Stream made a cut, of sorts, through that part of the CBD and so the streets are complicated, unevenly planned and were never fully integrated into the rectilinear patterning of this part of the city. So, wandering up perhaps the most well-known thoroughfare in Sydney, we find ourselves trying to make Kyja's little blue dot meet the lost blue line, awkwardly integrating the enduring axes of the near and far as they criss-cross through space. Looking up, finally, Kyja decides just to go straight on. 'The way I went isn't really slower anyway'.

## Datums: Mohammed, when vertical stability meets changing tides

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*'This copper bolt is 17 feet 10 in[ches] above the level of the soundings taken by H. M. Surveying Vessel Rifleman in 1860 along the foreshore of Hong Kong (Victoria) Harbor.'* (Plaque in Hong Kong Maritime Museum)

For Mohammed, the first order of business on his first morning in Hong Kong is to make his way from 'Causeway Bay' to 'Admiralty' to see the Bank of China building. Designed by one of his favourite architects, I. M. Pei, the Bank of China was the tallest building in Hong Kong at the time of its construction. Our journey is full of ups and downs. Delving deep into the Mass Transit Railway (MTR), we resurface at 'Admiralty', where Mohammed promptly becomes disoriented. Pulling his phone out of his pocket, he opens Google maps and starts twirling, like Kyja, following the 'blue dot' in order to figure out his direction.

The problem in Hong Kong that Mohammed first encounters (staring at his phone screen) is that whilst the cartographic imagination is able to take into account vertical territories via three dimensional outlines, the experience of being situated in hyper-vertical, multi-layered environments is more illusive. The homogeneity of Mohammed's Google map belies the complexity of the hyper-vertical, hyper-urban space around 'Admiralty'. This is where the Naval Docks once stood before the gradual resumption of Victoria Harbour through land reclamation.

Because of the lack of availability of flat land on the island and along the Kowloon peninsula, Hong Kong has a peculiar relationship with the cartographic imagination. Weizman (2002) claims that the 'flatness' of geo-political discourse is a result of the 'flatness' of the cartographic imagination:

'Geo-politics is a flat discourse. It largely ignores the vertical dimension and tends to look across rather than to cut through the landscape. This was the cartographic imagination inherited from the military and political spatialities of the modern state.'  
(Weizman, 2002: 3)

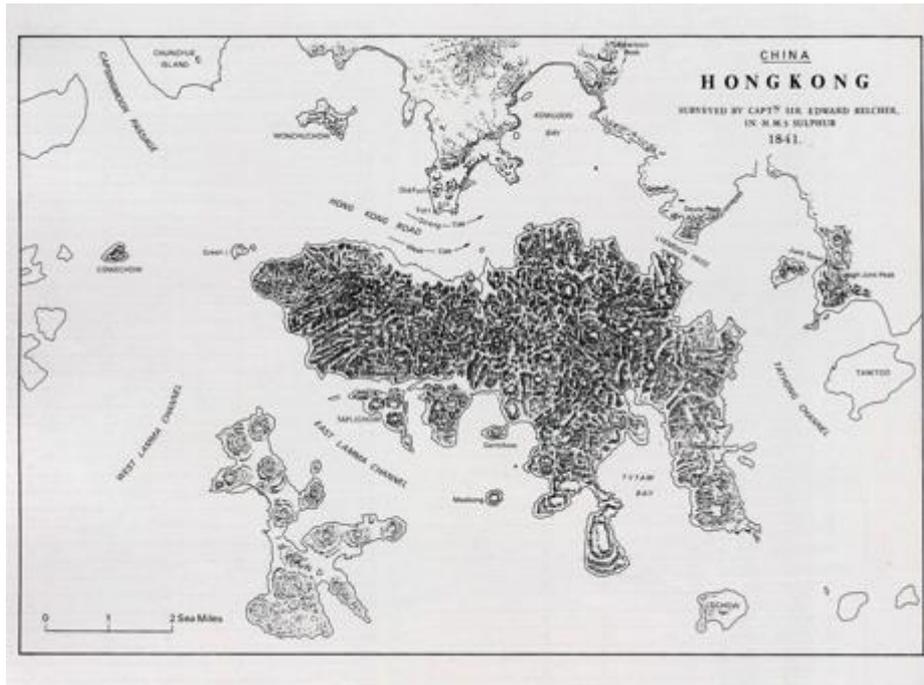
Weizman's claims appear to be axiomatic: the majority of maps are flat, two-dimensional objects sporting planimetric representations. Yet, verticality has defined the imagination of Hong Kong, and the cartographic imagination has adapted

towards this. Weizman's argument privileges the power of Cartesian cartographies, rather than reflecting the complexity of cartographic practices. From sketching, to birds-eye views, to elevation plans, cross-sections and GPS tracking, there are a multitude of practices that allow the cartographic imagination to comprehend three dimensions. Today, Hong Kong maintains its position as the city with the highest number of skyscrapers in the world (Lau and Zhang, 2015); a new kind of urban verticality arising out of the limitations of Hong Kong's steep topography.

However, while cartographic reason, through a vertical cartographic imagination, continues to rationalise and numerate the upward plane, it fails to comprehend the quality of experience and disorientation that comes from being embedded within vertical environments. Once reception is reinstated at the foot of the Lippo Centre, Mohammed despairs at not being able to find the Bank of China building on his phone. He describes how, in Kuala Lumpur, Google Maps already has widespread 3D mapping that uses a three-dimensional outline of the building, effectively helping users navigate between the abstraction of flattened screen-based representation and the three-dimensional world around them. Yet, in Hong Kong, in a city that defies such two-dimensionality, Mohammed shows me how this particular feature is blocky and not reflective of the shape of the buildings.

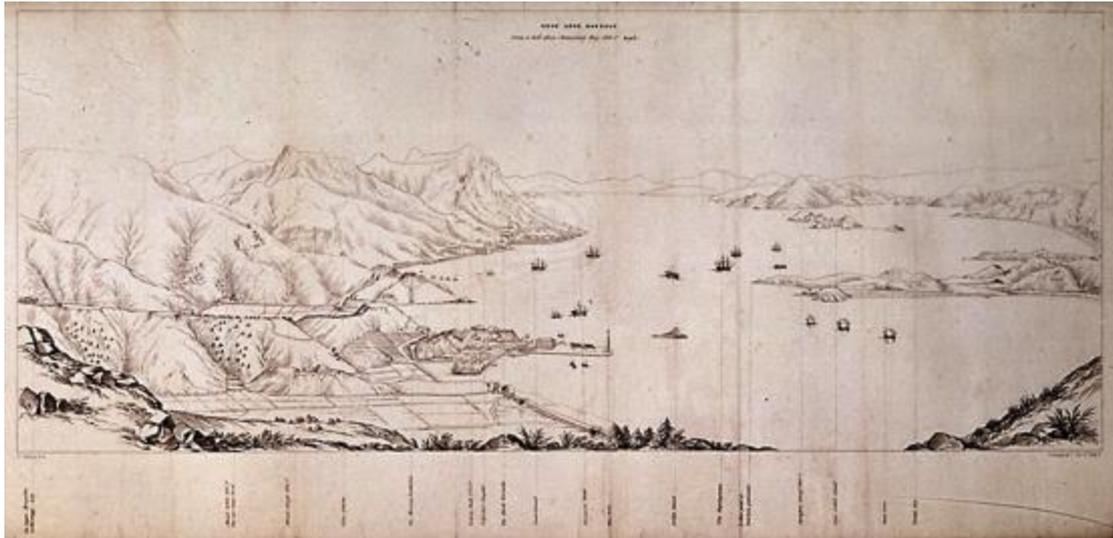
'The buildings don't really look like the buildings,' he exclaims woefully, '... yeah, this is not right'.

Even in flatness, the verticalities of the cartographic imagination create complexity through the regimentation of shape. Tasked with making the first colonial maps of Hong Kong after the Treaty of Chuen-pi in 1841, Captain Belcher of the HMS Sulphur produced a series of cartographic depictions which, although flat in form, emphasised the verticality of the new territory (Figure 5.10) (Belcher, 1843).



**Figure 5.10** *Map by Captain Belcher.* Map of Hong Kong dating to 1841 showing the geological formations across the island. (Source: Royal Museums Greenwich)

The map is an outline of Hong Kong and surrounding islands, and features contoured sketches and hachuring, to give a sense of the height of the steep and hilly terrain, as well as an impressive array of depth measurements of the surrounding waters. This particular style of mapping, which Empson (1992) describes as typical of the meticulous style of the British Navy, was both pragmatic and ideological: the hills and bays of Hong Kong lend a natural verticality to the geomorphology of Hong Kong; and yet, at the same time, this particular cartographic practice also draws attention to the ways in which vertical space was already undergoing rational stabilisation through increasingly accurate forms of scientific description. Later sketches in 1845 by Lt Collinson, a naval engineer, saw the introduction of topographic data in even more detail, in the form of relief contours at 100ft intervals. Accompanying the survey Collinson produced a series of coastline sketches (Figure 5.11), from a variety of vantage points, marking higher peaks with their relative elevation. Collinson's sketches, together with the contour relief maps, provide an overwhelming sense of the role that topography had in the shaping of Hong Kong's urban development even at the earliest stage of colonisation, as the City of Victoria grew. Furthermore, the sketches emphasise the ongoing relationship between the cartographic imagination and vertical landscapes. On these sketches, it is possible to see the very early flattening of hill-tops and hill-side terracing to make way for development: the emergence of the current landscape of Hong Kong.



**Figure 5.11** *Possession Point*. An 1845 map of Hong Kong Harbour, showing Possession Point near the centre. Map by Lieutenant Thomas Bernard Collinson (1821-1902) (Source: Hong Kong Central Library)

Climbing up the stairs from the Lippo Centre, we emerge onto a freeway overpass, giving us full view of the Central District to our west. Mohammed is visibly excited. 'Before this [today's experience] I just saw this building on a book,' he says. Switching his phone to camera mode, he proceeds to take a dozen or more photos of the building from different angles, all the while telling me about the history of the buildings before us (Figure 5.12).

'And the guy who designed the Hong Kong Shanghai bank over there,' Mohammed continues, 'the HSBC, is not Chinese, Norman Foster.'

Sitting behind the Bank of China building, and overshadowed because of its shorter stature, sits the HSBC building in what is a poetic estimation of Hong Kong's post/colonial present.

'They say that the building, the Hong Kong and Shanghai bank, they can assemble the building back...,' he points out across the road, 'they can take the building away, put somewhere else, assemble the building somewhere, because, uh, they think that China, I mean that China going to take back Hong Kong, they will assemble the building back, put it somewhere else...that's why they rigged it, the design like, you can assemble it, it looks like Lego'.

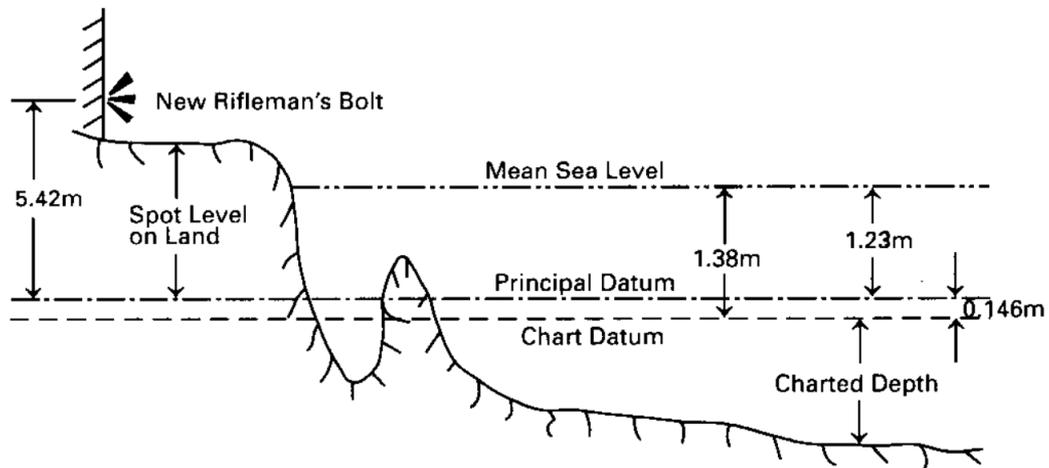


**Figure 5.12** *The two banks.* Mohammad takes photos of the new Bank of China (designed by I. M. Pei) building in the foreground, while the HSBC building (designed by Sir. Norman Foster) can be seen in the background. We stand at *The Lippo Centre* (力寶中心), built on the original site of the Rifleman's bolt. (Source: ActionCam)

It's a profound statement. Lego is a three-dimensional geometry - where tessellation becomes re-combinable and fixities become fluid through assembly and disassembly. Here, regimentation and fix-points, rather than stasis, becomes more significant. It is not that such an environment will stay the same - the liquid modernity (Baumann, 2000) of Hong Kong makes that near-impossible. Rather, it is important that stabilisations can be reshaped, like the HSBC building, to funnel transformation according to future conditions through the establishment of systems of regimentation – this is how the urban space of Hong Kong operates, in constant flux.

The site of the Lippo Centre, where Mohammed and I stand, is situated in a history of spatial regimentation. In 1866, the crew of HMS Survey Vessel 'Rifleman' drove a copper bolt into the wall of Storehouse No.12 in the Hong Kong Naval Dockyard. The Rifleman's Bolt, currently a relic in the Survey and Mapping Office in Fortress Hill (Figure 5.13), was the first imprint of a constant vertical mean - a datum by which the verticality of Hong Kong could be measured (Nissim, 2011). It was the survey datum for all heights and levels on land until twenty-two years later, when the 17ft higher Hong Kong Principal Datum (HKPD) was established from tidal observations. Remaining on-site in the dockyard until a series of reclamations changed the coastline of Hong Kong, the Rifleman's Bolt was then moved to the new Naval dockyard where it was once again driven into a wall, however, at a slightly different

height. The arbitrary nature of this mean vertical measurement did not end with the Rifleman's Bolt. The HKPD was found to be four-feet lower than sea-level, measured over eighteen years between 1965 and 1983 (Mugnier, 1998), and a new Mean Sea Level was established in 1983 relative to the HKPD (Figure 5.13) (Survey and Mapping, 1995).



**Figure 5.13** *Regimenting the Vertical.* (Top) The Rifleman's Bolt - currently on exhibition at the Hong Kong Maritime Museum (Source: Author). (Bottom) Hong Kong Principal Datum (Source: Hong Kong Institute of Surveyors, 1994).

In terms of mobile mapping, it is possible to see how the measurement of verticality has, at once, been a stabilising yet imperfect practice of setting datums. Much like Mohammed with Google Maps, the British colony of Hong Kong struggled to make sense of the mountainous and irregular terrain. This was compounded by a sense of insularity, reminiscent of the coastal perspectives of the early British settlers in Australia who relied on a maritime viewpoint to comprehend terrain. Later on, as Mohammed and I catch the number 22 bus up the hill to 'The Peak', he looks down at the Happy Valley racecourse.

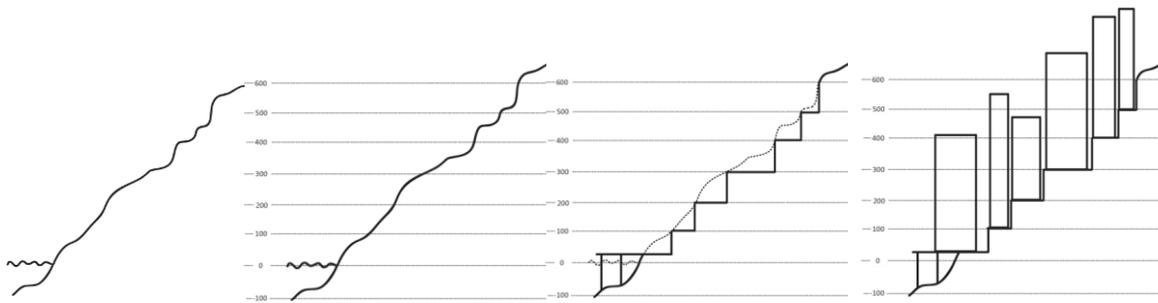
'It's so high', he says looking down at the sheer drop from the side of the road, as we wind our way into the centre of the island.

On the map, this drop is obscured by the homogenous green pantone of the Google Map he was looking at earlier to decide our route. He is amazed at the ability to build houses and high-rises on such a steep landscape - they perch precariously on outcrops and look starkly manufactured, naked next to the lush surrounding forest. The road itself is held together by a series of impressive fortifying walls, which dig into the hillside and prevent landslides - another feature obscured by Mohammed's map.

The cartographic imagination is defined by stabilising and regimenting datums that see the stultification of space through levelled fixities. This is precisely the distinction between the map (which is flat) and the cartographic imagination (as a rationalising force). The cartographic imagination is adaptive (if occasionally, arbitrary) and is able to rationalise the vertical formations of the geological (Braun, 2000), industrial (Scott, 2008), nautical (Höhler, 2002), speleological (Pérez, 2013) and subterranean (Picon and Ponte, 2003). This vast array of cartographic stabilisations of vertical space suggests that, instead, it is the militarisation, politicisation and commercialisation of space through the cartographic imagination that produces a kind of flatness, rather than an inherent trait to the cartographic imagination itself. Therefore, although Weizman (2002) charges the cartographic imagination with being flat, in Hong Kong, the cartographic dispositif generates multiple ways of comprehending the nuances of power relations which occur on the vertical sphere. Reclamation on the New Territories near Plover Cove was demarcated by geological mapping, as described by Faure and Siu (1995):

'The area of reclamation coincides almost exactly with the area shown on the Hong Kong Geological Survey as "Terraced Alluvium".' (Faure and Siu, 1995: 254-255).

Terraced Alluvium is a natural fluvial terracing that can be harnessed to produce stable foundations for reclamation work. The verticality of the cartographic imagination (if not always the cartographic image) can therefore be seen in terracing (Figure 5.14) and the transformation of the liquidity of Victoria Harbour into stabilised flatness through land reclamations.



**Figure 5.14** *Vertical stabilisations.* New grids stabilise according to Cartesian systems prioritising flatness, regularity and fixed zero points in vertical datums. (Source: Author).

Furthermore, Weizman's (2002) claims understate the role that certain colonial logics – including governmentality, militarism and commercialisation – have in overemphasising the horizontal plane through surveillance, resource acquisition and defence. Whilst Mohammed's map may not represent verticality particularly well, cartography has driven the architecture of Hong Kong. The quantification of upwards measurement, from peaks to buildings, points to the way in which the cartographic imagination has shaped not only horizontal measurements, but vertical measurements too.

Over time, the cartographic imagination has stabilised the hillsides of Hong Kong into ever more precise frameworks: Lieutenant Collinson's triangulation points; the Rifleman's Bolt; and then the Hong Kong Principal and Chart Datums. Thus, the verticalities embedded in Mohammed's experience of mobile mapping both reflect and produce particular kinds of cartographic imagination in an iterative process. Furthermore, the landscape in which this occurs is the present iteration of a series of successive, anthropogenic changes. The relationship between maps and landscapes is not incidental - rather, cartography is used as a tool, in order to stabilise vertical landscapes into fix-points rather than flatness.

## Roads: Vicki, when calculable landscapes produce controllable territories

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*'A Road would be highly desirable not only as a matter of convenience to the Inhabitants, but as a means of moving Troops with speed and facility to that part of the Island'* - Land Officer A. J. Gordon to Lieutenant Colonel A. B. Malcolm, Acting Colonial Secretary, 6<sup>th</sup> July, 1843: 140

A local resident of Hong Kong, Vicki wants to hike to Victoria Peak in order to keep fit and explore the landscape. The road to the Peak on Hong Kong Island is not only an ascent in elevation, but also in economic status. The height of the mountains affords an almost uninterrupted view of the north and south sides of Hong Kong Island, attracting throngs of tourists, like Mohammed, and locals to the top, either by bus, tram or by walking. Vicki and I walk from Des Voeux Street in Central before taking the mid-levels escalators halfway up. On the way, Vicki taps her Octopus card on a card-reader.

'It allows me to have a 2 dollar reduction on my return back,' she tells me.

It is unclear whether the reward aims to encourage public transport use, or the use of the Mid-Levels escalator system. Vicki explains how the escalators are at once easier and faster than walking, but also remove you from the navigability of the city. The consequence is that you are left entirely at the mercy of the less-than-adequate wayfinding system above, rather than the clearly labelled streets below.

'Signs are often not that accurate,' she explains, 'Sometimes it's hard to tell what street you are on. So even for locals to get off you need to look up,' she points to a series of signs hanging off the roof of the covered escalators, directing people where to go. After the escalators, she tells me that we will cut across the Hong Kong Botanical Gardens and then take the road to the top.

'So, we go all the way up. So, we go Old Peak Road'.

She points to a large building sitting in the saddle of the highest two mountains. I know the path, having lodged nearby, and grimace at the trek.

'Is there a New Peak Road?' I ask, as Vicki laughs.

'I guess it's the tram.'

Halfway up the Old Peak Road, in the lush foliage of Victoria Peak, she opens Google Maps to show me how far we have walked (Figure 5.15). Yet, she finds the same problem of ambiguous signage exists with Google Maps: the sparseness of detail on the map obscures as much as it shows.

'It doesn't show its incline,' she slides her finger across the screen, 'you know, the green areas is mountains.'

Victoria Peak and the hills are represented on Google Maps by a series of green patches, with a few yellow and white roads snaking around and through the middle. These roads are the only indication of the contours affecting this landscape, and the steepness of the path upwards. Furthermore, the blue dot that represents our position is floating off to the side somewhere. Thus, in and of itself, the green area is not enough to determine where we are. Vicki laments that she cannot find the mobile-optimised government hiking map that she uses on other countryside routes, which tags the track with wayfinding points marked on the map for easy comparison without GPS or a compass. Instead, Vicki must rely on the shape of the path in relation to the surrounding environment, working between an abstracted top-down perspective and our horizontal/vertical experience.



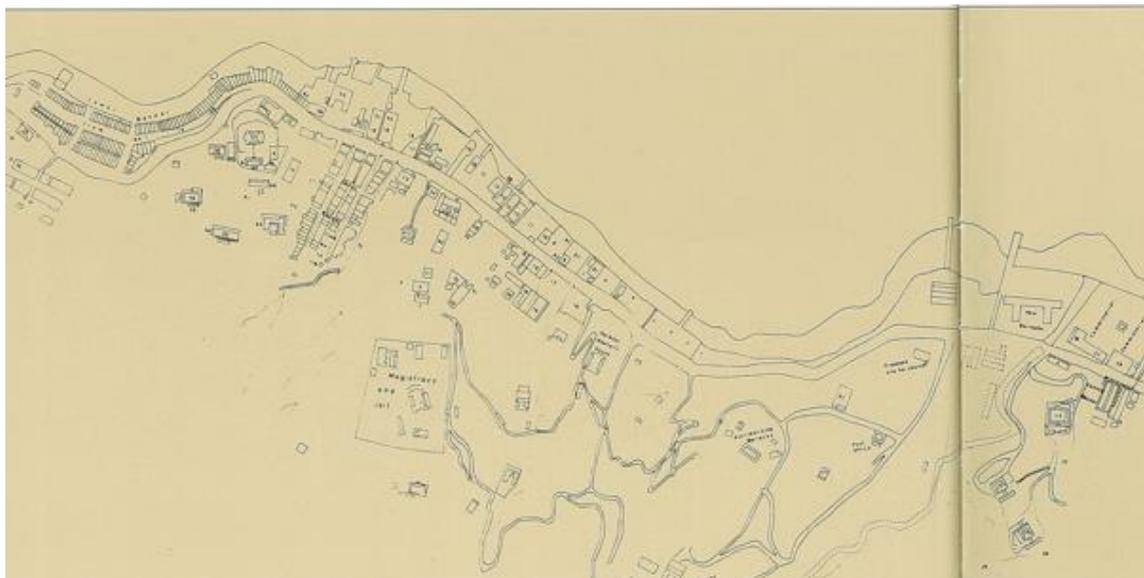
**Figure 5.15** '*The green areas is mountains*'. Vicki shows me The Peak on Google Maps using search. The blue dot sits to the left of the screen. (Source: ActionCam Footage)

The emphasis on the road is not just a quirk in Google mapping software. Rather, the road is a theme that appears in the early establishment of imperial power. The road from the point of landing in Sydney Cove to the Governor's residence was a key development in the fledgling colony, and roads dominated many early maps. Similarly, a cadastral map, drawn by land officer A. J. Gordon in 1843 (Figure 5.16), details the first road in Hong Kong - Queens Road, snaking along the shoreline of the

emerging town of Victoria. Söderström (1996) describes the historical relationship between cartography, visual thinking and urban planning:

‘This naturalisation of the representation, which can also be seen in small-scale cartography, is a paradoxical process, since it entails a sudden shift of the gaze from the horizontal and oblique, in the case of perspective, to the vertical and consequently, much less ‘natural’ viewpoint of the geometrical plan.’ (Söderström, 1996: 260)

In *Gordon’s Map* (below), Gordon begins the task of laying out the early stages in the development of the Victoria’s town plan and numerically cataloguing the various land-grants already given in the first few years of colonial occupation. In addition to Queens Road, it is possible to see smaller streets curving up into the hills, as well as a number of rhombic shapes clearly delineated with sets of numbers.



**Figure 5.16** *Map by Land Officer Gordon*. Close-up of Land Officer Gordon’s cadastral map drawn in 1843. An earlier map by Pottinger in 1842 includes some contour data, which is omitted in this update. (Source: Empson, 1992)

These spaces sit at odds with the uneven shoreline (which forces the road itself to run in a similar curvature), and the unsteady lines of roads as they make their way up into the hills towards the centre of the island. Later surveys of Victoria were plagued with the same dissonance between the desire for straight, coherent and regular lines of development, and the imperfect and irrational Hong Kong landscape. In an 1843 letter

updating the then-Colonial Secretary Colonel A. B. Malcolm, Gordon wrote of this situation:

*'It is a matter of necessity, from the hilly and uneven nature of the ground in this Island, than any plan of a Town must be of a somewhat irregular or straggling nature.'* (Gordon, 1843: 140)

Gordon seemed particularly uneasy about this irregularity. In his opinion, the problem of the uneven nature of the urban landscape was further augmented by unplanned buildings:

*'Much confusion has arisen from the land never having been properly set out, and even now scarcely any one knows his limits.'* (Gordon, 1843: 148).

Gordon's proposed solution was simply to impose more order through the surveying of space, the zoning of land, and insisting that streets were uniform. Furthermore, he suggested giving European warehouses better sea frontage (too valuable for Chinese shops) (Gordon, 1843: 145; see also Carroll, 2002), which would 'afford ample room for troops, guns'. Here, the discourses fostering the development of the city of Victoria are at once pragmatic - looking to create suitable spaces given the difficult terrain - and yet also ideological, co-purposing the space with military capabilities, class divisions, and governability (Ó Tuathail, 1996).

The impact of these decisions flow through to present practices of mobile mapping. Vicki chose to take Old Peak Road specifically because it is easy to follow, and since she is scared of heights, falling rocks and snakes, she sees the road as being governed, safer and maintained.

'Even though it's steep, it's very well paved.... It's well paved because this road is kind of an old route to The Peak before the train....' she explains.

Vicki's choices work precisely within the framework that Gordon was attempting to establish: Vicki takes the paved and/or regulated roads, which at once keep her safe, but also keep her within the confines of governable space. Here, the definition of roads and the numbering of property lots in order to facilitate (or prevent) the movement of populations, becomes a disciplining device; constructed through and reinforced by the cartographic imagination in order to encourage compliant behaviour of the population (Huxley, 2006). Furthermore, the cartographic imagination becomes implicated in the modern cartographic impulse to survey and develop. In the lengthy

list at the end of Gordon's letter, he tabulates the number, the owner, and the various 'improvements' made to each property. Owners were at risk of eviction or fines if sufficient construction and/or development was not made. This disciplining through survey is based effectively upon the same system of logic as Gordon's map laying-out the City of Victoria. This logic is also similar to Vicki's Google Map that keeps walkers on the road for a lack of other options. Here, the map becomes a 'moralising force':

'First, security and risk were used to think of space and people as *resources* that required management and protection. Second, space and individuals were understood through *normalizing surveillance*.' (Crampton, 2003a: 137, original emphasis)

The relationship between the cartographic and the moral is based in the mode of surveillance of top-down plan, according to Söderström, – the zenithal gaze in which mathematical space abstracts or extracts from the ordinary inhabitant, and thereby becomes implicated in the quantification, qualification and codification of people.

'It is a gaze which also enables the viewer to conceive in abstract terms the particular measurable characteristics of the citizens of the city, such as the density of the population, their earning power, or the state of their health.' (Söderström, 1996: 260)

Söderström's argument, particularly in relation to the rationalising force of the map, is that whilst he agrees with Crampton's (2003a) argument that a top down perspective objectifies both landscapes and people into quantifiable measurements, such shifts *enable rationalisation via visual abstraction from the everyday and the ordinary gaze*<sup>16</sup>. This same process can be seen in both Gordon's letters and Pottinger's cadastral map - the removal of the anthropic into the scientific and the objective (Harley, 1992) by rearranging Hong Kong's space into numeric and calculable parcels.

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<sup>16</sup> Latour (1986: 25) argues similarly around the collection and calculation of objects - in which centres of calculation encouraged the removal of objects and information from their spatiotemporal contexts, into institutional spaces where they could be synoptically presented (cf. Foucault, 2003) and categorised.



**Figure 5.17** *'The air here is much better'*. Vicki uses her phone with the tops of the skyscrapers peeking through the trees in the distance. (Source: ActionCam Footage)

Now, as Vicki constantly returns to her phone as we walk up the hill, these moralising forces, abstracted through the cartographic imagination, become replicated in the constant self-reference between where we are and the little blue Google Maps dot. The cartographic imagination turns the road into a space of inequality. Here, in Vicki's story, we can begin to see an interoperability of rationalist forms, in Foucault's (2002a: 37) terms, a criteria of *correlation*. As we walk further up Victoria Peak, Vicki smiles.

'The air here is much better', she tells me, before discussing the pollution blowing over from the industry in southern China.

One hundred and seventy years earlier, Gordon too (1843: 142) stated: 'I am aware it may be thought advisable, for the sake of air at particular seasons, to have the streets at right angles to the direction I have described...', before going on to explain why commerce in the canals may be affected by such a plan. He argues: 'I believe there is no reason to fear a want of good air, and in the European part of the Town there might be streets at right angles to those already mentioned' (Gordon, 1843: 142). The Victorian obsession with good air (Driver, 1988) that is better in one place or another is so affixed in the discourses of urban planning that Vicki mimics sentiments expressed, and then dismissed, by Gordon more than a century and a half earlier. This moves beyond initial modes of governance and control, exhibited by the early colonisers in Hong Kong. Here, moralising forces intertwine public health

with the cartographic imagination (or what Söderström (1996: 249) might term 'visual thinking'), hiding a more sinister valuation of economic prioritisation and colonial class.

Here, correlation between cartographic and governmental rationalism, with the explicit aim of producing technologies of power through moral geographies, is perhaps evidence of the continued progress of reason (Foucault, 1991). The dominance of the roads as a safe path, fit for purpose and socially acceptable, is replicated in the way in which Vicki disciplines her journey, through way-finding systems that reflect similar regimes historically. The isolated lines of Pottinger's map look remarkably like the representation that Vicki grapples with on the mobile screen - scientifically accurate but functionally useless for everyday navigational purposes in Hong Kong. The apps and maps, which Vicki uses, hold the same *criteria of formation* (Foucault, 1991): Google leeches geographic information from governmental land maps, information which is already irrevocably imbued with ideologies of governance and control. Even the government hiking trail apps continue to serve this purpose - posited as public health and information, they are still subject to the discursive apparatuses of cartographic logic, planning and governability. This is the nature of the cartographic imagination - whether cadastral maps of the nineteenth century or the mobile maps of the twenty-first. It reduces people to objectified users - mechanisms in the dialectic between landscape and representation - promoting this reduction as necessary to 'ensure a relatively predictable and purposely surprise-free milieu' (Akkerman, 2000: 283). For Vicki, contemporarily, such maps trade the assurance of her safety for increasing personal surveillance and controllability (Crampton, 2003a) through the spatial technology of the road.

### **Codes: Shaun, when the same order becomes a new language**

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'Turn right onto Boundary Street, A38'  
(Shaun's iPhone)

Shaun, who has never been to the North Shore before, has chosen this destination because a man he once worked with came into a fortune and bought a large house up near Dee Why beach. It is an extraordinarily hot summer's day, and the glaring sun cuts through windshield, reflecting off the smooth glass of Shaun's phone as he tries to set up the GPS. It takes until the other side of the city, well up into the Northern Beaches, before we get it working. The lively commentary of the city

supplied by Shaun up until this point suddenly becomes punctuated by GPS commands. The GPS uses a foreign accent, clinical and clipped compared to Shaun's animated political history. Its intermittent interruptions are also inconsiderate of the rhythm or the flow of the traffic, the car, or the conversation. As the GPS begins to increasingly insert itself into Shaun's navigation, we turn onto Boundary Street and he points to an overhead road sign that displays the name of the street as well as a numeric code, 'A38' (Figure 5.17).



**Figure 5.18** *A road of national importance.* This screenshot is taken at the intersection where the Boundary St ceases to be the A38, and Babbage Rd instead takes on the marker, where Shaun first comments on the new alphanumeric system. (Source: ActionCam Footage)

'That's the other thing too,' he tells me, 'they're bringing it into line with this "A" nonsense and "M" nonsense and they've ... it's the renaming of main-major streets and roads and stuff and it sort of happened about a year and a half ago...they didn't - they just sort of did it and didn't really tell anyone... or, actually, they might've. I just don't watch TV.'

This reclassification is part of a national roads initiative to bring road toponymy into a standardised form across all Australian states by creating a hierarchy of importance according to a national framework (Table 5.1). Each alphabet code is supplemented by numeric designation, which has been decided either based upon pre-existing road numbers, or because of their relative proximity in road hierarchies to other more important roads (Austroads, 2013).

**Table 5.1** *Austrroads alphanumeric road system*. Designation and roads in NSW.  
(Source: Austrroads, 2013)

Alphanumeric Designation	Type	Meaning
M	Motorway	Motorway
A	Main Road	National importance
B	Lesser main road	State importance

Importantly, whilst the restructuring of urban design lies on a plane that is visible to ordinary citizens (even though the decision-making processes may not be), the epistemological restructuring, involved in the renaming of streets for instance, has long been in play; albeit less obviously. Shaun's observations that 'they just sort of did it and didn't really tell anyone' is astute, delving into the complex way in which the reclassification of roads is occurring. In fact, according to the peak organisation of Australasian roads and traffic management (Austrroads):

'[T]he new signs have been "cover-plated" from view, awaiting the roll-out of the new system. Given the high percentage of the State road network that is now ready to unveil the new signs, Roads and Maritime has decided to commence the implementation of the new scheme.' (Austrroads, 2013: 9)

One of the key selling points of this system was its interoperability with GPS devices, and GIS data systems. The new road names had been rolled out to major cartographic stakeholders well before they were available to the public (Austrroads, 2013). Local planning increasingly cooperates with global standards of cartographic communication and best practice (Söderström, 1996). Consequently, the toponymies that retain the specific temporalities of development in post/colonial urbanism - from La Perouse, to the Tank Stream, the Rifleman's Bolt and the Old Peak Road - become replaced by governmental and commercial interests through a reterritorialisation of the past under logics of progress.

Thrift (2004b) describes the increased territoriality of identification systems and the way in which space itself is being rearranged in order to accommodate and optimise these systems. The 'track-and-trace' evolution, Thrift (2004b) argues, results in a '*standardisation of space*' (Thrift, 2004b: 175 [emphasis added]), brought about as a

result of the availability of geolocative technologies, increased the formalisation of sequential knowledge systems and the expansion of calculative capabilities. I ask Shaun if he finds the switchover from the current toponymic system to the new alphanumeric one confusing?

'I understand why they're doing it,' he responds, 'I mean Victoria has it, Queensland has it, they're just sort of bringing it into line'.

Ostensibly, this reclassification standardises names into machine-readable logics, thereby assisting the efficiency and productivity of planning regimes and government systems. It also calls the taxonomic and toponymic systems of cartography into coded and digital systems. Even though the GPS shows both the toponymic name of the road, 'Boundary Street', and its alphanumeric equivalency, 'A38', the two are not quite the same: the 'A38' is, in fact, comprised of a number of different roads, only one of which is 'Boundary Street'. This is evidence of gradual homogenisation of road names, comparable, arguably, to the same retrospective ordering systems that were applied to address the chaotic nature of early Sydney and Hong Kong (Figure 5.18).

P L A N		
OF THE NEW AND OLD NAMES OF STREETS, &c. IN THE TOWN OF SYDNEY; WITH Explanations and References.		
NEW NAMES of STREETS.	OLD NAMES of STREETS.	EXPLANATIONS and REFERENCES.
1. GEORGE STREET.	{ High Street, Spring Row, or Serjeant Major's Row.	{ Extends from Dawes's Point, in a southerly direction, through the middle of the town to the extremity thereof, and to where the toll bar is intended to be erected near the Brickfields.
2. PRINCE STREET.	.. Windmill Row.	{ Extending from Charlotte Square and the Government Stone Wharff, in a southerly direction towards Dawes's Point.
3. YORK STREET.	.. Barrack Street.	{ Extends from the Barracks, in a southerly direction to the Burying-ground, parallel with George-street.
4. CLARENCE STREET.	.. Middle Soldiers' Row.	{ Next street west of York-street, and running parallel with it north and south.
5. KENT STREET.	.. Back Soldiers' Row.	{ Westernmost street of the Military District, next to and running parallel with Clarence-street.
6. CUMBERLAND STREET.	.. (No Name).	{ Extends from Charlotte-square, in a northerly direction towards Dawes's Point, next to and running parallel with Prince-street on the east.
7. SUSSEX STREET.	.. (No Name).	{ A new street, to be formed immediately next to Kent-street on the west, and running parallel with it north and south.
8. CAMBRIDGE STREET.	.. (No Name).	{ Extending from Charlotte-square, in a northerly direction towards Dawes's Point, next to and running parallel with Cumberland-street on the east.
9. FITZ STREET.	.. Fitz's Row.	{ Extends from Hunter-street, in a southerly direction to Hyde Park, parallel with and next to George-street on the east.
10. CASTLEREAGH STREET.	.. Chapel Row.	{ Extends from Hunter-street, southerly to Hyde Park, parallel with and next to Fitz street on the east.
11. PHILLIP STREET.	.. Back Row East.	{ Extending from the Government Domain southerly to Hyde Park, parallel with and next to Castlereagh street on the east.
12. HUNTER STREET.	.. Bell Street.	{ Extending from George street, in an easterly direction across the Spring and Tanks to Hyde Park.

Figure 5.19 Plan of the new and old names of streets, in the town of Sydney; with explanation and references. This is a notice taken from The Sydney Gazette and New South Wales Advertiser in 1810, which describes the renaming of the streets around the Tank Stream, concurrent with the urban redesign of the area around Wynyard and Circular Quay. Notable in this list is a loss of geographic markers, such as Chapel, Windmill and Barrack to more austere, English and colonial markers such as York, George and Cambridge. (Source: National Library of Australia; Gazette, 1810)

Whether this is a geometric functional aesthetic, or systems which improve the calculability of disordered landscapes, the redrawing of qualitative names, paths, and

places into taxonomic, quantitative and ordered systems has resulted in loss of toponymic history and memory.

I'm curious about the impact that this may have on Shaun's everyday navigation practices - does he feel that loss? I ask him if it will be easier for him to remember A38 as opposed to Boundary Street - and again, he responds by shaking his head.

'Nup, nup. But I mean, generations after me probably will.'

Shaun seems resigned to the formalisation of these systems in the future. Yet, his off-hand comment displays how these epistemological shifts also become embedded in the production of history that, for generations after him, the heterogeneity of these names will be absent. However, this redraft isn't necessarily symptomatic of the digital turn and technology itself. What we see here is not so much the rise of a new discourse of spatial rationality and order, but rather its transformation and extension into new epistemological territories and networks (Foucault, 2002a). Numerous scholars have traced the history of geo-code into its earliest archaeological forms. Rose-Redwood (2006; 2012a; 2012b; 2012c) consistently uncovers discursive and political links between contemporary modes of geocode, toponymy and governmentality. He terms this 'governing by numbers' (Rose-Redwood, 2012c: 626) and asserts that the vast array of systems through which the city is shaped and understood are directly linked to modes of government and surveillance. This includes calculable systems such as the census and statistics, spatial systems, such as street and house numbering, and systems of order, including the Cartesian rationalism of the grid (Rose-Redwood and Tantner, 2012).

Further north from Boundary Street, the name A38 has also replaced Warringah Road. According to the local council, 'Warringah' is derived from a *Guringai* word for 'Middle Harbour', although it is also associated with words from other Aboriginal languages meaning 'sign of rain', 'across the waves' and 'sea' (Warringah Council, 2015). It was retroactively and somewhat arbitrarily applied to the council area in 1906. As we turn onto Warringah Road, now on the homeward journey, the GPS speaks up again, massacring the pronunciation and the intonation of the name.

'We're turning onto WORingae [Warringah] Rd...' Shaun laughs, mocking the pronunciation of the GPS.

Warringah is pronounced War-RING-Gah. Throughout the trip, several instances occurred when the GPS struggled to pronounce the Aboriginal words that were adopted for particular places, and were later used in road naming. Similar names exist all over Sydney - markers of the European interpretation of an Aboriginal past,

ghosts of the people who were driven from the landscape so that roads and skyscrapers could be built and named after them. Such toponyms carry a complicated and tense history, reminders of the devastating destructiveness of the colonial process. They, at once, acknowledge that colonial past by pushing it so far into the light that in its hypervisibility it, again, becomes invisible (Gordon, 2008). 'Is it mostly just the Aboriginal names that it has problems with...?' I ask curiously. 'Probably,' he replies, 'And don't you love that too,' he points to the car next to us, occupied by two young women. Noticing the small action camera in my hand, the young woman who is driving moves awkwardly (Figure 5.20).



**Figure 5.20** *We're not filming YOU!* Shaun responds to a bystander in a car nearby. (Source: ActionCam Footage)

'Look at these white blonde girls,' he continues. Shaun's anger is palpable in contrast to his earlier philosophical mien. These shifts have seen a change in the nature of 'the address', argues Thrift (2004b), beyond people and objects to anything that can be calculated. However, what the national shift to alphanumeric systems signifies, even in the localised spatio-temporal event between Shaun, his GPS and the A38, is arguably a continued reassertion of the cartographic imagination (as an ordering device) over the landscape.

'Y'know they're the only,' Shaun's voice rises, 'the street names of the people that lived, that used to own, walking through this land sixty thousand years ago, the only thing that remains, we have these blonde, y'know, bitch, we're not filming YOU!'

Where the past names of the A38 still contain links to the social history of the Sydney landscape, 'A38' no longer references Aboriginal people, nor the process of colonisation - or even its own cartographic processes of drawing lines. The new alphanumeric road names effectively remove that past becoming solely referential of the planning systems and ideologies which produced them. Carter (2009) describes how the journeys erased from documentary memory linger on in the names of places. Other erasures linger on too; stories that form part of Shaun's identity. But what appears particularly brutal with the arrival of this new system is that even this seething and complex past is brushed aside by institutions that care less about reconciliation of the past, than about inducing rationalities that suit future calculability. The A38 all but hides any cartographic or toponymic trace of planning boundaries (Boundary Street), colonisers (Babbage Road<sup>17</sup>), and of the original inhabitants of the land (Warringah Road), both on the landscape and on the map.

The renaming of the roads in line with these logics heralds a present-future where, in the words of Borges, 'the map becomes the territory' (Borges, 1998: 325), not just in its representational symbolism and iconography, but in its discursive logics and ideologies too. Many of the city's roads have already been reordered 'behind the scenes', through invisible cartographies designed for Geographic Information Systems, data analysis and transport strategies. As these reclassifications become implemented into the landscape, the road systems of Sydney are shaped and renamed accordingly. The A38 is calculated against the hierarchy of roads, and under the gaze of the GIS map in determining their numeration, enacted in line with transport planning and institutional data-gathering systems. Hence, this coded and ordered landscape is entirely filled with simulacra, where the original referents of colonialism are lost through an endless cycle of representation and re-representation.

The alphanumeric system does not, however, pay homage to that past and the continued conflict in the present. Tench (1789: 102) describes the 'calamity' that overcame the local Aboriginal population in the summer and autumn of 1789. The Eora nation, annihilated by small pox and dispossession, haunt this landscape in a constant reminder of the brutality of imperial conquest and the erasure through abstraction of the cartographic imagination. The words of the Eora in place names, no

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<sup>17</sup> Babbage Road was named for Eden Herschel Babbage (b. (ca.1844 – 5 February 1924), a resident of Roseville. A memorial, proclaiming him "Father of Roseville" can be found on the corner of Babbage Rd and Ormonde Road.

matter how cynically attributed, are ghosts of the people who were erased from the landscape, and increasingly, from geography and history. Such stories are perforations in the straight Cartesian lines of cartographic reason and gaps in the folding over of the past into the future. Yet, with the standardisation of spatial toponymy under universal systems of classification, these stories suffer another erasure. What Shaun's observations discuss is the formalisation of this discourse to the point where these logics have been so naturalised that their systems are being made visible, concomitantly, to ordinary road users and navigators. This would suggest that cartographic imaginations, rather than diminishing in use, import and power, are in fact becoming more prevalent - but less visible than ever.

### **Practices: regimentation, interpretation, dissension**

As Pickles (2005) argues, the history of space is compounded with a history of ordering, rationalisation and domination. This history is bound up in a cartographic imagination that struggles to fathom its own discursive erasure, through increasing stabilisation of the eccentricities of spatial meaning, especially in current iterations of GIS (Pickles, 2000) and GPS technologies. Through these encounters, the past folds into the present. Calculable and affective landscapes coform: the lingering signs of bays and rivers, swampy attempts at rectilinear urbanisms, vertical vertigo and arbitrary datums, the zoning of the landscape into safe and unsafe passages, and the renaming of streets from toponymy to codes. Throughout, the discourse of cartographic reason can be found reasserting its presence in contemporary experiences with mobile mapping.

The stabilisations enacted through the materialisation of the cartographic dispositif emerge in frequent epistemological denials and obfuscations carried out under the processes of colonialism. This results in iterative practices of regimentation through the classifying and bounding qualities of the map, subjective interpretations between maps and landscapes by people, and dissensions when landscapes are revealed to be unwieldy, unpredictable and abject. However, where the cartographic imagination promises order through geometry, bleeding into contemporary experienced spaces, as mathematical space constellates into affective assemblages and regimenting movements, it also invites unpredictable practices of *interpretation* and affords everyday dissensions. From Cliff's complicated relationship with the Australian landscape, Kyja's stumble into the swamp of the 'Tank Stream', Mohammed's difficulty finding the Bank of China on the Google Map, Vicki's attachment to the road

as a site of security, and Shaun's outburst towards the GPS and gradual erasure of Sydney's Aboriginal past, the promises and failures of old stabilisations coagulate into new maps. They haunt them with ghostly flaws of universal imaginations in disobedient landscapes made of sandstone cliffs and steep granite hills, and disobedient people who move in contrapuntal spaces.

Mobile mapping is interpretative space, where the cartographic imagination (a utopic force) presents an image of the world simplified and rationalised against a disordered and heterotopic world. However, these stories show that these antithetical forces do not synthesise easily. The landscape and the imagination in Cliff's story do not merge autonomously. Neither does Kyja's experience of navigating (and not-quite seeing her location reflected on screen) switch easily between experienced and mathematical spaces. The periscope between the vertical landscape and the flat map for Mohammed also collapses in on itself as multiplicities became the domain of regimentation. This emerges for Vicki too, as she interprets amongst moving walkways, regimented paths and dangerous landscapes between the abstraction and materiality of space. Finally, the *trompe d'œil* of alphanumeric numbers for Shaun is a labyrinth of mirrors as the materialisation of signs - the naming of things - become ever more abstracted from the spatial meaning-making of everyday life.

Foucault (2002b) describes the process of 'ordering' as the space between utopia and heterotopia. The development of digital technologies has seen a transduction, although not a transformation, as the cartographic imagination continues to order space through post/colonial practices of regimentation, interpretation and dissension in everyday mobile mapping. Biggs (1999) suggests, '[k]nowledge must always attach itself, as it were, to a power. And power inevitably influences the content of knowledge. So it was with cartography and rulership.' (Biggs, 1999: 399). If this is the case, then the next chapter asks: who are the new rulers of the digital empires, and what does their cartography look like?

What we begin to see here is that, from the present moment, before digital computing and automation, the groundwork for cartographic reason in a digital age was already laid in spatial practices. Furthermore, as technologies have begun to advance, space becomes reformed according to the cartographic logics of algorithmic languages. Thus, the cartographic impulse always remains unfulfilled in irreconcilable *dissension*, unable to fully order spatialities that have consistently

defied the confines of the 'Western' cartographic imagination, and continue to refuse to submit to the discourse of cartographic reason.

This chapter has demonstrated that, in spatial terms, the phenomenon of mobile mapping - especially with digital maps - is not without precedent. From a spatial perspective, these technological shifts do not emphasise a complete newness, a discourse utterly transformed and unrecognisable to those that came before, nor a crisis of cartographic reason, as Farinelli (2009) claims. Rather, what we see is an increasing ease of translation, an expanding fluidity between pre-existing discursive relationships and the continued inscription of cartographic reason into space, through the continued proliferation of signs, grids, datums, zones and codes.

## 6. Mobile mapping and technology: relations, the monadic digital and the network of Hermes.

'The *Monad*, of which we shall here speak, is nothing but a *simple* substance which enters into compounds; by "*simple*", is meant "without parts".... Now where there are no parts, there can be neither extension nor form [*figure*] nor divisibility. These Monads are the true atoms of nature and, in a word, the elements of things.' (Leibniz and Loptson, 2012: 117, original emphasis)

'You will eat words, but more often these days you will eat codes and numbers. So you will gorge copiously, and still more, always more. Nothing goes down quite so easily as code, nothing grows as well as numbers. You will gobble up quantities of them. Your body will overrun the space around it, just like the word itself, carried on the wind, just like a society founded on the word.' (Serres, 2008: 187)

How do we deal with the transition from coordinates to code in mobile mapping? After we have begun to examine how cartographic reason can be encountered as an apparatus of stabilisation and regimentation, what does the transition to digital, computational ubiquity mean for mobile mapping practices? These are the questions that began to appear in the final stages of the last chapter. Through the question of turning landscapes into lines, lines into numbers, numbers into roads, and roads into alphanumeric systems, it is possible to see how cartographic reason stabilises and regiments certain aspects of mobile mapping toward a digital era. As classifications and calculations fold together into the same discursive process of (spatial) order, as Foucault (2002a) suggested, they create certain fixities - signs, grids, datums, roads and codes - that emerge in mobile mapping.

The encounters in this section see a transposition from a *series* of fixed points, scalable-*ad-infinitum*, to *building blocks* of codes, equations, and functions that are recombinable and fragmentary. This is a different realm of philosophy - less the rigid posts of coordinate geometry and grids cast over the world, than shifting topologies (of objects, of power, of everything) that are deeply relational. In spatial terms, this discursive transformation of cartographic reason has a very different fix-point than the (0,0) of the Cartesian cartographers who drew their eyes across the surface and the volumes of Sydney and Hong Kong. The fix-points in this world are relational binaries - digital monads (Leibniz and Loptson, 2012) - that build upon each other through the network of Hermes (Serres, 1982a; 1982b). These encounters are less

interested in the location of points than the relationality *in-between* the points: the translations, velocities, accelerations and redirections. This is the realm of Leibniz and his philosophy, of what Baudrillard terms ‘the metaphysics of the code’ (Baudrillard, 1994: 57).

Leibniz’s monadology describes monads as irreducible, the lowest substrate of things, the true atoms of nature’ (Leibniz and Lopston, 2012: 172). They create limits through the process of assembling and disassembling, and are the material and representational appearance of what Leibniz terms ‘the infinity’ of God, or soul (Leibniz and Lopston, 2012: 27). The link between the monadic and the digital in Leibnizian philosophy sits within the development of binary logic and arithmetic. The use of binary became particularly prescient with the development of electronic computing - where the on and off state of electronic switches could be precisely matched by the logic of binary - true=on, false=off. Thus, monadic forms of thought became central to computational technology and, contemporarily, still form the basis of most digital communication in its representational forms.

This is what I have come to call the ‘monadic digital’ - a theme that underpins the empiricism across this chapter. I am not arguing that Leibniz meant that binary code was a monad - there is little evidence to suggest that he did. Other philosophers, like Friedrich Nietzsche (1973) and Walter Benjamin (2003) have used the idea of the monad differently, emphasising the ‘more than the sum of its parts’ aspect of Leibniz’s monadology, where the monad is desirous, chaotic, haunting and vibrant. Yet, as I argue throughout this chapter, the intersections between cartographic reason and subjugated knowledges, affects, interpretations and movements within mobile mapping, bring the tension between binary (as a rationalist construct) and these more radiant readings of monadology to the fore. Therefore, rather than simply labelling 0 and 1 as monads - which is difficult considering how, as described above, digital, electronic computing blurs distinctions between experience, materiality and representation - I prefer to describe binary as monadic in both form and desire. Likewise, I term the system of digital electronic representation as ‘the monadic digital’.

This chapter is organised along the general constellation of the elastic rhythms of relation that are stretched across the network of Hermes by the monadic digital: *arpeggiato*, *accelerando*, *fermata*, *portamento*, *staccato*, *rondo*. To begin, I start with an analysis of the transformation of the cartographic point, as the creation of co-existent taxonomies intertwines with the experiences of Marianna in Sydney. Then, I

consider how the cartographic calculation of movement itself becomes embedded in the relational with Nick: not just in terms of constant speed, but the calculation of acceleration and velocity. Next, I explore Hong Kong with Ellen, where gates and electronic barriers create uneven digital geographies, and with Camille, the hybrid and controlled modes of using mobile phones and being (im)mobile in fluid spaces. Back to Sydney with Tanija, as she practices (ap)proximity as mediating between imperfect technology, limited codes, disobedient spaces and her own body. Finally, we return to Hong Kong and to Ravi, who helps us return to the basis of mobile mapping and to lead us to what mobile mapping might mean in a digital age.

### Arpeggiato<sup>18</sup>: Marianna, in which marking points becomes relational

As we amble down the south end of King Street in Sydney's inner west, Marianna tells me about the app she is using for this particular walk. It's a fitness app, MapMyFitness, and Marianna uses it regularly to take note of her varying times, distances and speeds.

'So, this is my walk tracker,' Marianna says casually, '...it tells you, uh, every kilometre it tells you how far you walked'.

The calculation of distance using GPS requires a complex task of computing between two coordinate points. Normally, this is done using the Pythagorean theorem through triangulation. Increasingly, however, the Pythagorean theorem has been overshadowed in use by the Haversine formula (Figure 6.1)

```
function haversine() {
  var radians = Array.prototype.map.call(arguments, function(deg) { return deg/180.0 *
  Math.PI; });
  var lat1 = radians[0], lon1 = radians[1], lat2 = radians[2], lon2 = radians[3];
  var R = 6372.8; // km
  var dLat = lat2 - lat1;
  var dLon = lon2 - lon1;
  var a = Math.sin(dLat / 2) * Math.sin(dLat / 2) + Math.sin(dLon / 2) * Math.sin(dLon / 2) *
  Math.cos(lat1) * Math.cos(lat2);
  var c = 2 * Math.asin(Math.sqrt(a));
  return R * c;
}
console.log(haversine(36.12, -86.67, 33.94, -118.40));
```

**Figure 6.1** *Haversine function in JavaScript.* This is an example of the haversine input using JavaScript. This code structure uses variables rather than parameters, where it is possible to see the longitudinal (lon1, lon2) and latitudinal (lat1, lat2) inputs, along with the trigonometric functions (sin, cos), an estimation of the radius of the earth, and other commands/numbers. (Source: RosettaCode.org, 2015)

<sup>18</sup> Arpeggiato: to play the notes of chord in rapid succession rather than in simultaneity

The Haversine Formula uses circles and spheres to measure the distances between centre points and radii<sup>19</sup>. This enables calculation of distance using spheres rather than triangles, taking into account the approximately spherical nature of the earth. It also still uses the coordinate system, but in a slightly different way. Marianna's screen captures a minute piece of the curved earth. No longer understood as a flat Cartesian grid or a node along a series of imagined triangles, this screen represents a spherical topology. This topology implicitly establishes a point looking downward into the earth's centre and outwards towards the heavens.

'So, it tells you what speed you're going?' I ask.

Despite the complexity of the calculations, they are masked for Marianna by the speed of the technology, the opacity of the interface, and the hidden algorithmic backend of the software. Our walk down King Street, for instance, in terms of the GPS data, is given in Figure 6.2:



**Figure 6.2** (Dis)embodied waypoints. Timestamps placed over coordinates (waypoints) on the walk taken by Marianna and I northwards along King Street (Source: ActionCam GPS data)

<sup>19</sup> The principles of the formula were first documented in the work of Spanish mathematician José de Mendoza y Ríos in 1801, and named *haversine* by James Imman in 1835 because it is half a versed sine (versine) - an important function in spherical trigonometry.

GPS datasets usually consist of a number of pieces of information: time, longitude, and latitude. Using this data, it is possible to then calculate cumulative distance, relative distance, and speed. From the intersection of two coordinate lines in eighteenth century navigation – longitude and latitude – the data columns have proliferated in GPS towards time stamps, distance and speed, and altitude, allowing points to be approximated into lines. When Michel Serres (2008) writes that we will now eat numbers and codes more than words, Figure 6.2 is a veritable buffet. More than a hundred waypoints, each made up of at least twenty numbers, constitute our path on the digital plane.

'Ideally, I shouldn't walk less than,' Marianna pauses briefly '...I should be able to do one kilometre every ten minutes.'

Marianna's pocket distance-calculator presents a new way of thinking about this process. Calculation is no longer as simple as the relation between two points, but the increments between hundreds and the broad stroke-patterns that they paint. Although still based upon the Enlightenment principles of rationality, the construction of this mathematical space through the 'monadic digital' uses new terms and has new ambitions. It requires different labours and skills, and makes the bodily and spatial perception of space elastic. These changes permeate the everyday, as the relationality between points (and the way in which this is calculated) folds into everyday experience. Location becomes a fluid concept classified and translated across multiple scales: binary and monadic levels of representation, the embodied and affective meaning of space through buildings and purpose, and also the continuing navigational systems of street names and street numbers.

As we walk down King Street, Marianna sighs.

'This end of King Street is still a little ugly, I find,' she tells me.

It's a vernacular space made for living as well as looking - a waitress mops the floor of a local café, graffiti adorns the grey walls of unkempt shops. Bottlebrush trees overhang, and chewing gum and beer cans rest on the street. Most of the signs are old - designed and painted at least twenty years earlier - an area still on the cusp of gentrification. We pause briefly outside a flower market and she points to a dilapidated petrol station that sits on the corner of the intersection. I remember it from my childhood as a functioning mechanic workshop, but as the paint fades and the roof rusts, I struggle to conjure this specific memory to mind. Google Maps - the software from which Marianna's app runs - classifies place according to three criteria (Table 6.1): an address, a coordinate position, or a place is listed by the Google database of place names - or what Zook and Graham (2007: 466) call 'DigiPlace'.

These terms can be read as more than semiotic: they are relational to the situation, linking the egocentric subjectivity of Marianna's app to the velocities of the global coordinate grid.

**Table 6.1** *Origins*. Three categories of origin: street address at the top right, coordinate position middle right, and place\_id bottom right. (Source: Data from Google Maps API, processed and tabulated by author)

	origins=536A+King+Street+Newtown+NSW+ON
origins	origins=-33.902997,151.179661
	origins=place_id:ChIjRdF50mwEmsRZipFiOkKN94

Such taxonomic systems reduce the complexity of place and spatial meaning into monadic structures that take up minimal digital memory whilst also retaining uniqueness. Marianna tells me that the petrol station was more recently a squat. She seems to appreciate the precarity; its fleeting presence only in memory and not ever on her map.

'It didn't last long - the police came...', she whispers before pointing down a side street to our right, 'we go that way'.

When place takes on a new coded calculability, where specific coordinates can be given particular names or identities that do not key into monadic digital systems, this fleeting moment does not (and perhaps cannot) make it into the taxonomies listed in Table 6.1. There is no option for an origin that is attentive to the delicate reminiscences of Marianna's mapping practices.

**Table 6.2** *Origins II*. The origins of Marianna as she tells me her story of this location, if it were possible to code ambiguity, vagueness and eccentricity. (Source: Author)

	origins=We+go+this+way+ON
origins	origins=petrolstation,squat
	origins=place_id:It didnt last long_the police came

The functionality of code means that such subjective eccentricity cannot work - or, indeed if it can, as Foucault (2002a) suggests, then it risks being engulfed into

hegemonic discourses. Once digital classifications become associated with this location, they *can only be associated with this location* on the digital plane: the heterogeneity of space becomes lost. Figure 6.3 shows how the point where Marianna and I find ourselves can be transformed from the embodied experience (that now only exists in our memories) across multiple levels to the pixelated image, the cartographical interface and the monadic digital.



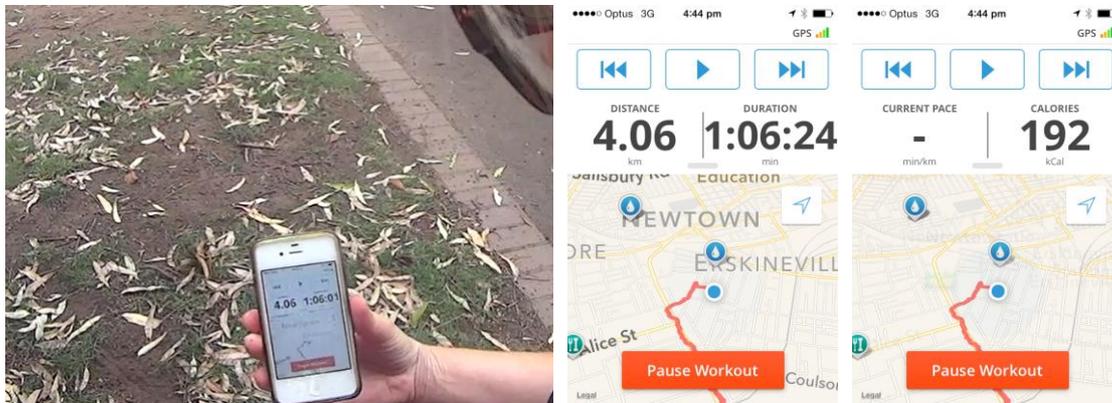
Longitude/Latitude (lon/lat)	-33.902997	151.179661
Lon/Lat in E5	-33902997	151179661
Binary (ASCII)	00000011 00000011 00001001	00000001 00000101 00000001
	00000000 00000010 00001001	00000001 00000111 00001001
	00001001 00000111	00000111
Encoded point	vt mE{gvy[	

**Figure 6.3** *Three shades of points.* Marianna and I at 536 King Street (top left) (Source: ActionCam Footage). Google maps drop pin at 538 King Street (top right) (Source: Google Maps app). Encoded coordinate point derived from point at 538 King Street, Newtown, NSW 2048 in Sydney using the *Encoded Polyline Algorithm Format*. (Source: Google Maps API)

Numbers and letters are the simplest expressions to translate into and out-of binary code. By creating specific identities out of combinations of letters, numbers and symbols - designed to take up as little memory as possible whilst also being unique - names become abstracted into alphanumeric codes. At each level of reduction into the monadic digital, inscription becomes more systemised, homogenised and distanced from everyday mobile mappings.

However, as we move off the main street into the backstreets, we stop briefly at a permaculture garden that Marianna tells me she found by getting lost. Drawing off

the main street into a small park, we stop again after the app pipes up and interrupts our conversation, updating us on how far and for how long we have walked. Marianna shows me how the app works and the data that it collects (Figure 6.4).



**Figure 6.4** *MapMyFitness in the park.* Marianna shows me how the app works (left). Screenshots of the app interface (middle and right) where our position is marked at the blue dot at the end of the red line, showing distance, duration and calories burnt (Source: ActionCam Footage and screenshots provided by Marianna)

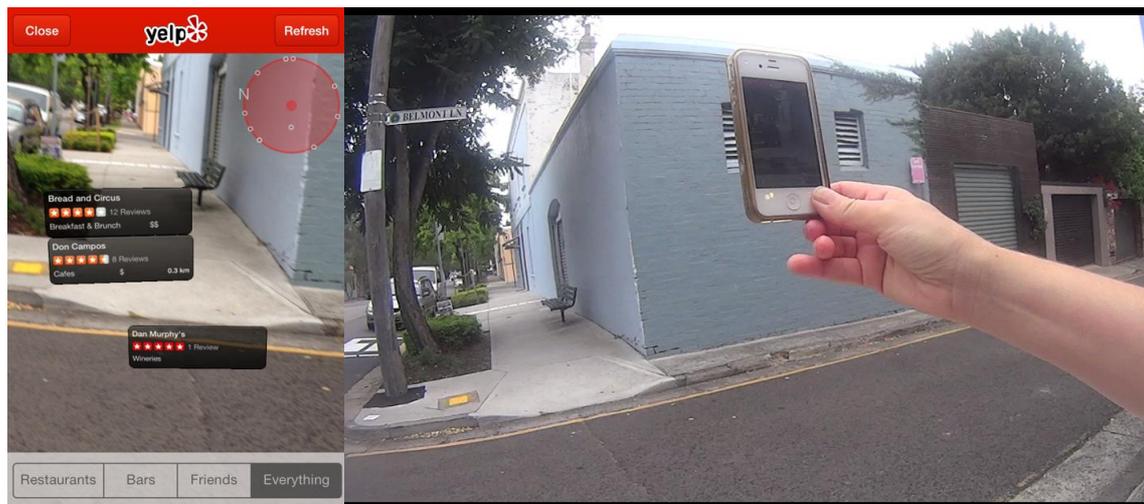
The spirit of classification and calculation remains in the monadic digital, but the categories have expanded and been reified in order to produce new algorithmic calculations based on new locational taxonomies. These taxonomies seep deeper into the spaces produced by bodily movements, providing multiple new ways of classification, facilitated by the collection of spatio-temporally specific datasets. Throughout our walk Marianna shows me all the apps that she uses and the kinds of data they collect (Figure 6.4). As we go on, this data folds through our bodies - signalling movement, corporeality, as we move faster or slower in relation to the data already collected and foregrounded into the future.

The 'origins' code embeds systems of information into location: reviews, prices, opening times, websites, phone numbers, reordering the way in which information is structured (if not the desire for order itself). Cartographic reason can take on perception too, in which the map becomes a screen that you see through, points of interest floating across the landscape. Marianna shows me how she uses particular functions on Yelp (Figure 6.5), for instance.

'Okay,' she says, 'you can search nearby with different categories,' Marianna makes a scrolling motion with her hand, 'But...it will just tell you, you know, what is within walking distance. But there was a nicer,' she pauses again briefly to tap the screen, '...okay it's doing it ...' and she presses the screen again '... here we go...restaurants

and everything.'

She holds the phone in the air as if she was taking a picture, and after a few seconds the screen loads. It shows an overlay of information (as seen on the left of Figure 6.5) onto the image of the road beyond, scaled so that the relative proximity of locations nearby is mapped by their verticality on the overlay. On the top right of the phone screen, a small radar sits, with no geographic information save for the relational distance between the user (at the centre of the circle), a one kilometre radius, and a north point.



**Figure 6.5** *Superimposed information.* Marianna shows me how Yelp works. (Source: Screenshot provided by Marianna; ActionCam Footage)

'So,' Marianna continues, 'It basically just superimposes information onto the screen in whatever direction you go.'

'So, it geotags location and it places you in the middle...?' I ask.

'No, it just tells you that if you go over there,' she points to the left, 'you will find whatever it says there....'

Marianna rejects my easy reading of the power embedded in egocentric mappings where the body is placed at the centre. This has become somewhat of a theme throughout the interview.

'So do you often just use that to find...?' I ask.

'Yeah, it is a good way. It is a nice... and I like,' she makes a gesture in front of her face, 'I used to like it on Urbanspoon a lot, then they removed this. But this [Yelp] has it and I don't read the reviews so much but, like here you can...' she pauses while she waits for a new screen to load.

'So,' Marianna continues, 'it takes you to Victoria's Basement in case you want some pots and pans...' she points to the map, 'that's where you go. And it gives you all

sorts of, you know, information you might want and if there are reviews and so on.'

For Marianna, maps simply tell you where things are, and where you have been: they describe locations, but they do not inevitably constitute them. Her phone is merely a tool that makes visible and adds to these layers, not necessarily adding to her determination of location by erasing the coeval slips of spatiality.

'It makes ordinary life more...', I try again, this time getting closer, drawing together the strands of aesthetics, looking, moving - and for the first time - in this first interview - I realised that there may be disorder in order.

'Yeah,' she nods her head 'and there were other things that I was trying to use at one stage.' Suddenly, she breaks off and looks towards a small tree with multiple white pot plants and lanterns hanging from its boughs (Figure 6.6). Its deep green and white colour is poorly rendered by the murky video footage but I remember it as vibrant - so striking that it cut through our conversation.



**Figure 6.6** *'I like this...'* White lanterns and pot plants hang from the boughs of a tree. (Source: ActionCam Footage).

Marianna's agency in writing her own spatial narratives redirects focus from a subject that can fall prey to technological determinism towards the affordances of technology, and the power of indeterminacy. Stopping briefly to look more carefully at the lanterns and pot-plants, Marianna smiles.

'I like this...', she murmurs.

A point-in-space that appears on no map and that does not really have a taxonomy.

## **Accelerando<sup>20</sup>: Nick, in which measuring movement becomes relational**

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Nick owns an Android phone, on which he has set up a number of alerts for various calendars, email accounts and other social media.

'I have it set up that way,' he explains to me, 'only because my phone is Google. I probably have this incorrect feeling that when my...everything that goes through Google is battery efficient, that's my assumption...'

He speaks so sincerely that I can't help but smile.

'Just because you like Google?' I ask.

'No. Because my phone is Google', he reiterates, 'and Google has money and therefore they do things correctly'.

This is not an erroneous assumption - there are reasons for the underlying popularity of Google. Indeed a large part of such popular preference is the easy interoperability between the various Google platforms, including (but not limited to) Gmail, Google Maps, Google Cal, Google Docs and Google Search.

As we discuss the relative efficiencies of a Google-based platform, Nick explains that he doesn't use Facebook - and he's never used the geo-tagging feature of Facebook Places. But he will, however, use his phone to track and map his bike rides through the city. He's on a fitness regime and cycling is a functional way of incorporating this into the everyday, with maps offering a monitoring aid for him to see how far and for how long he has ridden, much the same way they afforded this information for Marianna.

'So you sort of see the maps as primarily—'

'—giving me more feedback on what I'm doing,' he finishes for me.

'As a data source then, rather than a chance for social networking?' I attempt to clarify. He pauses.

'A data source for me. Um, more so to compare the rides. I suppose to try to make me exercise a little more, I guess.' He wheels his bike next to me, holding a takeaway coffee cup precariously in his hand.

'We can go up here,' he points with the coffee, 'and find where they're building the bike lanes...'

As a newly-enthusiastic cyclist, and dedicated Google user, the bike lanes form the nexus of Nick's navigational spaces (Verstraete, 2010) in Sydney. While we walk,

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<sup>20</sup> Accelerando: to play with a gradual increase of speed

Nick explains to me how he rode from home to the Broadway Shopping Centre, which sits on a major intersection between three arterial roads in and out of the city's Inner West. He didn't use the bike lane, he says, because it isn't finished. Instead, he had to journey down Wyndham and Abercrombie, stopping briefly to pump up tires at a petrol station right near his house. Now, Nick wants to show me where the bike paths through Chippendale will run. The establishment of bike paths go hand in hand with a development that allows for new thoroughfares across what was once the historic Carlton Brewery. Now, it is a large, glass, verdant eco-building, with an art space housed in the shell of the old brewery building.

'I found this interesting app called "Zombie Run" - Do you know it?' He asks me as we walk.

'Yes!' I laugh, 'do you use it often?' *Zombies, Run!* is a fitness app predicated on the concept that, as a runner, you move through a world filled with Zombies. The app has all the functions of a fitness app (including music selection and updates similar to those shown to me by Marianna), but at particular intervals, an urgent sound will ring, and the player needs to run faster and harder in order to escape the zombies. Witkowski (2015) argues that *Zombies, Run!* produces multiple corporealities in mapping *whilst running*, including 'a fluid feeling of space, time, terrain, and moving body' (Witkowski, 2015: 5). *Zombies, Run!* is a typical example of either a gamified fitness app (Lupton, 2016), or (with map-based variations like 'Run Zombies Run'), what might be described as a cartographical interface, whereby the map becomes a playground hybridised between digital and analogue, between going and looking (Lammes, 2011).

'I used it four times, I think,' Nick replies, 'I used it twice actually running and twice at the gym. It was kind of cool.'

'Twice at the gym?' I ask, 'How did it work at the gym?'

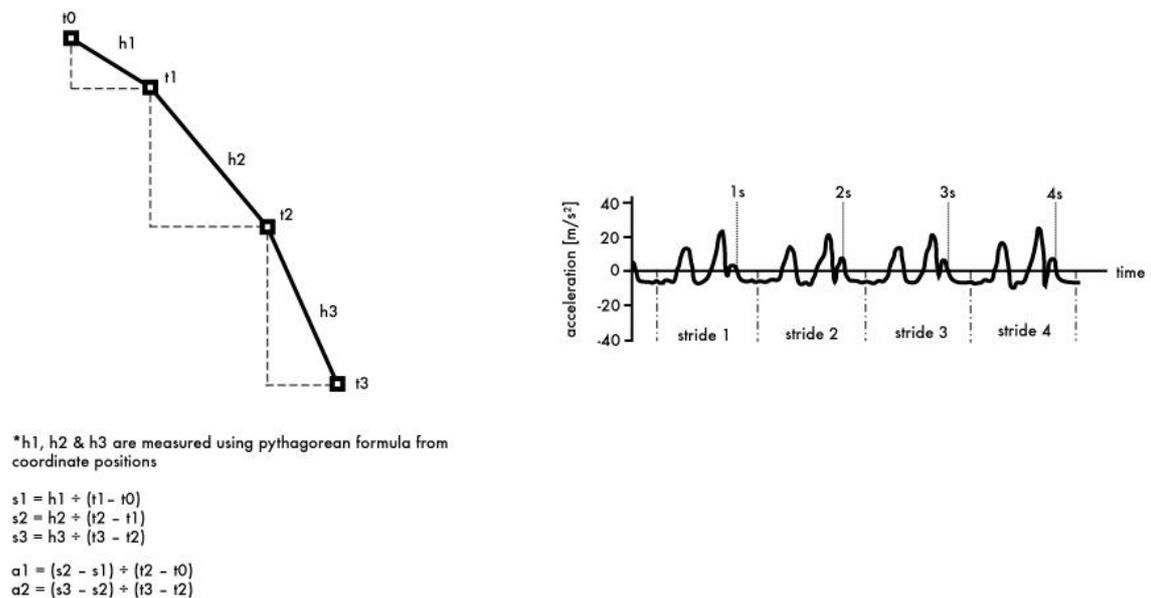
'The phone has the motion sensor and so when it goes it knows how fast you're running,' he replies, 'But then it doesn't do direction obviously.'

'Yeah, because I thought part of the point of the app was to use it while running through the city or something.' I respond.

'Yeah, so when I did actually run with it, it was telling me to change directions, "Zombie coming". And when I was at the gym it just told me to run faster - "Zombies are coming".'

I had forgotten about the use of accelerometers - a technological feature particular to mobile media. Nick and I discuss the differences between the GPS triangulation and

the motion sensor. Accelerometers work in interesting ways. They are not fixed to global cartographic systems, like GPS technologies, and do not measure according to fixed points - even if such points may move across the grid. Rather, they are purely relational calculators, which use crystals sensitive to forces of acceleration to measure changes. Using the cadence of the body as it speeds up and slows down with each stride, it can sit in a pocket and measure different kinds of footsteps based on the speed of movement. Mobile relationality is central to how motion sensor data can be algorithmically coded to sort between walking, jogging, running and sprinting. These coding systems create new classifications based in relativity rather than fixity: the integrative functions of change rather than the constants. This is an important shift: it is precisely the fluid, changeable space, or difference, that becomes the crucial piece of information in the way in which accelerometers work. Moving from the triangulation of GPS coordinates and the approximation of speed through 'time stamps', accelerometers measure the distance relative to the footstep itself based upon the height and weight of the user. At the same time, this data is rather fuzzy or noisy, and the exponential nature of algorithmic processes means that distance-based data is often inaccurate (Figure 6.7).



data source: Susi, M., Renaudin, V., and Lachapelle G. (2013) 'Motion Mode Recognition and Step Detection Algorithms for Mobile Phone Users' Sensors. 13(

Figure 6.7 *Measuring acceleration; measuring GPS.* (Right) method of measuring acceleration using GPS coordinates and trigonometry. (Left) Accelerometer data showing patterns of acceleration and deceleration across strides and seconds. (Source: Author)

As such, the algorithmic mensuration of acceleration creates new systems of classification. These categories are not the triplicate distinctions of points seen with Marianna, like in Google's 'origins' code. Instead, they work towards establishing

categories of movement by mapping the relations between two points. Adey (2006) suggests that mobility is relational: that flows through space are transductive. In order to create categories of movement, accelerometers map patterns of acceleration. Furthermore, against the 'dialectic of mobilities/moorings' posited by Urry (2003), Adey argues that it is not in the antitheses that an understanding of mobility can be found - but rather, as Doel (1999) suggests, in the relativity of flows, of mobile forces: in relative mobilities and relative immobilities.

Still, the crystals that measure and the algorithms that calculate relative mobility are less for Nick than the playful affordances of *Zombies, Run!* He tells me that he preferred the experience of using the app during the two times he used it 'in the real world'.

'There are more things to interact with,' he clarifies. In the gym, however, it felt more monotonous. 'In the real world where you had to wait for traffic lights etc. ... I entered a kind of "game-scape" in my head.'

He also tried using it on his bike, but the motion sensor didn't pick up the speed, or the changes in acceleration needed to escape the zombies. We are brought back to the conversation about the relationship between maps and bike lanes, and how Nick decides what route to take. Like *Zombies, Run!*, cycling involves specific kinds of mobilities that trouble typical conceptions of how digital maps may be used in mobile mapping. Partly, this is because the bike lanes are still a project in the making and at this stage in early 2014, Google had only just begun to beta-test the cycle function on its maps in Sydney. Similar to the different parameters of location expressed through 'origins', Google also offers developers the opportunity to classify movement according to parameters based on the mode of transport - driving, walking, cycling, and via public transport. Each set of parameters preference particular classes of path - 'the road network', 'pedestrian paths and sidewalks', 'bicycle paths and preferred streets', or the complex aggregation of transport routes and timetables (Google Maps, 2016). The 'shortest path' algorithms that compute this process on Google are black-boxed. However, given the open source equivalents - for instance, OpenTripPlanner (Conveyal, 2013) - the algorithm appears to be a specific parameter-set, underpinned by Dijkstra's algorithm. This algorithmic structure was developed by computer scientist Edsger Dijkstra in 1956 to determine the shortest path between two points.

With Marianna, I showed how locations can be interpreted, and the way in which complex meaning, or locational, numeric or algorithmic data can be compressed into

a short series of letters and numbers (Figure 6.3). Similarly, for 'shortest path' algorithms, the discursive structure is simple to uncover. Codes work along the logics of mathematics and the reproducibility of computing. Each coding language has different rules that produce different enunciations and shape the way in which actions can be brought forth - both by digital mobile maps and by people. The specific appearance of the algorithmic statement differs between, say, Java and C++, and complex algorithms can often be simply represented by a word that enacts the specific function (Figure 6.1). Coding languages do not only have different semiotics, but also often require different approaches to logic. Such differences have spatial and temporal consequences: for instance, affecting the accuracy of GPS data, or the degree to which noise can be extracted from accelerometer data.

Furthermore, until recently, Google had not collaborated with the City of Sydney on producing a map that marked what stage of development bike lanes had reached or whether they were open. So, theoretically, a cyclist could be directed down a bike lane, but in practice they may not be able to ride down it. Nick, for instance, remarks on these variations with a sense of irony. He tells me that, outside his house, there is a completed bike lane with a large sign on it saying 'Don't Ride', because it won't be open until the rest of the lane is complete.

'So, with the bike lanes that are on Google Maps - are they marked as closed or open?' I ask.

'It's not on Google Maps. I found out about that information on the Cycleways Network where they talk about how they're building it.'

This is also an important consideration - the futurity of paths that have not been built. Google Maps relies on presenting information that reflects the constantly updated present - an accumulated past rather than the future. Fitness apps, like Marianna's, represent the past also, in a GPS overlay of her tracks. Yet, Nick is interested in the future too, because as he plans his mobility in advance, he already thinks through his path. We pause as we reach Shepherd Street in Chippendale.

'So,' Nick says, 'this is where they're going to build it.'

There's no sign of a bike lane yet on this quiet suburban street (Figure 6.8).



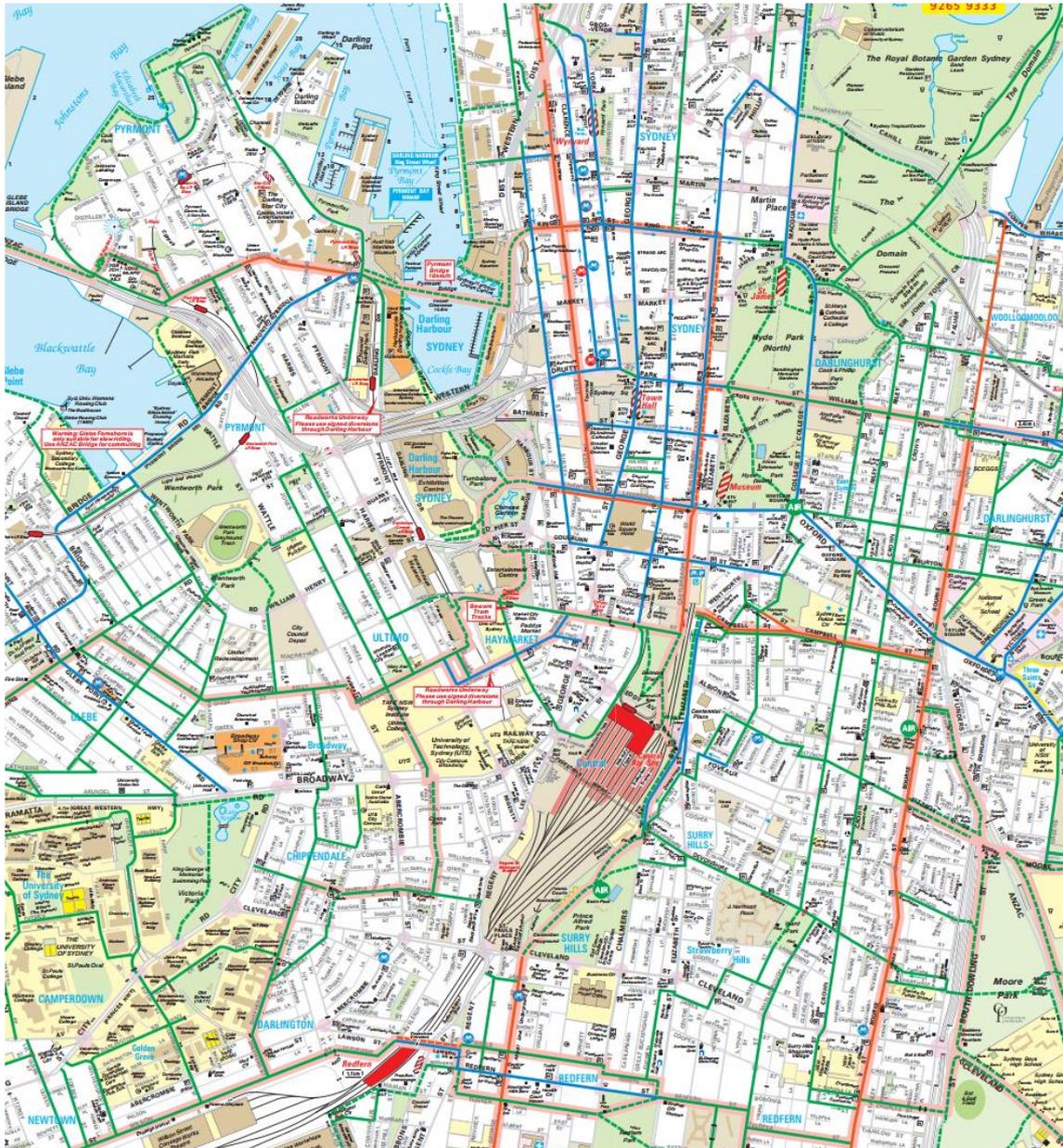
**Figure 6.8** *‘This is where they’re going to build it’*. Standing on the corner of Shepherd Street with Nick - no sign of a bike lane yet. (Source: ActionCam Footage)

Nick explains that he prefers to use the City of Sydney ‘Sydney Cycleways’ maps (Figure 6.9), which specifically show the bike paths and whether or not they are separated, shared or along a busy road.

‘I find them more useful than Google,’ he says, ‘because - I dunno - I guess it’s the idea that they’re more accurate than Google, but I haven’t really noticed a difference. Ah, because I like to plan it myself, that’s why - Google doesn’t tell you a sensible way to ride, so there’s no point using that feature of Google.’

Like Shepherd Street waiting for its bike lanes, Nick likes stretch out into the future. He also likes to have control over how that path is shaped, seeing information on what is complete and what will be completed, and deciding from there which way he wants to go. Still, I’m curious as to what constitutes ‘a sensible way to ride’, and when I ask, Nick frowns.

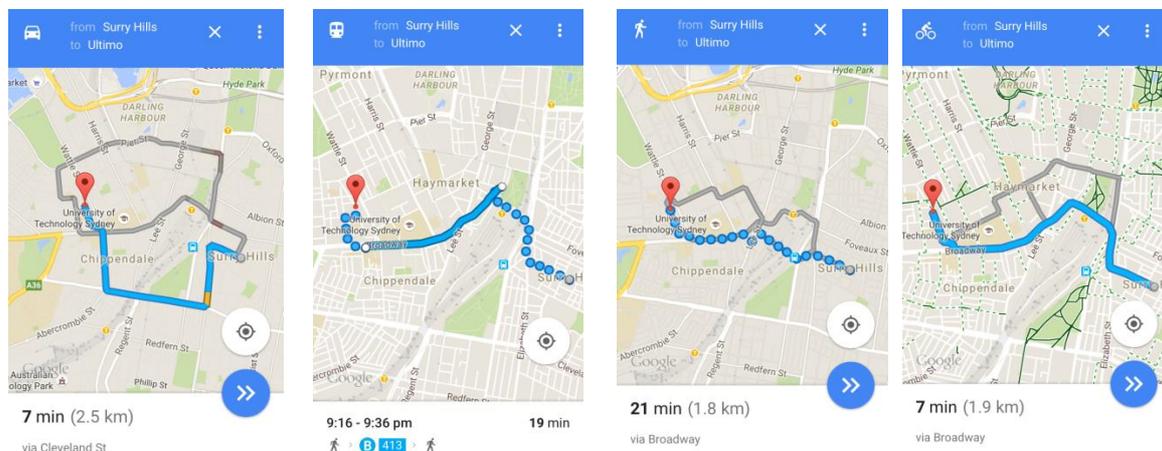
‘Uh, they don’t tell you to ride on the bike paths,’ he says, ‘They just tell you the quickest way to ride. They don’t say “you could spend an extra five minutes on your 30 minute ride and ride along this bike path”, they say, “you can save five minutes by riding along this road”.’



**Figure 6.9 Sydney Cycleways.** Excerpt from City of Sydney cycleways map, updated April 2012, using the Sydways base map. Red paths are separated cycleways, green are routes on low traffic streets and blue are streets with heavy traffic. (Source: [www.sydneycycleways.net](http://www.sydneycycleways.net))

So, we can see here how practices of *mathesis* - or quantification - have particular limitations in creating systems of order. This is why the concept of taxonomia (Foucault, 2002b) sits in the same theoretical arena as *mathesis*. Systems of classification and categorisation are needed in order to mediate between the abstract world of numbers or codes, and different qualities of spatial experience. Yet, classifications do not seek to arrest movement by pinpointing it on a grid and fixing objects to points. Rather, they seek to wrangle, influence, tame and direct movement according to categories of algorithms, enacted through categories of code: to make

enduring relationalities rather than points through which the world is shaped rather than fixed.



**Figure 6.10** *Durable pathways*. Taxonomies of movement according to Google Maps - driving (far left), public transport (middle left), walking (middle right) and cycling (far right) - and the different paths that are created algorithmically. (Source: Nick's iPhone)

The transformability of the monadic digital - its ability to be disassembled and reassembled like building blocks into multiple materialities, interfaces and bodily practices - is a more fluid form of stabilisation. The codes and the computational algorithms depend on the ability (of coders and cartographers) to classify and set parameters with enough specificity to be tailored to the geolocatedness of the user, and enough generalisability that large numbers of people can use the app across different spaces. This is the conundrum of cartographic reason in a digital age. The race to fix and order the world under the Cartesian system of universality has been superseded by a race to unfold fluid systems of relationality that order the world through the system of Hermes - from the infinitely small and monadic (for instance, the touch between a wearable device and the skin), to the infinitely large and universal (like massive datasets that geo-tag information).

Of course, the world is not so easily ordered. Nick has surprising reasons for mapping out and choosing his routes on the City of Sydney Cycleways map, and for choosing the bike lanes rather than just following the algorithmic directions from Google.

'They're nicer - it's more enjoyable.' He says smiling, 'I guess because they're safer, they're more enjoyable. Less things to hit, less things to hit you'.

## **Fermata<sup>21</sup>: Ellen, in which boundaries become relational.**

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Ellen tells me how she finds boundaries every day. A relative newcomer to Hong Kong, she moved here to take up a place as a domestic worker for a middle-class family in the New Territories near the Choi Hung estate. All through Hong Kong, the digital and material systems fold together to moderate, direct and regulate movement through space. Yet, for Ellen, the same forces that allowed Marianna surreal spatial experiences, and Nick different ways of measuring his path, also produce splintering urbanisms (Graham and Marvin, 2001). Here, cartographic reason operates across discursive-material formations, where technologies interact with cartographies to bound and segregate movement through space. Despite the emphasis on relationality in the monadic and networked qualities of mobile mapping, Cartesian notions of fixity remain. Digital mobile maps combine fixity and relationality together in the same frame, using the stability of grids and material structures as rebounding points for the monadic digital and the network of Hermes. The result is that, for some people, fixities become relational, and relationality becomes fixed, the monadic digital is materialised, and the material is a central part of the monadic digital. Vast cartographic channels of movement are built across digital maps and digital landscapes - where gates and switches sort people according to who can continue and who cannot.

Ellen and I enter the Choi Hung MTR station through the north entrance. We go down a set of stairs, and as we reach the concourse, the short, sharp beeps of Octopus travel cards at the barriers to the platform occur in regular intervals. Passengers line up behind each barrier, readjusting their flow to be let through - beep; step; barriers open; step through; barriers close; repeat. Ellen and I go through seamlessly - and since this is her home MTR station, she directs me easily through the crowded flows that do not give enough pause to read the signs. Down some more escalators to the platform, and rainbow tiling adorns the pylons. I comment on how attractive it looks (Figure 6.11).

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<sup>21</sup> Fermata: a pause in an arrangement of a length unspecified.



**Figure 6.11** *Choi Hung rainbow livery.* The Choi Hung MTR platform with the tiled rainbow livery. (Source: ActionCam Footage).

'You know,' Ellen says, 'every MTR station is not the same - if you go on some direction - the red line - it's not the same. Some are white and you need to find the things, you know.'

She tells me that this is her favourite station because it is bright. The rainbow colours are testament to the name of the station, Choi Hung, which means rainbow. This was the name of a nearby public housing estate, one of the first in Hong Kong, famous for its brightly coloured rainbow buildings.

As the train pulls into the platform, we wait patiently for the doors of the carriage, and the doors on the platform, to open in tandem. In front of the doors sits a set of five arrows (four point inwards and one points outwards). Each of these arrows are paired up with a demarcated space, where a queue can be formed (Figure 6.12). The question of automation - where bodies, barriers and codes come together - is through the disciplining of flows and the body (Foucault, 1995). This process creates more openness for some, and more rigidity for others - a paradox in which cartographic reason is implicated.



**Figure 6.12** *Controlling flows*. Stickered arrows on the ground indicating bi-directional flows on and off the train. (Source: ActionCam Footage)

In obedience to what Deleuze terms '*societies of control*' (Deleuze, 1992b: 4, original emphasis), passengers habitually line up according to these arrows. Furthermore, the ticket barriers earlier were not so far from Deleuze's (1992b) description of Guattari's imagined city:

'Félix Guattari has imagined a city where one would be able to leave one's apartment, one's street, one's neighbourhood, thanks to one's (dividual) electronic card that raises a given barrier; but the card could just as easily be rejected on a given day or between certain hours; what counts is not the barrier but the computer that tracks each person's position - licit or illicit - and effects a universal modulation.' (Deleuze, 1992b: 7)

Entering the carriage, we move in towards the far doors and stand out of the way. Ellen stares purposefully at the MTR map above the doors, before glancing at the time displayed on a digital screen beside it (Figure 6.13). She's practiced at navigating the MTR now – but that wasn't always the case. She describes her first encounter with Hong Kong.

'The first time I came here was the scariest time,' she says. She tells me how she looked for someone who could speak English well enough to explain to her which line she had to follow.

'You didn't think to look it up on a map?' I ask curiously.

'No,' she replies, 'No, because when I first came here, my phone... I didn't know how to use Google before and I just saw when now - er - like maybe my friends, you know. You just see - when you just see this constantly.' She points to the map above the doors, 'and you can read the Google Maps. But I think here - some people, they don't use Google Maps - you know - because of the train, you know where you go...'



**Figure 6.13** *Different media, interoperable discourses.* Two examples of spatio-temporal mappings sit side by side. Both show information that would normally be available via GPS data, as well as route information and a sense of distance and time. (Source: ActionCam Footage)

Arriving in a new city and not knowing how to use Google Maps, Ellen found different ways of navigating the flows, of moving around boundaries. Transport maps, as Hornsey (2013) suggests, play a crucial role in determining how particular forms of movement come about. Furthermore, subway maps also tend to stick in the imagination - paths that become crucial to what Lynch (1960: 2) calls the 'legibility' of the city, or our ability to cognitively map the city. Such maps offer a useful point of material fixity - they give stability to the monadic digital and explain how the network of Hermes runs. Even though such maps are atomically (rather than digitally) monadic, through this interaction, they get drawn into the network as the material interfaces with the digital through the discursive. This is implicit in Ellen's mobile mapping. Boundaries are blurred as mobile mapping practices fold different materialities of cartography together. This occurs because they obey the same

discursive rules of formation. Ellen's experience also questions how cartographical interfaces, arguably, still contribute to what Bollnow (2011) describes as the equivocation of living space under homogenous geometries. Ellen uses all the information available to her in order to navigate through the MTR system.

As she continues to stare at the map, she traces out our route.

'See here, it is the last station and you need to interchange to the other side,' she explains.

Pointing to the orange line, she tells me a story of how she travelled along this route with some friends a few days ago in order to see a small amusement park, 'Noah's Ark'. Having successfully navigated her way there with a group of friends, they got to the entrance and her friend found that there was a fee to pay. Communicating the digital axiom that all spaces are equal (for indeed, in numeric terms and without context they are) hides the increasing privatisation and surveillance of public space. When you look at a map - when points are abstracted from their materiality, both structures of power and heterotopias, disappear. Practices of exchange and interchange coincide with this code/space of digital materiality. A matrix is created between cartographic accessibility and spatial accessibility in Ellen's life - one which reroutes her constantly.

'They said, you need to prepare 155 HKD for the entrance and she [her friend] said "Oh my god. It's too expensive!" you know? And you know what we do? We yesterday, we just stayed outside...' Ellen bursts out laughing, as the noise rebounds around the carriage, '... just took pictures of the entrance!'

'So you just went there and you had a look through the...?' I laugh with her.

'Yeah, you know, some parks here, is like so expensive you know for the entrance. But there's nothing inside. But you can stay outside, you can take pictures.'

The cartographic surrealism that Marianna enjoys creates boundaries for Ellen. We see here, again, a material rearrangement of space - determined less and less by the Cartesian model of geometric planning examined in the last chapter, but by the Leibnizian forces of relationality. In this configuration, boundaries become relational to capital and property, and modernity is transformed into 'speculative urbanism', as Chu (2012: 1) calls it, in a floating city (Lee, 1997: 43). To be clear, I am not arguing that cartographic reason built the theme park, Noah's Ark. Nor am I arguing that the network of Hermes necessarily prevented Ellen from gaining access to that park. But these are microcosms in global flows, which contribute to the placing of boundaries that cement inequalities. The flows of capital required to gain access to the park are

deeply linked to flows of global labour that brought Ellen here from the Philippines. Mobile mapping is complicit in the experiential rearrangement of these flows, to sweep some along with the tide and to subdue others in the undercurrents.

When I search for 'Noah's Ark Hong Kong' on Google Maps, even from the UK several price tags appear: the first, that of a resort, indicates to me that this is a private not a public park. The second, a price tag of \$800HKD, tells me how much a room in this resort will cost, its star rating, reviews and any number of other pieces of information, which key into the network of Hermes. Without accessing this network - and without being able to read the implicit symbolic nuances that are embedded in the language of the digital map, it is difficult for Ellen to tell when a space is public or private: she needs to stumble upon it. But the design of the map is deceptive: all parks are green, regardless of whether they are private or public; the water is blue, whether it is accessible or not; and places are called whatever people wish, without indication of their relative accessibility.

This is also the case for LOHAS<sup>22</sup> Park where we now travel. Ellen tells me how she wishes to spend her day off at the park - to see somewhere green and to go somewhere new. She originally drew this information off the MTR map - LOHAS Park Station - but after she Googled it, she found that there was indeed a green space, functionally named 'The Park'. When we arrive, we discover a large housing complex designed for Hong Kong's growing middle-class. As we wind through the fenced raised walkways towards the park, it becomes clearer that we have stumbled upon a gated community. The park, when we find it, requires a pass-card to enter (Figure 6.14). There is a button to open the gate from the inside, but it is cunningly designed to be out of reach from the public side of the gate. From behind the tall fences, we can only catch glimpses of the green trees below, and the sounds of children playing and people talking. It strikes me as peculiar - precisely whom is this park meant to keep out? Yet, I begin to realise that, for Ellen, the cartographic space of Hong Kong is a matrix of cartographic in/visibility and material in/accessibility.

Control - through borders, directions, instructions or data - also creates dialectics of movement and occupation. This is most prominent for those who are blocked or moved on: inside or outside, access permitted or not permitted. Such dialectics are less visible in experiences of mobile mapping - as with Marianna or Nick in Sydney,

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<sup>22</sup> LOHAS is an abbreviation of Lifestyle of Health and Sustainability, but the acronym is far more commonly used.

who have the ability to move beyond binaries, to find alternatives rather than syntheses, to search outside rather than hybridise.



**Figure 6.14** *'We're so lucky!'* Ellen laughs as we move backwards past the entry gates to 'The Park' after gaining access from a local resident. (Source: ActionCam Footage) (See also Appendix 3)

Yet, although space itself may be open, Ellen's world is not. It is perhaps more severely limited than any of the examples we saw in the first chapter because new barriers of algorithmic control have appeared (Amoore, 2013), dependent upon both cultural and financial capital, at once hidden and reified by cartographic reason. Such barriers are not only the durable sentinels of rational colonial spatial planning found in walls and streets and buildings, but more flexible, adaptable and frequently digital structures. They appear in entry costs to the MTR, pass card gates to parks, time and date keepers on trains, and arrow stickers on the ground. Hong Kong increasingly uses digital gates to filter access, rather than keeping the doors locked. Keys generate in the network of Hermes. Boundaries become fluid, hard or soft depending on who a person may be or how much they are able to pay. Eventually, we manage to make our way into the park - a brief exchange between a local resident and I results in her letting us through the gate. My position as a foreigner provided Ellen with the cultural capital to negotiate her way into the park. But it also reinforced the invisible social boundaries that are always implied, although are never strictly clear on most generic digital maps.

I became a social key to a boundary that, for Ellen, would be otherwise fixed. Some

people get through, some people do not - and the keys are not only the electronic cards of which Guattari (in Deleuze, 1992b) dreamed. Even in digital code/spaces, keys can be social, cultural and economic and, as Deleuze (1992b) rightly suggested, access can be rejected at any point. Therefore, we can see how the Cartesian and Leibnizian striations of space, carried out under a rationalist project, neglects the striations of lives lived within and without the boundaries that cartographic reason creates.

### **Portamento<sup>23</sup>: Camille, in which (im)mobility becomes relational**

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Camille and I walk through the Central Market between 'Des Voeux Street' and 'Queens Road' on Hong Kong Island. The market is a large multi-storey building, which now serves as a thoroughfare on the Central to Mid-Levels escalator system, facilitating movement between the harbour and the residences halfway up Victoria Peak. On our left sits a series of small retail outlets, the majority of which have their roller doors locked shut. On our right, a small leisure space is located, with plants, seating, and a number of children's artworks. Camille nods towards it.

'This is a fun place, because - uh - they sort of built this to show local art and stuff,' she explains. It appears to be a fairly recent development, however, it is deeply embedded in the style of chic urban pop-ups that have lately become popular in liquidised global economies (Harris, 2015).

The building itself is built in a Bauhaus style, an open space to facilitate the coming together of arts, crafts and technologies, and is four storeys high, with wide concrete walkways (Waters, 2013).

'What was here before?' I ask curiously.

'Just like that,' Camille replies, pointing towards the roller doors.

'Just like these shops?' I'm interested by this suggestion. The market appears quite run-down, teetering on the edge of abandonment. It has a complicated history (Figure 6.15). The site itself is the place where Hong Kong's oldest market, the Canton (or Middle) Bazaar, was relocated in 1858. Since then, it was rebuilt several times - as a Victorian marble structure in 1895, then as its present structure in 1939 - so it could accommodate two hundred trader stalls. It's an example of how speculative modernity (Chu, 2013) becomes refolded in place across the history of

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<sup>23</sup> Portamento: to glide from one note to the next without a pause, or a break.

Hong Kong; the settling, restructuring and re-emergence of spaces of capital and trade through geographies of property accumulation.



**Figure 6.15** *Retail spaces and art spaces.* On the left lies a series of small retail shops selling dry-cleaning services, small goods and hot food. On the right, the local art installation with foliage and wooden benches. Further along sit small artworks painted by local primary school children (Source: ActionCam Footage).

A brown square on Google Maps, the Central Market building is now adorned with mural art and cluttered with people sitting on the benches enjoying the reprieve from the humidity.

'It looks better,' Camille says emphatically, 'they tried to put some plants in there because there is a lack of plants in Hong Kong. There's no green in Hong Kong.' Throughout these interviews, various governmentalities - from Victorian hygienic cities to elite spaces - have emerged through maps into the landscape of Hong Kong. Yet, these stabilisations are more precarious here, more dependent upon the mobility of people passing through. Green space *is* a rare commodity in the urbanised sections of Hong Kong. Although, there are many strictly-protected parklands (like Victoria Peak where we walked with Vicki), and much green space in the city is hidden behind boundaries, like those seen with Ellen.

Green space comes to represent a moment for pause in a city of flows - a stutter in continual fluidity. The friction between immobility and mobility in Hong Kong is poorly represented by the elasticity of relations in the digital map. As Camille and I entered the Central Market, a digital visualisation of parklands blanketed the front wall of the

building (Figure 6.16) (Rose *et al.*, 2014). This image was an explicitly visual modernity (Jameson, 1990) steeped in speculative urbanism (Chu, 2012): a speculative modernity. Stickered over the image, a small speech bubble was placed, its sides curling up in a gentle reminder of another temporality - an imagined thought of the person walking down the street and the materialised thought of an unknown sticker-placer: 'Where has my dream city gone?'



**Figure 6.16** *Where has my dream city gone?* (Left) Camille and I walk past the visualisation of urban parkland. (Right) A close up of the piece of sticker graffiti, showing the words "Where has my dream city gone?" (Source: ActionCam Footage; Archival Photo by Author)

At the time, there was no opportunity to stop and see. I only found it later in the video, and, curious, I went back to the location find it for myself. In Hong Kong, speculative modernities have become more liquidised and precarious, paving way for what Jameson (1991: 357) would call the precariousness of the cultural logic of late capitalism. In this process, even architecture becomes folded over, referential, relational and heterogeneous.

The relationality of mobility becomes more apparent as we leave the Central Market building, as Camille tries to wrestle with the mobile map.

'Let me check how far up we have to go,' Camille says, taking out her phone. Tentatively, she steps whilst navigating the interface. There is no opportunity to pause in this forward-moving slipstream. We move closer to a set of escalators ahead. Camille trips onto them without missing a beat, adapting fluidly to their relative velocity before moving to the right so that she can pause and be out of the

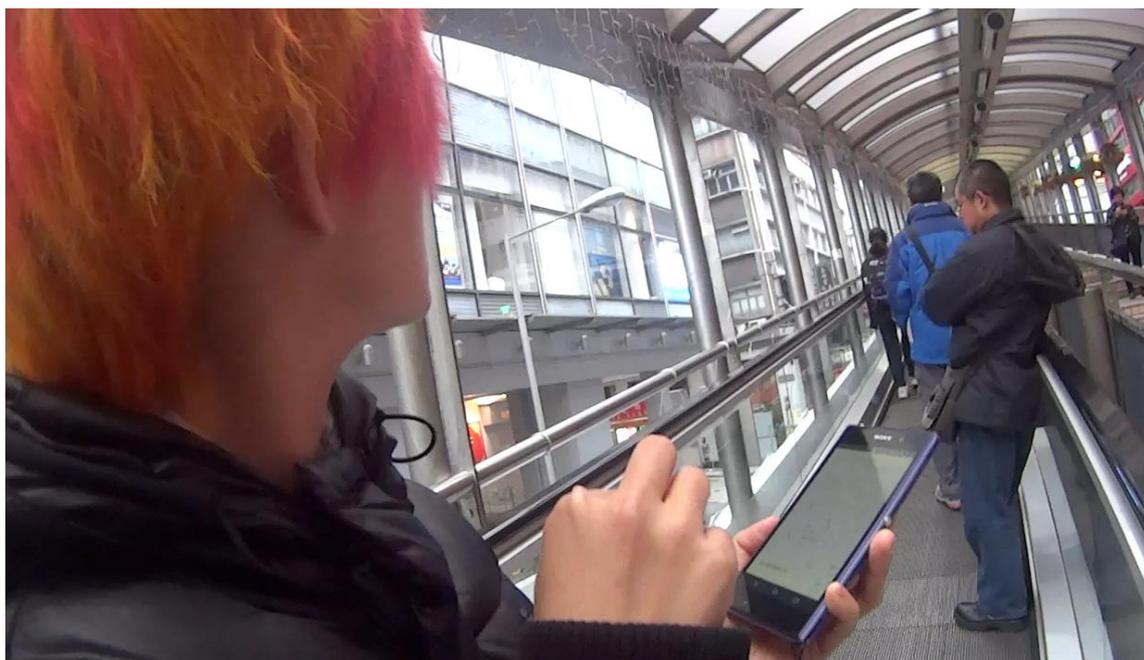
way.

'How far up?' I ask.

The Central to Mid-Levels Escalator is over eight hundred metres long. It was constructed in 1993 in order to better manage foot-traffic movement between the MTR system, the Central Business District (which runs along the flattened shore of Hong Kong Island), and the residential mid-levels halfway up the steep inclines of the Peak District. As people walk past us, as Camille tries to determine our location. Below, the city shifts past and we shift past it in heterogeneous flows that shuffle and sprint (Adey, 2006). Camille looks downward to the streets, then at the map on her phone, then downwards again, stretching her neck further.

'We are...' her neck cranes as she attempts to look behind and in-front of the metal poles of the walkway as we travel past them, down towards the street below. 'That's Stanley Street and Stanley Street is... somewhere,' She pauses again as she scrolls up on the mapping interface. Slipping the map under her finger, she finally finds it on the map, 'Stanley Street'.

So, we stand, still but not still, a *portamento* moving between fixed points and an ever-fluid relationality. Stanley Street becomes an *ostinato*, a stubborn, recurring theme, which resonates across the Cartesian and the Leibnizian; eroding modern distinctions between the material and the digital, the embodied and the imaginative. Turning her phone screen back towards me, Camille shows me how we shall journey up to Soho, to find the café where we've agreed to go.





**Figure 6.17** *Stanley Street Camille* uses the *portato* on the escalator to look down to the ground plane, to see which street we are crossing above (top), and then shows me on the map where our location is (bottom) (Source: ActionCam Footage)

‘So we’re going up Stanley Street and then, from here,’ she tilts the cartographic interface towards me so that I can see better, ‘and then we are going up Wellington Street then...’ She pauses as people race past us along the escalator on our left, before realising that the text is too small to read on the size of her screen, ‘then that street and then Hollywood Road, and that’s Hollywood Road, which we get off there and then walk that way...’

Navigation becomes a combination of touring and looking (Lammes, 2011), between the top-down Cartesian plane and the any-point relations of the Leibnizian. Like Nick, Camille maps our future path, before turning to the more immediate task of concentrating on the rhythm of the escalator and waiting for it to end.

The digital folds into space - into the vertical urbanism typical of modernity. The map takes on a different meaning here. The relations of Hermes and Leibniz move faster, asynchronous to the capability of the map. The GPS doesn’t work in parts of Hong Kong because the buildings are too tall and too dense - and so Hermes seeps into Camille’s mobile mapping practices as she becomes the exchanger and translator - a parasite that takes hold of both gods and demons. Earlier, as we made our way up the escalators, Camille and I passed the Hang Seng bank, with a small digital screen flashing up the Hang Seng Index - ‘the Dow Jones for Hong Kong’ - as it rose and fell. Nearby, a quick response (QR) code (Figure 6.18) appears plastered onto a window

on the third floor - an ideal height for passers-by like Camille who could take a photo and follow the code to the website.



**Figure 6.18** QR Codes and 'Free-To-Go Anytime'. Verticality, mobility and digitality converge. Advertisements line the windows and walls to the left of the escalator. (Source: ActionCam Footage).

Just as space adapts to the pursuit of the monad, the monad also adapts to space - reshaping its mobilities and motilities.

'This is Wellington Street,' she says, looking downward again, 'This is good. We're in the right direction.'

'In the right direction,' I echo.

'And these escalators are interesting 'cause, like, in this hour, it goes up. Um, after office hours, it goes down, so that all these office people can go to the MTR station.'

'Right, okay.'

'I don't know the exact times, but they do have times.'

Tempo, again, switches and changes. Mobile mapping complicates this tempo, especially with the use of mobile maps. Using mobile maps needs a pause - a momentary suspension - in order to engage, to become absorbed, to read the map without disrupting the flow. But to read the map, it is important to be mobile. Thus, already, a paradox has been presented - digital mobile maps invite both mobility and immobility at once.

'How do you know the times? Is there a website?' She looks at me strangely, 'Or, do you just know?'

'I have no idea,' she laughs.

The market is perhaps more expected in the urban form, a space of arrhythmia with spaces to sit, to pause, and to use your phone on one side against the constant stream of people which are fed through on the other. Or the escalators, a not-quite-(im)mobile lacuna, where you can pause while you keep moving and take a photo of a poster on a window, which leads you to a website. Such paradoxes become resolved through the adaptable liquidity of space; the monadic digital *is* material and the meaning of mobility in mobile mapping becomes restructured.

'Is it one of those things where people in Hong Kong find out stuff without ever knowing how to find it' I ask, sighing.

Camille smirks widely.

'That.' Camille affirms. 'I think they should have signs somewhere but I have no idea where...I've seen something, somewhere. But I can't recall. Yep.'

I am reminded again that, even in a space of homogeneity - where the monad increasingly melds fixed grids of knowledge into relational experiences - there are certain phenomena that are so thoroughly cultural that they cannot be unpicked except through *something else*. Such cultural understanding warrants a kind of mobile mapping that intuits beyond the map, somewhere deep in a memory that only flits at the edges of recollection.

### **Staccato<sup>24</sup>: Tanija, in which (ap)proximity becomes relational**

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Tanija stares at her phone, typing with a momentum and purpose to which I would soon become accustomed. She's demanding that Google Maps tell her what time the Apple Store on George Street in Sydney closes, so she will know if we have time for her to show me a place where she recently got lost.

'Ahhh...it's Wynyard!' She stops tapping and waits, 'I don't think I spelt that right, anyway, it'll correct me. I don't have to spell - ever!'

Tanija is looking for the flagship Apple Store. When it first opened, it was a massive event, the transformation of an old building into a three-storey glass box, completely open to the gaze of the outside public to view the space of digital technological consumption within. Its appearance interrupted George Street's mix of Victorian and post-war buildings - a transparent fish-tank containing the future of commercial retail.

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<sup>24</sup> Staccato: the play notes in a detached and broken way

It created an iconic moment on the journey along George Street from Central Station in the south end of the CBD, through to Circular Quay and The Rocks in the north.

'Give me the hours-' she breaks off, 'you're not going to. That's really annoying.' Having entered 'Apple Store Wynard [sic]' into the interface, Tanija's map has become populated with little red dots. Her zoom level is too distant for her to be able to accurately touch the specific 'dot' that she wants, floating between the jutting peninsulas of Milson's Point and Bennelong. As a result, a list of Apple stores across Sydney appears and she continues to scroll across the mapping interface with her thumb. 'That's it right?' She points towards the option on the top of the screen that says 'Apple Store, Sydney'.

'Yep,' I reply, 'It's the Sydney City one.' She selects it and at the bottom of the contact information, a little note sits: 'Open now: 9am-8pm'.

"Til 8! Win!' She raises a fist in the air.

'Great!', I echo, 'Let's go.'

Holding the phone loosely in her hands, we continue on to Clarence Street. Clarence Street is a long straight street that runs parallel with George Street in near north-south formation.

'The studio I am taking you to,' Tanija explains, 'I had to book over Christmas and New Year because, um, pretty much everywhere else was closed...'

She takes out her phone again.

'... And, um, they were rented out, but it's not somewhere I had ever been before. So, and I looked at it and I thought, yeah, Clarence Street. And I'm like, oh, yeah, I know Clarence Street, it's like here, it's like right next to work. Um, so I had it on my phone but when you do Google Maps,' she talks and focuses on the phone, tapping in her passcode with both thumbs, 'I walked past it three times,' I laugh and she joins in, 'I'm a special individual.'

I have two queries at this point: I'm uncertain as to how Tanija walked past her destination three times; and I'm also unsure as to why she chose to use Google Maps considering that Clarence Street is so close to where she works. Clarence Street is a long straight street, with crossroads that bisect the north-south parallels at regular intervals.

'Um, so I was like, 'cos I'll track where I'm going on Google Maps,' she brings up Google Maps before moving selecting her saved locations, 'and I'm pretty sure I saved the location, no, I obviously didn't. Or I thought I did. Nope...' she fiddles about with the interface, selecting different options, 'Aahh! I can't use this thing. Eearhhh - where are my saved locations? Nnnh. Ah, there we go. That's it. The other one was

my brother's house.'

This is particularly fascinating to watch. Tanija appears to embed places in the map before the landscape - to show me on Google Maps, to save her location, rather than pointing down the street. A more fluid version of cartographic reason, then, as for Tanija, Google Maps becomes a practice of (ap)proximity, where she uses the application to place herself at the centre of a network of relations between locations in her life. In these mappings, momentary fix-points emerge and disappear within the framework of a unified, global grid - sometimes saved into the background as personal locations, other times lost into the black box (Serres, 1982b).



**Figure 6.19** *Clarence Street*. Tanija shows me the location of the salsa studio on her phone as we walk down the first block of Clarence Street. (Source: ActionCam Footage )

Suddenly, the array of frustrated noises stops when she happens upon a list of two places embedded somewhere in the interface.

'So, it's got, like this little blue dot,' she points to the dot, 'and I walked past it, and I was like, "no, no, no. I didn't see it" – 'cos I'm looking for 253 Clarence Street. And so I walked past it, and then it takes so long for your little thing to catch up that its, like, it's kind of jumped past it and I was like, oh, shit, it's behind me...'

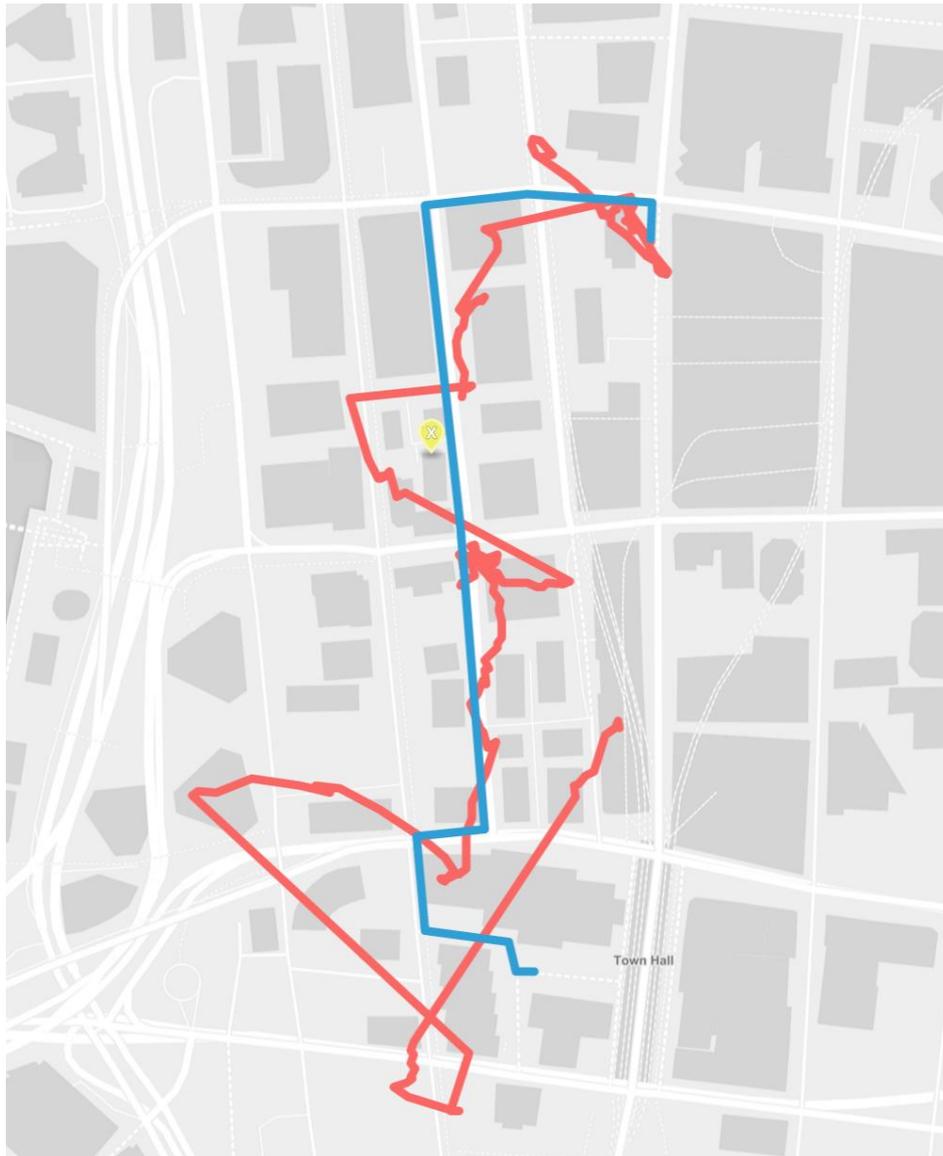
Experimenting with the fluidity of these relations - moving closer and farther, parallel and perpendicular, allows Tanija to measure comparative distances between where she is and where she wants to be.

'... And then I was like, sometimes it's really inaccurate, so like actually, is it on this side of the road', she laughs, 'No, no, no, no. I'm just a moron. I managed to walk

past it like three times.'

Tanija's mode of (ap)proximate navigation is perhaps more akin to the radar of a submarine or a ship at sea, than seeing through grand visions of the legible, ordered rectilinear city. It is far more Leibnizian, more relative, than the homogenising geometries of Descartes. We saw the same kind of practice of (ap)proximation with Kyja, as she wandered up Martin Place, using her body and her phone as a hybrid compass to determine which direction she faced. Cartographic reason is now capable of the calculations required to re-center on any point, reappearing at each update of the GPS, each waypoint indicating where Tanija is/was/might be. The absolute zero point of (0,0) has lost its centrality and its fixity: Tanija becomes her own zero point as her body and her marker skate along a Cartesian grid, reorienting it, as they move closer towards another point, the salsa studio. Tanija transverses the monadic and the material: navigation *becomes* through the app rather than the landscape, the system of Hermes appears to have replaced perception, and the monadic digital appears to have become embedded in corporeality.

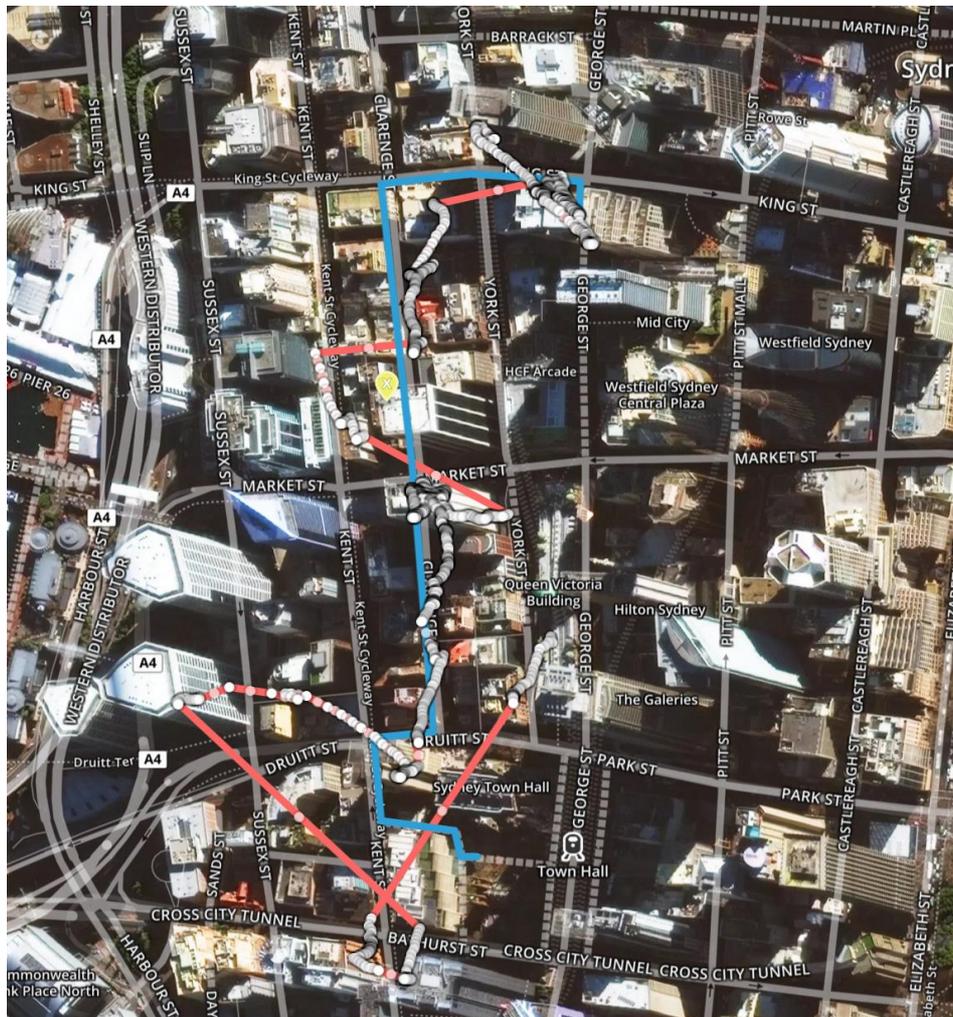
Such practices are also not without their pitfalls: localisation in the extreme results in a cognitive vertigo and also a dependence upon the technology itself to account correctly for both the final destination and Tanija's present location. This results in Tanija walking past it three times. The GPS, required for Tanija's blue dot to work, mediates between the device, the satellite and the ground-station, measuring position through the time it takes for the signal to arrive. Later, looking back at my own GPS data, I convert it and map the path onto a raster layer of graphic tiles (Figure 6.20). Compared with my memory, the GPS data only barely reflects our path down Clarence Street (in red), dashing all over the coordinate grid. The location of Tanija's salsa studio sits at A, and suddenly, a likely reason for her predicament on her first journey begins to emerge. It is possible to see the layering of the digital map, of the Leibnizian over the Cartesian here.



**Figure 6.20** (*Ap*)*proximate Tracking*. In blue, the route Tanija and I took. The GPS track of our walk in red. The salsa studio that Tanija was attempting to find is in yellow marker 'X'. (Source: GPS data)

I rework the GPS data onto a satellite layer, this time marking up each of the individual waypoints and the jumps in-between (Figure 6.21). Again, the map morphs as collections of points gather together, punctuated by large jumps across blocks and streets and around tall buildings. This, of course, presupposes a constant clear path - a grid without volume or verticality. In 'Central' in Hong Kong, where the GPS does not work well, I gathered a number of GPS logs no more than 1kb in size, with no way points. On the satellite map, the waypoints gather in the gaps between tall buildings, clinging to and jumping between the streets and the intersections, curling around the blockages caused by tall buildings. 101 Market Street looms large over Tanija's salsa studio. The earth's surface curves ever-so-slightly. As the satellites

above and the phone below try to make connections, this curvature means that things in the landscape - buildings, mountains, cliffs: objects of verticality - sometimes get in the way. As such, in cities in particular, such positions also often become (ap)proximations, generated through a range of factors including the material composition of the urban landscape.



**Figure 6.21** *Density of waypoints with red-line jumps in-between.* Waypoints are small white or grey dots, with red marking significant jumps between points. Clarence Street runs up the centre of the image, our path marked in blue, and the location of Tanija's salsa studio can be seen at the yellow marker. (Source: GPS data/MapBox)

It is not only Tanija who brings forth (ap)proximation as a way of navigating. The waypoints themselves are also (ap)proximate: approximations of proximity to Tanija's body, produced by a phone as it moves through space and time. Thus, the relationality in mobile mapping may exist not only in the spatio-temporal distance between here and there (or nearly here and nearly there), but also between bodies

and maps.

Perhaps this has always been the case - that such relationalities have always been situated in mapping practices. We saw this in the previous chapter, as signs, grids, datums, roads and codes regimented spaces. Yet, staring at the waypoints, and watching the footage of Tanija and I walking back up Clarence Street, listening to her story, it strikes me that although the maps often look the same, and our bodies still walk down the same streets, these scattered markers tell us that the mediation of such relations has changed. The rhythms and the approximations have been altered, bodies are now updated into the map, the apparatus has been reshuffled.

'Were you looking at the addresses on the street, or were you actually just looking at the map and trying to make your dot match up...?' I ask.

'I was trying to make my dot match up with the spot. But then I started looking at the addresses on the street, because I came back over here...' she indicates from the other of the road to this, '... so like it's 253 and I'm like, well, it has to be on that side...'

'Cos it's odd numbers?' I'm curious.

'Yeah, so eventually I found it. But yes, I often just try and make the dot match up and then get frustrated when my map doesn't work.'

'So do you often use Google Maps when you're going to places and you don't know where they are?' I ask.

'Yes - just about always. It's really - I like it on buses because you don't know where you're going: you can just watch as you're getting closer to your destination.' She makes motions with her hands, motioning from one point to the next in an embodied performance of her navigational style, 'so you can gauge, "oh, like I'm almost there I'll press the button now and I'll get off at whatever the next stop is".'

There are two ways of thinking about this structuring of spatio-temporality through a technological lens. The first, as Casey (1993) suggests, is to view the points as gathering together to form the line:

'If the time-line is spatial in its continuity and homogeneity, it is at the same time "placial" in its constitution by means of positions, that is, a series of points arranged on the line and grasped, all together, as the line.' (Casey 1993: 93)

This is a geometric argument: lines are simply collections of infinitely small points that obey particular functions or rules *ad infinitum*. The restructuring of points to proximity emerges again - just as it did with Kyja in the previous chapter, and with Marianna in this chapter. Yet, where there are points, there is the space without: the space of what Debord (2010: thesis 192) calls 'the incommunicable'. Figure 6.20, if anything, is also an approximation towards infinity - but what it does show is *where these gaps may lie*.

### **Rondo<sup>25</sup>: Ravi, in which (un)fixity becomes relational**

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Ravi is in Hong Kong for a few days to pick up a Chinese visa. We meet where he is staying at Chungking Mansions, on the southern tip of the Kowloon peninsula in Tsim Sha Tsui. Chungking stands as a monument in a city that is so fluid, it is arguably without a ground plane (Solomon *et al.*, 2012). Around and through this entrepôt (Mathews, 2011), crowds swarm into slipstreams lined with mobile phone vendors and electronics salesmen. They are beset with hawkers offering tailoring or bootleg watches or handbags. Space and time warp in the corridors of Chungking. As we step out into the bright light, he tells me about how he ended up in here, a story of fix-points. Ravi is a weaver of stories.

'[W]hen I entered Chungking for the first time, I was directed by my friend to go to the station and just choose any exit. And then ask someone for Chungking. No need to use your head. Chungking Mansion, everybody knows this place. Once you reach outside of Chungking Mansion you will see many people standing there offering watches, hotels, guest houses, things like that. And you just look and choose one of them, see which one suits you.'

'Okay, okay.' I laugh.

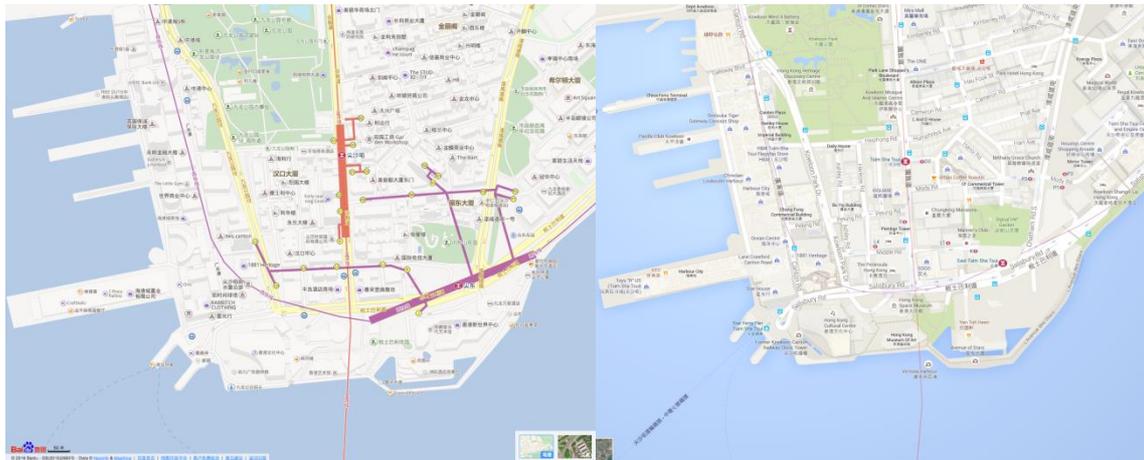
'So, that's how I did it for the first time.'

As we cross Canton Road and head towards the eastern foreshore, Ravi tells me a story of maps. He describes how he had to go 'to this very big, known supermarket in Guangzhou', but he got lost using the Google Maps route finder. He then got more lost asking people in Chinese where to go and ended up walking six or seven hundred meters more in the wrong direction. He explains that Baidu maps, a Chinese

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<sup>25</sup> Rondo: a formal structure of music written with a recurring theme between sections that returns as the completion of the composition, usually in the structure of ABACA.

mapping agency, is much more accurate than Google Maps (Figure 6.22).



**Figure 6.22** *Baidu Maps and Google Maps*. Tsim Sha Tsui on the Kowloon Peninsula where Ravi and I are walking in Baidu Maps (left) and in Google Maps (right). There is some distinction between locations, classification of parklands, and the representation of the MTR system, where Baidu maps represents the length of the station concourse, underground walkways and connections. (Source: Baidu Maps and Google Maps, 2016)

‘But I don’t blame Google 100% for this,’ he says, ‘because China has - has - has - it’s somehow closed the doors for Google in many places.’

In Ravi’s entrepôt space, embodied and eroding, a monadic universality is only still an ambition in the chaos between cultures. Joachim Bouvet (1656-1730) was one of the first Europeans to spend significant periods of time in the Chinese court, making a series of maps according to scientific principles and translating key mathematical and philosophical treatises into Manchu. In 1701, he started a correspondence with a man he had met at the Vatican a few years earlier, Willem Göttfried Leibniz. Bouvet described to Leibniz the hexagram system of the *i-Ching* consisting of six broken and unbroken lines which ran along the binary system of yin and yang. Taking inspiration from this system, Leibniz developed a similar model - a base 2 system for calculation consisting of 0 and 1 (Figure 6.22). This became the basis of modern binary systems of code: *creatio ex nihilo*.

The image shows a handwritten manuscript on aged paper. At the top left, there is a '10e' with a superscript 'e'. The main title is 'Tabulag ita stabil'. The table consists of three columns: powers of 10, powers of 2, and powers of 2 with exponents. The powers of 10 are written in a slanted, cursive style. The powers of 2 are written in a similar style. The exponents are written in a smaller, more regular hand.

10 <sup>e</sup>	2 <sup>n</sup>	n
1	1	2 <sup>0</sup>
10	2	2 <sup>1</sup>
100	4	2 <sup>2</sup>
1000	8	2 <sup>3</sup>
10000	16	2 <sup>4</sup>
100000	32	2 <sup>5</sup>
1000000	64	2 <sup>6</sup>
10000000	128	2 <sup>7</sup>
100000000	256	2 <sup>8</sup>
1000000000	512	2 <sup>9</sup>
10000000000	1024	2 <sup>10</sup>

**Figure 6.22** Leibniz's base two binary. Handwritten correspondence by Leibniz showing calculations as he experiments with the calculability of binary arithmetic. (Source: Götffried William Leibniz Bibliothek)

Ravi tells me a story of translations. For Ravi, the distance between Google Maps and Baidu Maps is as abstracted as the distance between Leibniz's binary and the Bouvet's description of the *i-Ching*. This distance is so crucial that even though Baidu Maps is more geographically accurate, its linguistic accuracy is far more laborious to navigate.

'Because Baidu Maps', he explains, 'originally it's Chinese, I need to get used to typing Chinese.'

It is not so easy to type 'Chinese' on mobile screens. When computer algorithms were first developed, like Dijkstra's algorithm, scripts like pseudo-codes were needed to outline the steps to be translated into automatable code languages like C++ or Java. However, at the base level of computer representations, 0 and 1, pixel-squares of memory still make up the basis of digital orthographic systems, optimised for alphabetic language systems.

'So you tend to use Google Maps rather than Baidu maps?' I ask.

'Right. If it's not in English - or, what I have to do is, first get the full address in Chinese, or, in English, type translate, then paste in in a Baidu map and then get the location. It's a bloody tedious job.'

'Pre-digital' versions of pinyin exist. Pinyin (or in Cantonese, *jyutping*) is a pseudo-orthography to aid translation between languages that use character-based orthographic systems and those that use alphabetic character systems. Pinyin can

be seen dotted all over Hong Kong, in duplications of street names and building names, and now, increasingly in China too.

**Table 6.3** ‘Guangzhou’ across three languages. Traditional Chinese (far left) is the official writing system of Hong Kong, Simplified Chinese (left), Hanyu Pinyin (centre), Cantonese Jyutping (right), and finally, English (far right). (Source: Author)

Traditional Chinese	Simplified Chinese	Hanyu Pinyin	Cantonese Jyutping	English
廣州	广州	Guǎngzhōu	Gwong <sup>2</sup> zau <sup>1</sup>	Guangzhou

Chinese-speaking users need to learn a new orthographic system to translate between the type on their phone, and characters in the digital databases like Unicode. Using pinyin in Google is a constant guess as to whether the right character will appear. Characters that were once calligraphic have now become digitalised, the swift upward stroke of a brush fixed into set numbers of pixels, requiring a staccato tapping input form to generate the characters on-screen. Alternatively, Chinese-speaking users need to download an assistant app like Pleco, which allows touchscreen writing. These characters operate as an image, which is pixelated, vectorised and matched to a character code. The labour of universality is translated through the monadic digital: from Ravi as he tries to turn a series of strokes into a series of taps; to the system itself, as it computes, calculates and transforms motion into pixels. Each square: is it white, yes or no?

Ravi tells me a story about liquidities. He describes decentralised networks of relations that move people and ideas across the world.

‘The people in Hong Kong are fast’, he says. ‘You see, it’s a free port - no matter what, it tends to be developed. You can move money in and you can move money out. The whole city is a duty free shop.’

This ‘duty free shop’ was a product of empire. An ‘east-west sandwich’, such free ports are translators and exchangers between languages, systems, cultures and economies. Empires are arguably the first global networks (Jacobs, 1996): the first instances of Hermes. Hong Kong was a gateway into the east, Ravi tells me, an entrepôt between Britain and China.

'[Hong Kong] was ruled by the Britishers until the '90s. You see the majority of development in Hong Kong is being done when the British were still here.'

To enter into a system whose rules you understand entirely - that is a different thing. Embedded already in spatial realisations, imperial networks still linger because cultures that are already part-unified into global hegemonic discourses, like cartographic reason, survive better in a world predicated on velocity (Said, 1993).

Digital networks are structured from these imperialisms (Fuchs, 2016), as too are new political structures across new territories. The power relations embedded in the translational space of digital-memory values smaller, rather than larger, sizes. Every pixel is a byte of memory, and because of the way in which digital systems are structured, as if alphabetic languages were axioms, the space in which the Chinese, Japanese and Korean character-sets take up is a million times larger than that of European alphabets.

**Table 6.4** Comparison of Unicode Composition between Latin Alphabet (Ä) and a non-encoded Unicode CJK character, showing binary digits and Unicode. The Latin Alphabet character at the top is comprised of two elements, whereas the CJK character at the bottom involves 5 ideograms (consisting of multiple graphemes and glyphs) plus two ideograph character markers - U+2FF2 and U+2FF3 - that form the structure of the character. The difference in binary size is marked, along with the UTF composition of the character - this is without the possible substitution of similar ideograms with different stroke variations

Unicode Latin Alphabet – A with diaeresis													
Character	A	+	¨	=	Ä								
Binary	01000001		11000010 10101000		11000010 10101000								
Unicode	U+0041		U+0308		U+00C4								
Non-encoded, non-unified Unicode CJK (Unihan)													
Character	𠄎	+	𠄎	+	𠄎	+	𠄎	+	𠄎	+	𠄎	=	𠄎
UTF-8 (Binary)	11100010: 10111111: 10110011		11100010: 10111111: 10110010		11100100: 10111000: 10000010		11100101: 10111101: 10100001		11100100: 10111000: 10000010		11100101: 10111101: 10010000		11100111: 10011010: 10111111
Unicode	U+2FF3		U+2FF2		U+4E02		U+5F61		U+4E02		U+5F50		U+76BF

Ravi points backwards towards Chungking, which is increasingly home to not only South-Asian migrants, but now also Africans and others.

'Indians were welcome because Britishers were here', he tells me. 'And they found it more comfortable, because they already know who are Britishers. How they behave. What they want, what they don't want.... So they just got part of the system. They just became a huge part of the Hong Kong system. Immediately.'

Ravi tells me about his dreams of numbers. The digital geospatial world has been distracted, he explains, focusing too much on new colonies of interiors and bodies, and not enough on securing the streetscape shores upon which they have already landed. In Hong Kong, Ravi's argument becomes clearer: a project of an ordered alpha-numerisation - street numbers, road numbers - is not complete in Hong Kong. Slopes may have numbers - but a number without a system merely becomes a taxonomy.

'They show you the inside structure of the mall, of library, of Whitehouse. C'mon we can have a tour of the inside of a house', he exclaims, 'But we can't afford to lose our destination. Do you understand my point?'

I do. The first object of the cartographic gaze was the landscape and the people who inhabited it.

For Ravi, cartography creates fixed points in space durable beyond their material formation and enduring in cultural memory, systems which produce and fulfil expectations of predictability. By linking monads and grids, spatio-temporal transformation (from embodied movement to urban development) could be facilitated in an amalgam between algebraic geometry and binary systems. As for digital maps, well, they have become distracted by the euphoria of colonisation, rather than establishing the universal functionalities of order.

'Let's say, for example, you planned a trip, okay, you want to go to the beach in the evening. I need 5 hours for that. Before that I need to have my dinner or supper or anything. Ok before that I have free time - I can go to the Peak, this temple, or the market.'

Time is opportune for Ravi and he wants his life to be efficient. The logics of capital, described by Debord (2010 [1983]), begin to wind themselves through Ravi's reading of the 'logic' of the mobile map. The disintegration of time into spectacles goes hand in hand with the organisation of territory: as space becomes shaped, so time becomes separated and all things become frozen then reordered under unities. Yet, in Ravi's estimation, the intertwined logics of cartography and capitalism have become distracted in their purpose in this digital age.

'Okay, so now you use the map', he continues, 'you want to navigate. But let's say you want to go to Market A and it sends you to Market B, but you've already seen that! You lose time.'

Time was also lost when he got lost looking for the supermarket in Guangzhou.

'You lose time!' he continues, 'That means that you lost the opportunity to B from A. Why? Because of the streets, the addresses. So rather than showing which mall is there, or showing the structure of the mall, they could pinpoint where it is from numbers.'

Too busy taxonomising spaces, interpreting their interiors and expanding into new territories, capital and cartographic reason no longer even properly serve each other's purposes: they have degenerated into mere spectacles when 'we can't afford to lose our destination'. All the same, like Leibniz, Ravi dreams of numbers - numbers that outlive their material forms, that can assemble and disassemble, that constitute the foundations of spatial epistemology.

'When you were explaining it to me in the restaurant', his voice has grown now, as we move closer to Chungking, where we started, 'I actually got so deep into it that I could visualise a map that was only numbers. Only numbers! A map that always gets you to the exact pinpointed location. Like I said there, number 154, what is this? Number 154 is Chungking Mansion. Nathan Road. Done, end of the story. Whether it is Chungking Mansion or they destroyed and made a whole new thing. You don't need to care about it.'

### **Practices: transposition, translation and elasticity**

Serres (2008) argues that a displacement is occurring: a 'new global emigration from space to signs, from the countryside to the image, from languages to codes and from cultures to science' (Serres, 2008: 257). Accordingly, he states that all that is left behinds are 'schemas, messages and numbers, all digital' (Serres, 2008: 257). The monadic digital transposes and translates between cartographic interfaces, coordinates and codes - bundling together relational fixities and fixed relations, as it stretches and tightens experiences of space. We lose earth, he claims, we turn landscapes and space into calculations (Serres, 2008). We saw this in the stories of Marianna and Nick, Ellen and Camille, Tanija and Ravi, the formation of new relations and approximations, taxonomies and black-boxed layers of calculation. Yet, as Serres (1997) also argues, the relationship between points and lines, fixities and flows, monads, and the way in which they connect together is a transportation, rather than a refiguring or rupture of reasoning:

'locally, far from imagining a subset of two terms, only the line connecting them, an analogy or a distinction, was given

emphasis. Globally, every theory of systems became a graph of either a simplex or a complex, all things being first of all situated in the depths of a black box. We despise contents, we administer flow charts. So then: the foregoing reasoning transports itself from particles to connections, without any major changes.' (Serres, 1997: 3-4)

This is an important point in the framework of this research - for the distance between the term and its analogy, or distinction, can also be seen in the distance between the point and its relations: in the way in which cartographic reason can be situated within practices of mobile mapping. We saw that whilst the monadic digital can give a point multiple taxonomies, it too affords the ability to classify its relations: the *arpeggiatto* and *staccato* of the multiple iterations of the point and the line between accelerations, accesses and *portamentos*. Where digital boundaries can appear, so too can material boundaries. Flows can become fixed and fixities can become fluid. In mobile mapping, it is possible to be mobile and immobile at once. This creates elasticity - between spaces, temporalities, practices and scales. The apparatus of cartographic reason in a digital age folds over and stretches within the assemblages of mobile mapping - be it in fitness apps, location-based games, electronic barriers and cards, escalators, mapping apps and numbered systems, alphanumeric categories, or the movements of people across the world. Where the deity in Leibniz's and Descartes' God may, as Nietzsche (1996) suggests, be dead, the desire and the impulse of the monad and the geometric is not. The rondo always returns to its completion. The rationalist god lives on in the ever-expanding ambition of the monadic digital, its discursive-material status through the coordinate, as numbers seep deeper into bodies and come to constitute the way in which spatiality is understood.

Yet, like the previous chapter, this is a transposition rather than a transition - a song that is old, replayed in a slightly different key. This is where we can see the durability of the Cartesian plane - in the pinpointing of place, the measurement of distance, the matching of material streets to digital streets, the smattering of (ap)proximate locations in a the map that is only numbers. The marks of cartographic reason, inscribed and wrangled into spaces encountered by mobile mapping, work in partnership with the monadic digital and the network of Hermes. At the point of contact with imperialism, Hong Kong and Sydney already became both numerative and networked. Numbers were carried across the world to be

materialised in new places so they could translate landscapes into geometries, and forms into quantities. In the monadic digital, the automated exchange of both the coordinate and the binary code, Descartes and Leibniz become bedfellows in spatial reason once again. Here, the rondo is complete, even if it sounds different because of everything that happened in between, as the geometric and topological are brought together again in agile mobile digital maps and old discourses that stretch through transformative spaces and new practices.

## 7. Mobile mapping and people: haunting, making-do and the dreams of the unreasonable field

'Sly as a fox and twice as quick: there are countless ways of "making do".'  
(de Certeau, 1984: 29)

'What kind of case is a ghost? It is a case of haunting, a story about what happens when we admit the ghost - that special instance of the merging of the visible and the invisible, the dead and the living, the past and the present - into the making of worldly relations and into the making of our accounts of the world.' (Gordon, 2008: 24)

Throughout these chapters, the threads of cartographic reason have fused and braided together in the unreasonable field, producing particular planes of encounter and modes of movement, experience and practice. Certain themes, interconnected across spaces and times, have appeared: the stabilising qualities of the Cartesian as the cartographic imagination becomes inscribed into landscapes through signs, grids, datums, lines and codes, and the elasticity of the Leibnizian in stretching points, accelerations, snapping back and diminishing, carrying, punctuating and numerating. These stabilisations and elasticities generated certain kinds of practices - interpretations, regimentations and dissensions between cartographies and spaces, and the transpositions, translations and elasticities between cartographies and technologies. Within such practices the continuing impulse towards order emerged; the materialisation of geometric reason and the desire for universality. Order materialised in the apparatus of cartographic reason, as it spreads across maps, plans, charts, apps, mobile devices and computational technologies.

However, at every turn, we have also found ourselves destabilised by *other people*, *other things*, and *other spaces-times*: the cartographic eye is not omnipresent; we do not eat only codes and numbers; technology affords as well as determines. Where the unreasonable field has been filled with cartographic reason, it has also been smudged with (un)reason. These are ways of 'making-do' (de Certeau, 1984: 29), of mobile mapping while interrupting the fixity-fluidity of cartographic reason. To 'make-do' is to find *ways of using* constraining orders to limit, to create new possibilities through hybridity or ambiguity, to build a space of *plurality* within, as well as without, boundedness. Such practices, like hauntings, are often invisible to the analytical

schema used to comprehend space and practice - like statistics, cartography, surveying and other quantified methods:

'...[A] rationalized, expansionist, centralised, spectacular and clamorous production is confronted by an entirely different kind of production, called "consumption" and characterized by its ruses, its fragmentation (the result of the circumstances), its poaching, its clandestine nature, its tireless but quiet activity, in short by its quasi-invisibility, since it shows itself not in its own products...but in an art of using those imposed on it.' (de Certeau, 1984: 31)

The haunting of space brings the structures of apparatuses, like those that promulgate cartographic reason, into moments of encounter. The study of 'making-do' illuminates everyday tactics: '[it] at least assured their presence as ghosts' (de Certeau, 1984: 41). The evidence of a haunting, as Gordon (2008) suggests, is that of a *ghost*, or a ghostly matter: a spectre, an absence, a hypervisible scar, for ghosts appear as much in failure as in success. Beyond the simplicity of Harley's (1988; 1992) absences and silences in maps, the ghost has appeared in paradoxical forms throughout all these stories as absent-presences and present-absences, encountered through spaces, technologies, and now, finally, people. This final empirical chapter will consider haunting and 'making-do' as central to mobile mapping, the embodiment of space and interpretations of spaces and technologies that are haunted by the conflicts of cartographic reason.

This chapter is, in part, a search for ghosts. Many of the people in this chapter do not use maps: they find other ways of navigating, and other means of mapping. As I noted in earlier chapters, what is unsaid, liminal, vernacular and haunted, in seething absences and muted presences, tells us as much about the mobile map and cartographic reason as the lines on the screen. We have already seen many ghosts so far. The ghosts of this research are not limited to the case studies that have been selected for this final empirical chapter. Indeed, ghosts and hauntings have woven their way through all the stories, appearing in dreams, imaginations, hopes, and feelings: *I'm a moron* (Tanija), *there's no green in Hong Kong* (Camille), *the bush is alive* (Cliff) or *we're so lucky* (Ellen). The examples here are chosen to illuminate traces in those stories and bring them into a state of positive action. Central to Gordon's (2008) work is a critique of the pessimism of the social analyst, or, for

Massey (2005), a lack of hope. I do not wish to be pessimistic here. Rather, these cases aim to pull these lingering threads together; from their seething absences and muted presences, into moments of power, politics and potential. For, as Gordon writes:

‘What kind of case is a ghost? ... It is often a case of inarticulate experiences, of symptoms and screen memories, of spiralling affects, of more than one story at a time, of the traffic in domains of experience that are anything but transparent and referential.’ (Gordon, 2008: 25)

Therefore, this chapter is an admission of ghosts and of haunting - not to skate over them, or push them into the footnotes, but to bring the heterotopic, the wordless, the affective, and the otherwise-known, into this account of mobile mapping *beyond cartographic reason*.

#### **‘It has his name’: Taylor and endurances of memory.**

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It’s an overcast and cool day when Taylor shows me where the Kai Tak airport used to be, along the northeast shore of Kowloon Bay. Taylor likes to hike. We’re walking east, the entire way across this shore - about an hour and a half away – heading for a small fishing village that sits out near LOHAS Park, where Ellen and I visited. Pointing out the fortress of tall fences that block our view to the harbour, he describes how this area used to be the old airport (before it was moved out to Lantau) and is now going to be a cruise terminal. As we walk, we happen upon a little park named Sacred Hill. At the eastern end, a small square boulder sits, fenced off, diminished, with 臺王宋 carved and painted in red: *Sung Wong Toi*,<sup>26</sup> ‘Hall of the King of the Sung’.

‘So’, Taylor says to me, ‘I think it is one of the historical monuments in Hong Kong - yah - this is Sung Wong Toi.’

‘This?’ I ask - pointing to the boulder. It is difficult to tell the age of it - the cut appears relatively recent in geological terms, and the paint is not too faded. He nods.

‘This is, uh, you know a little bit about Chinese history?’

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<sup>26</sup> There are a number of different pinyin translations of the phrase *Sung Wong Toi*, including ‘Song Wang Tai’ (Hon, 2011). *Sung Wong Toi*, however, remains the translation written on the nearby streets, the park sign and the Google Map.

'A little bit...' I reply.

'Uh, there was a dynasty called Song.'

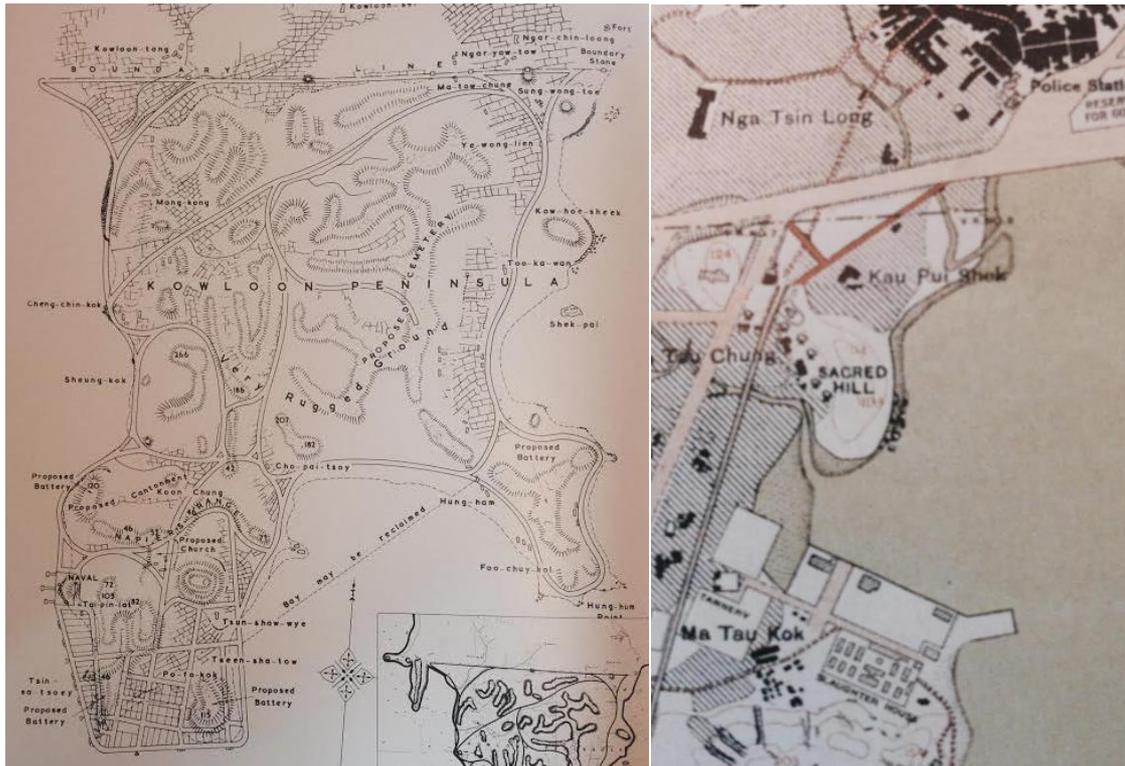


**Figure 7.1** *Song Wang Tai*. In 'Sacred Hill' to the east of Kowloon City, Taylor points out the new development of the ferry terminal where the old Kai Tak airport used to be. The Song Wang Tai monument sits in the distance (bottom right) under a tree. Its characters can be barely made out due to the quality of the footage, but were able to be read from a distance. (Source: ActionCam Footage)

The museums in Hong Kong tell a longer story than the one of colonisation which is commonly heard in Anglophone accounts. They tell stories of the geological transformations that created the peculiar hilliness of the area and the wealth of the Pearl River trading. They also recall tales of the wars and alliances between local Hakka and Tanka tribes, fishermen and villagers, with complex traditions unique to this region of Asia. Early Chinese maps, too, tell this story (Empson, 1992; Hostetler, 2001; Pegg, 2014) – not of Hong Kong specifically as the centre of its own cartography, but of relations between the cities on the Pearl River Delta - between the southern Cantonese speaking region and Beijing, and the various conflicts that swept the region.

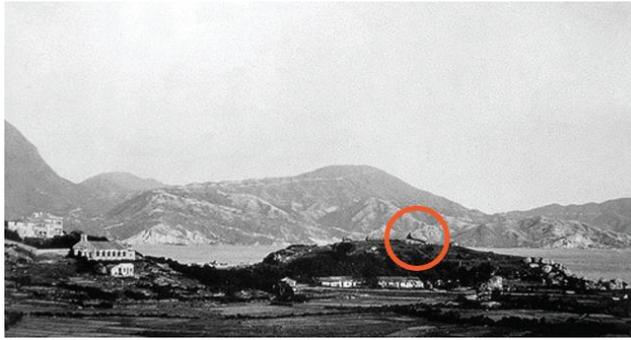
'I know there was an emperor,' I say, searching back in my memory to find the threads of the Song, 'who died somewhere around the Pearl River Delta.'

'Yeah, here,' he says emphatically, 'that was here. It has his name.'



**Figure 7.2** *Sung Wong Toe (1863) and Sacred Hill (1924)*. Two maps show the small hillock that existed before the construction of the Kai Tak aerodrome with differing names: 'Kowloon 8 inch to 1 mile planning map' (left), a retrace of a planning map by A. F. Alves on behalf of Surveyor-General Cleverly in 1863 (Source: Empson, 1992: Plate 4-1). 'A revised colour printing of the War Office 8 inch series. Sheets 4 and 8 are reproduced again for comparison (City Hall Library)' is a 1924 revised version of the 1902-1903 War Office 8 inch series completed by the Ordnance Survey in Southampton in 1904 (Source: Empson, 1992: Plate 4-4).

It is a strange turn of phrase that Taylor uses to describe the inscription - that it 'has his name', the name of the Song emperor. The inscription itself was put there by local villagers under Mongol rule during the Yuan dynasty (Hon, 2011). It was once part of a massive boulder that sat atop Sacred Hill. During the 1943-45 occupation, the Japanese initiated blasting operations to flatten the hill for expansion of the Kai-Tak airport (Schofield, 1968). Then, during the 1950s, the inscription was cut out from the boulder and moved down towards the burgeoning city. Despite this spatio-temporal displacement, a refiguring of its form, and the weaving of legends (Hon, 2011), the rock still, *has his name*.



**Figure 7.3** *Enduring landscapes.* Sacred Hill (left) in 1900, with Kowloon Bay in the background. On the top of the hill, the full boulder can just be made out against the mountainous terrain in the distance (Unknown, c.1900). Sung Wong Toi was cut from this boulder (right) in the 1950s, and squared off to become the rectangular rock pointed out by Taylor (Unknown, c.1950). (Source: Hong Kong Museum of History; Hong Kong Information Services Department)

Taylor's choice of words is emblematic of the transportative nature of meaning and the way in which he reads the world, the stories he tells, the relations he forms. Buildings are important for Taylor - as I discover after he points out a non-descript salmon pink hotel building, which 'every youngster in Hong Kong must know'. It's where the International English Language Testing System (IELTS) exams take place - exams that are important for young people striving to survive in a global economy. Taylor didn't get great marks.

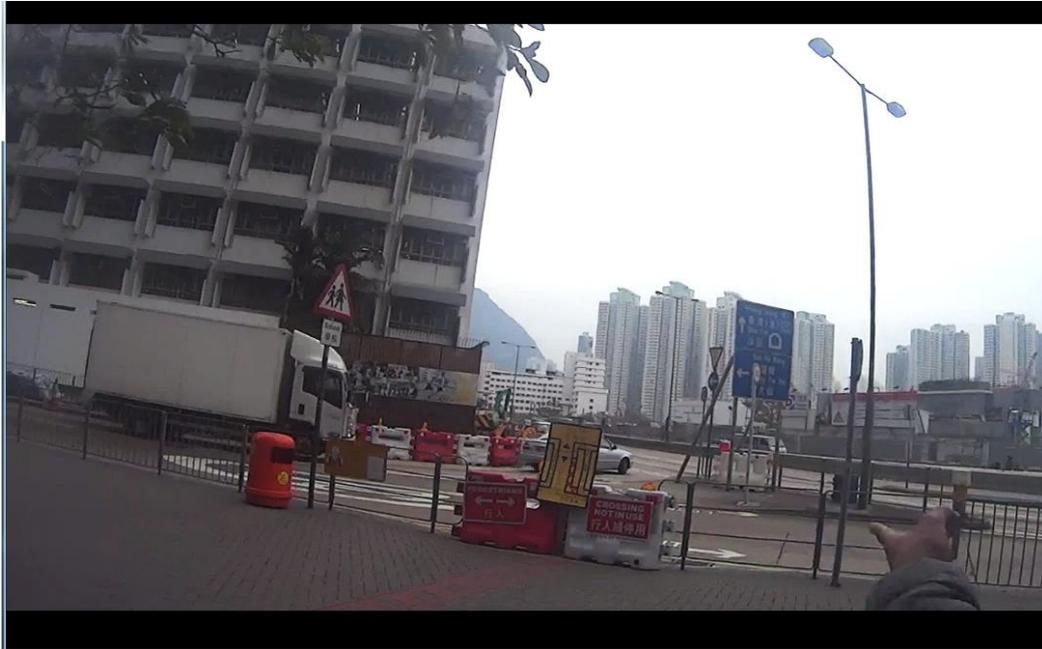
'I hate this place,' he says forcefully.

*It has his name; I hate this place.* Like the name engraved on the boulder, the hotel retains an inscription in memory. Practices of remembering, like Taylor's, flow beyond the map and instead endure in form. They withstand, across space and through time, working outside of the cartographic reading of toponymy discussed with Shaun, or the multi-tiered taxonomies of place described by Marianna. This hotel sits as a rite of passage: a moment in a collective experience that funnels generations of Hong Kongese young people through it. It endures, even when maps, landscapes, cultures, governments and people, do not.

Later, we are walking further along Kowloon Bay underneath contorted freeways and new residential developments. An ad-hoc pedestrian barrier (Figure 7.4) halts our path. He points and laughs, clearly not expecting its appearance, and pulls out his phone to find a way around it.

'You know maybe five or ten years ago,' he muses, 'the electronic, the Google Maps, are not very popular.'

People used to rely on ordinary paper maps, he explains, but he thinks they're useless. They're only updated and republished once a year, and Hong Kong changes too fast, so Google Maps is better.



**Figure 7.4** *Impromptu walls*. The path is blocked and Taylor points and laughs, without seeming to mind. Our destination can be seen beyond the tall buildings to the right. Unfazed, Taylor turns us towards the left and keeps talking as he casually navigates a different path (Source: ActionCam Footage).

'But you know, in Hong Kong, the public transport system is very good. So, sometimes, you do not need to worry about - uh - how, uh...' He frowns and breaks off, 'I mean, the map is not very important. If you want to get to the place, you can just, uh, you can go to - you can go by MTR - go to the nearest MTR station and walk. If you can't get to the point you are going to, you can just ask people.'

Asking people reappears - that vernacular 'making-do' (de Certeau, 1984) that always works when the map fails. From Hong Kong to Sydney, navigations between cartographic, local and *other* knowledge have been frequent.

'I think in Hong Kong - uh - you will always find the way.'

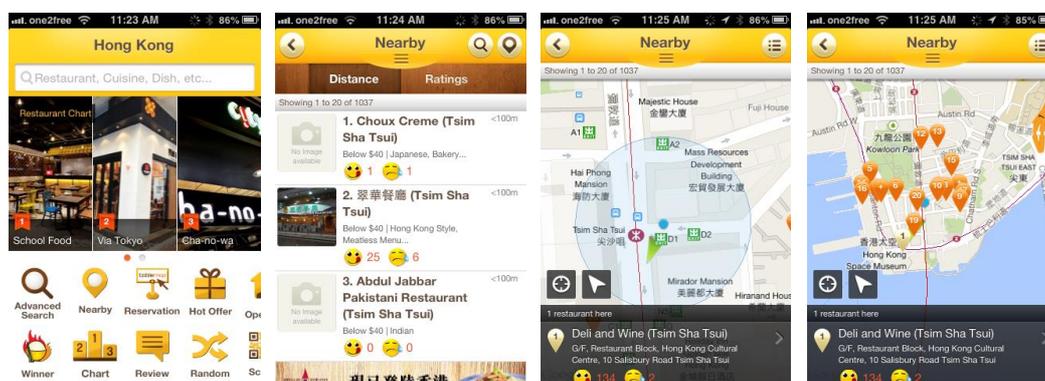
I know what he means - the flows become forces and gradually you end up where you need to go.

'Okay,' I say. He smiles.

'But it's the problem of how long do you need.'

Taylor asks me if there are any apps like Open Rice in Manchester or in Australia. Open Rice is a restaurant/café/food venue app which allows users to see and upload

reviews of restaurants. It operates bilingually, often with different ratings in English and Cantonese, but supports use across both languages by providing images of the front of the store to aid in navigation (Figure 7.5). I know Open Rice quite well by this point, having used it intensively to locate places to eat. I explain that there are a few similar apps - foursquare or EatManchester - but none are as good as Open Rice.



**Figure 7.5** *Open Rice*. Four screens based upon a search for locations nearby. The home screen (far right) opens with a number of options. The nearby option brings up a list of local places (centre right) with ratings based upon a binary happy/sad system. Clicking on the small map icon on the top left opens a screen showing the user's current location (centre left), which proved to be too near. On zooming out (far left), a number of places are shown within a wider proximity. (Source: Taylor's iPhone)

'So, do you use Open Rice?'" I ask.

'Yeah,' he says vehemently, 'yeah it was my agenda, I want to say about that. Um, I - when - I and my friends go out to have a gathering, sometimes we do have an idea where to go to eat - where to go and eat - and we will go just to Google and Open Rice. But, recently, I have a different view about that...'

'Mmm?'

'Because, uh, sometimes, the comments, on the open rice is not very - tsk - accurate.'

'Yep?'

'And sometimes, maybe the boss of the restaurant hire some people to write some good comments on it.'

'Right okay', I reply.

'So, I think, I - now, I rely more on my eyes - uuhhh - to feel the kind of restaurant, whether it is good or not. I just go around at a certain pace - and then I ah, how do I think this restaurant - I think it's good, so then I should have a try there.'

There is another kind of endurance here, not too far from cut boulders, bad marks or impromptu walls. This endurance is based not just in the way that the landscape

speaks, but in the way in which Taylor reads it: in practice as much as representations, in making-do as much as haunting. He struggles to express the informality of his decision-making, what de Certeau (1984) understands as the difference between *what* he uses and the *way* he uses it. Yet, it is not a map, not bound within cartographic reason - there are no grids and no numbers in Taylor's search.

'I don't know,' he says, 'just feeling good. Maybe I haven't seen this restaurant before, so maybe just have a try.'

### **'I want to go through it': Magdalena and persistences of liminality**

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Magdalena has just moved to Hong Kong from Mainland China. She insists on travelling by ferry and foot from Kennedy Town (where she is based) northwards through Kowloon along Nathan Road to Mong Kok, in order to buy a bag. We meet at the Star Ferry Terminal in Hong Kong and Magdalena sets off at a pace only matched by Tanija. She doesn't really use mobile maps, nor does she want to be removed from the spatiality of experience.

'Whatever the experience is,' she says, 'I want to go through it.'

I cannot keep up with Magdalena's *joie de vivre*. It is, at once, challenging and exhilarating. She walks with vitality, enjoying the experience of moving through space and I struggle to keep up with her agile pace as she slips between crowds of people.

Reaching the north shore of the harbour, Tsim Sha Tsui (TST), Magdalena directs us rapidly out of the ferry terminal and towards Nathan Road. The same skyline that greeted Ravi and I as we walked this same pavement, sits in the haze on Hong Kong Island. The International Finance Centre and the Bank of China stare across at us, as we pass towards the Peninsula Hotel. The old Kowloon Central Terminus clock-tower and the new Hong Kong Cultural Centre are in our periphery (Figure 7.6).



**Figure 7.6** *Tsim Sha Tsui*. Magdalena with the Hong Kong Cultural Centre in the background (left) and the Kowloon Central Terminus Clock Tower (centre) and in the distance (right) the tall skyscrapers of Hong Kong Island. (Source: ActionCam Footage)

Magdalena is encountering Hong Kong at the point where it is one of the world's most global cities, with financial, commercial and logistical trade pouring in and out everyday. These landscapes, along the northern shore of Hong Kong Island and Nathan Road, have undergone significant transformation - not least the billowing reclamations into the harbour that render our ferry journey five minutes shorter than it was in 1900. Prior to the handover, Abbas (1996) described Hong Kong not as a culture, but as an economy. Post-1997, Chu (2013: 3) describes Hong Kong as 'caught in a paradox' between culture and economy. Its status of a global city, an east-west entrepôt, becomes increasingly tenuous:

'When China surpasses Hong Kong in terms of capitalism, Hong Kong culture can no longer retain its special role between China and the world - at that point, China has become the world. Hong Kong's singular, ambiguous but prolific existence has changed. And the loss of "in-between-ness" fuzzes the edges, shifts the foci and alters the shape of its cultural identity.' (Chu, 2013: 3)

A liminal boundary that appears less porous on the map than it is on the landscape, the harbour is also a fuzzy edge. Before the leasing of the Kowloon Peninsula, it was a space of cross-cultural encounter, a liquid boundary between China and Britain.

Then, the boundary was moved to the northern edge of the Kowloon Peninsula, cemented into a street named Boundary Road. Foreshore reclamations have changed its shape, and now it has become a place of spectacular lightshows as millions stare out across it every year. Spaces of action are equally fuzzy: it becomes more urgent to shape out what Hong Kong means as old knowledge disintegrates into fast experience that hides the cynicism towards non-conformity (Hui and Lau, 2015).

Even Magdalena's experience in mainland China has not fully prepared her for the vertiginous barrage of the busy-ness of Hong Kong that Ravi so embraced. In Hong Kong, pasts become present in palimpsestic form (Huysen, 2003). Never entirely erased, colonial residues become integrated into the global gaze and consumption of urbanity that now characterises Victoria Harbour.

'I think...' she starts, 'I kind of have a feeling in Hong Kong that everything is fake, you know, that - maybe it's the amount, the number of people living here. Again, it's my first big city, like really big city experience. So, prices for food - you know, for a bowl of noodles, in Mainland you pay 6 yuan. Here, twenty! You feel - I know the rent and everything, but *this* bowl of noodles should be cheaper. And you know this. And it's - I think - my guess is that the more people live in the one place, you know, this number creates different layers, you know, that distance us from what is basic - from what is really needed, you know?'

'Yeah?'

'I feel far away from my basic needs here, you know? Well, I can experience them every day, but people are distracted here.'

Magdalena is dancing around a more complicated issue here - emanating from her experiences of Hong Kong's complex and rapid spatiality. It is difficult to explain it on paper - the speed of change, of development and of the refiguring of the landscapes is not only, as Abbas (1997) suggests, a culture of disappearance, but a celebration of it (Botz-Bornstein, 2012). Spaces that do not change become liminal - one, two, three times removed from their origins. Behind us, the clock tower of Kowloon-Canton (Guangzhou) railway terminus stands without its terminal or its platforms. Detached in 1977, it is an after-image (Resina and Ingenschay, 2003) of the colonial occupation and networks of mobility of the Pearl River Delta.

In Hong Kong, after 1997 and the economic crash of 1998, cultures folded inwards whilst looking outwards. Erni (2001) describes this as a turn towards China in the

wake of Hong Kong instability and China's strong economic growth. The rate of growth and decay in Hong Kong is mercurial, as money flows in and out of its financial centres and the rest of 'everything' rushes to keep up and to make change (Ortmann, 2015). In this space, Magdalena has chosen an anachronistic way of negotiating this speed. Her desire to walk, but not necessarily to slow down, mirrors the remnants of a colonial past that embody the landscape and the flows around her. She uses cynicism against itself, persisting in being liminal where Chu (2013) says that liminality might disintegrate. This is the privilege of the outsider. But it can appear within too. The clock tower and the Star Ferry Terminal (both anachronisms in the shift towards hypermodern landscapes and rapid mass-transit) become steadfast. Palimpsests, they adapt to change, and maintain their historical roles from an older modernity: telling the time and moving people across the harbour.



**Figure 7.7** *The Clocktower and the Harbour*. Clockwise from top right - Kowloon Central Terminus circa 1916, Terminus building circa 1950s, clocktower with support structures during demolition 1977 (Source: Grundy, 2014), and the clock tower in 2013. (Source: Peter Yang, 2013)

Now, as we walk down Nathan Road, the scale of these restructures becomes clearer as the out-of-reach high-capital space of the harbour is replaced by the tangible retail space of the street. Neon signs crowd-out into the empty space of the road, tumbling over one another to claim any advertising space that is left. The “mansions” of the 1950s, the remnants of the first wave of post-war immigration, sit side by side with towering glass skyscrapers that have restaurants on the 26<sup>th</sup> floor. People are, she says, ‘locked in a monochromatic world’. So, Madgalena walks everywhere, lives in paradoxes, and maps intuitively.

On the ferry, she told me that she might look up somewhere on Google to get a general idea of where it is, but usually once she arrives, she prefers to ‘walk around’, follow her instincts and ‘get a sense of the place’. De Certeau (1984) describes how by focusing the apparatus, we don't see practices that are ‘heterogenous’ to the structures of power (de Certeau, 1984: 41):

‘...[T]hey are *also* part of social life, and all the more resistant because they are more flexible and adjusted to perpetual mutation’ (de Certeau, 1984: 41, original emphasis)

Against this overwhelming landscape that never quietens, and never rests, Magdalena has found ways of ‘making-do’ (de Certeau, 1984). One way is to embed herself into the landscape on her own terms, by discovering at her own pace. Passing by the Survey and Mapping Office on Nathan Road, she tells me about a recent walk she took through one of the vast protected country parks that constitutes the majority of the region. She walks often, seeking the solitude of the New Territories.

‘I had a very interesting, a very beautiful experience, actually, two weeks ago. I went to hike - to Lantau - and suddenly, we were in the, uh, sylvan area, you know, the forest, and I heard birds, and...I cried. I thought “oh my god”, birds. I was so deeply moved by this...’ She squints at the overcrowded signs of Nathan Road. ‘...natural experience, right, I would never think in my life - past life - that the birds singing would touch me so deeply because it was so normal thing to hear, so, yeah.’

She pauses as I laugh. ‘In Kunming [Yunnan], I was living in a neighbourhood with a lot of trees and everything. And my parents, they have a villa with, you know, a huge garden - every evening you would hear birds. And suddenly I found myself, wow, *birds*, long time no hear’. A small smile flickers, ‘and then I talked to some of my

classmates and some of my friends, and yeah - I'm not the only one who has had this experience with birds.'

Liminal phenomena persist in small, shared experiences, in poignancy and self-deprecation. The fluctuating and disintegrating forces of Hong Kong are not totalising, and cartographic reason cannot entirely erase terrains into *tabula rasa*. The palimpsestic landscape still lingers, by definition, never fully erased. Sacred hills might become small monuments, but they still bear names of the complex entrepôt that this region has always been. Away from this hypervisibility, invisible ghosts also exist, borne through special memories based in the persistence of people. Little birds, little basics, Magdalena finds her own persistence in paths and peace. She also borrows others, like the Star Ferry, which continues because of a strong political campaign that argued these small green boats were integral to the identity of Hong Kong. Yet, there are others, like the clock tower, which she misses altogether - this is the remnant of someone who is not part of this story, but whose actions intersect with ours, a glance in the periphery of our memory. These things tell a different story to a culture of disappearance, and perforate the grids and topologies of cartographic reason.

### **'I'm a stickybeak': Cassie and the daydreams of the inside**

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Cassie tells me how she judges everything by the curve of the train line, since train travel is her main form of transport. As she speaks, her hands make curving motions through the space before her, cutting its volumetrics with an imagined, projected trajectory. The running of curves rather than lines, as seen in the introduction of the Haversine formula, signals an embodied relationality that expands from an imagined centre point. An anchor in the distance, Cassie reads between herself and the landscape in trajectories through space.

'It's not the map', she says, 'so much as the line itself, kind of looking out the window and seeing the city in the distance and seeing whether we're going on a curve.'

The city becomes a landmark which Cassie circles in her every-day explorations. Dispersed, sprawling and short, Sydney's sub-urbanity forms a vast plane of dwelling. It is possible to stand at the mountains to the west, or the cliffs to the north and the south, and see Sydney stretch-out across the basin. Scattered concentrations of towers erupt from the flatness - Hurstville, Chatswood, Parramatta, Bondi Junction

and the CBD - streaming into the haze like distant lighthouses across a rough sea. In a city that defies reason, these beacons become ways of 'making-do', measuring relationality in a whirlpool of movement, velocity and decomposition.

After meeting at Cassie's work, we walk through Surry Hills towards Central Station along a mix of residential and commercial streets. It's midsummer-hot, as the sun bears down on our necks, scorching our shoulders, and we slip from sun to shade where we can. Bourke Street provides a languid length of respite. Crowded in large eucalypts and dense electricity wires, the cover draws the shade closer-in, containing the footpath and the cycle path. Cars go slower than normal here, people too, and Cassie relaxes her pace into the deep green cool.



**Figure 7.8** *A siren sounds.* An ambulance rushes past on the right, with the small workers terraces along the left. The cycle path sits centre between the footpath and the road. (Source: ActionCam Footage)

Suddenly, cutting into the solitude of the street, a siren sounds, signalling someone else's distress - an unknown outsider who suddenly, brutally, winds themselves into this moment of mobile mapping. In tandem with this interruption, the sun starts streaming down through the trees, making Cassie squint.

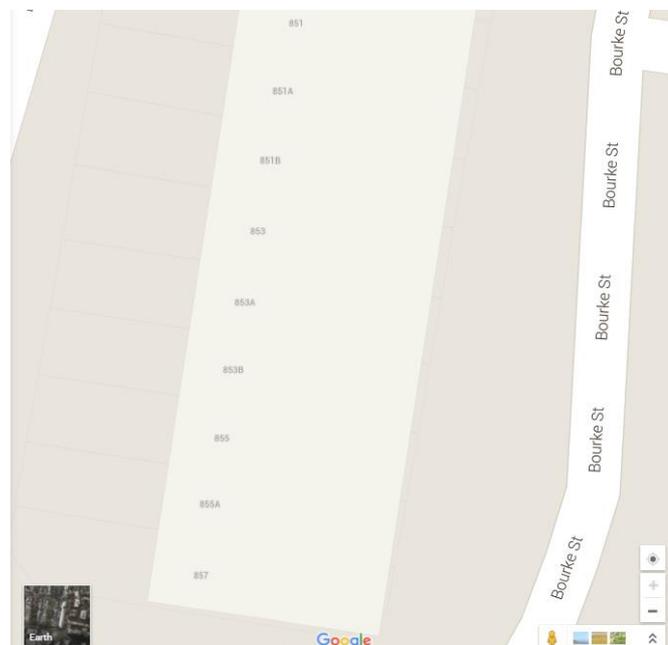
'So what are the main landmarks along here?' I ask.

'Along here?' Cassie pauses and waits for it to pass before she continues, 'Along here I tend to look at the houses.'

'Okay.'

“Cos I’m a stickybeak<sup>27</sup> - and I like to look at houses’, she laughs. ‘Ah, so, I might notice a house that I particularly like or just a section of street that I think is attractive so yeah, I just tend to remember I guess the way the street kind of works.’

Small workers’ terraces sit side-by-side, soldiers painted in warm colours, with intricate cast-iron fencing and overhangs, dusted with leaves from the London Plane Trees that line the street. It is perhaps more ordered than other parts of the suburb, once a teeming urban slum at the turn of the last century, where the government had neither the will nor the capacity to plan and order (Wotherspoon and Keating, 2009). Overpopulation led to splits in house numbers - 855A, 853B, 853A, 853, 851B... (Figure 7.9) - pencil thin properties where the air doesn’t flow, the damp gathers in winter and lingers in summer.



**Figure 7.9** *Halfnumbers*. Google map showing the sequence of house numbers along Bourke Street. (Source: Google Maps)

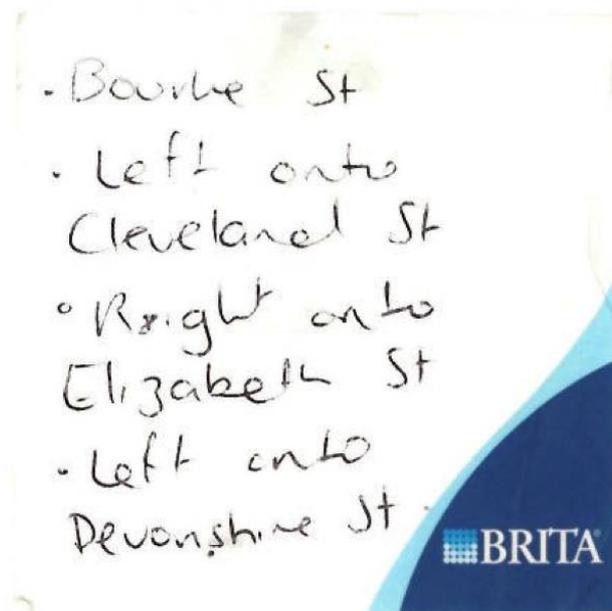
The houses have not changed much since then, even from the 1940s when Ruth Park described Surry Hills as ‘an antique island where the nineteenth century still prevailed’ (Park and Niland, 1956: 181). But the streetscape *has* changed. A new bike path runs alongside the footpath and the gusts created by cyclists whip up the fallen leaves on the ground and agitate the pollen in the air. Immobile cars line the

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<sup>27</sup> Stickybeak is an Australian/New Zealander colloquialism for someone who is nosy, or who likes to have a look-see.

street, tightly parked. A lemma hangs in the air of this suburb, as if the past and present furl into the moment before a thought becomes a word.

In her hand, Cassie holds a small post-it note (Figure 7.10). The edges curl in and around as the tacky back clings to her fingers with waning vigour. The ink has smudged and the paper sweated in the heat. Scratchings of roads are marked on the note - Bourke Street, Left onto Cleveland Street, Right onto Elizabeth Street, Left onto Devonshire Street. As it flutters, I wonder if it might be blown away and make its own path down the street without us. This piece of paper becomes instilled in precariousness of 'sticky-beaking'. Cassie seems at ease with this impermanent state of affairs, the delicacy of her chosen mode of navigation. The note is a snapshot of a labyrinthine of streets, parched of cardinal directions or landmarks or grids. I know the way already, perhaps the only reason my heart isn't vibrating at the delicacy of Cassie's little note.



**Figure 7.10** *Sticky Notes*. Cassie's note with the directions from her work to Central Station. (Source: Cassie)

Cassie does not just 'make-do', scrawled in ephemeral post-it notes. She imagines her path through space, building it slowly into her repertoire of experience. Seeing the curve of the train or the network of streets, she creates multiple trajectories and possibilities through her imagining. From looking inside other people's houses, to ephemeral instructions, Cassie extrapolates from her daydreams of space. She

imagines herself *into* the landscape through memory and relations, and into the possibility of intimate lives that shy away from the firm boundaries of lines and numbers. As Bachelard (1994) writes:

‘[F]or our house is our corner of the world. As has often been said, it is our first universe, a real cosmos in every sense of the word. If we look at it intimately, the humblest dwelling has beauty.’ (Bachelard, 1994: 4)

On a map, the boundaries of houses appear as hard lines, fixed material dividers between public and private space. Yet, Bachelard (1994) writes that the house is experienced ‘in its reality and in its virtuality’ (Bachelard, 1994: 5) between its material constitution and the shadows of shelter and protection afforded by the imagination. For Cassie, the house comes to contain the daydreams between the ‘immemorial’ (Bachelard, 1994: 5) and recollection. Such inspirations arrive in flashes: ‘an entire past comes to dwell in a new house... through dreams, the various dwelling-places in our lives co-penetrate and retain the treasures of former days’ (Bachelard, 1994: 5).

‘I like to go for walks on my lunch break’, Cassie explains, ‘and walk around the streets where the houses are - look at the houses, kind of daydream a bit about, you know, if I had that house, you know, if I lived there what the place might look like inside, or whatever.’

On a hot day such as this, the lack of airflow leads to doors and windows being open, pushing a cool breeze through the long corridor that runs down the inside of the house. The heavy wooden door will be open and the metal gate locked shut, allowing a ‘stickybeak’ to have a look inside. The house, as Bachelard (1994) describes it, becomes a space composed of different dynamisms, which oppose, interfere, and stimulate. Against the grids and topologies of cartographic reason, they *bound together through daydreams* between space and memory.

‘Yeah, I just like houses’, she smiles, ‘it’s disturbingly domestic of me.’

To be ‘disturbingly domestic’ is also to retreat from the gaze of outside. Bachelard (1994) describes the verticality of the house, from the rational slant of the roof (which geographers claim can tell an onlooker something about the climate), to the deep irrationality of the cellar and the memories that it holds. This is the ‘oneiric house’, the dream house of several floors where the attic holds memories of joy and the basement of those most feared. Cartography lines the boundaries of public and

private, inside and outside, the map-makers have always 'traced lines and lived inside them' (Sonenberg, 1990: 3). But, such cartographies do little to demarcate the lives lived inside houses, the daydreams of dwellers, the memories collected in the corners, as 'houses lose themselves into the folds of the land' (Sonenberg, 1990: 21).

Bachelard (1994) bemoans that vertical urbanism has squashed the dream house into a single floor, that our pleasures and fears become inextricable from one another. For Cassie, however, such traces of unreason can be mapped not via verticality (for we already saw in the first empirical chapter how verticality can be subsumed under Cartesian logics), but in the membranous distinction between 'inside' and 'outside' that is so ambiguous in everyday life. The cellar of dreaming stands not in opposition to the height of the roof, but its externality, its contact with the outward elements and the engineering needed to acclimatise it to the weather. The houses along Bourke Street also have roofs that slant downwards, channelling the summer downpours onto the footpath and into the storm water drains. It is not the externality of the roof, nor its contact zone with the space that Cassie and I now produce that interests her particularly. Instead, it is *inside*, the space of daydreams where she can embrace plurality and potentiality, and mould it into stories about other lives she may have lived.

For Cassie, the irrationality of the house and the daydreams of dwellers lie not in the closed, musty space of the cellar, nor does rationality lie on the hot tin roof of a terrace. Rather, irrationality can be found at the break in the wall - in windows and doors, in air vents that give the slightest glimpse inside. These are the cracks in cartographic reason that suggest that boundaries must be fixed and that only objects flow.

'When I was up in Queensland for Christmas, we went to look at the Christmas lights', she tells me.

It is a tradition - in the humid air of December - to walk or drive with the family on cooler evenings, through residential neighbourhoods where houses are decorated with shimmering lights. These street-based light shows become social spectacles, drawing strangers together to stare at glowing plastic snowmen as they gather mosquitoes in the dissipating heat.

'It's as much looking at the lights, but also if they have to have a tree in that window, then it's a good excuse to look through that window and see what kind of house they've got.'

It is not only the spectacle of the illuminations that draws Cassie in. It is also the delicate hope that some households may have a window-display that requires their curtains to be open and their lights on. In this moment, the inside, shuttered away from the gaze of the external, becomes briefly accessible for a short time in the summer heat.

This is at once a haunting and a way of 'making-do'. It would be too easy to dismiss this as escapism from the grids of global capital that have transformed landscape slums into the province of inner-city elites. It is doubtful that Cassie would ever be able to afford these dark damp cottages, with the price of Sydney's rent rocketing beyond the reach of normal people.

However, the way in which Cassie talks, the glint and the subtle humour in her eyes, speak not to a repressed subject lusting over social mobility. It speaks of a person who wishes to daydream her own bespoke maps unrestricted by the uniformities of pen-to-paper, lines and grids. In this moment, imagining becomes an embodied act where the encounter of mobile mapping slips from the desire of cartographic reason, towards Cassie's desire to craft her own worldly relations. It is between the materiality of the landscape and dreams that Cassie maps her world. In these interwoven spaces and times, we return to this state of liminality - to the in-between - the slippage from lines into other ways of knowing, the etching of possibilities in the air that flows through open doors and flutters past the post-it note tacked to her fingers.

### **'It's an architecture of dreams': Ben and accidents of wandering**

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Ben ambles. His rhythms are foreign, turbulent, and his sense of direction is somehow otherworldly. He disappears into his path - which is both prescient and untouchable. As I walk with him, I find myself struggling to keep up - not because his pace is fast, but because he has a peculiar ability to bring the close and the distant into focus at the same time. He can speak of the city as whole and whilst staring closely at a piece of trash, can trace vast networks and flash-of-light appearances in tandem. To comprehend the things that he talks about, I realise I have to become practiced at osmosis - to move from my world to his and back again. In doing so, I give up my foundations of knowing. Ben has little interest in differentiations. I worry that we are lost, while for Ben, he both does and does not know where we are - and he is comfortable with this.

In Sydney, we went looking for a park, Ben and I, eyes squinting into the sun that refracts off pale footpaths and trembling tar. Our destination: a square of green amongst the beige suburbs, the cartographic iconography pinning down a certain future promise. Ben wanted to go somewhere that he had never been before, somewhere cool, somewhere verdant. Walking down into Camperdown, which lies between two arterial roads, a ligature of rabbit-warren streets greets us, clotted with parked cars. We stumble down an alleyway and see Atlas holding the world on his shoulders, an Ikea box which contains 1x Earth.



**Figure 7.11** *Atlas*. Ben and I walk down a laneway in Camperdown (top) and find a piece of graffiti art on a wall (bottom) done by Sydney-based stencil artist FUKT (Photo Credit: Lee Wilmott).

When we arrive at the park, disappointment welcomes us. In Ben's words: 'I expected more trees and less sports-fields' - the deceit of the map and the heat of the day casting nasty mirages of hope, and giving us desolation instead.

After abandoning the treacherous colours of cartographic logics in order to follow our nose and find something else, we talk of the city and of space - the humdrum of dwelling and embodying the urban assemblage. Benjamin recalls Venice, where he visited for the Biennale the year before.

'I love that place', he says.

'Why?'

'It's an architecture of dreams', he pauses, 'you've got stones, solid foundations on liquid, the canals and the structuring of it means that if you want to go anywhere you can't plot a straight path, so you have to detour around. In the act of going to a place, you always forget where you're going and find something else, and the final point that I really want to stress is that death is always in the corner, it's always off to the left of your eye.'

What is an 'architecture of dreams'? Of solid foundations, of liquid, where you can't plot a straight path, where you must detour around and you always forget where you're going, and find something else? What is a city where death is always in the corner? Can such architecture ever be mapped on the quotidian digital mobile devices we gather with us?

Architecture obeys certain rules and adheres to certain logics - structure, form, engineering - it houses and directs our spatial practices. Architectures are both form and function, creating structures that reify discourse, or undo it. Architecture is the realm of the plan, the diagram, of rulers and compasses, measurement, design (Desimini, 2013). It convinces us not only that the legibility of the city can be assured in image, as Lynch (1960) once decried, but that the city *is* image. Thus, the plan becomes the public, the map becomes the territory, and the building becomes the space.

On the other hand, dreams and desires that flow through our bodies as they flow through the city, are intertwined with the daydreams *through* Bachelard's (1994) flattened oneiric house, the lingering temporalities of boulders and clock towers that persist and endure. An architecture of dreams can also be an architecture of desire or fear - even if we do not know their form or understand their logic. Both Foucault

(1984a; 1984b; 2001) and Derrida (2005) wrote of 'the dream' as a state of possible madness.

In order to alleviate the boredom of this sun-stroked suburbia, Ben and I are detouring, tactically, strategically. The phone, proving its treachery once, has been reclaimed. In the corner of our eye is a back alley, at random. We hesitate against our desire to see what is down there. The mobile map says go forward, and Benjamin says go left. Cartographies, like cities and like dreams, are duplicitous: they also hold secret discourses, absurd rules and deceitful perspectives. Geometric and Euclidean, the map is the tool of the Enlightenment as science orders space and people. Yet, everyday cartography moves closer to the realm of dreams; as they disentangle themselves from their own conditions of possibility into simulacra *ad infinitum*.

Ben and I no longer know where we are. The street has become our navigator, the jacarandas<sup>28</sup> cheering us on and the electricity poles watching silently. As we go deeper into the alley, the world stills.



**Figure 7.12** *Back alley heterotopia*. Tags, back fences, garage doors and green bins with green, yellow and red lids characterise this alleyway. (Source: ActionCam Footage)

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28 A jacaranda is an introduced species of tree, which has a startling purple flower when in bloom. It is common to find them in Australian suburbs.

We teeter on the edge between forgetting where we are going and knowing our way, between madness and reason, between dreaming and wakefulness. A heterotopia of bins and back-fences, tags and gates in vast arrays of colour and design greet us.

‘Heterotopias always presuppose a system of opening and closing that both isolates them and makes them penetrable.’<sup>29</sup> (Foucault, 1984a: 29)

The rubbish pile, the otto<sup>30</sup> bin, the neglected back fence - in this alleyway is the dust of urban modernity as it occupies our homes, and then is shoved to the posterior to make way for new materialisms. They are relics of an exponentially faster world that has no time to look back; the forgotten orphans of a cartographic reason that colours streets yellow, points to front doors and casts the no man’s land of the alley to the oubliette.

There it is - a slip of the eye, a glimmer of something, a swift change of direction (Figure 7.13). We almost missed it and walked straight past. But Ben can't leave it alone, can't let it go.

‘Look,’ he says.

A post, designed to protect the corner, has failed in its duty. It sits there, bent out of shape, left for Ben and I to wonder at its appearance. He grasps it strongly with both hands and pulls, but it won’t budge - it won’t move. The sky is bright and Ben moves on, but not without a final glance backwards at this trace through time.

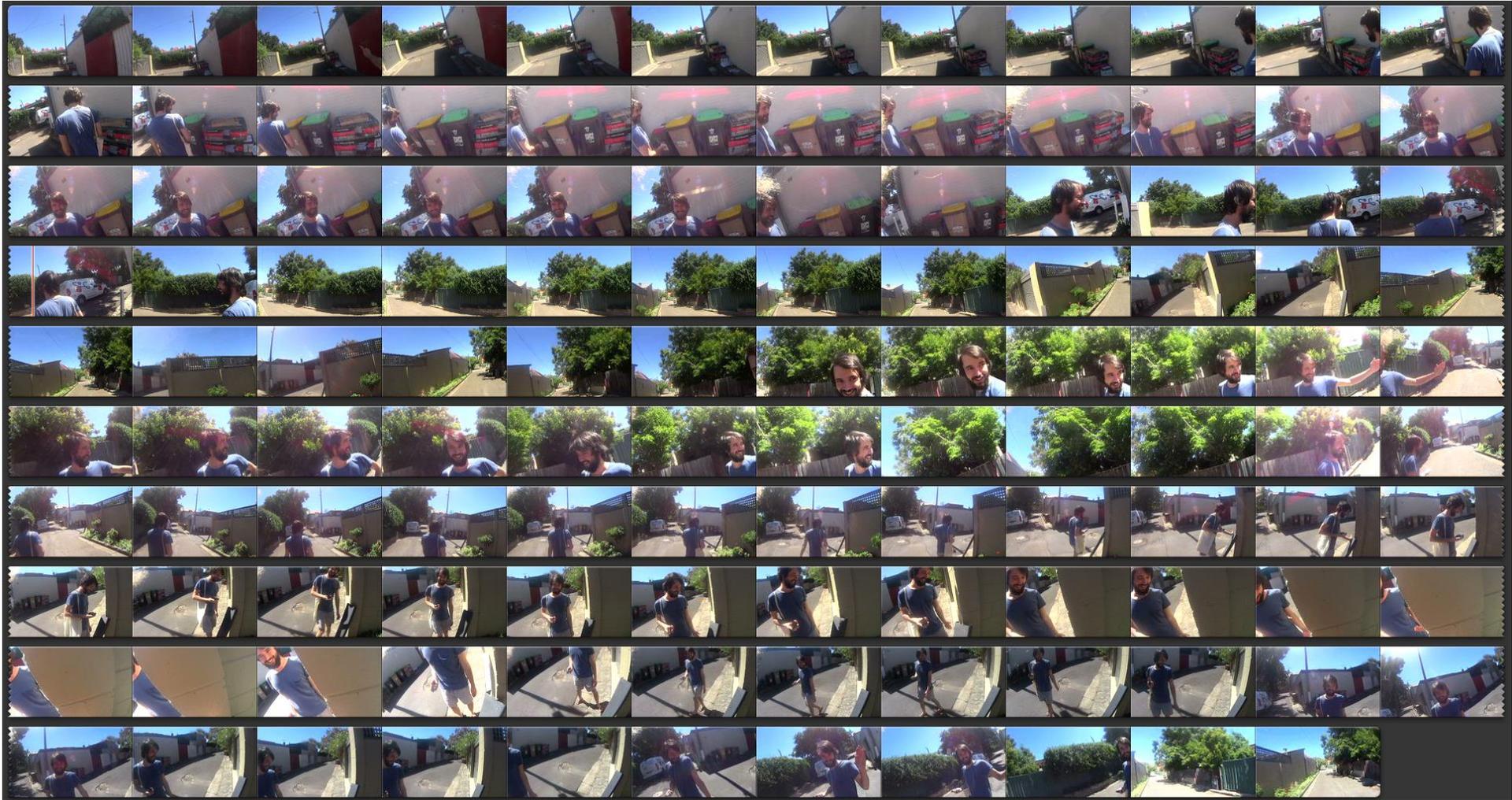
‘It’s bent!’ he continues, ‘Seriously, it’s like – it’s a really beautiful object. Right?’

‘I’ll buy that,’ I respond, ‘I’ll buy that.’

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29 Translated by Jay Miskowiec

30 ‘Otto’ is an Australian colloquialism for a wheelie bin, based on the name of the most common manufacturer.



**Figure 7.13** 'A really beautiful object'. Ben finds a pile of rubbish off the back of Stafford Lane. He then turns the corner, walks a few meters and then suddenly spins and returns to the corner. He points to a metal pole. Placing both hands on it, he briefly pulls on it, taps it with his foot and then returns to our walk. (Source: ActionCam Footage). (See also Appendix 4)

This is an accidental artwork, a glitch in the urban system. This is a sign that time has passed, an event that is not completed. This is the harbinger of the architecture of dreams, structural and structure-less - a trauma on the urban psyche, uncovered by walking through a labyrinthine veil. A situation without a past or future, tentatively tangled in the present.



**Figure 7.14** *Death is always in the corner.* Tyre marks from a large truck, and empty garbage bins that have been knocked over give digital clues to how the pole came to be knocked over. (Source: Google Street View).

Afterwards, I go back to Google Street view to find the exact spot and accidentally discover scattered bins and tyre marks of a garbage truck, locked in a different cartography on another plane, a secret assassin that lives in another space-time afforded by a piece of cartographic software (Figure 7.14). Death is always in the corner of the architecture of dreams - hidden in the interstices of the city, the pauses between looking and understanding, drowned out by the roar of modernity. Here, we have found something else, in this architecture of dreams.

### *Coda*

A couple of years later, I asked Ben about his words and told him I was putting together a paper. Drawing on another Benjamin (Walter), I asked him if the 'architecture of dreams'

could be a dialectical image - if it could transcend our discord between subjects and objects, image and experience, time and space and the rational and irrational. Is the architecture of dreams to be found in the distance between the main road and the back alley, between movement and stillness, between the map and the landscape? Does it hold a legibility that makes our epistemological utopianism suddenly obvious - upon waking would the phantasmagoria break? Little ripples appeared on the Facebook chat window as I waited anxiously for his reply. When it came, his face suddenly became prescient again, the same beaming smile that my little action camera had captured in that back alley.

‘That makes me genuinely happy’, he wrote, ‘I’d forgotten those orphan words’.

### **‘If you’d never have been here’: Daren and the caches of the ground plane**

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Less than a month after my conversation with Ben, I am with Daren in Hong Kong, scrabbling around on the streets looking for graffiti and art galleries. We walk along the uneven historic cobblestones of Pottinger Street, well worn by millions of feet. A key thoroughfare in Central, Pottinger Street connects steeply between the long, flat streets contouring around the hillsides of the Peaks that Vicki and I walked, and Camille and I bypassed. Along the old iron handrails, someone has yarn bombed with brightly-coloured knitted interventions. Groups of tourists take photos of themselves looking back down towards the city, and Daren points out a hidden park in the shape of an amphitheater that shrinks below the incline of the street.

Daren is hoping to show me some of Hong Kong. Nearing the top of the street he stops.

‘I check where is the Victoria, uh, Victoria Police Station.’ He takes out his phone. ‘I know it is near here.’

There is something about Hong Kong that defies the plan and the map. Hong Kong is built on foundations as solid as they come - mountains made of volcanic stone and granite, dating back to the Mesozoic period, that stand like ancient guardians on either side of the narrowing, fragrant harbour. This geology is not soft, supporting hundreds of thin skyscrapers splintering the sky, forming walls and wind-tunnels in the urban architecture, a resolute ground plane.



**Figure 7.14** *Yarn bombing*. Daren walks up Pottinger Street, with yarn bombing on the handrail. On the left in the distance, mainland tourists can be seen taking photographs, and the hidden park sits below and behind the alcoves on the other side of the street. (Source: ActionCam Footage)

But the unyielding form of the South China bedrock has found a willing combatant in the equally fierce authority of western cartographic reason. If Olsson (2007) is to be believed, such reason is founded in the Cartesian plane, and according to de Certeau (1984), 'is also the attitude of modern science, politics and the military' (1984: 36). This is the vision that builds towers and walkways upwards into the aero-geographies of the sky and tunnels downwards into the subterranean vaults of the MTR. In Hong Kong, the dream of representational fixity defies the ground plane (Solomon *et al.*, 2012) - an ultimate belief in the cartographic ideal, the solidity of ground upon which you can spread a plan, a city which can be made *from* image, the city in which imagination becomes material, a city that was implanted, not born. As Daren and I walk, these solid foundations wage an epochal battle - on one side, materiality, space and landscape; on the other, representation, cartography and imagination. In this war Daren struggles to find place.

Staring at the map, he furrows his brows, and enters search-terms into the interface. Brows still furrowed, he starts walking again. Suddenly, he stops and points at a large building covered in yellow scaffolding (Figure 7.15).

'Oh my god', he exclaims, gesturing up the street, 'It is here.'

It is all that can be seen at the top of the street, the final point on the horizon.

'Right here?' I ask.



**Figure 7.15** *'Oh my god! It is here!'* Daren searches for the Victoria Police Station on his phone (top) before taking a few steps and suddenly realizing it is at the top of the street. (Source: ActionCam Footage)

A disconnect between the map and the landscape, hidden away under the yellow sheets, Daren searches for glimpses of the building of his memory between the map and the sarcophagus before us.

'If only we knew, we knew! Oh my god! You see! You see! The wall, it wall is...um... grey before, a grey colour. It was grey. Now it's white!'

He seems visibly thrown as he tries to comprehend this new discovery. I ask if they've repainted it - or if it was grey from the pollution.

'It's not paint', he explains, 'but the elements of the construction. The stone. But, uh, it was a prison before, prison. Now you see, and they put, now they paint, uh, a white colour on that,' he shakes his head in disbelief, 'Changed a lot. It's no longer a prison. Before it was a prison.'

These words are stutters, embodied reactions, ghosts, spiraling affects. He pushes his glasses up his nose and tries again to explain.

‘You see, the old building was, uh, a green colour and now, they try to express a kind of feeling, like, uh, like there’s a prison, but now, it’s like, uh, a castle.’ (Figure 7.16).



**Figure 7.16** ‘A kind of feeling’. The Victoria Police Station in 2014 (top) as Daren and I walk past, and the Victoria Police Station in 2006 (bottom) (Source: ActionCam and Wikilimages)

In de Certeau’s words: ‘the Concept-city is decaying’ (1984: 95). This is the city that was the hero of modernity, the occularcentric visions of Le Corbusier and the boulevards of Hausmann. Replacing it is a ‘liquid modernity’ (Bauman, 2000), a vast circulatory conduit that Deleuze and Guattari (1987) determine as material, but never fixed. Post-modern, hyper-modern, late capitalist, globalised - the liquid city is a space-time where change and

transformation are the only permanence, in which the ground plane becomes a sea. For a city governed by the currents of people, goods and capital, Hong Kong is perhaps one of the best examples of this contemporary urbanism. Perhaps this is because, as Jacobs (1996) argues, colonial cities were the first global cities - set up as nodes in the imperial web, to feed the hungry spider as it moves about the world. Hong Kong is a city of movement, a 'city without ground' (Solomon, *et al.*, 2013: 6), it has no 'surface on which the conflicts of urban propinquity: public and private, planned and impromptu, privileged and disadvantaged, are worked out.' (Solomon, *et al.*, 2013: 6). In the floating city of Hong Kong (Ingham, 2007), not even the architecture is stable, and the cartographic loses its point of reference.

Above us, the mid-level escalators rise, as we intersect the journeys of Camille and Vicki from a different point on the vertical hierarchy. Another encounter in this interconnected network governed by constant mobility. As we stare upward from the ground, from a different angle, at the people moving quickly past, Daren tells me that we could travel up there and skip the street altogether.

'But...I like going down the street.'

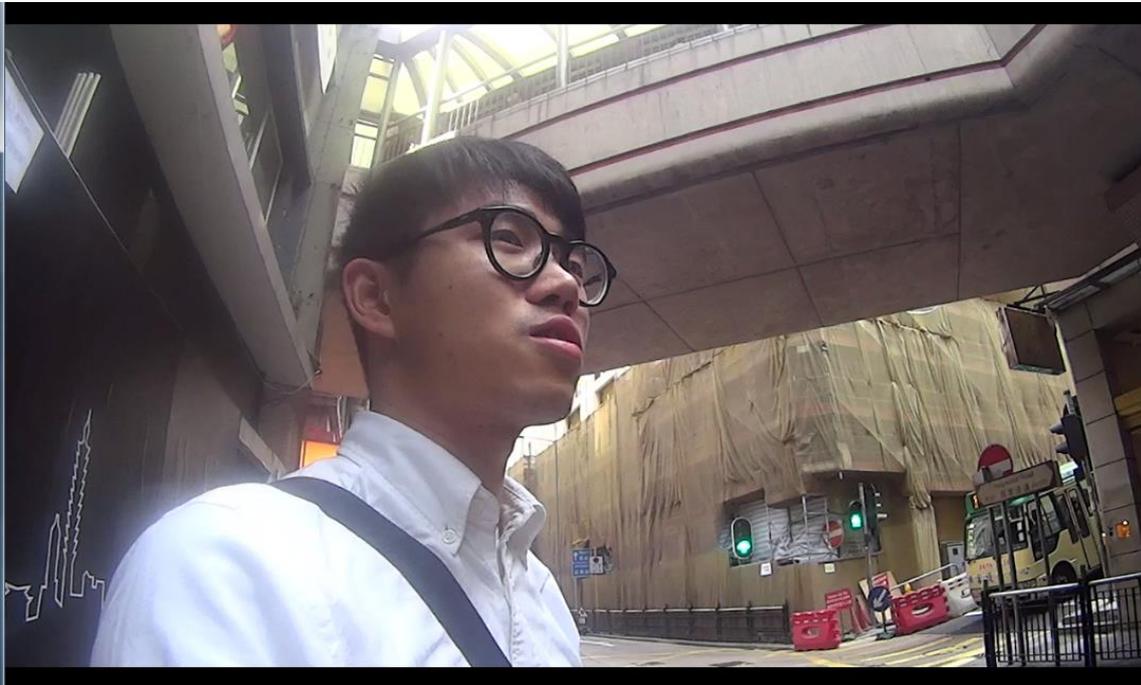
'You do? Why?'

'You miss something,' he nods at his choice of words, '...miss something. And it's better, or, or...'. He breaks off, thinking.

In some ways the escalators, and indeed all things cartographical in Hong Kong, are not passive participants in the differential mobilities that characterise the experience of late capitalism. Rather, they actively construct hierarchies of experience, which emphasise movement rather than stillness, progression rather than reflection, liquidity rather than permanence. In these hierarchies, cartographies and spaces merge to obscure the avenues of the future - we merely happen upon them as they appear. Yet, Daren remains on the ground plane, determined not to participate in total liquidity. He embraces the vernacular of the side-alley, the street-seller, and the architectural surprise. Furthermore, the ground plane continues to assert itself in a way that makes it easier for Daren to 'make-do', to find ways around the desire for controlled flows and fixed boundaries - for him, to find ghosts in the landscape.

A sharply-inclined minibus sits patiently waiting for the lights to change (Figure 7.18). Daren points towards it, indicating that we will go this way. Up the hill, he takes me on a search for graffiti behind the Victoria Police Station into a space that is scaffolded in a different way. The walk is steep and brutal on my calves and my lungs. There are no grand boulevards in Hong Kong (nor in Sydney), though not for a lack of trying. Hong Kong had hoped for a promenade along the north shore of the island. But this space is occupied by elevated

freeways that were borne out of a need to move people, the ground plane otherwise does not provide enough flat land on which to build.



**Figure 7.18** *'Down the street'*. Daren on Hollywood Road with the Mid-Levels escalator system above. A minibus (right) sits waiting at the lights next to the Victoria Police Station. (ActionCam Footage)

At the top of the hill, Daren directs us onto the flat road at the back of the prison. Then, excited, he retraces his steps back along the road and turns to me.

'Okay, I'll show you a path in space,' he says, 'You will never find it on Google Maps.'

Daren points to sign on a wall (Figure 7.19), a semaphore to those who know how to read it. It sits low in a city that encourages you to look up - above a parked scooter near an air-conditioning unit.



**Figure 7.19** *Semaphore* Daren points to a small piece of graffiti on a wall near an alleyway (highlighted). (Source: ActionCam Footage, edited by Author)

We're off the main road, into a burrow of mopeds, ladders and flattened cardboard boxes. Two faces stare down at us from a wall, surrounded by tags and symbols. 'See', Daren says, in hushed tones (Figure 7.19), 'if you'd never have been here then you wouldn't know.'



**Figure 7.19** 'See'. Into the alleyway, Daren points to a piece of graffiti showing two faces on the wall. A stairway at the end (just below the tree) is obscured. (Source: ActionCam Footage)

We glance and move on. Daren has seen this artwork already and he is hungry for new experiences. Around us, the signs of modernity decay and the map loses control. Daren structures his experience through the ghosts of old buildings and by the 'making-do' on the ground plane. Here, the recovery of the lost and forgotten is possible, in gaps in-between thoroughfares, in pockets formed by flows.

The stairway is almost hidden - a curtain call at the end of a street I thought to be a dead end. In a vertical city like Hong Kong, one does not go down the rabbit hole, one goes up, like Mohammed and Camille did, to embrace its vertiginous absurdity. Yet, in this concrete urbanism, Darren navigates us into esoteric and heterotopic terrain, into the textures of the ground plane. He taps briefly on a tag on the outside of the stair-rail before moving us up the stairs (Figure 7.20) from the dark to the light. I am entirely unprepared for what comes next.

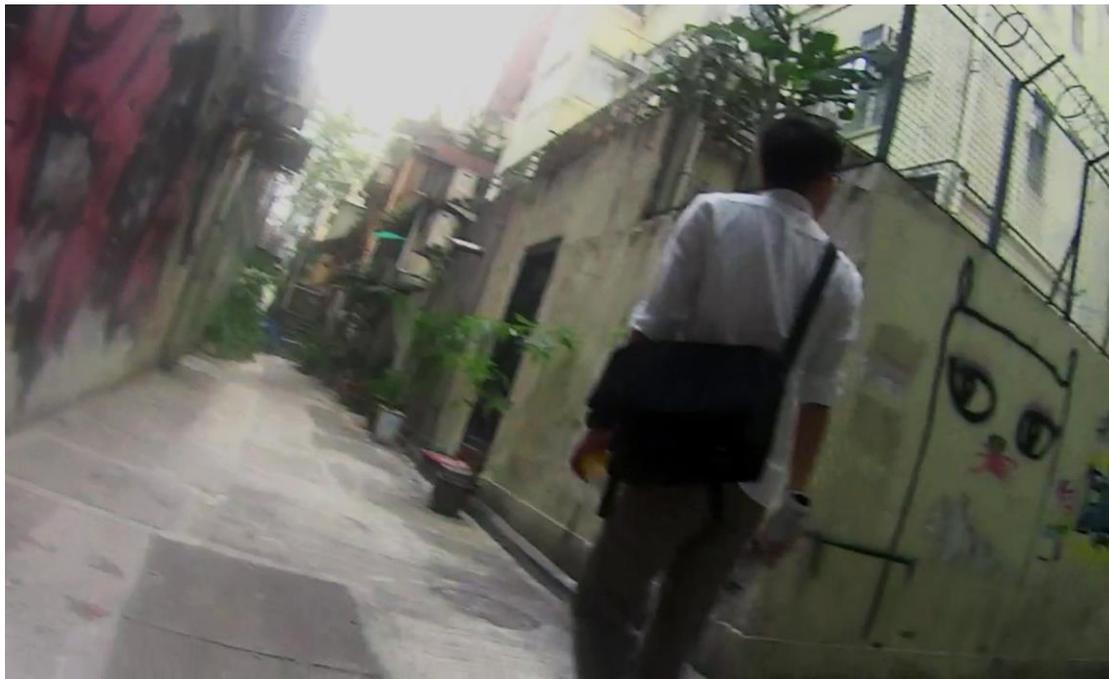


**Figure 7.20** *From dark to light.* Footage of the transition from one alleyway to the next (2fps), Daren takes us up the stairs. Full video can be found at Appendix 5. (Source: ActionCam Footage)

A new cacophony of images appears. An outline of an animal, a cat, is painted on one wall. Its eyes are cast sceptically askew, decorated outlandishly with purple eye shadow and pink mascara, surrounded by barbed-wire and crowded by the city above. Its vitality stands out against the beige peeling walls and the humble white tiles. Plants decorate this strange sanctuary, disturbing the concrete architecture, put there by some caring resident who lives behind one of these black gates.

This space calls for pause, to meditate against the barrage of immediacy - to get lost and find your way, to dream and wake all at once. Politics and art merge in this space, in a city that has minimal democratic structure. Beside the cat, there is a stencil which says 'Pride in Rainbow'. This has been appearing all over the city, Daren explains. The silhouette of a face is coloured in the pride flag.

'It means', he says, 'life for what you love'.



**Figure 7.21** *The ground plane.* The image of the cat and the pride flag sits to Daren's right, the plants and the black gate to his left. (Source: ActionCam Footage)

Up the stairs, the crowded streets of Hong Kong continue to hum in unsettling ignorance of this lost alley. Cartographic reason is the architecture that structures the colonialist dream: a mappable, plannable, governable space that can easily be conquered, calculated and controlled. The first roads in Hong Kong were built to move troops - as we found with Vicki - and so the mountains were already surveyed with a warring-eye to defy contour and flatten them out. In contrast, the steep entanglement of ground planes in this old part of Central clashes with the dreams of straight lines and spines in the European tradition of modernity. Multi-levelled, ambiguous, secret - the spaces like the alleyway and the park that Daren shows me appear as ghosts in his experience, invisible on the map. Geometry, in architecture, is the realm of straight lines and grand visions. The dreams of the ground plane, of the unreasonable field, defy any vision at all.

**‘Some things need to be unfinished’: Sarah and skies of the future.**

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Sarah and I walk down the main avenue of Hyde Park in Sydney, under the large Port Jackson figs (*ficus rubiginosa*) that flank its sides. As we walk, we discuss the trees and how European imaginations of leisure walking were materialised under their boughs. Laid aside by Governor Macquarie in 1810 for amusement and leisure purposes, the park runs for two blocks along a north-south line in the centre of the CBD. Its geometric design, built over the course of the past two centuries, projects the north end of the park into Macquarie Street. This area houses a collection of state and legal buildings including the Mint, the State Library, the NSW Government House, Sydney Hospital, Sydney Barracks and the Supreme Court of NSW.

Sarah points out that these trees were planted here during the construction of Hyde Park (Figure 7.22). They function as a kind of refiguring and revisioning of the original landscape to resemble the carefully-designed, geometric parks of England - a materialisation of cartographic reason as both geometry and relations.



**Figure 7.22** A park here in the European sense. Southern half of Hyde Park off Park Road. This layout was designed and built in 1926 as part of the Weekes project. It saw the refashioning of the main boulevard into a final southern point in commemoration of the 120,000 New South Welshmen who died in World War I. (Source: ActionCam Footage)

Much earlier in the conversation, Sarah had described how she only ever uses mobile maps if she needs to be somewhere on time. Otherwise, it didn't matter, she just figured out where

she was going on her own. 'If I've never been there, then it doesn't exist in my mind', she tells me emphatically. As we go further south, however, we discuss the Aboriginal landscape and stories that have been lost as a part of the process of colonisation. Sarah is from up north and so she doesn't know the local stories. At any moment she says that she may be unknowingly trespassing on a sacred site (no less sacred due to the refiguring of the landscape), and that worries her. I do not see how Sarah can 'make-do' against the barrage of hauntings that linger in this landscape, how she can avoid treading on sacred ground. 'If you could regain a way of reading the landscape, or it were possible, how would you, like, if you could find a way to read whether or not particular places were sacred or not...' I ask. 'I mean, you know, Hyde Park, I mean obviously there aren't many, if any, Gadigal people left... are those stories completely lost, or...?' I stumble over my words, unsure. Sarah pauses before replying. 'I don't think those stories are completely lost. I know there is an aboriginal burial mound under or next to Central Station.' These are the ghosts hidden in maps, terrible seething absences brought from the hubris of modernity.



**Figure 7.23** *Bennelong Point from Dawes Point* (c.1804). Watercolour on card, attributed to John Eyre, showing Bennelong Point and Sydney Cove before the site was developed. This landscape has been refigured and extended in order to build Government House, the Botanic Gardens (which contain many non-native trees) and the Sydney Opera House. (Source: Image courtesy Mitchell Library, State Library of NSW - V1/1810/1)

'I don't know how you reclaim those things...like, Hyde Park has completely desolated something that was sitting here before - this', she gestures all around her at the trees and the footpaths, 'is all made - this wasn't what it looked like. They haven't just gone and put footpaths through what was originally here. They got rid of what was here and then created a

park here in the European sense, even though there might be natives<sup>31</sup> - I don't know if there are that many natives. There might be, I dunno...but they've used them anyway so it's been destroyed and you can't really reclaim something that's been destroyed.'

The problem, Sarah says, is a matter of rights - that white people are obsessed with their right to know things and to do things, most significantly to own and to build things - which means that in Sydney, at least, property is more important than history. The flatness of the cartographic imagination, and over time, different configurations of governments, planners and developers, have all-but erased one history and landscape. They have also erased its original custodians and replaced it with something that is more taxonomisable, more interested in quantifying than qualifying spatio-temporal relationships. The landscape has been so reconfigured that only remnants of lives exist in white colonial maps and sketches, and in secret stories that are fiercely protected from the cartographic eye (Ryan, 1996).

In a way, Sarah, by arguing away from a discourse of 'rights' towards one of humble, secret knowledge, is asking us to relinquish what Gordon (2008: 7-12) terms disciplinary logics. I have nothing to say to this. There is nothing that can be produced (within or without cartographic reason) that does not damage Sarah's stance through the stretching grasp of colonial discourse into the episteme, and the stabilisation of knowledge once it has settled within. Scholarship is necessarily visible, words are necessarily said, actions are necessarily done. What exists other to the speech-act, requires a different epistemological standpoint. Practices, beliefs, and dreamings endure - even if the people that held them have disappeared under the rationalisations of the West.

We traced the inscription of Sydney in Chapter Four - the point of contact at Botany Bay, the revisioning of Sydney City and the renaming of places and streets farther and farther away from their original form. This brings us back to the stories of the first settlers in Sydney and Hong Kong, who surveyed the landscape in the eyes of a future settler-nation. British settlements who struggled to drag the Sydney basin and the Hong Kong mountains into a cartographic space, which was more readable and exploitable on English terms. Over time, these struggles became transferred into the world of relations, as it was not just the landscape, but also the bodies, the air, the flows, and the languages of these places that came under this ambition. The Tank Stream that provided water festered and then was buried, while Ta-Ra was renamed the Rocks and Dubbagullee, Bennelong Point.

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<sup>31</sup> Native is an Australian colloquialism to describe botanicals and flora native to the Australian region. It is often used in opposition to non-native shrubs and flowers brought in from Europe during the process of colonization.

Still, new drawings can be made. Sarah sees the city differently, and tells me about what she does not know. But she does not speak for all experiences of this space, nor could she - and this is precisely what makes it so important. Turning away from the universality and homogeneity of cartographic reason, we find heterogeneity in experiences and living. Indeed, the poetics of space are unique to every encounter, and the oneiric house may not be a house at all, but a lost landscape, a small booklet, an oral history or even a piece of digital media. The geometric centrality of the urban landscape can be reduced to a temporary quiver against the imaginations of people, the ghosts that they find and their multitudinous ways of 'making-do'. Leavy (2014) (Figure 7.24), for instance, specialises in imagining the landscape at the point of contact. Creating video games and immersive experiences, he uses the same technologies in grids and the monadic digital to resurrect that which has been lost.



**Figure 7.24** *Virtual Warrane*. This screenshot of Brett Leavy's (2014) *Virtual Songlines* project shows an overlay of the contemporary Sydney landscape over a digital rendering of the landscape in 1788. Bennelong Point (Dubbagullee) sits on the left where the Sydney Opera House now lies, and The Rocks (Ta-Ra) on the right in the lead-up to the Harbour Bridge. Even so - it still looks inward from the sea. (Source: Leavy, 2014)

In this everyday encounter with mobile mapping, such tension is brought to the fore somewhat differently. Old landscapes cannot be reclaimed, and any attempt to do so spills secrets across the map.

'And if you could make it Aboriginal?'

'Well there wouldn't be anything here - there wouldn't be any man-made buildings here.'

'You'd let it all rot?'

Secrets and secret knowledges don't work on maps - because the moment they are mapped, they are no longer secrets. Thus, for the most part, they remain 'off the map'; embedded in local knowledge, memories, affective landscapes and away from what Spivak (1996) calls 'postcolonial reason'.

'It just wouldn't exist...', she says. Sarah rails against my implication of a progressive history. There is no return to a Gadigal Sydney - there would just be no Sydney.

'So it's gone forever?'

Reading this now, the stumbling in my words becomes clear, the messiness of the research and the disconcertment in my understanding.

'Yeah, even though, like the QVB<sup>32</sup> is gorgeous but it just wouldn't be here. It'd go back to being what it was before.'

'Which it can't?'

'It would take millions of years to go back to the way it was before. Which is against the whole way that the world works because it develops - even naturally it would develop and change. The harbour would get bigger or smaller - bigger, because I think it started off really small...it started out as a river going into the sea. It wasn't a big harbour.'

*Before* is a separate dimension, a possible story that is realised but not materialised. It sits side by side with the urban present, as we stare at the buildings in the park - a story where another place continued on as it had for seventy thousand years.

'I see - so temporally, how do you see the landscape of Sydney then?'

'What do you mean?' she asks.

'Do you think it's been fractured by colonisation?' I clarify, 'Do you think it was going up on this process where it always does change but slowly and builds...or do you see the city as being somewhat natural?'

Sarah pauses before replying.

'The city's not natural. I mean, the British came here two hundred and twenty-six years ago like, it's sprung up in less than that because they didn't start building straight away. All of these buildings have come and all this damage has been done in a really short period of time. And so it's not something you can reverse - it's just going to keep getting bigger and there's not enough room in Sydney.'

In this sense, the invisibility of the original landscape, in contrast to the hypervisibility of the trees (even in their potential absence) also points to a kind of haunting - of lost stories, lost space and lost time. This is a kind of knowing that can appear on no map, a kind of knowing that sits uniquely in Sarah's production of an unreasonable field. Here, mobile mapping becomes a site of embodied and indeterminate political potential. As we walk on, Sarah becomes melancholic. Looking up at the sky and the skyscrapers that surround us, (Figure 7.25; also Appendix 6) she speaks again.

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<sup>32</sup> The Queen Victoria Building, or QVB, is a large Victorian-era shopping building on George Street.



**Figure 7.25** *If you cover it with buildings.* Sarah looks south towards the Liverpool Street end of the city, across the south-west corner of Hyde Park. In the distance The Hyde stands to the left, with the Hyde Park Inn in the centre. (Source: ActionCam Footage).(See Appendix 6)

'It's already overcrowded so they're just going to keep building and building until you can't see the sky...'

'And the sky is important?'

'If you can't see the sky, then everything is dark. I mean, you can't see the stars at night. The stars are important. The stars show you where to go. And you can't see them, so...'. She breaks off and sighs.

'Why do you think the stars show you where to go?' I press on.

'Cos they've always shown - like you follow the constellations.'

'So, like navigation or do you think it's more of a future thing?'

'Well, traditionally, Aboriginal people, among other ways, used like a lot of other people used the stars to navigate all the places of the world. But also I think it's important to see the sky. If you cover it with buildings...'

'You've got no future? You've got no direction?'

'You can't go anywhere. You can't go anywhere...'. She looks up at the overcast clouds gathering at the tops of the young city. 'If you can't see the sky anymore - everything is filled. Some things need to be unfinished. You can have a future. You can do something with that future.'

## Mobile mapping beyond cartographic reason

Before this chapter started, we had already happened-upon hauntings, 'making-do' and dreams, countless times, as all of these stories formed through the unreasonable field and detoured us around. These were largely unarticulated, slipping under the emphasis of stabilisation and space, and elastic technologies. But it is also important to give voice to these inconsistencies, surprises, and the unexpected. Ghosts and people do not just speak, they act, too. We have seen practices, the canny, clever, affective ways in which people navigate the tensions and frictions of mobile mapping between haunting and 'making do'.

This is why 'making-do' offers something different from *tactics* and *strategies* - two terms for which de Certeau (1984) is perhaps better known. De Certeau (1984: 36) describes a *strategy* as a 'rationalization' of a Cartesian variety, a base from which exterior things can be determined by institutions. Meanwhile, *tactics* are the 'polemology of the weak' (1984: 39), in 'the space of the other' (1984:37); a manoeuvre or a ruse that must operate upon the terrain of the strategic that has been imposed upon it. These stories problematise this oppositional nesting of power: concepts of spatiality, of technology and of the body have never been wholly-subject to the determinism of cartographic reason. Infinities are not always subject to the whims of the Cartesian and Leibnizian God: they can be found in the everyday, the persistent and the liminal. As we walked along and saw the endurance of memory in landscapes that folded across space and time with Taylor, and then moved quickly to see how this folding requires new modes of embeddedness with Magdalena, the role of liminality became clearer. Then, we followed Cassie into the interior - the space in-between fix-points - inside houses and daydreams and the gaps between marks on a sticky note. We next found the in-between in liminal places, and architectures of dreams with Ben. Then, Daren reminded us of ground planes that can only be found through exploring, whose semaphores were too delicate for Cartesian fixities and crumbled away from Leibnizian relations. Finally, we ended where our tender empiricisms started, back in Sydney with Sarah at the point where one culture tried to subsume another and despite all the new tools of navigations, she argued that we might have lost our way.

Haunting, 'making-do', and dreams are about modes of resistance and reframing that are more complicated than the polemic between strong and weak. In Sydney and Hong Kong they are *part* of social life and perhaps constitute more of it than the lines and numbers of cartographic reason:

‘When one examines this fleeting and permanent reality carefully, one has the impression of exploring the night-side of societies, a night longer than their day, a dark sea from which successive institutions emerge, a maritime immensity on which socioeconomic and political structures appear as ephemeral islands.’ (de Certeau, 1984: 41)

So, it is to haunting and ‘making-do’ that we turn here, to a night longer than day, and across the dark seas that surround the enunciations of cartographic reason that we have seen so far. Ghosts, ‘making-do’, and dreams emerge in the unreasonable field; in moments of mobile mapping beyond cartographic reason. Of the three, it is perhaps dreams that are most important at this end, for they are one of many culminations of making-do in a landscape filled with ghosts. Aragon (2011) writes:

‘Dreams, dreams, dreams, with each step the domain of dreams expands. Dreams, dreams, dreams, at last the blue sun of dreams forces the steel-eyed beasts back to the lairs. Dreams, dreams, dreams on the lips of love, on the numbers of happiness, on the teardrops of carefulness, on the signals of hope, on building sites where a whole nation submits to the authority of pickaxes.’ (Aragon, 2011: 7-8)

Dreams have certain agencies: they expand, they force, they ferment. Dreams create gaps in the Leibnizian fold and perforate the Cartesian line. They can occur within and without cartographic reason, as Aragon implies, on the lips of love, on the numbers of happiness and on building sites where the future becomes too crowded to craft for ourselves.

At the same time, these examples also point to how ghosts and ‘making-do’ - dreams - can equally occur in the interstices of cartographic reason, from *within* when the *outside* is only a ghostly impossibility. This is not just about the imaginations which occur within mobile mapping, but the way in which they come to be enacted through the failures and cracks of cartographic reason. It is often understood that infinity constitutes the largest number which can be imagined - an infinity which, following the development of limits, can be contained. But it is less understood that within two points on a grid, between zero and one on a binary plane, there also exists an infinite number of points *in-between*. Over and over again, *in-between* has revealed itself through memories, liminalities, insides, wanderings, ground planes and futures (Gordon, 2008). The potential of ‘in-between’ emerges in boulders, refigured and moved, in persistent names, in birds heard in cities, in looking through windows, alleyways filled with architectures of dreams, the graffiti gardens in-between

buildings and the edges of buildings which have not quite reached the sky. Irregularities, inconsistencies, fractures and fissions appear in-between the points of coordinates, the relations between zero and one, and the impulse of cartographic reason.

Ghosts, dreams and 'making-do' irrupt in the practices of these post/colonial landscapes *because of* the limits of the cartographic imagination and the monadic digital. Stabilisation, always necessary, creates an in-between, and the elasticity of homogenisation begets heterogeneity. At this tender point, the stalwarts of the Enlightenment - truth, universality, logic, reason - develop a static energy because, in the unreasonable field, their material appearance is not as certain as they appear. Friction erodes, generalisation blurs and grand narratives incarcerate. At the same time, it has been evidenced throughout this research that erosion also uncovers, blurring creates possibility and incarceration renders invisible boundaries visible. Other kinds of parasites eat at the network of Hermes – in feeling with your eyes, in going through experiences, in post-it notes, in not following the map, in staying on the ground, and in remembering unrealised (hi)stories that could have been otherwise, and sites that persist longer than the configuration of the landscape. From start to finish, the empiricisms in this chapter point to the limits of representation as they bleed into experience, the points of contact between cartographic reason and, to reiterate de Certeau (1984: 41) above, 'the night that is longer than day'.

## 8. Conclusion

### Mobile mapping and the gaps in the fold.

“If I understand you correctly, you are aiming to constitute a knowledge of spaces [*un savoir des espaces*]. Is it important for you to constitute it as a science? Or do you find it acceptable to say that the break which marks the threshold of science is only a means of disqualifying certain knowledges [*savoirs*]...” (Foucault, 2007: 19)

“Space is not a collection of pre-existing points set out in a fixed geometry, a container, as it were, for matter to inhabit. Matter isn’t situated in the world; matter is worlding in its materiality.” (Barad, 2007: 180-181)

“Such is the power of cartographical reason, a mode of understanding at the verge of realizing that the canvas of the world is not a smooth flatness but a wrinkled manifold... And it has no idea what will happen next.” (Gunnæel Jensson, 2007: 431)

When I first started researching mobile mapping, I expected to see a world comprised of lines and numbers, indeterminate landscapes regimented beyond recognition, immanent practices seduced by the power of classification and calculation, and cartographic technologies in the process of expanding their discursive grasp to the limits of the comprehensible. I asked how experiences of contemporary mobile mapping in Sydney and Hong Kong can be situated in and beyond cartographic reason, the ways in which power/knowledge relations of cartographic reason are shaped and reshaped through everyday mobile mapping, and to what degree new media technologies are reforming mobile mapping practices, in the context of cartographic reason. I expected that, despite my best efforts towards disconcertment, radical empiricisms and (more-than-)discursive critiques, my fealty towards Foucauldian thought would still enclose me into spaces dead and fixed by grids; bind me to digital binaries that had funnelled the monad into inflexible circuits; and see me walk with participants who could not perceive the invisible codes that kept them caged.

Over the course of this research, what emerged instead were mobile mapping practices that were continuously, surprisingly, generative in their encounters: spaces where ghosts persisted despite cultures of erasure and disappearance, technologies that afforded humour and ad-hoc solutions in their limitations, and secret pockets of potential at the limits of representation, wedged open by dreaming, haunting and making-do. Throughout, mobile

mappings have been revealed as practices through which cartographic reason emerges, but is also engaged, interrupted, ignored and transformed in a power/knowledge politics of potential, augured through and beyond new media technologies. As such, throughout this thesis – creating a conceptual frame, designing method(ologies), walking with people *in situ* and writing up these stories – a rethinking has been required. This has resulted in an expansion beyond the broad philosophical and epistemological questions of cartographic reason articulated by Farinelli (1998; 2009), Olsson (1998; 2007), Pickles (2005) and others into multiple, uneven, repetitious materialisations (fixities, fluidities, embodiments, technologies, forms, languages and structures) in both cities: a cartographic reason that is both Cartesian and Leibnizian.

Here, this thesis seeks to redefine both our understanding of cartographic reason on the level of everyday practices, as well as our understanding of how mobile mapping – even in an era of digital mobile media – continues to operate in inexorable heterogeneity. This means reassessing both the primacy of the map – or the cartographic technology – in the study of power within critical cartography, digital media and digital geography, as well as the way in which it might appear. Cartographic anxieties about the Cartesian limitations of the map described in Chapter Five become reproduced in Leibnizian anxieties about the limitations of the universal characteristic, in this case, expressed as the monadic digital in Chapter 6. This thesis suggests that foundational to the notion of cartographic power – especially as shaped by cartographic reason – remains systems of order. Yet, the calculative and classificatory technologies (*mathesis* and *taxonomia*) brought about by cartographic reason have less interest in fixing spaces and lives, Such fixities delimit not only the boundaries of resistance, but also the boundaries of power, accepting its territory against the transcendental order described by Descartes in algebraic geometries and Leibniz in his monadology. Instead, cartographic reason *stabilises* in the manner that Serres (REF) describes of Hermes – that is, produces tensile forms, conduits, elasticities, viscosities. Stabilisation protects against both modes of anxiety – to stretch universally into the infinitely small strata of our daily lives and the infinitely wide strata of our imagination,

In these moments of situated encounter, it was not only the form of discursive appearances of cartographic reason that prove to be important. The discursive conditions of cartographic reason are continuities that set the conditions for certain epistemologies, logics, universalisms, and practices to appear rather than anything else (Foucault, 2002a) against the groundswell of destabilising qualities. Yet, as the transformation of cartographic reason was traced across space and time, often other *things* intervened: impulses away from the cartographic, from *the roos*, through *swamps* and *hills*, *it used to be*, *luck*, *things that only*

*locals know, boulders and birds and secret alleyways and burial places.* At this point, this project diverges from Foucault's early work on discourse (2001f; 2002a; 2002b), and the singular discursive formation of cartographic reason, and instead takes up the ambition of his work on surrealism (Foucault, 2001a), heterotopias (Foucault, 1984a) and subjugated knowledges (Foucault, 2003c). It does so by extending into the pre-discursive, the more-than-representational (Lorimer, 2008), the affective (Massumi, 2002; Stewart, 2007), making-do (de Certeau, 1984) and the ghostly (Gordon, 2008).

This thesis has outlined a heuristic triad of spaces, technologies and bodies. Across this triad, the multivalent and uneven texture of power/knowledge relations could be traced while leaving room for indeterminacy (Massumi, 2002), openness (Massey, 2005) and that-which-cannot-be-explained (Gordon, 2008). By starting with Foucault (2002a) and using the writings of de Certeau (1984), it conceived of a theory of mobile mapping that encompassed thinking *and doing on the same level*. This theory was expressed explicitly in the case studies of Sydney and Hong Kong where power-knowledge relations exert beyond discourse and ideology in post/colonial spaces, in everyday mobile mapping practices.

I did not think it would be possible, even in the midst of tender empiricisms and unreasonable fields, to discover, let alone trace, the muted ways of saying and doing beyond cartographic reason. Foucault (2002a) states that the focus of archaeological methods should be on what *was* said, rather than what else *could have been* said, what *was not* said, or what *was subjugated*. This was, perhaps, the project of JB Harley (1988, 1992) in articulating the silences and absences on maps in contrast to what was depicted. Yet, in answering the research questions, the lack of speech spoke as powerfully as speech itself. Walking with each participant, that which *could have been said, was not said, was subjugated*, and even that which *cannot be said* were lingering in their potential, their networks of affect, their haunting loss. Crucial to the everyday mobile mappings through which we lived, these facets of local knowledges were always present, coforming in tandem and opposition, as a result of or in spite of the conditions of possibility set by cartographic reason, producing space where I had thought there was none left.

In everyday practice, cartographic reason multiplied as a stabilisation which can stretch, billow and fold, but in doing so, opens up gaps, perforates and spaces where heterogeneity may be found. This is the key argument of this thesis: that the total universality of cartographic reason, even in the structures dreamed by the Cartesians and Leibnizians is an impossible promise. Stabilisations continue to recur through the homogenising force of a cartographic imagination, the generic tools of the cartographic dispositif, the construction of

universal systems of calculation and classification. Elasticities in power/knowledge relations stretch and relax as such systems became more robust and resilient, extending the subject into local and global processes. Cartographic language is also becoming increasingly interoperable and re-combinable, folding and pleating into itself. Impulses have begun to expand and become flexible as cartographic reason moves into uncharted domains, adapting to new phenomena. And finally, microscopic perforations have appeared in the power/knowledge relations of cartographic reason in new media technologies, where contradictions reign, uniformity becomes impossible, heterogeneity is imminent and the limits of stable or elastic predictabilities fracture into fragmentation.

Thus, this thesis argues throughout that, from both an empirical and theoretical perspective, the possibility for openness and heterogeneity described by Massey (2005) is not only to be found at the exterior of the Cartesian grid, but also in the interior of the Baroque fold: the infinite space between two points or two lines on a grid, gaps in the pleats, perforations in the billows. The fold is paradoxical: it is one thing and its adversary, inside and outside. When walking with people, through the empirical chapters, this became clearer. Cartographic reason could produce rectilinear grids that stretch across landscapes, and the heterogeneity of space still resulted in us getting lost. Similarly, the monadic digital could pull semantic meaning into a unified binary system and, still, we made our own readings of how we live alongside these technologies. At the end, it became important to give voice to these inconsistencies that will form the crux of these final conclusions. When the structures, scriptures and striations of cartographic reason were viewed *in situ*, in the midst of the vast networks of forces, desires and matters that constitute worldings, they appeared somehow diminished, limited by their own limitations, without any idea what would happen next.

### **Fixities, fluidities and fragmentations.**

This thesis has been a project to understand mobile mapping in a digital age parented by cartographic reason, but also as a practice constellated by spaces, technologies and bodies. It considered the situated, embodied and performative aspects of these constellations, as they emerged in Sydney and Hong Kong, affective spaces haunted by deep and uneven post/colonial presents bound through cartographic and digital practices. In these ever-forming assemblages, cartographic reason (Farinelli, 1998; Olsson, 2007) came forth as an ordering device, structuring relations between fixities and flows according to a geometric order, which, in the rationalist philosophies of the Enlightenment had developed universalist and expansionist roots. I argued that the totalising and ordering principles of cartographic reason – expressed through the technologies of cartographic dispositif – could be found equally in the Cartesian emphasis on fixed points, grid systems and coordinate (algebraic)

geometry *as well as* the monadic, binary and relational logic of Leibnizian systems and models. The question, here, is one of structures of cartographic power as fluid, transformational and translational: they do not merely fix spatiality, they direct it, form it, rearrange it, reorder it, translate it from one way of understanding to another. This means understanding the theoretical underpinning of cartographic reason as more than simply a Cartesian structure comprised of lines and grids but a network of minute components that can seamlessly form together, temporarily building grids of power, billowing out and drawing the subjugated into their folds, and then disassembling, invisible to be restructured somewhere.

It also means reassessing the way in which the empirical and everyday experiences of cartographic reason can be understood. The grids of power in which Foucault (1995) and Olsson (2007) would have us live are not as firm in digital lives as they may appear theoretically. Staring back up at the cartographic gaze, and living within the planes of the cartographic eye, the ethnographic data collected throughout challenged the idea of representational fixities and clear lines of power. Rather, while the discourse of cartographic reason remained stable, its form transformed – from the coordinate geometries of early cartographers, to the binary systems of digital apps, the topologies and toponymies of urban systems – coforming with everyday movements, experiences, dreams and possibilities of the people with whom I walked. Beyond theory, everyday lives produced a wealth of encounters which challenged the traditional understanding of cartographic reason, and the role that cartographic discourses play in everyday lives.

What is of specific interest to a study of cartographic reason is that, more than ever, while the discursive formation of cartographic reason remains steady in producing the conditions of possibility, the convergence of representational forms (specifically cartography and media) has augured unprecedented interoperability. Numbers, lines, space, media, access, places, paths – ideas which often operate on different planes of theory – can now be understood using the same digital language, Sydney and Hong Kong were understood as more than just case studies, fields or sites. Each city held cartographic reason and its various disruptions in different ways. What was important was that the dualism of Leibnizian and Cartesian cartographic technologies have always produced colonial spaces, although through separate means, and different forms. However, linked with a heritage in Enlightenment rationalities, from the present moment of using a digital mobile map, they quickened into continuing and transforming cartographic practices that have, since the first moments of settlement, sought to impose imperial ordering on disobedient spaces. The materialisation of these technologies,

however, proves to be both situated and specific to each city, beset by different failures, oversights and conquests.

Furthermore, this is *not* a theoretical phenomenon. The empirical output of this thesis suggests that this is a *lived* phenomenon, where cartographic reason in contemporary technologies folds together systems of power (from the representational to the biopolitical). This became apparent in modern practices of surveying, charting and planning, and contemporarily in GIS and mobile digital devices. Here, the architecture of space in Sydney and Hong Kong, as well as the flows it disciplined, became an archive of the discursive history of cartographic reason. Therefore, focusing on discursive practices (Foucault, 2002a) (or collections of ‘speech-acts’) (de Certeau, 1984), it was possible to trace the regularities of statements and the connections between speech-acts (on the level of both speaking and doing) across geography and history, as they were encountered in the present. By doing so, it is possible to map the transformation, translation and transduction of cartographic reason, as it shifted with changing geographies, societies and stories. This is where the central theoretical contribution of this thesis – that multiple political forces may *coform* in mobile mapping – comes to the fore. Where systems of power may fold together, so too may everyday resistances. Mobile mapping is more than just the materialisation and performance of cartographic reason – and power, in the cartographic realm, is not absolute. Mobile mapping practices are situated, produce certain kinds of imminences and affects, and assemble in complex, unpredictable and disruptive ways. On the other side of gridded spaces, elastic boundaries and regimented bodies, *coformation* sees the simultaneous emergence of the subjugated from the openness of space (Massey, 2005), the indeterminacy of potential (Massumi, 2002) and the everyday making-do of people (de Certeau, 1984). Therefore, this research embarked on a more-than-representational approach (Lorimer, 2005) in order to make space for the potentiality of the liminal. Through this more-than-representational approach, it is possible to trace how the same processes of calculation, classification and control also afforded ongoing contrapuntal practices – hauntings, affects, making-do, dreamings, local knowledges and heterotopias. These practices *coform* alongside the auspices of cartographic reason, drawing from and erupting into ordering practices, creating disruptions and potentialities.

The room for openness was drawn specifically from the methodological innovations offered by this research. Foundationally self-reflective, against the universalising power of cartographic reason, the ethnographic methods deployed in this project destabilise the authority of the researcher, and giving rise to the polyvocality of a field that was unreasonable and people who each had their own stories, memories and worldings.

Situating ethnographic encounters through the archive, the links between contemporary mobile mapping practices – in their heterogeneity – and Cartesian and Leibnizian cartographic discourses can be clearly seen. As a result, three empirical chapters focused on these seepages from three different starting points: the spatial, with Cliff, Kyja, Mohammed, Vicki and Shaun; the technological, with Marianna, Nick, Ellen, Camille, Tanija, and Ravi; and the social, with Taylor, Magdalena, Cassie, Ben, Daren and Sarah. Tracing deep into conversations with participants, cartographic reason became situated and destabilised into everyday encounters. With this, the archive of cartographic reason - as Foucault, (2002a) might understand it - lingers beyond institutional collections as an ‘everywhere archive’ across the spaces, technologies and subjectivities that comprise everyday life. In this archive, the encounter is imbued with competing forces of cartographic reason, affects, hauntings and embodiments seeping pasts, presents and futures together.

### **Stabilisation: transpositions, regimentations, conduits**

To understand how coformation might work, the theoretical and empirical contributions of this thesis maps some of the multifarious practices that characterise cartographic reason in contemporary postcolonial spaces. Like Guarassi, in cartographic reason, Olsson (2007) underscores a relationship with order, of how the cartographic governs how we should know and understand space, as well as ourselves. Rose-Redwood (2006: 480) too asks “is not geopower a prerequisite for biopower”, and states that “the ordering of space is itself one of the requisities for *producing* governmental power/knowledges” (Rose-Redwood: 480). Key to this kind of order, I have argued, is the stabilisation of forces *in flux*. Tracing from the encounter into the apparatus, stabilisations appear in translations: transposing space into stable alphanumeric systems and establishing grids of movement to structure and limit flows.

In mobile mapping, this thesis has demonstrated that continuing stabilising practices of cartographic reason can be traced through *transpositions*, *regimentations* and *conduits*, structuring that which is exterior to the cartographic dispositif and the cartographic imagination:

“... the impetus to motion and mobility, for a space of flows, can only be achieved through the construction of (temporary, provisional) stabilisations: a restructuring of stories-so-far. This is not the

annihilation of space; but it is a radical reorganisation of the challenges that spatiality poses.” (Massey, 2005: 95-96)

At the level of discursive formations – the level of the speech-act - this is not a revolution of cartographic reason, brought about digital technologies. Rather, as Massey has suggested, the story told through conversations with people as they moved through space. Such practices, whether spatio-temporally near or far, gather into moments of encounter, across the entire remit of Cartesian, Leibnizian, colonial and digital technologies. Focused on objects exterior to their own formation, the practices of cartographic reason then duplicate their force by pinning the abstract and the material together according to the same logics of calculability, classification, predictability and control.

In the post/colonial city, practices of cartographic transposition can be equally located in the transposition of reason from one space and time to another, or according to different directions or rotations within the same space or time. For instance, this thesis draws out how the dreams of white cliffs and mythology of Botany Bay are transposed in the cartographic eye over and over again, with each rewriting – from the voyage of Joseph Banks through to the walk along its shores with Cliff. Here, the same structures of cartographic knowledge are expected to maintain form and meaning without heed to geography or perspective, stabilising shifting tides and subjective chromatics into universal systems of signification regardless of situated knowledges. Similarly, this struggle is encountered on a rotational axis: longitude and latitude are transposed into stable vertical datums against the shifting tides of the Hong Kong mean sea level, implicated in Mohammed’s mapping of Hong Kong.

It is not only the equivocations between materiality and abstraction where stabilisations occur. The production of constant conduits – paths and routes - are anticipatory stabilisations, less centred on the momentary equalities of transposition ( $2y = 2x$ ) than formalising future trajectories with unwavering rules ( $y = x^2$ ). Such routings are evident across the everyday mobile mappings described in this thesis. Conduits may be ingrained and entrenched, like the continuing prominence of the Star Ferry or Martin Place. Or, they may have changed slightly in what they transport if not where they go, like the transition from military to leisure use of the Old Peak Road. Furthermore, once the paths of such conduits are set, gates and barriers can be formed – to decide who may or may not pass and what they must give to the parasites (Serres, 1982b: 44) in order to do so. For instance, as we have seen, for Ellen parasites are bound up in economics: Octopus cards that leech payment for entry and transport; or resident cards that deny access to parks for those without the income to live there.

Furthermore, the uneven formations of mobile mapping assemblages throughout Sydney and Hong Kong have shed light on how the transpositions and construction of durable conduits by the cartographic dispositif often amount to regimentations, especially in post/colonial cities and spatial stories. Such is the ordering impulse that, even in the case of Taylor, boulders that carry the names of Song emperors are sculpted into regular angles and transposed to bespoke parks, and the names of places which were so precious to Shaun become stabilised into coordinates and universal toponymic systems. Cartographic reason formalises binary distinctions – those of outside and inside, for instance, which Cassie strives to perforate. It also establishes the ambitions of grids that can expand outwards infinitely, starting from the centre of cities. Conduits are stabilised along straight boulevards, expanding outwards into the disordered exterior and regimenting it into an ordered system that is efficient, predictable and controllable.

Thus, although the drawing and reading of a line may be geographic, in Gregory's (1994) estimation, for Olsson (2007), it is the formation of those lines, their relationality and their authority, which underscores cartographic reason. However, across both empirics and theory, this thesis argues that it is not merely a question of relations and authority, but rather the stability of relations and the stability of authority which forms the crux of the materialisation of cartographic reason, its dispositif structures and its production of sites of encounter.

### **Elasticity: billowing, folding, pleating**

In cartographic reason, practices of stabilisation are not merely about fixing where limits may lie – either through transpositions, conduits or regimentations – but also about defining the outer limits of expansion and extension of stretching influences. Elasticity is where, this thesis demonstrates, the stabilisation of cartographic reason ceases to be merely a Cartesian container of the *res extensa* and the grid seen in *Chapter Five: Mobile Mapping and Space*, but also emergent through the monadic digital, the Baroque fold and the Leibnizian view of relational co-existence seen in *Chapter 6: Mobile Mapping and Technology*. As Serres (2008) writes:

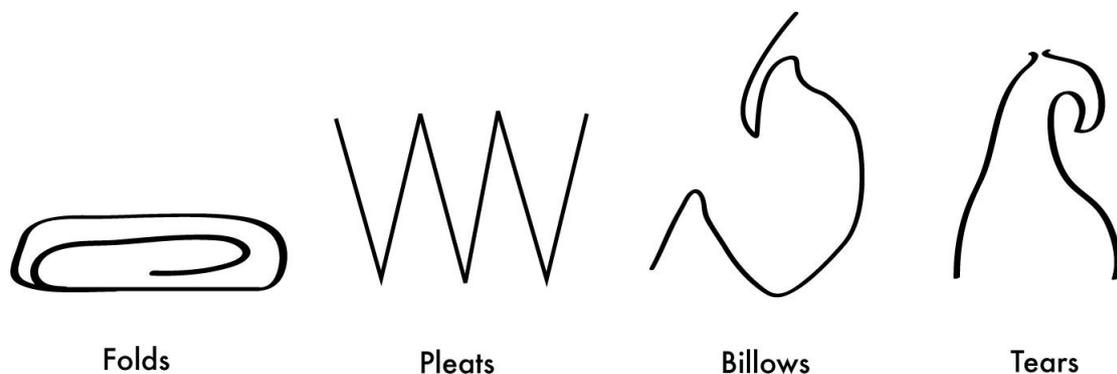
“The computer world takes the place of the observed world; things we know because we have seen them give way to the exchange of codes. Everything changes, everything flows from the victory won by the table of harmony over the tableau of seeing.” (Serres, 2008: 50)

Serres' words speak to the transpositions appearing throughout the encounters in this thesis: the desire away from fixity in points and lines toward relationality in numbers and codes. Yet, the hunger for omniscience and homogeneity is also embedded in the expansion and realignment of rationalism, stretching between, pleating together and folding over the global and the intimate.

'This meditation, Cartesian in nature, rediscovers, Leibniz's solutions. They are in music as if buried. Harmony conceals the collection of partitions (scores) with no relation.' (Serres, 1982b: 132)

The computer world is elastic – hinged on the functions of transformability and changeability according to the stable systems of the 'table of harmony' (Serres, 2008: 50). Extending out of the epistemology of the sciences into gnoseological perceptions (Serres, 2008: 50) of space and place, choices of paths and routes, the retention of memories and stories and our everyday lives *within* these systems, the same rules can take on new appearances.

This thesis demonstrates ongoing mobile mapping practices that engage the realm of interiority, where the inside bulges, compresses and reforms. Figure 8.1 shows how some of these elasticities may occur on a geometric plane.



**Figure 8.1** *Folds, pleats, billows and tears.* This figure demonstrates some different modes of elasticity according to curvature, volume, surface and reproductions of form: such lines are always elastic. (Source: Author).

Such elasticities can be seen throughout the mobile mapping practices articulated here in Sydney and Hong Kong. Pleating brings previously distant points into closer proximity, reducing volume and distance, so Kyja falls 'off the swamp' in Sydney, and Magdalena's journey across Victoria Harbour is shorter than it was fifty years ago. Nick pleats together past and future as he negotiates the indeterminate construction of the bike lanes – where they are and where they will be – and Ravi compresses his world into scales of efficiency

and time. Cassie's imagination shortens the distance between the daydreamed inside of a house from the outside of the world around.

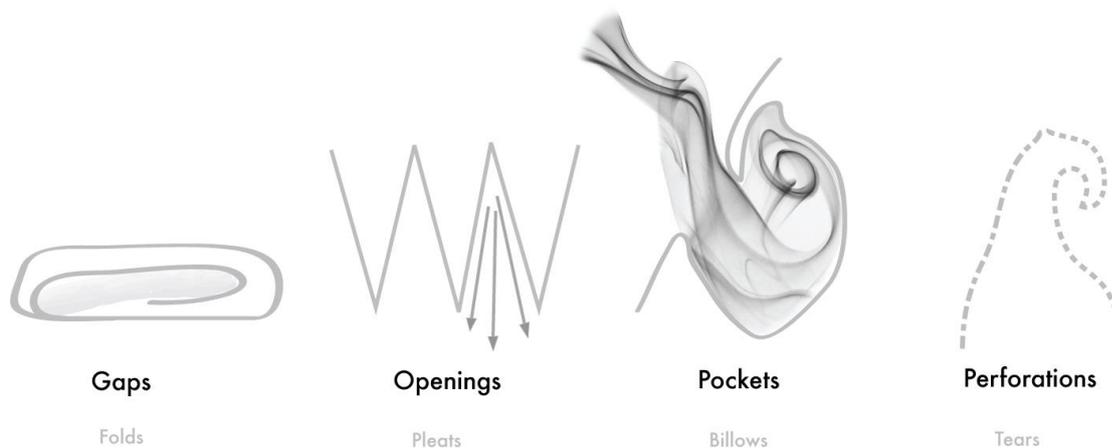
All the same, where pleatings in mobile mapping pull moments and spaces closer together, billows see an expansion, a transformation in flux. Billows stretch and recede in constant mobility, without cessation. This creates spaces of constant movement and change where limits are determined only by the elasticity of the boundary up until to its point of tearing. The plane of cartographic reason, which Mohammed encountered in Admiralty, for instance, billowed upwards, fortified by strong hills and limited by engineering. Furthermore, as the cartographic imagination stabilises the world these stories have also seen it billow outwards into new terrains such as Venice, Malaysia, China and the Swan and Avon rivers, before settling back into its territory. With each stretch, other stories from outside cartographic reason – of other landscapes, lives and architectures of dreams - snap back into those spaces and times, transforming them, remodelling their meaning. As they billow, mobile mappings fold over and over again. The fold encloses and reproduces itself within, extending and enclosing limits, stretching itself into new forms. As Marianna walks through the same backstreets of Sydney, for instance, she sees the same places, rewriting their story as they enclosed within folds of meaning between herself, her mobile phone and the landscape.

These forces of elasticity do not merely conquer space, they also create space where there appeared to be none before, cracking as they stretch. Where the elastic may also contain – stretch to bring things together, stretch so that it may retract – it is also a sign of possibility, haunted by the ghosts of its potential. Taylor folds his own (hi)story and that of the Song together in the same walk and Daren searches the interior of the fold to find back-alleys replete with graffiti, small oases enclosed by the urban mesh. Here, coformations between stabilisations, elasticities and gaps intersect and interact: an encounter between forces. This has, perhaps, been one of the most profound results of this thesis, a conclusion that can only end on these gaps and the potential that they hold.

### **Gaps: openings, pockets and perforations**

In the liminal - or in Gordon's (1996: 16-18) words, the hypervisible and the invisible - 'other' more-than-discursive practices linger. Spaces of liminality are a consequence of the stabilising and elastic properties of cartographic reason, the production of spaces, pasts obscured, futures unfolding (or vice-versa). As the folds of cartographic reason form, the dispositif wrinkling and curving, they also produce gaps that are open and hold the

obscured potential of emergent spaces and indeterminate practices. These actions cannot be clearly named or delimited, and throughout this thesis I have been reluctant to do so. Yet, where I do not wish to link them through a taxonomy of practices, it is possible to find examples of the kinds of spaces they produce (Figure 8.4), making room, as it were, for a politics of hope and potentiality. The gaps produced by making room, bubble, surface, push and burst, coforming over and over again, as the millions of mobile mapping practices across the world intersect, converge and disperse, leaving traces of themselves in landscapes, technologies and subjectivities.



**Figure 8.2** Gaps. Openings, pockets and perforations showing spaces for potential. (Source: Author).

Billows of cartographic power, for instance, also produce pockets, relentless in their persistence, and occasionally, as we have seen, offering their own forms of stability in unyielding contradiction. Within such pockets, *other* practices swirl, pushing out the boundaries, filling the gaps. Such moments have appeared too numerous to mention here, but we can see instances in Ellen’s desire to make her own space, to push boundaries where she can, and to be happy. We can also see examples in Tanija’s laconic humour at the impossibility of a phone that at once tells her where she is and where she is not, or in Kyja’s swampy urbanism that promises clarity yet results in her acceptance of being unsure. The paradoxical space afforded by the pockets in billows can also be seen in the fluid contradiction of Camille’s ride on the escalators as she can be standing still and moving at the same time. They can, for instance, also be seen in the way in which Nick inhabits both a present and a future space, and produces a way of navigating that exploits the power of the digital map, but still bases itself in the feel of the landscape and the falling of the sun. These materialities stretched out into coformations, affording ad-hoc navigational practices.

Openings, however, are spaces necessarily produced through the compressive practices of pleating. Where two points may be drawn closer together, the space between them becomes

redrawn and, in the case of a point, a line or a plane, transform into multidimensionality. As such, openings are kinds of 'in-between' spaces, defined not by their size but their indeterminate, ambiguous and hybrid status. Ben's architecture of dreams in Sydney, for instance, occupies this realm in the back alley, the space between two roads, left fallow in the stabilisations of grids and brought forth by the billowing experiences of movements. Daren's secret semaphores in Hong Kong, leading to graffiti landscapes that are suspended between busy thoroughfares, are also examples of openings filled with dreams. Windows and doors are also openings, as our lives pleat closer together in urban lines, spaces through which Cassie describes her dream beyond the boundaries of interior and exterior. And then there is Marianna, who negotiates her own openings, gaming the regularity of the system to pleat two places closer together so that two other places may leave more space for her to do what she wishes.

Finally, we have perforations, minor tears – or incomplete tears – that dot across the boundaries and limits, and which become more prolific in the extremities of elasticity – at full stretch or at full recoil. Perforations are generated by the persistence and intensity of forces, inwards or outwards. Serres (1982b) describes such gaps as parasitic, holes that stutter the fluidity of the system of Hermes, changing meanings, losing information:

“What passes might be a message but parasites (static) prevent it from being heard, and sometimes, from being sent. Like a hole in a canal that makes the water spill into the surrounding area. There are escapes and losses, obstacles and opacities. Doors and windows close; Hermes might faint or die among us. An angel passes.”  
(Serres, 1982b: 11)

Yet, in a fluctuating post/colonial space, even the stasis of the parasite undermines the power of cartographic reason in transforming spaces, technologies and people into blank slates. It is resilient – it rings the echoes of colonialism in the fluid spaces of cartographic reason. The parasite persists in a world in meltdown; it lingers in space, gnawing at the structures which have been implanted into its domain. To understand such holes as ghosts – absences in the containing fabric, presences in its imperfection – is to understand the political potential of the parasite in reminding us of the impossibility of erasing heterogeneity, and the continuing presences of coformation. The realisation of that potential is in persistence, in creating frictions along the walls of stabilisation and by demonstrating the precariousness of infinite elasticisation. Sometimes these reminders are small – the sound of birdsong cutting through a walk, and the emotions that it brought to Magdalena, or the idea of a snake crossing a path,

which so horrified Vicki. And yet, sometimes, these reminders are poignant: Taylor reminded us – “*it has his name*” - that before 1842, Song emperors lived and died on the shores of Kowloon Bay, that the Hakka tribes remembered them and inscribed their story into a rock, and that this monument persists, cutting holes into the cartographic narrative of Hong Kong as a barren rock made up of numbers. Moments of dissonance perforate the myth that post/colonial spaces are not contested, that they are not empty, and that cartographic reason can ever eradicate complexity. Olsson writes:

“our thoughts and actions are governed by a form of cartographical reason, a mode of understanding which simultaneously tells me where I am and where I should go; to be sane is to know one’s way, to be crazy is to be lost. (Olsson, 2001: 255)

The empirics in this thesis have repeatedly revealed, however, that – despite what Olsson (2007) and Farinelli (1998) may say - our thoughts and actions are not entirely governed by cartographical reason. The distinction between sanity and madness – a trope which also influenced Foucault’s (2003a) work on biopolitics – is a fallible distinction, made simple by the abstracting power of cartographic reason, but dissolves the moment it enters the sphere of lived experiences traced through these stories. Situated in the moment, the instruments of cartographic reason have often been revealed to sit more closely with insanity than have the intuitive, local knowledges and affects produced through mobile mapping.

Most importantly, what this research has shown is that it is not in theory or in academic reasoning where we can necessarily discover what lies at the limits of predictability. Potential is not something which can be drawn – for when it is, the process of fixity has commenced - and the moment a gap becomes highlighted, it has already begun to be filled. Yet it is in the affective assemblages between people, spaces and technologies – situated *in* encounters - that the lingering after-effects of these pockets, perforations and openings can be seen winding themselves around speech-acts (which may, at first, appear ‘crazy’) and through which the multiple, not-yet-realised trajectories of navigating through the world seep into mobile mapping practices.

### **“And it has no idea what will happen next”: making room**

In 2015, I met Doreen Massey at the 7th Doreen Massey Annual Event at the Open University, which, for that year, focused on digital geographies. At that time, after fieldwork and while writing up, I was grappling with the consequences of my decisions during this

thesis. The combination of networks of theories, unreasonable fields and 'every-where' archives had, with the help of seventeen others, unintentionally turned something which was supposed to be a simple critical analysis into a manifesto for possibility, openness and potential. Massey and I had briefly bonded over both having an arm out of action due to injury, when, during the social after-function, I asked her about the possibility of infinity between two points and the limits of representation. If we cannot know what exists outside representation, I argued, but we know that it is lively, coeval and vibrant, could heterogeneity be found *inside* the lines and fixities of representation, at the indeterminate and unfixable infinity enclosed between two points. Massey looked at me strangely, and held up a finger to slow me down.

"I have a question," she said seriously, before pausing. "*Is it important?*"

I remember the rhythms of movement around me slowing down, the noise of the room muting as the sound of clinking glasses became isolated.

"It is," I said, buying for time. I knew – felt - that it *was* important, crucial even, but I had not yet managed to formulate the thoughts or the words to express that surety into communicable reason.

As I stumbled over my words and half-formed thoughts, she looked at me oddly.

"Send me an email," she said.

Post/colonial spaces are entirely drawn with lines, entire cultures written over by cartographies. Every day, people live inside these lines, redrawing them through making do, cutting through the grid and stretching the billow until it tears. Massey writes:

'The chance of space may set us down next to the unexpected neighbour ... that inevitable contingency which underlies the necessity for the institution of the social and which, at a moment of antagonism, is revealed in particular fractures which pose the question of the political.' (Massey, 2005: 151)

And so this openness also has to come from the impossible and paradoxical within – 'the chance of space' (Massey, 2005: 151), otherwise the fight over these spaces can't be reconciled without total annihilation of one force over another. In this, coformation has repeatedly appeared as the centrifuge around which forces, powers and hopes are formed.

Given the outcomes of this research, I would argue that key to this responsibility is making room for other voices within critical research, for surprise, disconcertment and the possibility of being derailed along the way. This is especially important in researching digital cultures in mobile mapping, and a word of caution for essentialising the power of the *digital* in digital

geographies, digital media or digital cultures. Where the algorithm may restrict and direct the flows of possibility and potential, looping inquiry into flow charts of action, the elastic and tearable nature of the monadic digital reveals heterogeneities of cultures, practices, uses, encounters and impacts. This could and should occur across the methodological, conceptual and empirical framings of future research into mobile mapping, cartographic practices and digital culture, with a firm emphasis on empirical, situated research.

In terms of empirics, this investigation has only focused on two cities – minutiae in the breadth of contemporary (post/colonial) urbanisms. What more could be found by expanding beyond the European and North American classics of urban studies into cities which signal the future of urbanism in central, southern and south-east Asia, in Central and South America, in Africa? What too of other non-urban spaces – remote island communities in the Pacific grappling with the effects of climate change on their shorelines, Indigenous communities struggling with industrial remodelling of landscapes in rural areas, impromptu refugee camps in border areas that define new spaces of inhabitation? With such questions, come the complications of generalising too far on questions of identity and space – what is the impact of socio-cultural and economic factors in everyday mobile mappings, if different people instigate different spatial, technological and embodied practices as they move, map and make-do in space?

This thesis attempted to pave one path to transgress the conceptual questions of boundaries, binaries, disciplines and theories. In this instance, success was defined by the opening up of questions, of making room, rather than providing clear future trajectories. It is possible, for example, to destabilise the need for binaries and for hybridisations by bringing contradiction to the fore. This has valuable and political implications for the way in which research is undertaken: to start listening, to value rather than evaluate in the first instance, and to find where the fetishisation of the object, the technological and the theoretical has resulted in an endless cycle of conceptualisation and naming. The potential of contradiction as a tool for understanding and helping the world is still yet to be wholly seen. The same is important in acknowledging the depth and heterogeneity of space and spatial practices. What I *can* say, however, is that the coformations of more-than-representational approaches and more-than-discursive practices – encompassing both material and representational qualities – sees a shift in understanding how power-knowledge relations work.

At this end, it is important to reemphasise some of the early stresses made at the beginning of this thesis, to pause and reassert a theoretical resilience towards analyses that seek

uniformity, generality and synthesis over multiplicity, possibility and simultaneity. On the project of a postmodern geography, Olsson (2001) states:

‘But there is a hole in the bucket. And that leakage explains why the bright hopes which initially were associated with the term ‘postmodern geographical praxis’ have all but disappeared. Quite understandable, though ... the (post)modern cultivation of the fragment runs counter to almost everything which is currently considered politically correct.’(Olsson, 2001: 263)

This thesis has primarily left us with fragments, for it is in fragments that possibilities are generated, hauntings perpetuate and everyday tactics swell against the stabilising and elastic tides of cartographic reason. The empirical data in this project suggests that such forces do not easily synthesize, that they do not hybridise, nor do they entirely subsume one another. Rather, they sit side-by-side, coforming and co-existing, constellating and assembling the everyday practices which require their translation into the finite room of communication, comprised of discursive speech-acts (this *or* that, one *or* the other). As de Certeau suggests:

‘Haunted places are the only ones people can live in – and this inverts the schema of the *Panopticon*.’ (de Certeau, 1984: 108)

Focusing on the lives of everyday people is to stare back at the panopticon from a different angle and to see multiple practices, forces and structures coforming around it. To be on the outside looking in, through windows or gates, is to question the normalisation of the centre, of the powerful, of the most visible: to question the totality of cartographic reason. In this way, this thesis defined analysis not by form but by the people who build and live inside the structures made by mappings, cartographies and the host of yet unnamed forces that give vitality to the world. This is perhaps one step to understanding the limitations and the potencies of epistemes that have perpetuated across space and time. So much of the cartographic scholarship outlined in Chapter 2 focuses on the potential of outside and the other, the counter, the abject and the exterior. Yet, there are also points of infinity inside the fold, sites where contradiction creates brief pockets of possibility. A future research agenda should give credence and space for these gaps *within*, the impossible materiality of the infinity between two points, that which can be calculated and classified, represented and fixed in maps and in numbers, but still is incomplete. In mobile mapping, little bubbles of the otherwise form in the process of folding, potent in potential reactivity, in which they burst, minutely and massively.

So. *Is it important?* I wish I'd been able to answer Doreen Massey then, as I answer now: Yes, I believe it is. It was important because each of the lives that I had encountered were important. The stories I had been told – from failed IELTS exams to secret gardens and disastrous river adventures were important to each of the people who told them. The magnetism of the landscape, and the potential of open space – in adventures, chores or excursions – was also important in the deep connections it made within the affective assemblages of mobile mapping. The vibrant, witty and cunning constructions, dismissals and deployments of technology by these people shifted everything I thought I knew about practices, cartographies and spaces. And the continued value of unreasoned affects, intuitions, embodiments and memories was potent in their minor confessions (from not being able to use maps to daydreaming about the inside of houses). It was important because every day secret speech-acts, ghosts and making do suddenly destabilised the foundations of cartographic reason, its imaginations, its dispositifs and its technologies in a way that I had not thought possible. *It has to be important, because there has to be hope.*

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# Appendix 1: Consent Form

The University of Manchester



## Research Participant's Consent Form

### Living the map

Research conducted by Clancy Wilmott, PhD Candidate at the University of Manchester

### CONSENT FORM

This form underlines your consent to participate in the research. If you are happy to participate please initial each box and sign the consent form below

	Please initial box
1. I confirm that I have read the Participant's Guide about the above study and have had the opportunity to consider the information and ask questions and had these answered satisfactorily.	
2. I understand that my participation in the study is voluntary and that I am free to withdraw at any time without giving a reason.	
3. I understand and agree that the interviews will be recorded in the following ways:	
• Audio-visual recording using a video camera	
• GPS tracking	
• Screenshots of mobile phone/tablet	
4. I agree that any data collected may be made anonymous and passed to other researchers	
5. I agree that any data collected may be made anonymous and published in academic books or journals.	

I agree to take part in the above project.

\_\_\_\_\_  
Name of participant                      Date                      Signature

\_\_\_\_\_  
Name of researcher                      Date                      Signature

## Appendix 2: Audio-Visual Release Form

### Living the map: mobile mapping in postcolonial cities

Research conducted by Clancy Wilmott, PhD Candidate at the University of Manchester

#### AUDIO-VISUAL RELEASE FORM

This form outlines your agreement for the footage recorded via video camera to be released in a non-anonymous format, to be used for academic presentations and publications. *You DO NOT have to agree to this.* Please tick one option, and sign at the bottom of the form. If you do agree, at the end of the form is a section (Attachment 1) where you can list all the footage that you *do not want released*.

---

##### Option 1

*I consent and agree that Clancy Wilmott, PhD Candidate at the University of Manchester has the right to take photographs or record audio/video of me (and/or my property) and to use any and all material subject to my further approval excluding that specified by me in Attachment 1 of this consent form, with my identity withheld, in any and all media, now or hereafter known, and for academic purposes. (See attachment 1).*

*I do hereby release all rights to Clancy Wilmott to exhibit this work in print and electronic form publicly or privately. I waive any rights, claims or interest I may have to control the use of my identity or likeness in the images and agree that any uses described herein may be made without compensation or additional consideration of me.*

---

##### Option 2

*I do not consent and agree that the Clancy Wilmott, PhD Candidate at the University of Manchester has right to take photographs or record audio/video of me (and/or my property) and to use these in any and all media, now or hereafter known, and for any purpose whatsoever.*

---

I am at least 18 years of age, have read and understand this statement, and am competent to execute this agreement.

Name: \_\_\_\_\_

Email address: \_\_\_\_\_

Signed: \_\_\_\_\_

Date: \_\_\_\_\_

**Appendix 3: Magdalena's moment (the birds)**  
(See attached disk)



**Appendix 4: Ben's discovery ('a really beautiful object')**  
(See attached disk)



**Appendix 5: Daren's secret (the back alley)**  
(See attached disk)



**Appendix 6: Sarah's dreams (the unfinished sky)**  
(See attached disk)

