ROYAL HOLLOWAY UNIVERSITY OF LONDON

DEPARTMENT OF GEOGRAPHY

PhD THESIS

MAPPING INTERFACES: AN ETHNOGRAPHY OF EVERYDAY DIGITAL MAPPING PRACTICES

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DECLARATION OF AUTHORSHIP

I, Michael Duggan, hereby declare that this thesis and the work presented in it is entirely my own. Where I have consulted the work of others, this is always clearly stated.

Signed: M. Duggan

Date: 3/3/17

ABSTRACT

This thesis examines everyday mapping practices in our digital age. It builds on an eighteen-month ethnographic study of a diverse group of participants, including walkers, cyclists and drivers, leisure seekers, artists, and amateur and professional map makers based in London and surrounding areas. The thesis responds to two primary aims: firstly, it addresses how contemporary mapping practices are embedded in the cultural geographies of everyday life; secondly, it investigates how digital technologies are affecting contemporary mapping practices, and ultimately everyday experiences of place. Drawing from literature on place, digital technology, critical cartography, cartographic practice, and everyday geographies, the thesis brings both an empirical and theoretical contribution to current studies of maps and map users, socio-technical practice and conceptualisations of place. Overall it highlights the tensions, possibilities and limits of our current socio-technical moment, in which digital technologies are becoming more and more intertwined with our everyday experiences of the world, and traditional mapping technologies

The dissertation also makes a specific contribution to ethnographic studies of mapping cultures, as well as ethnographically-informed digital methodologies. Ethnographic materials are framed through the concept of interface, suggesting that contemporary mapping practices can only be understood by unpacking the minutia of everyday life, the relational properties of place and the power of maps. The first of the thematic chapters in the dissertation explores how a theory of mapping interfaces can shed light on how practices of navigation have been affected by digital mapping technology. The second chapter focuses on the practices of map making in both an amateur and professional context. The third chapter discusses the performativity of contemporary mapping practices. The following chapter discusses the conceptualisation of place in the digital age and shows how the intertwinement of digital technologies and everyday practices demands novel ways of thinking about place. The dissertation concludes with policy relevant suggestions as to how we might think about maps and technology when considering work relevant to everyday practice and place in the future.

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CHAPTER 1

INTRODUCTION

1.1 The geographies of a digitalising world

The everyday practices and experiences of place, and particularly urban places, are becoming increasingly interwoven with digital technology, whether this be the technologies that run in the background of daily life, or those we grasp in our hands in the foreground of our daily routines. In many ways this is undeniable. Everyday life is now bound up in a vast ecology of algorithms, codes, software and digital devices, all of which come together to co-constitute the many spatialities of our daily experiences. The beeps, swipes, clicks and taps of everyday life have become the norm for a great many of us, as has the immediate access to vast amounts of digital information available to us on the personal devices which weigh down our pockets and bags. For those for whom this is not the case, life is increasingly marginalized, as access to digital information and digitalised services are today the metaphorical passports to the dominant socio-cultural and economic flows of contemporary life.

Certainly whether we are active, passive or reluctant users of digital technologies makes very little difference to the notion that the geographies of everyday life have been thoroughly shaken up by digital technologies. This is happening, and is likely to continue to happen, whether we like it or not. As a result, digital technologies need to be taken seriously when thinking about how our everyday geographies unfold. And indeed they have been by a number of geographers working in this field. It is now accepted that digital technologies are used to produce the spatialities of everyday practice, often automatically, from positions of power and implemented without contestation (Dourish, 2016; Kitchin and Dodge, 2011; Kitchin, 2016; Kitchin and Perng, 2016; Leszczynski, 2015; Thrift and French, 2002). However, where we must be cautious is in making grand assumptions about the ways in which digital technologies have, and will, come to affect our daily experience of places. Whilst studies detailing the impacts that digital technology has on our spatialities have been at the centre of recent geographical debate, surprisingly few investigations have been carried out from a bottom-up perspective, that is, from the point of view of those living these experiences day in, day out.

What I intend to demonstrate in this thesis is that there is no single framework which can be used to qualitatively assess the ways in which digital technologies have become intertwined with place, for place (and particularly urban place) is an inherently messy concept constituted by the entanglements of socio-technical spatial forces. Examining how digital technologies are embedded in the minutia of everyday life, I show, can help in garnering a better understanding of how the complex configurations of place unfold in an increasingly digital society. The main goal of this thesis is thus to highlight a novel way of unraveling the complexity of place in the digital age by unraveling the often unforeseen digital practices of everyday life.

1.2 Aims

I aim to do this by focusing on one particular set of digital practices that have seen unprecedented growth over the past two decades: digital mapping practices. Examining the impact of these technologies from the bottom-up, I will demonstrate, offers a novel way to examine how place is understood and experienced in the digital age. Maps have always tied people to places and places to people, but as I will argue, digital maps and the intricacies of contemporary cultural practice are complicating these ties. This is a timely object of research for it addresses these issues at a moment of transition, which is often characterised by an uncertainty about whether future (mapping) practices will be completely digitalised in one form or another. As such, this research uses empirical evidence to show how this period of transition is being lived out in and amongst the everyday lives of map users.

I will suggest, as have others, that digital mapping technologies have had a significant impact on the ways in which maps work on a technical level (Crampton, 2010; Graham et al. 2013). Maps are now more dynamic as a result, which does have an impact on how and why they are used and produced. Digital maps open users up to a plethora of immediately accessible spatial information, much of which has not been available before, and digital map makers now have a diverse range of tools and data sets at their disposal (Della Dora, 2012; Haklay and Weber, 2008). However, the main focus of this thesis will be to further this work by showing how digital technologies have not simply changed the form of maps, but also how and why they have become intertwined with cultural practices and everyday experiences of place.

Ultimately this thesis seeks to respond to two intersecting aims, which are of particular relevance to the discipline of geography and in line with the broad interests of Ordnance Survey. Firstly it aims to explore how contemporary mapping practices are

embedded in the cultural geographies of everyday life. Secondly, it aims to examine the effects that digital technologies have on contemporary mapping practices, and everyday experiences of place. Cumulatively I hope to provide the much-needed empirical detail that is often called for in geographical studies of everyday mapping practices (Dodge et al. 2009; Kitchin et al. 2013), and in geographical studies of digital technology and place (Ash et al. 2016, Rose, 2016).

It will do this by examining the contemporary mapping practices of walkers, commuters, cyclists and drivers, as well as the mapping practices involved in novel forms of leisure activity (geocaching), artistic practice and cartographic production. I will use these practice-led groups to offer a unique insight into what contemporary mapping practices are, showing that they are increasingly digital but not necessarily universally so. Between October 2013 and May 2016, I carried out an extensive ethnographic study of these groups, the majority of which was based in London and the South East of England. London has often been characterised as a complicated place made simpler by the use of maps (see, for example, Vertesi, 2008). Whether it was the once popular A-Z map books, London underground maps or the reliance on the spatial knowledge of a black cab driver, maps of one form or another have long mediated the everyday experiences and understandings of the city. This makes it a suitable site for research on the ways that digital maps affect these contemporary experiences and understanding of the city. Moreover, the contrast provided by my research outside of the city will act as an interesting comparison that shows how different geographies affect the use of maps in everyday life.

1.3 Thesis outline

Reviewing literature from a wide range of disciplines and sub-disciplines, chapter 2 shows where my research contributes to the existing debates and concerns of this scholarly landscape. The chapter brings together critical literature concerning maps and mapping practices, digital technology, everyday practice, and conceptual notions of space and place. My research is grounded in cultural geography, and thus contributes to a discipline that has long been interested in understanding the relationships between people and place (Crang, 1998; Cresswell, 2004; Jackson, 1989; Massey, 1994, 2005) and more recently practice (Lorimer, 2005; Ogborn et al. 2014). Moreover, it also follows the discipline's tradition of speaking to a far wider spectrum of social and cultural studies, including that of critical cartography, media and communication studies, (digital) anthropology and (digital) sociology. In particular, I use this chapter to

position my research against the backdrop of geographic work on digital technologies, which all too often neglects the bottom-up perspectives of empirically-led ethnographic enquiry, and thus to the calls to address this gap in knowledge (Ash et al. 2016; Dourish, 2016; Kitchin, 2016a).

In chapter 3 I present the methodology for my research. Specifically, I detail the sites, participants and processes of my ethnographic research. In addition to covering these details and justifying my method of study, I also wish to make an argument about the practices of doing ethnography in digital cultures. I argue that ethnographies of digital cultures should take a holistic approach to studying how digital technologies are intertwined with everyday life. I make this argument with specific reference to Internet-connected mapping technologies. It is not enough, I suggest, to simply apply ethnographic techniques to studying the screen spaces of Internet-connected technologies. Instead, and alongside others in the fields of media and communication (Moores, 2012) and anthropology (Horst and Miller, 2012; Pink et al. 2015), but not yet widely done in geography, I detail the processes behind a 'digital ethnography', which suggests that digital technologies need to be studied from the perspective of the cultural contexts in which they are used. By doing so I make a much needed geographic contribution to ethnographic studies of digital cultures.

The remainder of this thesis falls into four intersecting thematic chapters, which cumulatively explore the people, practices, performances, contexts and technologies that constitute contemporary mapping practices, and everyday experiences of place. A theoretical chapter (chapter 4) is used to frame the remaining empirical chapters (chapters 5, 6 and 7).

In chapter 4 I introduce *mapping interfaces* as a theoretical framework for understanding everyday encounters with maps. I develop a theory which suggests that mapping practices are zones of possibility and limit in which the materiality, representation and performativity of mapping encounters should all be taken into account. This approach, I argue, enables a holistic discussion about digital and non-digital mapping practices, whilst at the same time providing the space to explore what is and is not novel about digital mapping practices. Adopting concepts from theories of the interface, I argue that a framework of mapping interfaces can provide us with a novel vocabulary and perspective from which the practices of contemporary maps may be understood. In developing this framework, I intend to move the research about maps away from a representational analysis towards a post-representational understanding of mapping encounters, which asks that we examine mapping practices as context specific

processes with their own internal performances and hierarchies of power (Della Dora, 2009; Kitchin et al. 2013; Lammes, 2016; Perkins, 2008).

In chapter 5 I use the theoretical framework of mapping interfaces to explore contemporary practices of map making. Describing the sites and practices of production in both professional and amateur map making environments, I argue that contemporary cartographic practices are constituted by complex socio-technical processes in which digital technologies are heavily intertwined. I demonstrate how amateur and professional map making is always open to the possibilities and limits of the technology and cultural contexts in which these practices take place. In specific regards to amateur practices, which have become increasingly popular in recent years, I suggest that map making has become a highly dynamic process. As such, it enfolds the political practices of co-authorship and co-working as well as enthusiasm, morality and digital technology. In this chapter I also describe the shifting power dynamics of map making, arguing that contemporary map making often unfolds in contexts whereby a neutrality of map making is assumed, and frequently championed. Ultimately I use this chapter to illustrate the role that digital technologies play in contemporary map making and offer an alternative perspective to that of the cartographer as a lone elite figure. By doing so, I provide empirical evidence that further documents the complex relationship between politics and web 2.0 mapping technologies (Haklay, 2013; Lin, 2013; Perkins, 2014).

In chapter 6 I continue to explore mapping interfaces, this time from a user's perspective. Here I focus on the performativity of maps and mapping encounters. Using examples taken from my ethnographies of road cyclists and rural walkers, I demonstrate how the performative capacity of maps unfold in a zone of possibility and limit constituted by socio-technical and socio-material coming-togethers. I suggest that maps have an agency beyond their representational form, which has the capacity to effect the socio-spatial, corporeal and gendered identity performances of everyday practice. Encounters with maps, I argue, should not be simply understood as what one does with a map, but rather should be understood as encounters constituted as culturally rich engagements with the world and others.

In chapter 7 I return to the question of how digital technologies have become intertwined with everyday experiences and understandings of place. The chapter takes focus on conceptualising place in a digitalising world, and uses empirical examples from my ethnography with walkers, drivers, geocachers and 'armchair geographers' to demonstrate what everyday life in a digitalising world might look and feel like for those living in it. I develop a notion of place that is constituted by the messy entanglements of

socio-technical and socio-material mapping practices which are threaded together in the locations, locales and experiences of everyday practice. In specific reference to the experience of place, or one's sense of place, I suggest that in a digitalising world we increasingly tune and tweak the technologies we use in order to suit our own preferences. Ultimately, I use this chapter to make a specific contribution about place in the digital age, which builds on conceptualisations of place as a relational site of practice (Agnew, 1987, 2011; Massey, 1994, 2005).

In conclusion, chapter 8 draws together the thesis by paying particular attention to the ways forward in thinking about the intersection of place, digital technology and mapping practice for future research, design and policy. Although this thesis is intended for both academics and policy makers, this particular chapter speaks directly to the Ordnance Survey's interest in understanding the contexts of everyday mapping practices. By doing so it demonstrates how examining culture and practice can reveal insights into how life in a digitalising world is lived, which can then be used to complement or inform broader debates, designs and policies around digital mapping technology and everyday life. In urging policy makers, map designers and technologists to take these claims seriously, I provide some suggestions as to how these groups may think about their own future practices. I briefly layout some theoretical considerations before showing how this empirical study can be used in practical terms.

CHAPTER 2

SPATIALISING DIGITAL TECHNOLOGIES

This thesis brings together research on maps, digital technology and the places of everyday life. It contributes primarily to ongoing debates in human geography and critical cartography, but also to (digital) anthropology, media and communication and (digital) sociology, which all have shared interests in these aforementioned themes. In this chapter I outline some key areas within this broad body of literature. Specifically, I draw attention to the gaps in the literature which this thesis aims to address.

The chapter is split into three sections. In the first section I place this thesis within studies on space and place. Specifically, I show where it sits within recent scholarship that conceptualises space and place as relational. The second section outlines how thinking about digital and Internet technologies has moved on from exploring the possibilities of 'virtual geographies' to examining the multifarious geographies that an expanding range of digital technologies have now come to produce. In the third section I show how digital mapping technologies have been fundamental to this shift. I highlight research which suggests that GPS, mobile and Internet mapping technologies have been instrumental in understanding how digital and physical spaces have become blurred, and what effect this has on our experiences of place. The final section describes the new mapping epistemologies that have arisen from this work, as well as that of practice led research. Overall, it shows how critical scholarship has moved on from considering maps as static and simply representational objects to a point where mapping practices are now thought of as context dependent cultural performances.

Before I begin this review, it is worth making a note about my use of the term 'digital technology'. The term is anything but specific, which continues to make it an ambiguous and therefore problematic term for research. For instance, digital technology could be used to frame discussions about standalone digital clocks and calculators inasmuch as it could be used to frame discussions about laptops, mobile phones, tablets, servers, vast networks of fiber optic cable and logistical systems. These are all electronic technologies, but they all do different things which affect the geographies of the world in different ways. The difficulties of defining 'the digital' have been well documented (see Berry, 2011, 2014a, 2014b; Horst and Miller, 2012; Kitchin and Dodge, 2011). The term is slippery and has become difficult to grasp, which has been

reflected in the many ways that it has been referred to in academic research and general discourse. Etymologically, 'digital' (digitus – digitalis) refers to a binary of bits consisting of 1s and 0s. Originally, it indicated a way of computing or counting numbers and processing numerical information. Nevertheless, as David Berry (2014a) makes clear, in the contemporary world 'the digital' is rarely defined or experienced as such. Rather, it is now defined and experienced most commonly as the screening user interfaces that increasingly populate our everyday practices. For much of the research focusing on digital cultures, which I outline in the following sections, 'the digital' *is* the smartphones, laptop computers, tablet devices and the internet. For the most part, studies of 'the digital' do not refer to the study of counting numerical digits but rather pertain to the phenomenological, visual, haptic and material affects of software loaded upon and represented through hardware.

2.1 Space and place

One could be forgiven for thinking that the concepts of space and place constitute human geography's greatest binary. The terms are frequently debated, both theoretically and practically, across the many sub-disciplines of human geography (Agnew, 2005). It could be suggested that any geographic discussion, once stripped back, has its roots in the debates over space and place. This thesis is no different, for ultimately it presents empirical evidence about contemporary mapping practices in order to make a contribution to a body of work interested in understanding how the spaces of society are produced and lived. In doing so, it makes a particular contribution to the study of place.

Defining place remains fraught with difficulties despite its wide spread use within the discipline of geography and beyond (Agnew, 2011; Cresswell, 2004). At the time of writing, the word has nineteen dictionary definitions (Oxford English Dictionary, 2016) which cover a wide spectrum of potential usages ranging from broad referrals to geographic space and scale, to specific references to individual sites, embodied states of being, and to the ways in which objects can be ordered. Place may, for example, be used to refer to London, the U.K. and Europe in as much as it may be used to convey a state of mind or to the correct placing of an individual component in the manufacture of goods on a production line. Indeed, whilst geographers have claimed place as their specific area of study, the term has frequently been contested and debated within and outside of the discipline. Yet, how is place different from and related to space?

Euclidean space and humanistic geography

Madanipour et al. (2001) note the popular tradition to treat space and place as unproblematic obvious realities: according to this tradition, space is a surface on which things happen at various locations (places). Throughout much of the twentieth century, this was also the favoured approach within the discipline of geography, particularly throughout the oft-quoted 'quantitative revolution' of the 1950's and 60's (see, for example, Hägerstrand, 1967; Haggett, 1961). Places were synonymous with locales. They rested on an absolute (or Euclidean) conceptualisation of space. Such thinking determined space as a fluid entity to be filled, and place as immutable, something that remained static within space. This understanding of the space/place binary meant that much of post-war geography focused its efforts on a quantifiable model of spatial socialisation. In this period, geography referred to *where* people and things were; it often represented their distribution on maps, rather than exploring on the dynamic relationships between people and things, which is the focus of much of contemporary geography.

Running parallel and in contrast to these ideas were those put forward by the humanistic geographers of the time, most notably Yi-Fu Tuan (1977) and Edward Relph (1976). Whilst accepting the idea that space is an absolute and abstract geometric dimension, humanistic geographers sought to examine what it was that made places unique within Euclidean space. Tuan and Relph redefined the concept of place as much more than simply a site or location of spatial practice. Using a phenomenological approach, they argued that places were locations found within space that had meaningful associations attached to them. Tuan (1977) noted that such meanings could be derived from either the sensory experience of locale (interpreted by the individual), or the signs, symbols and culture disseminated from a collective group. In this thesis I draw upon Tuan's initial ideas about meaningful locations in order to make an argument about how digital technologies might affect a sense of place.

Tuan's approach plays on the tension between space and place and asks us to examine the philosophical arguments underpinning the two concepts. Tuan insisted that space and place could not be separated, for the two are mutually constitutive. Nevertheless, his understanding of the binary presents two halves of a whole in which the forces at play are not always equal. For Tuan, it is place which acts according to the rules set by space. Place, in Tuan's assumptions is something which happens within space; as a result of space, after space (Anderson, 2010; Casey, 1997; Harvey, 2006).

Put differently, Tuan understood space as a container to be filled with sites of meaning, or places.

Although for Tuan the concept of place is far more than simply stable points on a map, his ideas suggest that place remains conceptually stable for as long as the meanings associated remain so (Dovey, 2010). As others have come to demonstrate, this static positioning of place highlights a flaw in Tuan's approach, for it does not account for the relational properties of place or space that scholars have since focused on.

Thinking space and place relationally

The origins of this relational approach to space can be traced back to the philosophy of Gottfried Wilhelm von Leibniz, which was appropriated by Henri Lefebvre (1974, 1991) and later by David Harvey (1989). Lefebvre argued that space is produced between lived practices, representational practices and practices of representation. These theories ask for a constitution of space that is based on the relations between objects, rather than imagining it as a container in which objects act. As noted by Agnew, space is not an entity in itself. Rather, it 'is entirely parasitic on the relations between objects and events occupying places. Space thus exists because of relations between sites at which events and objects are located' (2005, p. 84). Crucially these relations, often termed 'spatial flows', are products of the socio-material systems in which they act (Jones, 2009). Moreover, these flows need not only be produced actually, for example between people and materials. They can also be both representatively and representationally produced, for instance through word of mouth and media depiction (Massey, 2005). The ways in which spatial flows between objects and people are constituted and what such makings mean in situ have been the focus for much of contemporary geographical thought.

For a relational approach of space to work, the assimilation of place must also become relational as the binary of space/place dictates that space and place act and react in a mutually constitutive fashion (Casey, 2001; Massey, 2005; Preston, 2003; Soja, 1989; Watson, 2003). If one is to re-think space, then they must also attend to place. Adhering to this, place, like space, must also be understood as progressive, dynamic, multi-scalar and open to interpretation (Agnew, 2011; Cresswell, 2004; Massey, 1994, 2005). With this relational approach in mind, geographers have sought to rethink notions of place as more than simply static nodes in relational spatial networks.

John Agnew (2011) suggests four ways in which geographers have commonly referred to place. The first of these is the neo-Marxist perspective, which utilises

Lefebvre's (1991) conceptual triad of space to suggest that places are the lived experiences of space.[1] The second is the humanist perspective (outlined above), which asks that we understand place from the perspective of those that inhabit it (see Relph, 1976; Seamon, 1979; Tuan, 1974). The third is the feminist perspective, which seeks to dispel grand theories of place in favour of understanding the real-world social relations which create places for particular individuals and cultures (see Massey, 1994). The fourth, which is similarly interested in the social relations that constitute place, is grounded in a performative perspective (see Cresswell, 2004, 2006; Massey, 2005; Thrift, 1999). This perspective explores how multiple (and increasingly global) spatial flows come together both tangibly through socio-material formations and relationally through social, cultural, political and economic flows to produce places.

Straddling these perspectives, Agnew (2011) suggests, is the assumption that place can be described both singularly and collectively as a location, a locale and a meaningful site. Alongside these ideas, which I discuss in detail in chapter 7, geographers Doreen Massey (1994, 2005) and Tim Cresswell (2004, 2006) have been instrumental in re-conceptualising place in contemporary thought. Most notably they have demonstrated how relational global forces challenge the traditionally static approaches to thinking about place. For instance, the seminal essay, 'A Global Sense of Place' by Massey (1994), marked a necessary departure from place as a state of permanence by asking us to go further in re-thinking place as a relational entity in a globalising world. Using Kilburn High Road in northwest London as an example, Massey illustrated how place could be described as messy, fragile and always coming into being. The location of Kilburn High Road may have certain topographical permanence, she noted, but the global processes which come to form the everyday experience of this place are anything but. In her later work, Massey came to define place as having a sense of 'throwntogetherness' about it (2005, p. 13). Similarly, Cresswell (2006) put place into contention with mobility, arguing that theories of place must take into account the macro and micro movements of the world. In doing so, both scholars went beyond humanistic traditions and distorted topographical understandings of place in favour of a topological perspective (Jones, 2009). They saw no stasis in place, for place was all but a brief pause in a time-space trajectory. In this regard, it was suggested that place is forever in the present (Anderson, 2012). These ideas build on

[1] Lefebvre never actually uses the term 'place' in his writing. Rather he refers to 'concrete' or 'lived' space, which scholars have since appropriated as 'place'.

[2] Web 2.0 mapping technologies (see O'Reilly, 2005) such as crowd sourced mapping projects are also b

Tuan's early assumptions of place in that location and meaningful attachments to location are relationally constructed.

In more recent works, flat ontologies have been used to further expand these notions. Ben Anderson (2012) for instance, understands place as an assemblage in which 'material objects, living things, and natural processes, alongside the practices, cognitive responses, and emotions that produce and are produced by this intersection' come together at momentary instances (2012, p. 574). Similarly, Tim Ingold's (2007, 2010, 2015) ideas of 'meshwork' suggest that places are the resulting entanglements of human and non-human action. In regards to this work, place is the nexus at which the coming-togethers of spatial relations are momentarily formed.

Ultimately, I draw from much of the above in understanding place as an always-emerging site of dynamic interaction that unfolds between people, things and practices in the ongoing production of space. Places, I suggest, are not static but rather always coming into being as they intersect with new spatial and relational flows and fall out of line with others. In this sense I am in accord with much of British human geography, for place and places are now rarely studied without considering how they relate to other places, flows, materials and spatial processes.

2.2 From virtual geographies to augmented geographies

Both conceptually and concretely, place has been examined in great detail in many studies that seek to understand the impacts of digital technology on everyday life (Coyne, 2010; Ito et al. 2005; Horst and Miller, 2012; Kitchin and Dodge, 2011; Mains et al. 2015; Meyrowitz, 1986; Moores, 2007; 2012; Wilken and Goggin, 2012). In demonstrating how digital technologies of various kinds can affect understandings and processes of place, the authors of these studies ask us to question what has become of place in the digital age. Digital technologies, they argue, have further complicated conceptual notions of space and place to such an extent that they warrant scholarly attention.

In the 1990's theories determining the 'death of distance' became a popular way to discuss and frame the geographic effects of digital technologies such as the Internet, for it appeared to warp and stretch how we understood the spaces and places of everyday life (Graham, 1998). More recently, however, scholars have refocused their attention on the relational effects of digital technology that take into account their impact on the topographical and topological geographies of everyday life (Jones, 2009). In other words, where it was once said that digital technologies would facilitate 'virtual

geographies' in 'online' space (Batty, 1997; Graham, 1998), we are now aware of the impact that these technologies are having on a multiplicity of geographies in both the online, offline and in-between spaces of everyday life (Dutton and Graham, 2014; Kitchin and Dodge, 2011; Mains et al. 2015; Starosielski, 2015). In many cases there is no longer anything 'virtual' about using digital technologies in everyday life, for it is too simplistic to suggest that digital technologies constitute only virtual events. Rather, as it is frequently shown, digital technologies now co-constitute many of the actual events, spaces and embodiments of everyday life (Thrift and French, 2002; Hansen, 2006; Hine, 2015; Kinsley, 2014; Kitchin and Dodge, 2011; Wajcman, 2015).

Rob Kitchin and Martin Dodge (2011), for example, have shown how everyday spaces such as the airport and the supermarket can no longer operate in the same way without digital technologies. To remove the technology, which these spaces rely on, would radically transform them into vast warehouses unable to process and transport the movement of people, goods and money. Lines of code, software and hardware, they suggest, *transduce* these spaces. Kitchin and Dodge suggest that such are spaces mutually constituted by code and the spatiality of everyday life, and thus can be defined as 'code/space'. Moreover, these authors suggest that code/spaces are increasingly indicative of many of the spaces of modern life. As I will make clear in this thesis, the coming together of digital technologies and mapping practices are also capable of producing variations of code/space. For example, Kitchin and Dodge use the term 'coded space' to describe spaces which are heavily, but not fully reliant upon digital technologies to function. These include spaces such as the lecture theatre, which although now heavily intertwined with a variety of digital technologies, could still be used to give a lecture, if these technologies were to suddenly fail.

Offering an alternative view, other scholars have focused on the ways in which digital technologies have come to co-constitute the embodied spaces of everyday life. Christine Hine (2015), for instance, has focused on how the 'virtual' spaces of the Internet have become entangled with the embodied experiences of everyday social practice. In her study of online peer-to-peer market places (e.g. Freecycle.com), she found that the embodiments and emotions towards these practices changed at various stages of these online/offline transactions. For instance, during online browsing and exchanges of money, Hine found that buyers and sellers had different and subtler forms of anxiety than when these exchanges spilled out into the physical practices of exchange (for example when buyers or sellers requested to collect or sell goods seen online in person).

Cumulatively, these authors suggest is that much of contemporary life now unfolds in the blurry spaces of contact between the (digitally processed) 'virtual' and the 'actual'. As a result, these scholars are intending to distance themselves from the common assumption that digital technologies and the Internet produce 'virtual' spaces which we can traverse independently of our physical and material geographies (Kinsley, 2014). Scholars from across the social sciences have defined this notion of blurred space in various ways, with reference to both the Internet and digital networked technologies more broadly.

Media scholars Nick Couldry and Anna McCarthy (2004), for example, use the term 'media space' to refer to the ways in which digital media devices augment experiences of place, scale and culture. Citing the ways in which the television, mobile phones and the Internet create new spaces of practice, they argue that media technologies have specific effects on the spatial arrangements of people and culture. The use of mobile phones, they suggest, has created new ways of being and socialising in public and private space. Similarly, they argue that inflight entertainment systems have transformed the social practices of close proximity air travel.

Adriana de Souza e Silva (2006) uses the term 'hybrid spaces' to refer to the physical spaces in which online communities and practices are played out. Moving the discussion away from media as broadly conceived (see Couldry and McCarthy, 2004), de Souza e Silva attempts to close, or at least narrow, the gap between what happens 'online' and what happens 'offline'. As a result, her research has a particular focus on the physical practices of Internet users.

As mobile technologies such as the smartphone, tablet and laptop have become increasingly popular, scholars have sought new ways of referring to the blurring of the 'online' and 'offline'. Laura Forlano (2009), for instance, has used the term 'codescapes' to refer to the ways in which the spaces of everyday life have become layered with wireless digital information networks (such WIFI and 3g/4g mobile phone networks). She argues that this technology has fundamentally altered *where* the blurring of 'online' and 'offline' space takes place. Building on this, Graham et al. (2013) have used the term 'augmented realities' to define the ways that mobile technologies augment physical space with real-time and contextually specific information about user locales. With reference to mobile mapping applications, they have shown how a user's 'offline' locale can be layered with a rich and dynamic set of 'online' data. By doing so, they argue that digital technologies may increasingly be used to augment the realities of our everyday spatial practices. The key question being asked by this literature is to what

extent this nexus has provided us with new ways to augment, enhance, and experience the spatial realities of the human experience (Lindgren, 2014). Ultimately, the vision painted by scholars of technology in the 1990's (see Rheingold, 1991, 1993; Turkle, 1995), of a world in which we would live out life in the spaces of the 'online' or 'virtual' realm has hardly come into fruition (Frith, 2012). It is clear that, for the most part, we live out our lives in the material world with digital accompaniments, rather than digital replacements (Couclelis, 2007; Lindgren, 2014). This has prompted some to call for a shift away from the online/offline, real/virtual dichotomies that have structured our relationship to digital technology over the past two decades (Floridi, 2015). Whereas some have suggested that the move away from desktop computing to mobile computing could be responsible for these changing attitudes (Farman, 2012; Frith, 2012), others have argued more directly that it is time to pay more attention to the materiality of digital technologies, for it is the very matter of these devices that traverses such dichotomies (Kinsley, 2014; Parikka, 2015; Pfaff, 2010; Starosielski, 2015). This thesis makes a contribution to both of these strands of thought. With regards to the former it provides evidence to suggest that mobile mapping technology is continuing to blur the boundaries between digital and physical space, and in reference to the latter it shows how the materiality of mapping technology is tightly interwoven with social and spatial practices.

2.3 Digital mapping technologies

Collectively, digital and Internet mapping technologies such as mobile mapping apps, satellite navigation systems, crowd-sourced web-based mapping and alike have been described in terms of a 'neogeography' (Turner, 2006; Wilson and Graham, 2013a, 2013b), 'volunteered geographic information (VGI) systems' (Elwood, 2008; Goodchild, 2007; Zook et al. 2010), 'locative media' (Frith, 2015; Wilken and Goggin, 2014) and 'location based services' (Schiller and Voisard, 2004). Neogeography and VGI refer to the ways in which digital and web-based mapping technologies have made novel forms of cartographic production and consumption possible. Web 2.0 mapping technologies such as OpenStreetMap, which I explore in chapter 5, are included in this bracket. Locative media and location-based services refer to a set of GPS based technologies, which locate and represent their user's position on a digital map. Using digital mapping applications, or applications which have a mapping function, on mobile devices such as a smartphone would most often constitute using locative media or a

location-based service. Throughout this thesis I explore various practices in which these technologies are now a part of.

Kitchin et al. (2016) claim that all of these mapping technologies are multifarious and often overlapping. Indeed, they suggest that we frame these technologies simply as 'spatial media', for this phrase encapsulates the fundamental properties which these technologies share. Alternatively, others have argued that these technologies and associated practices constitute a 'geoweb' (Haklay, 2008; Hanke and Seefild, 2007), which emphasizes the significance of the Internet in the working of these spatial technologies. Given its broad empirical aim to study 'contemporary mapping practices', my study contributes to debates which encompass all of these terms. The decision to use variations on 'digital mapping technology' to cover these technologies deliberately came from my empirical approach to observe and engage with everyday mapping practitioners, for whom 'digital maps' were far better understood and described than any of the aforementioned terms. I continue to use this non-specific approach to defining digital mapping technologies throughout this thesis with the aim of making a broad argument about contemporary mapping practices and not specific arguments about one particular type of mapping technology or spatial media.

Maps and mobile technologies

GPS and mobile mapping technologies have had a large part to play in the move away from a focus on offline/online, virtual/real dichotomies. Indeed, it could be said that we now live at the nexus of the material and the virtual world, in which the digital devices we carry in our pockets and bags act as the mediators between them (Farman, 2012). The smartphone in particular has offered novel ways of experiencing and interacting with the world, which has encouraged many to explore the possibilities of these devices in relation to the spatial, temporal, social and cultural practices of everyday life. For instance, Ito et al. (2005) gave numerous examples of how early smartphones had become folded into the nuances of Japanese culture. These range from the ways that mobile devices afforded practices of selected sociability amongst family members, youth identity performances between friends and playful commuter routines. Alternatively, Melissa Gregg (2011) showed the extent to which smartphones had become embedded in the cultures of work practices, including how these devices had come to be used informally at work to structure leisure practices and formally at home to structure work practices.

With the arrival of Android devices and the iPhone in 2007, others have continued to investigate how smartphones become intertwined with the social, mobile, embodied and sensory practices of everyday life (Farman, 2012; Frith, 2015; Goggin and Hjorth, 2009; Wilken and Goggin, 2012). Ultimately, all of this work highlights how these devices help facilitate subtle and culturally specific variations on what Manuel Castells (2000) calls 'a new space of flows', in which time and space are understood in topological rather than topographical terms (Verne, 2013). This thesis makes a contribution to this body of work by providing further evidence to show the significance of the smartphone in contemporary British culture. Specifically I highlight the intimate intertwinement between smartphones and contemporary British mapping cultures.

Mobile technologies have been at the forefront of bringing digitally represented spaces into contention with physical spaces. The portability they offer has afforded the possibility to think and experience the blurring of the 'online' and 'offline' in ways that desktop-based machines could not do so easily. Smartphones, location-aware applications and satellite navigation devices, for example, have all become extremely popular technologies that do exactly this. In a variety of contexts they all overlay physical spaces with layers of digital information, which help dispel assumptions that digital information and hardware is somehow disconnected from physical space.[2] Research has made this especially clear with reference to everyday practices of navigation (Rehrl et al. 2007), location specific web searches (Frith, 2015), the spatial practices of public space (de Souza e Silva and Frith, 2010) and the spatial practices of social media users. Notably, Adriana de Souza e Silva and Daniel Sutko (2011) have argued this transition to ubiquitous mobile technologies has blurred not only digital and physical space, but also changed the ways in which communication is spatially produced. Using the example of location-aware social media, they suggest that the spatialities of social practice are being reconfigured in novel ways due to the affordances of these technologies.

There is a growing body of work which suggests that this transition to mobile technologies has implications for how we now use and understand maps in everyday practice. Graham et al. (2013) and Eric Gordan and Adriana de Souza e Silva (2011), for example, have all stated that mobile mapping applications offer novel possibilities of interacting with the physical and social environment. The 'augmented realities'

[2] Web 2.0 mapping technologies (see O'Reilly, 2005) such as crowd sourced mapping projects are also of note here for they have allowed a great many people the opportunity to contribute to digital maps and therefore blur that connection between actual practice and virtual representation.

(Graham et al. 2013) and 'net-localities' (Gordan and de Souza e Silva, 2011) now available to mobile map users have arguably changed the way we understand and experience the locales of everyday life. In offering a critique of this growing trend to augment our spatial practices, Graham et al. (2013) argue that experiences of place are increasingly being underwritten by the forces of a powerful few technology companies. This offers a novel take on what critical cartographers have been saying about the power of maps for nearly three decades (Crampton, 2001; Crampton and Krygier, 2006; Harley, 1989; Pickles, 2004; Wood and Fels, 1992). While the augmentation or layering of locale by information technology is not necessarily anything new - literary, musical and graphic information has long augmented our experiences of space and place (see Scannell, 1996; Jensen, 2010) – Graham et al. (2013) make the point that digital screen technologies offer something much richer. For instance, they are often highly visual, offer interoperability, are produced in real-time and are interactive in design. Such devices are also increasingly prevalent, which has had the effect of normalising the kinds of augmentations that they offer. Nigel Thrift has written about the ubiquity of these screening technologies, arguing that everyday life is now constituted by an 'ecology of screens', which we use for 'communicating, informing, entertaining, affecting life, simply providing ground' (2005: 233). Since his time of writing, digital maps have become increasingly prominent in this ecology of screens, and can now be seen to be used by millions of people around the world. In 2016, Statista estimated that there were 4.61 billion mobile phone subscriptions worldwide, 2.1 billion of which smartphone subscriptions. In reference to mapping applications on these smartphones, Nielsen estimates that Google Maps is the most popular, and the fourth most popular smartphone application overall behind Facebook, Facebook Messenger and YouTube with an average of 105, 749, 000 unique users per month.

Maps and the Internet

The Internet has arguably had a greater impact on maps than mobile technologies. This is partly because mobile technologies often rely on the Internet to work properly, but it is also because the popularity of the Internet, which was well underway before the advent of the smartphone, ushered in new epistemologies of mapping practice (Crampton, 2009b; Dodge and Kitchin, 2013; Gartner, 2009; Wood, 2003). From initial basic GIS beginnings to wide spread web-based participatory applications, the Internet has opened map making up to wider audiences (Elwood et al. 2012), provided new insights into how and why we use maps in everyday life (Lin, 2013; Wilmott, 2016a),

encouraged map users to become map makers (Crampton, 2009a; Dodge et al. 2009; Elwood, 2010; Turner, 2006) and broadened our geographical imaginations about the world (Della Dora, 2012). This thesis provides further evidence to support all of these claims. Nevertheless, there is still much debate over how much has fundamentally been changed by this technology in terms of where the politics and power lay in web-based maps (Burns, 2014; Crampton, 2009b; Dodge et al. 2009; Haklay, 2013; Perkins, 2014; Pickles, 2004). It is often argued that web-based maps have changed the form, but not the function of maps as tools used to represent the interests of a powerful few (Crampton, 2010; Haklay, 2013). This is despite the prevailing positive statements that are often made about web-based mapping practices, both in the press (Bell, 2014; Michael, 2014) and in academia (Chilton, 2011; Turner, 2006; Wilson and Graham, 2013b). Where this thesis makes a contribution in this regard is in providing empirical details of web-based map users and web-based map making cultures. On the one hand, the evidence presented further supports the claims that web-based mapping reproduces historical cartographic epistemologies. On the other hand, however, it also shows that these claims can become complicated when taking into account the specific cultures in which contemporary mapping practices take place, particularly when examining how and why certain web-based maps are being made.

Digital technology and everyday life

As Mazmanian et al. observed, 'while a number of scholars have explored the evolving relationship between technology and society in such an "information age," they have typically not addressed the micro-practices that individuals engage in when using wireless communication devices' (2005: 2). Indeed, research focusing on the everyday impacts of digital technologies seldom includes material taken from empirical research, which looks at the minutia of life in the digital age. For example, while Rob Kitchin and Martin Dodge (2011), Agnieszka Leszczynski (2015) and Nigel Thrift and Shaun French (2002) develop exemplary theories on the everyday spatial practices of the digital world, they do so using anecdotal examples and secondary sources, rather than using their own empirical research.

There are frequent calls to address this issue (see Ash et al. 2016), which reflects the broader concern that studies of everyday life are all too often desk-based, rather than field-based endeavors. As Wayne Brekhus suggests 'people's everyday, practical, routine and mundane practices have all too often been left unmarked, unaccented, and taken for granted in the pursuit of more abstract, theoretical generalisations about social

life' (1998: 36). It is often suggested that more attention must be paid to the practices of everyday life if we are to begin to understand broader social and cultural issues (de Certeau, 1984; Pink, 2009, 2012; Sherringham, 2006; Shove et al. 2012). Although noting that the everyday provides the context for much social science research, Sarah Pink (2012) suggests that the mundane subtleties continue to go unexamined, resulting in studies of the everyday that have little relevance to the intricacies of day to day life.

To examine everyday life in the digital age, empirical research is increasingly turning to 'digital methods' which apply digital technologies to the study of digital culture and practice (Rogers, 2013). Of these methods, 'digital ethnography' has been a favourable approach for those with an interest in ethnographic studies (Horst and Miller, 2012; Pink et al. 2016). This method has been particularly successful at studying the intricacies of digital practice from a holistic perspective, relating them to broader cultural themes. Pink et al. (2015), for example, used digital video ethnographies to explore the tactile relationships between hands and mobile media devices. They suggest that by examining tactile ways of the hand, such as the haptic swipes and gestures that we use to engage with smartphones, we can garner a better understanding of the importance of embodied tactility to the practices of digital culture. Alternatively, Daniel Miller and Jolynna Sinanan (2014) examined the use of the webcam in everyday Trinidadian life by focusing on the intimate cultures in which it what used. By doing so they found that it was culture rather than the technology that was mediating the topological experiences afforded by this technology. As I will describe further in chapter 3, digital ethnography is an approach well suited to studying life lived at the nexus of the online/offline, virtual/real dichotomy, for it puts practice, rather than technology, at the foreground of examination.

Collectively, what many of these studies lack, however, is an empirical focus that seeks to describe how digital technologies, and especially digital maps, are affecting the experiences and senses of place. The subsection of research that has begun to explore this particular impact of digital mapping technology in any detail is still very much in its infancy (see Evans, 2015; Farman, 2012; Kwan, 2008). In making an empirical contribution to this literature, this thesis pays particular attention to the minutia of everyday digital mapping practices using a (digital) ethnographically-informed methodology, which is something rarely done in studies of maps (see Brown and Laurier, 2012; Laurier et al, 2016; Wilmott, 2016a, 2016b for exceptions). Indeed, there remains surprisingly little empirically grounded (and especially ethnographic) research within this literature that shows how digital mapping technologies might come

to inform and build on the relational and performative understandings of place, which geographers interested in place have frequently drawn from in the past two decades or more (see Agnew, 1987; Massey, 1994; Cresswell, 2004, 2006; Jones, 2009).

2.4 New epistemologies for cartographic research

As the research outlined above suggests, digital technologies have complicated mapping practices and epistemologies. We are currently deep into a renaissance of research that is focused on what maps are, what they can do and how and why they are used. This is something that could not have been said a decade ago, prior to the arrival of web 2.0 and mobile technologies.

However, it is not just technologies that have affected how maps and mapping practices have been understood in recent years. An interest in process-led research has asked questions about the ontological stability of maps and mapping practices. Rob Kitchin and Martin Dodge (2007) and Kitchin et al. (2013) have argued that maps should no longer be thought of as simply static representations, but rather as representational, material and relational forms that are brought into being each and every time they are used. Maps, they suggest, are ontologically unstable and thus should be thought of as *ontogenetic*, meaning that they are 'always in a process of becoming' (p. 480). Within this literature, which does draw upon the impacts of digital mapping technology but is not entirely focused on them, it is argued that maps are more than just representational and political artefacts, as postulated by Brian Harley (1989) and his successors (see, for example, Monmonier, 1991; Pickles, 2004; Wood and Fels, 1992).

As Azócar Fernández and Pablo Buchroithner (2014) have shown, this post-representational epistemology is simply the next step in a continuum of a long and complex history of cartographic studies. By unpacking the prominent paradigms of cartography in the 20th and 21st centuries, these authors suggest that the study of maps has not necessarily unfolded in a chronological fashion. As they show, 'old' cartographic theories are not necessarily made redundant in a climate of 'new' cartographic theorising, for scholars have often been seen to take and repackage mapping epistemologies of the past. This is perhaps most clear in the ways that the majority of cartographic research (and general discourse about maps) remains focused on deconstructing maps as objects of accurate representation, vis-à-vis Arthur Robinson (1953). As such, Brian Harley's (1989) seminal work on deconstructing the political power of maps remains relevant in post-representational analyses of maps, and so does

‘critical cartography’ (Crampton and Krygier, 2006), from which post-representational analyses of maps heavily draw.

Critical cartographers have made particularly effective use of Harley’s ideas in their writings about cartography, by suggesting that we delve deeper between the ‘hidden’ lines of maps to reveal the power embedded within cartographic knowledge and practice. In adopting this method, John Pickles (2004) has noted the active nature of maps, suggesting that the continuous shifts in power relations that maps represent should be of consistent concern for scholars involved in cartographic research. Moreover, Jeremy Crampton and John Krygier (2006) advocate that Harley’s (1989) work did not go far enough in deconstructing the maps underlying ‘social text’. They suggest furthering Harley’s deconstructionist ideas of cartography by analysing map symbols, types, fonts, images, words, common assumptions and educational practices. By deconstructing cartography in this way, these scholars have argued that power structures are embedded in society and then transferred to maps, often through unconscious acts of social mechanisation. Wood et al. (2010) in particular have used this method of interpretation to highlight how maps create politics, order and hierarchical power structures. These authors suggest that maps create an ordered ‘reality’ that we *know* rather than *see*. In other words, maps bring into being hierarchical power structures. Wood et al. (2010) argue that we continue to acknowledge and abide by an assumed objectivity of maps because cartographic practices have, and continue to have, the ability to naturalise the social world.

In taking these paradigms of cartography into account, post-representational epistemologies of cartography have sought to examine what else can be understood from the ways in which maps as forms of representational artefact are embedded in cultural practice. Along similar lines, some scholars have argued that maps and mapping practices may also be cognitive, embodied, material, performative and playful (Crampton, 2009a). Veronica Della Dora (2009) for example, asks us to consider the performativity of maps. She argued that using maps is a type of social and material performance which reflects broader societal norms and attitudes. Christian Jacob (2006) has similarly argued, from a historical perspective, that the effects of maps principally result from the way users interact with their materiality. In other words, focusing on people’s tactile engagements with maps can reveal much about the work that they do in the world.

Chris Perkins (2008, 2009) has recommended that we pay more attention to cultures of map use. He argues that unpacking the cultural contexts of mapping practice

can provide unique insights into how maps are bound up in the performative and political practices of everyday life. This work pays particular attention to how qualitative methodologies such as ethnography can be useful in this respect. It also calls into question the role that different technologies might play in different mapping contexts, which is something this thesis focuses heavily on. Likewise, Sébastian Caquard (2015) has suggested that a focus on the cognitive aspects of cartography could develop an understanding of how maps create mental, emotional and embodied relationships to place. Caquard (2011) has also shown how maps, and specifically web 2.0 mapping technologies, have been used to explore narrative story telling. For Nanna Verhoeff (2013), mapping practices can be playful acts of performance that are deeply embedded in everyday understandings of place. She suggests that mapping playfully can be used to perform subtle acts of political intervention, and therefore could be a useful method for marginalised individuals and groups wanting to speak out in novel ways.

By studying maps in these various ways, issues surrounding the power and politics of maps - the focus of the deconstructivist and critical paradigms of cartography - reveal themselves in novel ways (Crampton, 2009a). Furthermore, such approaches can disclose the extent to which maps are bound up in broader cultural life. This reveals a novel aspect of map use somewhat neglected by representational analyses.

These studies constitute a novel and emerging field of research into maps, particularly at a time when the effects of digital mapping technology on representation are a key research theme.[3] This thesis makes a significant contribution here, for it situates itself between these two fields of research. It presents evidence from practice-led research while tying the novelties of digital mapping technologies with these novel post-representational mapping epistemologies. In doing so, it develops a theory of mapping practices – mapping interfaces (see chapter 4) - which pays particular attention to the performativity, materiality *and* representational effects of maps in the context of everyday practice.

[3] In recent years (2015 and 2016), both the AAG and RGS-IBG geography conferences have had numerous sessions on the social and geographical effects of digital mapping technologies. Nevertheless, the majority of these sessions only paid lip service to these post-representational enquiries into maps, which I see as the discipline's current frontier into studies of maps.

CHAPTER 3

RESEARCHING A DIGITALISING WORLD

This chapter has four main aims. The first is to explain the benefits of an ethnographically-informed methodology for the study of contemporary mapping practices. The second is to discuss the rationale behind the recruitment of my participants. The third is to provide the details of my fieldwork practices and my processes of data analysis. The fourth is to suggest ways in which my methods may be applied elsewhere in studies of everyday mapping practice. In the first section of the chapter I explain my rationale, reasons and details from my fieldwork, and discuss why the flexibility and creativity of ethnographically-informed methods are well suited to examining the multiplicity of mapping practices, many of which now unfold as part of broader 'digital cultures'. In the second section I outline and critically assess the sites of my data collection, my research methods and practices for data analysis. And in the third section I reflect on how key themes within these research processes may be used in broader contexts of research focusing on contemporary mapping practices.

3.1 Rationale and methodological framework

Rationale

As Jeremy Crampton (2010) suggests, maps have not always been part of everyday life in the many ways that they are today. The History of Cartography project (1987-2015) has shown that until relatively recently maps were principally the creation of certified craftsmen and the tools of a powerful few. Only in the late 19th and 20th century did they begin to appeal to the masses in the form of leisure maps, road maps and route maps. Conversely, contemporary mapping practitioners include virtually all of us. Today, in the western world at least, most people use maps or have been involved in some form of mapping practice. Indeed, digital technologies have had a large role to play in how and why many of us now use maps in day-to-day life (Crampton, 2010). As I noted in Chapter 2, the internet and mobile technologies have had a particularly significant effect on these changes taking place.

In order to select a group of participants suitable for my study – for a select study of contemporary mapping practitioners - I looked primarily to navigational and leisure practices, but also to amateur, professional and artistic cartographic practices. By

the end of my fieldwork, I had spent considerable periods of time examining the navigational and socio-technical practices of individuals and groups made up of walkers, commuters, cyclists and drivers, as well as the mapping practices involved in novel forms of leisure activity (geocaching), and had had substantial engagement with an artist and those involved in amateur and professional cartographic production. The participants of this study were made up of approximately forty men and women, aged between twenty and sixty years old. The fieldwork took place primarily in London and the South East of England between October 2013 and May 2016.

The rationale to select groups of navigational mapping practitioners was predominantly based on an ambition to examine how digital technologies were affecting the cultural geographies of everyday mobilities and leisure practices. Navigational practices offered a suitable focus since it has been agued that digital mapping technologies have affected contextual practices of mobility and navigation in fundamental ways (November et al. 2010). Digital maps, and specifically mobile maps, these authors argue, alter the way contexts of navigation should be understood in practice because they give us a better understanding of the relations between plotting and practicing a route. The technical capacity and material form of such maps show us that users navigate through non-geometric space in ways that go beyond a mimetic reading of maps as was historically assumed to be the case (ibid). That is to say that in mobile practices we use maps in ways that are more akin to notions of way finding (Ingold, 2007) than traditional notions of navigation. By seeking participants in navigational contexts I sought to contribute further empirical evidence to these claims, which is still lacking in this area (see Wilmott, 2016b for an exception), whilst also aiming to make a contribution as to how practices of navigation are bound up in the cultural contexts of map use. Moreover, due to Ordnance Survey's focus on the navigational and leisure practices of everyday life it was necessary to carry out research that spoke to these key areas of interest.

My rationale to study contemporary cartographic practices was based on the knowledge that such practices have been transformed by an array of digital technologies (e.g. computers, the internet, satellite's, GPS, mobile devices and sensor technologies), which has been well documented (Crampton, 2009b) but not yet fully evidenced by empirical studies to date. This rational was driven by a need to provide evidence pertaining to how the cultural geographies of these groups have an affect on how such mapping technologies are put into practice. Again, my aim here was to contribute further empirical evidence to support these claims.

As already mentioned, a primary aim of this research was to outline, understand and examine what contemporary mapping practices were, and how they were influencing relationships to everyday experiences of place. A complete overview of contemporary mapping practices was well beyond the scope of the project. Instead, the people and practices examined in this research are meant as snap-shots which represent the great variety of ways in which maps are used. These snap-shots, I argue, can reveal important insights into the variety and impacts of contemporary mapping practices.

Overall my study included slightly more men than women. This was due to the demographic make-up of my fieldwork with groups, especially one map-making group and the group of cyclists, in which members were predominantly men. In my fieldwork with individual participants the opposite is true, with women making up the majority of participants. Whilst gender differences in map use were not a primary aim of the study, my fieldwork did produce some useful insights into these differences, which will be discussed in the thematic chapters of this thesis. By doing so, this research also contributes to studies seeking to draw out dimensions of gender in mapping practices, which until relatively recently (see Kwan, 2007) has often been a hidden angle neglected in studies of cartography and mapping practice (Huffman, 1997; Van Den Hoonaard, 2013). Nevertheless, I acknowledge that my position as a male researcher would have had an effect in this context, especially in terms of gaining access to and working with certain mapping practices. This could not have been truer than in my work with some amateur map makers, whose activities could certainly be perceived as masculine (thus supporting claims also made by Glasze and Perkins, 2015 and Kwan, 2008), and with certain cliques within an amateur road cycling club, which were similarly underwritten by particular male attitudes often associated with sports practices.

I chose the participants for this study in three ways. Firstly, I targeted and actively participated in specific group activities that I knew had been affected by digital mapping technologies. Secondly, I targeted and requested participation from work places and specific industry practitioners that I knew had been affected by digital mapping technology. Thirdly, I targeted and requested participation from individuals referred to me by people I already knew personally and professionally, or passed on to me by other participants. What resulted was an ongoing process of recruitment over the course of my fieldwork. I thus combined methods of snowball sampling and targeted sampling to achieve the sufficient number of participants needed for this qualitative enquiry.

Ethical considerations

Following ethical approval from the research ethics board at Royal Holloway University of London, requests for fieldwork participants were given verbally or sent via email. Once terms of participation were agreed (i.e. what I was asking them to do and estimates of how long it might take), participants were informed further about the overall study and the role their participation would play. They were assured that the research would be carried out in a confidential and considerate manner and that their participation would remain anonymous throughout the fieldwork and publication phases of the project. Participants were also given the option to withdraw from the study at any time, which none did. Following that, participants were asked to provide their verbal and/or written consent. In the case of the work with the Police Service both parties sought written consent.

An ethnographically-informed methodology

I adopted an ethnographically-informed framework in order to address my research aims. This meant drawing from methods closely associated with, but not exclusive to, well known ethnographic (and at times ethnomethodological) frameworks.

My fieldwork consisted of participant observation, short and long form unstructured and semi-structured interviews, repeat interviews, focus group sessions and a host of mobile methods. I met regularly with ten individuals (see appendix 1) and approximately thirty as part of variously defined groups (see below). Time spent with these people ranged from one-hour interviews to day long participation in a range of mapping practices. In addition to these primary participants I spent many days and evenings during my fieldwork period attending specialist meet-up groups focusing on various technological developments that have had an impact on social practices in recent years. Some but not all of these groups specialised in the developments of digital mapping technology. These primary methods were complemented with observation and participation on Internet forums, and the analysis of social media outlets, online article comment sections, product and services websites, specialist practice websites, as well as auto-ethnographic observations taken from my own mapping practices. My fieldwork was recorded in a series of research diaries, much of which provided the basis for a series of ethnographic portraits, which I define and describe below (and provide in full in appendix 2). Working from these portraits and field diaries I thematically coded this data, which was used to structure the thematic section of this thesis (see chapters 4, 5, 6 and 7). Following Glaser and Strauss (1967), I used a 'grounded theory' approach to

analyse my data. As Charmaz (2009) has noted, grounded theory offers researchers the opportunity to think about their data with the intent of conceptualising it in their own way, without a preconceived hypothesis or theory. My intention was to build a theory of contemporary mapping practices from the bottom up; based on the data I collected, rather than try to retrofit an existing theoretical framework on to it.

This framework was chosen as it provided a suitable toolset from which to garner a broad range of in-depth qualitative information about the intricacies of everyday mapping practices. Knowing from the outset that 'everyday mapping practices' encompassed a wide variety of people and practices, I needed a framework that granted me the options to study such diversity. The flexibility of this loosely defined framework was attractive in that it permitted the kind of mixed-method, ad-hoc approach that I wanted to take in my sampling technique, and also with my participants during the fieldwork. The result is a relatively broad study, which can be used to give detailed insights into what contemporary mapping practices are, who is involved in them, for what reasons, and what this can tell us about the ways in which digital technologies are becoming increasingly intertwined with everyday life and everyday experiences of place.

At its core, ethnography, derived from the Greek words *ethnos* (people) and *graphein* (to write, describe), is a descriptive account of people and culture that is produced from fieldwork. It is not a methodology per se, but rather the descriptive outcome of a qualitative methodology that seeks to understand social phenomena. In this sense my study is ethnographic, for it does provide a descriptive outcome of qualitative fieldwork which sought to understand the cultures of map users. Nevertheless ethnography has become synonymous with a certain type of long-form, single-sited qualitative methodology due to the evolutionary ways in which it has been used across the social sciences, especially within anthropology and more recently sociology and geography (Hammersley and Atkinson, 2007).

My research is by no means an entirely ethnographic study in this conventional sense, in that I did not spend a year or more completely immersed in the practices and places of a single culture (for examples of 'conventional' ethnographies in anthropology, cultural geography and sociology, see Chagnon, 1968; Crang, 1994; Goffman, 2015; Young, 1979). Whilst I did spend extended periods of time with certain participants, namely two groups of amateur map makers, a group of road cyclists, and a group of geocachers, significant periods of my fieldwork were also spent working with individual participants for much shorter periods of time. Nevertheless, I do contend that

the entire study was undertaken using a wide range of methods and approaches to studying and writing about social phenomena, which could be considered ethnographic, or ethnographically-informed. This places my research alongside other social studies in a growing body of work that considers itself ethnographic in some way, even if it does not fit within the parameters of a conventional long-form ethnographic study (see Atkinson et al. 2001).

Indeed, as Hammersley and Atkinson (2007) consistently note, 'ethnography' is a term that escapes a universal definition due to the various ways in which disciplines across the social sciences have utilised it as a method in their research. In effect it can no longer be cited as a methodology with a clear set of boundaries, practices and conventions. In many ways ethnographically-informed methodologies have now become an accepted way of utilising the practices of participant observation and immersion without *always* having to spend extended periods of time with a particular culture at a particular field site. As a result, ethnographies can now also be multi-sited, mobile, shorter by comparison, and part of a wider mixed-methods approach to research. This is especially true in the case of mapping practices. Laurier et al.'s (2016) study of walkers using mobile mapping applications offers a good example of this, for they show how short term and mobile engagements with participants can generate a wealth of rich ethnographic data. Vaninni's (2012) study of ferry travel between the islands of North West Canada is also a good example for it shows in great detail how contemporary ethnography can be mobile, multi-sited *and* still long form, which dispels the idea that modern ethnographies cannot still reflect their beginnings in the anthropological and sociological traditions.

Ethnographies in recent years have often pushed the boundaries on what the key practices of the method actually are, which has resulted in a flexibility to the ways in which ethnographically-informed research has been carried out, and accepted as a legitimate form of research methodology (O'Reilly, 2011; Pink, 2009, 2012). Human geographers have been especially keen to explore the various ways in which ethnographically-informed methodologies can illuminate their research, which in turn contributes to a growing body of work experimenting with novel forms of qualitative enquiry within the discipline (see Last, 2012; Novoa, 2015). For example, both Spinney (2006) and Middleton (2010) used ethnographically-informed methods in their efforts to study the embodied practices of cycling and walking respectively. Neither study would satisfy the criteria of a conventional ethnography in the sense that neither party spent years embedded within a culture or site of study, but few would deny these studies

ethnographic or even experimental credibility, for both made excellent use of participant observation and mobile methods to achieve their aims. In many ways this thesis makes a similar contribution. For instance, during this time I was often jumping between long-form participant observation with one group and comparatively fleeting multi-sited 'go-alongs', interviews and focus group sessions with others in any given week. Acknowledging the limitation that this approach produced what may be viewed as a scattering of ethnographic data, which undoubtedly would have been richer had I focused on one specific group of participants, I do contend that my fieldwork did produce accounts rich enough to say something important and novel about contemporary mapping practices across a broad range of participants. Indeed, future ethnographic research into mapping practices could use these ethnographic snap-shots in order to determine which social and cultural groups to investigate further.

Specifically, this study makes a novel contribution in terms of its ethnographically-informed and multi-sited approach to studying the cultural geographies of contemporary mapping practices and the everyday uses of digital technologies. This places the research alongside that of other projects, which have utilised ethnographically-informed methods to study or reflect upon cultures of map use and mapping practice (see Brown and Knopp, 2008; Laurier and Brown, 2005, 2012; Laurier et al. 2016; Parker, 2006; Perkins, 2008; Rossetto, 2012; Suchan and Brewer, 2000; Wilmott, 2016a, 2016b). Whilst my fieldwork has similarities with these projects in that I used a host of mobile and mixed methods to capture ethnographic data, it also differs from these studies in its multi-sited approach to studying the cultures of map use and map making, and also in the various ways in which data was recorded during these studies. For example, I used 'go-along' type interviews in a similar way to Wilmott (2016a, 2016b) when examining mobile maps in the context of navigation, and yet we recorded these engagements in different ways, with Wilmott using video to document proceedings and myself taking notes in a field diary during or directly after these engagements. Likewise, although my research into the mapping practices of drivers was similar to Brown and Laurier's (2005) research in that we were all studying the use of maps in cars, our rationales and methods for recording were different. Their work, grounded in ethnomethodology, recorded the intricacies of map use using video recordings, which were then analysed in great detail to reveal the haptic practices of map use. By contrast, my fieldwork with drivers was primarily based around a looser form of participant observation and interviewing as participants drove, in an attempt to grasp how the use of maps whilst driving was linked to practices and performances of

identity and embodiment. As a final example, whilst my desires to use ethnographically-informed methods to study the sites and politics of amateur map makers was similar to Brown and Knopp's (2008) study of a participatory LGBT mapping project, our research produced very different outcomes. Brown and Knopp's ethnography documented the participation and processes of a political mapping intervention around the issues of LGBT life in Seattle, whereas my ethnography of map makers documents how the participation and practices of amateur map makers was bound up in the enthusiasm of those involved, as well as in the way that the spaces and politics of amateur map making are socially, materially and technically produced.

A digital ethnography

As I argue throughout this thesis, digital technologies are increasingly coming to affect many forms of mapping practice. During my fieldwork this meant paying close attention to mobile technologies as well as many other forms of Internet-connected or Internet-connectable devices such as desktop computers, vehicle GPS systems and wearable devices. As argued by Hine (2015) and Pink et al. (2016), research which focuses on digital technologies in the context of everyday life needs to adapt to new ways of doing ethnographic research, for digital technologies are rarely used in the kind of site-specific ways that have favoured ethnographic methodologies in the past. Due to the dynamic socio-spatial, increasingly mobile and technical ways in which digital technologies are used in everyday life, conventional ethnographic methods such as single sited participant observation and interviewing are perhaps not best suited for such studies. Indeed, conventional methods may actually force the researcher into a state of stasis whereby the research is unable to move coherently from one socio-spatial and technical formation to another, rather than allowing the researcher the opportunities to follow the dynamic ways in which digital technologies are coming to affect practices of everyday life (Hine, 2015).

In the case of studying digital mapping technologies there was a need to follow the work of softwares and digital devices across different socio-spatial configurations ranging from the practices related to screen-based activity to practices bound up in the broader contexts of an individual or group's everyday actions. For instance, in studying the ways in which GPS devices were embedded into the socio-spatial practices of a South London road cycling club (see below), I was required to 'follow' and examine the ways these devices were used around the different socio-spatial contexts of the club. As Postill (2016) has recently noted, the benefit of 'following' digital technologies is that it

highlights the context dependent nature of using technology. In practice this meant examining the use of GPS devices in the contexts of Saturday morning club rides, during post-ride coffee stops and within the confines of social media services and on the club's Internet forum. Moreover, when examining the uses of digital mapping applications on processes of navigation in individuals, I made the effort to trace how navigation and mobile applications were used and considered outside of the context of navigation. The aim was to seek a holistic contextualisation of how navigation, and the use of digital maps for navigation were bound up in an individual's daily digital practices and experiences of the digital world.

Whilst my research is not strictly a study about the impact of the Internet on everyday life, it does have a focus on Internet-connected digital mapping technologies. Indeed, a study of contemporary mapping practices cannot be properly understood without a consideration of how maps fit into the broader Internet-connected ecosystem. With that in mind, I suggest that my methodology most suitably fits under the banner of a 'digital ethnography' (or perhaps an 'ethnographically-informed digital methodology'). The term, suggested initially by Dicks et al. (2005), and then developed by anthropologists (Horst and Miller, 2012; Pink et al. 2016) and sociologists (Hine, 2015) alike, allows for an ethnography to cover 'the digital' in dynamic contexts that straddle both the 'online' and 'offline'. It is a methodology which focuses on the spaces of everyday practices in which digital technologies are used, rather than on the digitally processed virtual spaces often associated with digital and Internet technologies. Such 'online' spaces, I argue, cannot be separated from those which we might call 'offline'. The distinction between these spaces of life is now inextricably blurred, and therefore should no longer be made. Floridi (2015) has suggested we use the term 'onlife' instead, in an attempt to fuse this distinction. Furthermore, as Pink states, 'researching digital media practices often actually means researching the relationship between digital media and other things and processes, and considering how the practices through which these are played out become blurred' (2016: 57). Digital ethnography is therefore not specifically an 'Internet or net-ethnography' (Kozinets, 2009), nor is it a 'virtual' or 'cyber' ethnography' (Hine, 2000), which it often gets conflated or even confused with. That said, it does share many of the methods for understanding how digitally processed virtual spaces unfold in the context of everyday practice, for instance in the textual and visual analysis of social media and websites.

Using this definition of digital ethnography alongside the broader code/space arguments made by Kitchin and Dodge (2011), in which code is increasingly coming to

constitute the spaces of everyday life, I suggest that digital ethnography could in fact be used to understand a great many spaces of contemporary practice, which are seemingly distant from what has commonly come to be known as digital space. In reference to my own fieldwork, for example, walking, driving, cycling and map-making spaces could all now be considered digital spaces in many cases. For some of my participants at least, these practices had become inextricably shaped by digital technology.

In the case of studying digital mapping practices, doing a digital ethnography meant looking at user practices and not directly to digital technologies. I sought a holistic contextualisation of how mapping technologies were affecting practices, rather than a technical understanding of how maps had changed practices. For instance, in my study of taxi drivers, my observations and questioning of maps were always conducted with the context of what it was like to be a taxi driver in mind. And in my work with cyclists, my primary focus was on understanding the effects of digital maps within the context of the socio-spatial practices of the club. In other words, my approach could be framed as a 'non-media-centric' approach to studying media (which maps are) in everyday life (Couldry, 2012; Moores, 2012; Krajina et al. 2014). It was in using this approach to my empirical work that I developed my theoretical framework of mapping interfaces (see chapter 4), which seeks to theorise how mapping practices are deeply interwoven with everyday practice.

Whilst there is a growing body of research around the social implications of digital mapping technology (see Frith, 2015; Gordan and De Souza e Silva, 2011; Ozkul, 2015; Wilken and Goggin, 2012), to date, there has been relatively little empirical work within the social sciences, and certainly within the discipline of cultural geography, that explores how digital mapping practices are affecting the social, cultural and experiential geographies of everyday life.

In addition to making a geographic contribution to this epistemological approach to studying digital technologies, I also make minor contributions to ethnographic research detailing the effects that Big Data has on everyday practice. As defined by Kitchin and McArdle, Big Data are large electronically stored and processed data sets that 'possess a suite of key traits: volume, velocity and variety (the 3Vs), but also exhaustivity, resolution, indexicality, relationality, extensionality and scalability' (2016, p. 1). In recent years Big Data has had a significant impact on everyday spatial practices (Kitchin, 2014), including everyday mapping practices. Recent concerns suggest that there is a considerable lack of ethnographic research produced with regards to the

effects of 'big data' on everyday life (ibid).[4] It is often implied that geographers need to go beyond the numbers of 'big data' in order to understand how these data are being used and experienced at the level of social and cultural experience (Thatcher, 2015). My research responds to such calls by providing ethnographic accounts of how digital mapping technologies, which often rely on and contribute to 'big data', are increasingly used in daily life.

3.2 Research practices

Fieldwork sites

The majority of my fieldwork was carried out with participants based in South East England, although some fieldwork was carried out in the USA. Significant stretches of the fieldwork took place in the Greater London area, and the majority of my participants were residents of the city. To a lesser degree I also worked with participants in rural areas of Hampshire, Hertfordshire, Kent and Oxfordshire. The overall result is a study with a substantial but not exclusive urban focus. The reason for seeking participants in both rural and urban areas was to develop a broad understanding of the geographies of contemporary mapping practices. There has been considerable uptake of these technologies in urban, suburban and rural settings and therefore it was deemed necessary to carry out my fieldwork across these geographical boundaries. I thus contribute to the growing body of ethnographic work detailing the effects of digital technology in urban areas (Ito et al. 2005; Pink et al. 2016) but I also make an ethnographic contribution to rural studies of technology, which are far less common (see Gibson et al. 2012 for an exception).

The micro and macro geographies of my research sites and practices are important to note here for they undoubtedly played a crucial role in my access to participants and to the types of activities that I carried out over the course of my fieldwork. The mapping practices I studied were always-already affected by the spatialities in which they took place. For example, the mapping practices of walkers, cyclists and drivers were always-already constrained by the micro geographies of asphalt road networks, pavements and curbs, all of which shaped these practices and therefore my research. On a macro scale, London, the size, diversity and global positioning of the city certainly granted me access to participants and practices that

[4] Similarly, this call for more ethnographic research into the effects of 'big data' on everyday life was brought up in numerous sessions at the 2015 AAG meeting in Chicago.

simply would not have been possible elsewhere. London is undoubtedly a global city (Hamnett, 2003; Sassen, 2001), which sets itself apart from much of the world, and also my other research sites in the South East of England. The historical, political, cultural and economic positioning of the city makes it a place like no other. It is, as Vertovec (2007) describes, a unique place in the U.K characterised by 'super-diversity'. In many ways my arguments about contemporary mapping practices based on participants from London are unique to that place, and could perhaps only be comparable to those living in other global cities. Moreover, in recent years policy makers have actively encouraged and promoted technological innovation in the city (Gov.uk, 2010), which has led to the emergence of a burgeoning digital technology sector. London is fast becoming a technology hub, which makes it comparable in the UK to Cambridge and globally to cities such as Austin, Berlin, Dublin, Mumbai, San Francisco, Stockholm and Tel Aviv. However, it remains distinctive in that it also retains its status as a global city, making it perhaps only comparable to cities such as New York, another global city that has also actively pursued a technological agenda. A proportion of my London based participants moved to the city to work in the 'tech' industry and many of the interest groups that I attended and studied were based in the offices of this industry. It is perhaps no surprise that a study of digital mapping technologies attracted participants actively interested in digital technologies. However, it could also be said that people in city were attracted to the study because they were interested in the impacts that digital technologies were having on their lives more broadly.

Conversely, the rural areas of the South East granted me different access to important sites of participant practice that London could not physically offer. The most notable of which were the quiet roads and paths needed for my participatory practices with cyclists and walkers.

Living and working in London and the South East made it convenient to carry out my fieldwork in these places. Organising and attending interviews as well as carrying out participant observation in sites that were easily and inexpensively accessible has had a considerable effect on where the research has taken place, which as noted by Hammersley (2013) is often a limitation of most research projects. My research is no less limited by these factors and there is little doubt that if carried out in other areas it would have produced different results. I hope this study will encourage future research covering similar ground to expand the geographical boundaries of the project. In particular future research would benefit from having a specific rural or remote focus, where very little work in this vein has been carried out to date.

Challenges faced at research sites

Getting personally involved in the practices of my participants meant continually adapting my ethnographic skill set to suit the needs of particular fieldwork sites. For instance, I had to learn new technical skills and languages far removed from my usual day-to-day practices. When working with amateur map makers I had to learn how to use new systems and software and get acquainted with the technical languages that are associated with them. When sitting alongside taxi drivers and police officers I quickly learnt that academic questioning wasn't going to work and so I had to adopt a 'chatting' strategy to put them at ease. Working with a group of geocachers I struggled for some time trying to verify the identities of group members whose actual names differed from those that they were using on the group's Internet forum. In addition to these challenges, I had to learn entirely new corporeal practices and bodily arrangements with regards to some of my interviewing practices. This was especially the case when it came to studying road cycling practices. Having barely ridden a road bike before beginning this research I had to first learn how to cycle on such a bike, both as an individual and as part of a group. A certain amount of training and fitness was required before I had the confidence to ride with others whilst talking to them. This was particularly challenging when it came to 'go-alongs' with riders who wanted to travel at great speeds.

Pilot Studies

In order to assess the feasibility of my ethnographically-informed approach, I carried out four pilot studies before applying these practices on a broader scale. Although I chose an ad-hoc approach to my fieldwork, in which each encounter with participants was created in subtly different ways, it was still important to first test the feasibility of a mixed method approach in number of different contexts. Doing so gave me at least some indication of what might and might not work with regards to certain methods of practice. As Baker (1999) has noted, pilot studies can offer the researcher two opportunities. The first is to test the feasibility of their intended methodology on a small scale, and the second is to test the feasibility of specific research practices. Tailored methods for each participant or set of participants meant that I could not test all of my methods in their entirety, however I am confident that my pilot studies allowed me to test the general feasibility of my ethnographic approach. Crucially these initial studies allowed me to get feedback from my participants, primarily to get a sense of how people were engaging with the project and its aims.

Carried out between May and October 2014, I recruited four participants for these studies. Two of these, Harry and Sally, were close friends, the third, Lauren, was a family friend. The fourth, Tom, I had only known for a short time after working with him briefly on a university project. Despite their role as pilot participants in the early stages of the research, I have included them below as full participants due to the wealth of data they generated. While the obvious selection bias does impeach on the validity of the data, the data has been nonetheless useful in giving insights into contemporary mapping practice. There is little doubt that having known three of these people for a long time in a personal context has complicated the outcome of these pilot studies. On the one hand, studying these people allowed me the freedom and flexibility to trial methods that others might not have the patience or time for. On the other hand, these studies produced a bias that favoured me as a friend first, and a researcher second, which would have had an impact on the kinds of responses they gave to questions and on how they acted in my company. Much of ethnographic research is about getting to know the participants involved, and having this previous knowledge here allowed me to somewhat skip over this initial rapport building stage in order to move directly on to trial my research methods.

Typically speaking, each engagement began with a discussion of what maps were and how they had or had not been incorporated into their daily practices. We then decided on a participatory mapping practice(s) between us, based upon an aspect of their daily routines. These were primarily based on their daily mobilities and navigational practices.

Although certainly good practice in preparation for a larger research project, pilot studies are rarely a true indication of how research practices will unfold throughout the duration of a project (Baker, 1999). Carrying out research over a relatively long period of time will inevitably force methods to evolve and react to research context(s) over time, to a lesser or greater extent. In hindsight I found that my pilot studies were relatively poor in preparing me for certain research contexts such as working with strangers or groups of people. That said, the pilot studies did provide me with the opportunity to test and refine a variety of ethnographically-informed methods. Most notably this included adjusting my interviewing techniques from a structured line of questioning to a looser style of conversation, which I used throughout my fieldwork in an attempt to create a friendly rapport with my participants. Above anything else, carrying out these studies highlighted the need for a loose template of sorts, which could be used in my future engagements with individual participants. It was clear from these

studies that I would have to approach each participant with an adaptable methodological framework which would best suit their needs as well as the context in which their involvement in the project unfolded.

Templates

I created a template of methods from my pilot studies which I used to structure the time with individual participants. This template was based on an initial interview followed up by a participant-led mobile practice that reflected their everyday map use. This was primarily done in the context of a navigational practice because across my pilot studies these practices were shown to be a common mapping theme. Following this, and if possible, I requested a further interview in which we would look back over the participant-led mobile practice in order to delve further into their ways and reasons for using maps. Whilst the interviews in this template could be loosely categorised as unstructured or semi-structured, the participant-led practice was often far more varied, incorporating methods which could be categorised under the broad umbrella of 'mobile methods' (Büscher et al. 2011) or more specifically 'go-alongs' (Kusenbach, 2003), or perhaps even 'ride-alongs' (see Spinney, 2006) in the case of my work with cyclists and drivers. In every case a dialogical way of working was also encouraged, which had varying degrees of success depending on the participant.

The rationale for this three-part template was based around the assumption that interviewing would only get me so far with individual participants and thus limit my data collection to what participants said rather than what they did in practice. Carrying out a set of pilot studies was instrumental in making me understand this. By combining interviews with participant activities in a dialogical manner I was able to gain a far broader understanding of how my participants used maps in everyday life based on what they said and what they did. Moreover, it meant that I didn't have to rely on simply either interview or mobile-led methods. As Merriman (2014) has noted, despite the growing interest in mobile and other ethnographically-informed methodologies, it is still important to pay attention to what people say they do, as well as record what they actually do in practice.

In my ethnography of group activities I followed a far more conventional ethnographic route of participant observation and immersion in the groups activities. Whilst this way of working did also include many methods that could similarly be described as above, the template in place for individual participants was not applied in the same way. It wasn't necessary to structure participation in the same way because I

was joining a group rather than requesting participation from individuals. Often participating individuals wanted to know before they began what their role would be. By offering this loose template of how they might be involved I offered them a sense of what would be expected and how long their involvement might last. Ultimately the intention of the structure was to create a set guidelines rather than a specific set of instructions, and so it was not always the case that my participants and I stuck to it.

Interviews

After recruiting a participant, I organised an initial meeting in order to firstly outline the project and then to explain to them how they might be a part of it. In most cases an email exchange had preceded this, either as part of the recruitment process or as a way to respond to any questions the participants may have had about their involvement in the project. These initial meetings were done in a place and at a time most convenient for us both to attend, which was usually somewhere as neutral as possible such as a café, in a pub, in public buildings or public parks. In some cases it was necessary to meet them at their homes, at their places of work or at the buildings which hosted group meetings. Whilst my intention was to meet in places in which participants might be most comfortable, there is little doubt that some bias was produced by these sites of interaction, as well as the research practices involved in carrying out interviews in such places. For instance, on meeting in cafés and pubs I felt it was often assumed by my participants that I would purchase the drinks, and sometimes lunch. This may have helped in creating the relaxed research environments I wanted, but it could also be said that these sites and actions encouraged participants to be either flippant or casual with their responses. Moreover, participants may have had the feeling that their time had been bought and were required to give responses that they felt I was seeking in my questioning. Nevertheless, whilst using more 'official' sites for interviews (for instance at my university) may have produced more serious engagements from my participants I argue that this would have had more of an impact on my aim to study the 'everyday' lives of my participants. My intention was to hold interviews in places that would not seem out of the ordinary for my participants.

As Elwood and Martin (2000) have suggested, the decisions about where to conduct interviews is complicated and always fraught with contradictory processes. They argue that the power and positionality of interviewer and interviewee are always affected by where they take place. Acknowledging the impossibility of a neutral interview I made an effort to level the power and positionality between myself and my

participants at interview sites by engaging them in a dialogical rather than one-way discussion, and by seeking ways in which they might find the exercise helpful. This was also a practice I followed in all other parts of the template. Following Clifford's (1983) approach to a 'dialogical ethnography', my aim was to encourage participants to see some lasting value in their involvement. For instance when interviewing Barbara (see appendix 1 and 2) about her uses of a GPS device when cycling I also accepted to become her training partner as she prepared for an upcoming multi-day ride. We spent as much time talking about GPS devices as we did discussing how she might achieve an optimal power output and cadence on the bike.

Cultural geographers have a long history of putting participant experience at the forefront of the research agenda, and many have argued that participants deserve to be empowered in the research process (Burrell, 2014). It is in this vein that I hoped to have made a similar contribution by facilitating research environments in which my participants also took some value away from the research.

All thirty-two of the interviews I conducted were informal meetings. They were primarily unstructured and semi-structured in form. They lasted between thirty minutes and one hour, and were recorded by note taking during or immediately following the interview. Notes were then expanded on at the earliest possible convenience. A copy of these extended notes were then emailed to corresponding participants giving them the chance to agree or disagree with what we had discussed. Once I had received confirmation these notes were then filed and used later when composing 'portraits' of my participants (see below). On a similar note, all participants were offered the opportunity to view the final research output should they ever request it.

By not audio-recording and transcribing these interviews in the manner which has become a normative practice, I did run the risk of losing or distorting data. However, because interview data were always accompanied by further data produced by participant activities and observation, it was a sacrifice I was willing to make in order to generate the kind of open discussions I wanted. Moreover, it was often not practical to audio-record interviews, particularly in 'go-along' sessions which I discuss below.

Working in this way was designed to encourage a dialogical discussion between participants and myself. Due to the research not being about particularly sensitive issues, this method, on the whole, did produce the kind of two-way conversations that I had wanted, and I do contend that knowledge was produced together at these times. However hierarchical relations did of course prevail at certain points during these meetings. Implicit in inviting someone to be interviewed there is a notion of where the

power lies, and most of the time that power is with the interviewer. In an effort to try to balance this power I always asked that participants suggest possible places to hold the interview, and I tried to lead a line of questioning that was of interest to the interviewees and not just my overall aims. For instance, when interviewing taxi drivers about their use of Sat-Nav systems it was important to ask them about aspects of their use which mattered to them in their everyday lives as taxi drivers. My fieldwork was carried out during a contentious period in which the taxi industry in London had become transformed by ride sharing applications (e.g. Uber). During interviews I made a point of indulging the often one sided rhetoric from drivers about these issues in the hope that this would help build a more even relationship. There were also times when power balances shifted the other way during these interviews. Just being in the cars of taxi drivers produced a power dynamic in itself. The cars were their spaces and I was entering into them, sometimes paying to do so. Sometimes I rode upfront alongside drivers and sometimes in the back. Even these spatial formations produced a power dynamic that I had to negotiate and attempt to balance with each interview. For example, when riding in the front passenger seat I felt power was distributed more equally than when I was sat on the rear seat. In the front I was encroaching on *their* space in ways that I was not sat in the back; simply allowing me to sit up front was an admission that I was more than a customer, which in turn lowered the barriers for a more equal (but certainly not balanced) exchange.

Participatory activities

Participatory activities were either agreed upon before the interviews began, when I detailed a participant's involvement in the project, or at the end of each initial interview based upon the discussion we had. They were primarily a part of my fieldwork with individuals although I did do some with group members, most notably with the cycling and geocaching groups. All of these activities could be described as 'mobile methods' or as methods that make up a 'mobile ethnography'. These are a set of methods derived from the so-called 'new mobilities paradigm' (see Sheller and Urry, 2006) used to study the details of everyday mobile practices (Büscher et al. 2011; Novoa, 2015). The aim of a mobile methodology is to find new ways to understand the complexities of life on the move. In particular these methods are suitable for highlighting the sensory experiences and embodiments of mobile practices. As Büscher et al. (2011) and Cresswell (2006) suggest, much of everyday practice is on the move. My pilot studies suggested that mapping practices were no different, with all of my participants indicating that

navigation on the go was their primary use of maps and so it was an obvious line of enquiry to follow throughout my fieldwork.

My aim in using this method was to study the ways in which maps were used in a variety of mobile led practices, in order to understand why and how maps were used in certain socio-spatial contexts. In using these methods I did, to some extent, uncover how maps have become intertwined with the embodied and sensory experiences of life for my participants. These details are explored in chapters 6 and 7.

In order to capture map use on the move I developed an observation and interview method, which could be described as a 'go-along'. A 'go-along' can be defined as the practice in which a researcher shadows and interviews their participant as they go about a mobile activity (Kusenbach, 2003). By accompanying participants as they went about their daily practices, which primarily included walking, driving and cycling, I could examine and question how maps were used in different mobile contexts. It also gave me the opportunity to explore how mobile map use was different to stationary map use, and it allowed me to compare how participants said they used maps during initial interviews with how they actually used maps in practice. Again, inspired by the work of Brown and Laurier (2005) and Laurier et al. (2016), I sought to use these methods to find novel perspectives of map use on the go. To simply ask how and why my participants used maps in different contexts would not have provided the holistic picture of map use I was striving for in my fieldwork.

The details of 'go-alongs' were recorded in a field diary during the event, if practically possible, or immediately following the event if not. As with my interview data, these observations were then sent to my participants in order for them to validate what we had done, and thus continue the dialogical process. Whilst this was not a problem with the majority of my participants there were times when what I recorded did not align with what they thought they had done in practice, which raises a problem for this type of process. As a researcher, the call had to be made at some point as to what I thought had happened during these discrepancies, which I based on my previous knowledge of that participant and on the similar practices of my other participants. Using other forms of recording such as visual recording would have been helpful here, for rather than encourage a dialogical discussion around words I could have done so with images, which often carry more currency in our visual culture (Rose and Tolia-Kelly, 2012.

The complexity of 'go-alongs' posed other interesting challenges in a number of cases. I was frequently switching between asking questions, making observations and

mental notes, all the while engaged in the practices of my participants. During walking exercises this was fairly straightforward, for the pace of the practice gave me the time and space needed to juggle these elements. This was not always the case however. During 'go-alongs' with geocachers I found myself up trees, in bushes and generally looking suspicious as I watched out for other cachers seeking caches in strange places. 'Go-alongs' in other forms were even more complex. For instance cycling 'go-alongs', or 'ride-alongs' (see Spinney, 2006) were often exhausting and even dangerous at times, calling for me to spend great lengths of time just focusing on my own riding before getting the opportunity to speak with other riders. When riding with taxi drivers I even became involved in the journeys of customers as I sat up front with drivers whilst they continued to pick up and drop off passenger's in-between answering my questions.

Like my interviews, the 'go-alongs' also happened in places that had an impact on how they unfolded. They are also laden with certain power dynamics. Conducting 'go-alongs' with drivers in the city compared with drivers in suburban and rural areas made a difference on how they unfolded, as they did when these events unfolded in places that drivers did or did not have knowledge of. Moreover, carrying out 'go-alongs' with expert geocachers and experienced OpenStreetMap mappers could have created situations in which my participants thought they were babysitting me as I struggled to get to grips with the basics of their practice, which was certainly the case during the initial stages of my fieldwork. It was only after some time practicing the techniques of their practices, both with my participants and by myself, that I had the competent level of practical knowledge needed to get on with the task whilst also pursuing my own agenda.

Research which has used 'go-alongs' often seems to smooth out the difficulties and complexities of the method, which highlight its benefits whilst hiding its limitations. Along with Evans and Jones (2011), who focus on walking interviews specifically, I agree that 'go-alongs' can be extremely helpful in uncovering the minutia of mobile practices, and indeed everyday mapping practices, but I also argue that more attention needs to be paid to real-world difficulties of carrying them out. Based on my own fieldwork, I suggest that extensive periods of time are needed to learn how exactly to do a 'go-along' before one can carry them out successfully, and safely.

Auto-ethnography

In order to supplement the data derived of my participants, I carried out an auto-ethnography whereby I observed my own experiences of using maps in everyday life

over the entire fieldwork period. Reed-Danahay define auto-ethnography as 'a form of self narrative that places the self within a social context' (1997: 9). My rationale was to compare my mapping practices with those of my participants in a self-reflexive manner. By doing so it was thought that I would notice the complexities in my own practices, which I may then be able to spot in the practices of my participants. As echoed by Butz and Besio (2009), I argue that auto-ethnography is a well-placed method to understand the self within the context of fieldwork with others. It does not have to be necessarily separate from conventional ethnographic practice. Once I was engaged in participant observation with groups it also seemed entirely necessary to keep an auto-ethnographic record in order to keep track on my own positionality within the practices and presence of others.

As Muncey (2010) suggests, auto-ethnography is a particularly useful way of getting to grips with the minutia of practices, which are often neglected or skipped over in other types of qualitative research methods, such as interviewing or participant observation. Her point is not that other methods cannot access these details, but that they can be particularly difficult to draw out of research participants. As Perkins (2009) notes, auto-ethnographic methods can be valuable in assessing the performative aspect of mapping, which is a dimension of mapping practice that is often difficult to capture. In many cases, discussing my auto-ethnographic reflections with my participants actually helped to generate insightful discussions about the minutia of mapping practices, including its performative dimension. This was certainly the case when interviewing cyclists about how they used GPS devices whilst cycling. Using my auto-ethnographic notes I described exactly how I used these devices whilst riding – leaning in, taking my eyes of the road, and co-ordinating my line of sight with the map – to encourage participants to think about their own practices in a similar way. I acknowledge that this might have led interviewees into certain responses and not others but I do remain convinced that it was a useful tactic to deploy. I also acknowledge that using this tactic during interviews which covered more sensitive areas would have been far more problematic and therefore it should not always be considered as a transferable method.

I paid particular attention to how I used maps for navigational practices, primarily those associated with my everyday experiences of using maps in London, but also to everyday experiences in a foreign context, most notably during travel in the USA. My rationale for this was that, like the majority of my participants, my primary use of maps was for the purposes of navigation whilst on the move.

I kept a semi-regular diary documenting my mapping practices, and produced short descriptions from these notes, which I have included as prefaces to two of my thematic chapters (4 and 6). My intention was not to include these descriptions in the same way as my ethnographic materials, due to the ways in which such data was collected, analysed and written. My ethnographic processes were largely dialogical, in which knowledge was produced together with my participants, and then coded and written using a thematic schema. Conversely, my auto-ethnographic processes were not dialogical, and can only ever be considered the product of self-reflective enquiry. There is a danger that they may even be considered 'confessional tales' (Van Maanen, 1990) which are self-indulgent to the point that they distance themselves from the research aims. To combine these data would have been problematic in the sense that they were derived from two different epistemological positions, and presented using two different styles of writing.

Group practices and participant observation

For much of my fieldwork I immersed myself into the everyday practices of different social and cultural groups. I became a participant observer in these groups and made detailed notes about members and their mapping practices, which were recorded in a fieldwork diary. In carrying out this aspect of my fieldwork I have made further contributions to the growing body of work which seeks to understand mapping cultures using qualitative methods (Perkins, 2009; Roberts, 2012; Speake, 2015; Suchan and Brewer, 2000; Wood, 2012). Where I make a further contribution is in combining this material with other material derived from different methods, for instance from my interview and 'go-along' work with individual participants.

Below I describe the primary groups that I worked with in this context, and give a sense of what my involvement with these groups entailed. I have removed, wherever possible, any clearly identifying features in order to preserve their anonymous participation.

<u>Geocachers</u>

Geocaching is a leisure activity. The following statement, posted on its officially affiliated website broadly defines the practice.

> ‘Geocaching is an outdoor adventure where players use our free mobile app or a GPS device to find cleverly hidden containers around the world’ (Geocaching, 2016).

In studying geocaching I regularly met with a small group of London based ‘Cachers’ between April and September 2015, most of which knew each other and belonged to a community of people who regularly attended the same bi-monthly events. Members of this group were made up of British and European men and women aged approximately between twenty and sixty. The events I attended were primarily pre-planned meet-ups at various locations around central and South London. These casual events brought cachers together to discuss the practice and to facilitate the exchange of certain types of cache. During these events I observed and discussed these practice with those in attendance. At other times during this ethnography I accompanied cachers as they actively hunted caches around central and South London. At these times I observed and asked my participants to talk me through their practices. I also observed the practices of the geocaching community on both online forums and social networking sites, and via other media such as podcasting and online videos. Further still, I carried out my own geocaching activities from an auto-ethnographic perspective.

Humanitarian OpenStreepMap Team (HOT)

HOT is a charitable organisation. The following statement, posted on its website describes what it does.

> ‘Free, up-to-date maps are a critical resource when relief organizations are responding to disasters or political crises. The Humanitarian OpenStreetMap Team (HOT) creates and provides those maps [using OpenStreetMap software]’ (HOT, 2016).

I regularly attended and participated in HOT mapping events (also known as ‘mapathons’ or ‘mapping parties’) between October 2013 and May 2016. These evening events lasted between two and three hours and took place approximately twice a month in various office / university buildings dotted around central London. Approximately fifty-sixty men and women from different backgrounds attended each week. The purpose of my participation was to examine the practices and processes of contemporary map making in an amateur context. Moreover, it was to explore how

digital mapping technologies, specifically Web 2.0 mapping technologies, were affecting cartographic production in the contemporary context. Initially attending only to observe and participate I eventually recruited a small group of regular participants which I interviewed and observed on and off over the course of my ethnography with the wider group. In the course of our many discussions we talked about the reasons why they contributed to the project, and I observed the many ways in which they contributed to the project. This small group was made up of enthusiastic twenty-thirty year old men and women willing to contribute their free time to map parts of the world in an effort to provide humanitarian aid where it was deemed necessary by the organising team.

OpenStreetMap (OSM) Mappers

> 'OpenStreetMap is a free, editable map of the whole world that is being built by volunteers largely from scratch and released with an open-content license' (OSM Wiki, 2016).

Between October 2013 and September 2015 I spent time attending monthly 'mapping parties' with a group of OSM mappers based in central London. This group was made up of approximately ten regular attendees, all of which were white British males working in various technology sectors, aged between twenty-five and fifty. In examining the practices of this group I gathered further insights into the cultural geographies of contemporary map-making practices. In the warmer months these events consisted of efforts to 'map' specific areas of central London deemed under represented on the OSM platform. Alternatively in the cooler months these events were based around group discussions about OSM and other topics in pubs dotted around central London. During my time with this group I interviewed and observed attendees whilst they were out mapping as well as during the post mapping / winter pub meetings. In addition, I regularly participated in these activities by making edits to the OSM.

Whilst my engagements with OSM mappers were in the aforementioned social contexts, it should be noted that the majority of OSM practices are done by individuals working alone and usually indoors (Mooney and Corcoran, 2012). It is therefore the case that my research in this area can only speak about specific a sub-set of general OSM practices.

Wheels Cycling Club (WCC)

The WCC is an amateur road cycling club based in South London with over 500 members of all ages (16+) from different backgrounds. Between November 2014 and May 2016 I spent time participating in the clubs activities, both on the bike during weekly club rides and off the bike where I volunteered at events and engaged with club discussions via the club's Internet forum and via social media services. Primarily using participant observation and interviews with members, I examined the role which maps played in the socio-spatial relations of the club, as well as the part they played in the navigational practices of individuals cyclists. Throughout the entirety of this ethnography I carried out regular informal interviews and 'go-longs' with six members and spoke intermittently with fifteen to twenty members during informal group discussions.

Undergraduate Students

As an accompanying member of staff I spent time observing and informally interviewing two small groups of undergraduate students during two successive Geography field trips to New York in March 2015 and March 2016. These students were aged between 19 and 20, and were an equal mix of both men and women. During this time I spoke with, and observed, how and why these students used maps abroad. Particular attention was paid to how a different context of connectivity affected the use of digital mapping technologies.

Challenges of participant observation

Participant observation is fraught with multiple challenges, ranging from the practical and ethic problems encountered in the field to those associated with the writing up process (Hsmmersley and Atkinson, 2007; Van Maanen, 1990). My own experience was no different. In particular I encountered problems with inclusion and my own ambitions. I also encountered technical problems and language barriers, which I have addressed above.

Access to the groups I worked with wasn't particularly difficult. Because these groups were open to the public it was simply a case of signing up via the Internet and turning up in person to group meetings. Often this required an induction session, and in the case of the WCC this also required a nominal annual membership fee. The real challenge at these meetings was becoming recognised and treated as an insider and not simply a researcher there to poach data from these people. As Hammersley and

Atkinson (2007) suggest, the problem of inclusion will often stick with researchers throughout their time in the field. Researchers are not always welcomed with open arms, especially with groups that already have an established form and social structure. With the exception of the HOT mappers, all the aforementioned groups were made up of initially impenetrable cliques. It took many weeks of attending and participating in a group's activities before I could broach the subject of participation. In the most extreme case it took me almost three months before I could begin openly questioning members of the OSM group. Even by the end of my fieldwork I could not say that I was considered as a true insider. I suspect this was partly because of a division in technical skills which was never quite conquered on my part. The majority of this group had a computer literacy well beyond that of my own level, which often left me feeling like the junior in the group. This left me at a disadvantage in both in a practical sense during mapping activities and socially as many of their conservations were rich in technical discussion.

It was similarly difficult to become 'one of the lads' in the fast groups of riders at the WCC. Without the many months of training needed to prove I could keep up with the pace these riders, 'ride-along's' would not have been possible. Moreover, if I had not bought into the image of these types of rider – buying the right kit, having the right bike and GPS unit - I doubt that I would have been included at all. Luckily, in this case the hard work paid off, so much so that I remain in regular contact with a few in this group of riders.

Contrary to my work with individuals participants, participant observation with these groups took a long time, and required intense levels of dedication that I had not anticipated nor been remotely prepared for in some circumstances. Moreover, because these groups had an active presence on social media and Internet forums it was also often necessary to keep note on group happenings through these channels. For instance, in the week starting Monday 11th June 2015 I attended an OSM 'mapping party', had a geocaching induction, cycled 75 miles with the WCC, and attended a quantified-self meeting as well as making time to interview a sports journalist. Being present at these events wasn't necessarily difficult, but wading through the field notes from this week was. I suspect that much useful data was lost because I attempted too much. Future research in this area should not underestimate the critical distance needed to process fieldwork, especially that which focuses on multiple groups simultaneously.

Writing ethnographic 'portraits'

An ethnographic portrait is a piece of writing that collates field notes into an analytical form which describes participants and their involvement in the study. It is a way of writing-up ethnographic material in which particular emphasis is placed on evoking the personality of participants, and giving the reader a sense of the places in which research was carried out. Daniel Miller's book *Stuff* (2010) offers an excellent example of how this way of working with ethnographic data can be achieved. Indeed, I drew much inspiration from it when writing up my own field notes.

Over the course of my fieldwork, I completed nine individual portraits (see appendix 2), based on my time with individual participants. I have included all nine portraits in the appendix to this thesis despite not referring to all of my participants when making my arguments in this thesis. Those that I do not refer to directly will be used to inform future publications. My intention is that these writings will to be consulted as a detailed reference to frame how I went about my fieldwork with individuals, and as a way to show the kind of holistic contextualisation I was trying to achieve in exploring the everyday mapping practices of my participants. They should prove useful materials, alongside chapter 8, where I make suggestions for future research, design and policy aimed at exploring the cultures of mapping practices.

Portraits were written only after a sufficient period of time spent with these participants. This time varied across participants, but it was decided that they could not be written until I at least had a culmination of interview and participant activity transcripts, field notes and observation data to work with. The aim was to synthesise these materials in order to create texts that truthfully reflected the personality of participants, the practices we had been engaged with together as researcher and participant, and my interpretations of what these may mean in broader scholarly contexts. In essence, and much like the traditional artistic portrait, I have attempted to create a realistic impression of people through my writing practices. I firstly tried to draw out personality traits recognisable to many, in order to provide an engaging snapshot of someone's life. Only then could I weave information about how these personalities were reflected in everyday map practices. It is my hope that these portraits provide a further contribution to how geographers have engaged with maps in the context of everyday practice. To my knowledge, ethnographic research into mapping practices rarely presents its findings in this way (see also Wilmott, forthcoming 2017).

Under the banners of 'ethnographic fiction' (Brace and Johns-Putra, 2010; Price, 2010; Marsten and Leeuw, 2013), 'creative non-fiction' (Sparkes, 2002) and 'fraction'

(Geertz, 1988), scholars and geographers in particular have been keen to experiment with novel forms of representation in ethnographic research (Jacobson and Larsen, 2014). My portraits seek to make a contribution to 'creative non-fiction' ways of writing ethnographic data. I am reluctant to include my portraits under the terms of 'ethnographic fiction' and 'fraction' as they denote a sense that what is presented is somehow made up. I contend, after Sparkes (2002), that 'creative non-fiction' is a better fit. Ethnographic portraits such as mine attempt to create a coherent narrative based on participant observation and interview data. They are not fictitious in this sense. They are, however, creative in their use of fictional techniques such as evocative descriptions and scene setting. What is presented is not simply a chronological account or transcript of fieldwork events nor a fictitious story, but rather an evocative amalgamation of themes, quotes and instances that unfolded during fieldwork.

The limitations to 'creative non-fiction' are clear. Readers may simply not believe what they are reading is a true representation of actual events. For instance if fictional techniques are over used or abused by writers of this form then readers may regard this form as fictional narrative prose and disregard it as the output of 'proper' research. I had to be careful in this sense not to overdo it, and I have little doubt that some of my portraits occasionally edge over that thin boundary. In order to limit this, I followed Bignold (2011) in using Bochner's (2000) 'criteria to use against ourselves' when writing in story form. These criteria look for:

1. Abundant, concrete details in facts and feelings
2. Structurally complex narratives which move between past and present
3. The author's emotional credibility, vulnerability and honesty
4. Tales within the story, showing development of self
5. A high standard of ethical self-consciousness from the author

Coding of data

In order to develop my theoretical framework and structure the thematic chapters of this thesis, I used an analogue coding method to identify and draw out common themes from my data. Despite the benefits of software tools, which at the very least would have reduced the physical space needed for this task, I preferred to use an 'old fashioned' method of coding. After some brief experimentation with NVivo software I simply found the physical processes of analogue coding better suited for my approach to thinking through the data, making links between data and organising the data. In

practice this lengthy process involved laying out my ethnographic portraits alongside field notes and using coloured pens and a pair of scissors to order the data based on the themes and categories that emerged from reading, and re-reading it. It should be noted that the process of drawing out these themes didn't just begin once all the data was collected, rather it had begun during the fieldwork itself. To not think through how the data could have been used in the immediate aftermath of collecting it would have been an impossible task. I acknowledge that any analysis of data is fraught with complexities that have an effect on the final outcome of research (Hammersley and Atkinson, 2007). My methods of coding could not be repeated in exactly the same manner again, for they were based on ad-hoc decision processes that unfolded in the context of my coding practices. That said I do believe that others could have drawn similar themes from the data.

The most prominent themes to emerge from this process – *navigational practices*, *enthusiastic map making* and *the performativity of mapping practice* - were used to formulate the thematic section of this thesis. Another related but distinct theme to emerge, which was used to formulate chapter 7, was *how digital technologies had come to affect everyday experiences of place*. Other core themes and categories did emerge from this process, but they did not fit within the overall scope of the thesis and will be used in future publications.

3.3 Methodological implications

Using an ethnographically-informed methodology this thesis adopts a qualitative approach to studying everyday digital mapping practices. At a time when research that looks into the impacts of digital technology is dominated by quantitative approaches, this is relatively rare (Ash et al. 2016; Graham and Shelton, 2013). In studying the cultures of mapping practice, my approach has also been relatively novel in using qualitative methods to explore how and why maps are used by everyday practitioners (see Brown and Laurier, 2005, 2012; Perkins, 2008; Speake, 2015; Suchan and Brewer, 2000 for exceptions).

The ethnographically-informed methodology that I have presented in this thesis offers a useful framework for future researchers and designers looking to examine the ways and reasons why specific social and cultural groups use maps. I have shown that tailoring methodological approaches to specific individuals and groups can be a fruitful way of gaining meaningful insights into minutia of mapping practices. In this chapter, I highlighted three ways in which I tailored my approach. The first was to spend

extensive periods of time with a particular individual or group. The second was to spend intensive periods of time with people doing the mapping activities I wanted to investigate. And the third was to include participants in my processes of reflection about their practices. In the following I unpack each of these methods and point to how they might be used in future research.

Long-form ethnographic methods

Spending extensive periods of time with participants in their 'natural' settings can provide an unparalleled level of insight into their mapping practices. Doing so gives researchers the time and space needed to really get to know their participants and therefore make accurate judgements about how and why they use maps in their everyday lives. Where I found this to work best was in my studies of larger groups. Unpacking and understanding the mapping practices of amateur road cyclists, geocachers and map makers required that I spend significant periods of time (up to 18 months) with these people. In the beginning I had to put in much groundwork in order to understand how the dynamics of these groups worked, and where best I would fit into to these dynamics. This meant learning what the social and technical languages of these groups were, as well as becoming accustomed to what their cultural practices were and where the boundaries of my involvement lay. Future researchers looking to study mapping practices, I suggest, should not to rush into direct questioning but rather spend time acclimatising to the cultures of the group before deciding who and how to go about making their enquiries. In practice this means spending time *doing* the activities of, and making acquaintances with the people wishing to be studied.

Once I was acknowledged as an active participant in these groups, and not just a researcher, I was able to tailor my approach to the specific people and practices that I was in interested in. In theory, this meant dividing these groups up into their varying sub-cultures and trying to spend time engaged with different activities with all of these people. In reality this meant regularly engaging with a small group of individual members whilst also paying attention to the broader practices of these groups as a whole. The social and spatial dynamics of the larger groups' mapping practices were certainly far more complex than I could have hoped to note as an individual researcher. Future studies into the mapping practices of large groups may therefore benefit from a team of researchers rather than individual researchers. Doing so would give the study more breadth and further angles from which to view the mapping practices of others. This in turn would help to clarify where the boundaries were between the mapping

practices of individual members and the practices of the larger group. A team of researchers could also be used to study two or more groups involved in the same mapping practice. For example, to study and compare two or more road cycling clubs could generate important and interesting distinctions in how and why they used maps for cycling. This might be especially the case when considering clubs across the UK. Riders in the South East and riders in the North West may well have quite distinct uses and needs when it comes to maps. The same could be said about a number of practice led social groups, which are distributed across the country. Doing long-form multi-sited ethnographies in this way could identify and respond to such differences. Indeed, future designers could make use of this research as the basis for regional or practice specific maps.

Short-form ethnographic methods

Acknowledging the extensive periods of time needed to carry out long-form ethnographies I also developed some short-form methods which worked well in certain cases, particularly with individual participants. For research constrained by time, such methods could be a useful way to gather rich information about map users in relatively short periods of time. The most notable and successful method I developed with a range of participants was the 'go-along' (see Kusenbach, 2003). This method is particularly useful in the study of mapping practices because many of these practices unfold on the go. During this study I spent time carrying out 'go-alongs' during walking, cycling, driving and map making practices. Observing and questioning during these activities gave me a unique insight into the correlation between how map users talked about their use of maps and how they used maps in practice. In many cases there were stark differences, which perhaps reveals that using maps is often different to how we think about maps and our use of them.

Future research may wish to develop 'go-alongs' in different mapping contexts or expand on those with the groups mentioned above. Researchers could, for instance, develop 'go-along' methods within the tourism and leisure space. By doing so they could gain further insights into how and why tourists and leisure seekers use maps. This could mean carrying out 'go-alongs' with experienced and novel walkers or doing further work with road as well as mountain cyclists. Moreover, this method could be used to examine how and why those employed in the tourist industry might use maps. 'Go-alongs' with trail guides, outdoor activity leaders and local / national tourist board staff might generate some fascinating results. Future map designers seeking to

understand what people in this space want maps for could find these approaches useful as a research method.

Furthermore, for those working in the map / geographic information industry, individual or group 'go-alongs' could be a useful method for examining the often unforeseen details of the in-house map making process, which can be hidden from view by departmental boundaries. As I will show in chapter 5, each of the stages of the map making process has a significant effect on the outcome of the finished map. Using 'go-alongs' as a form of inter-team exchange, I suggest, could foster healthy discussions about where to improve or innovate the map making process. For example, cartography and design teams could benefit from undertaking 'go-alongs' with field survey or user-experience teams and vice versa. In doing so, those that draw and design maps may get a better understanding of how the data they use is collected and how users respond to the maps that they are producing. These novel insights could then be used to inform the future design of maps.

Dialogical approaches to qualitative research

Directly involving my research participants in my processes of reflecting on their mapping practices was valuable to my study. Sharing my observations and judgements about the mapping practices of my participants with them, helped to produce a dialogical way of working in which we both gained from our experiences together. Following Clifford (1983) I wanted to develop a relationship with my participants in which they felt fulfilled by their own involvement. Discussing my notes in person or via email exchanges was an excellent way of generating further insights into the mapping practices of my participants. It gave them, and me, the opportunity to clarify and dispute my observations and interview notes. In addition to strengthening my findings it also strengthened my relationship with participants, which I used to my advantage to probe deeper into the minutia of their everyday mapping practices.

Future studies may benefit from adopting a similar dialogical approach to working with participants. I suggest that this transparency helps to dull the distinction between researcher and participant, which has the potential to yield richer results. I found that allowing participants access to the research process itself helped them and myself to understand more. Doing so, I suggest, could be an important step to take when thinking about where researching mapping cultures might go next.

Taking this dialogical approach a step further, future map design may benefit from engaging participants in the map making process. As I show in chapter 5, people

take great pleasure and satisfaction in making maps. This is particularly the case when making maps with others for a social cause that matters to them. Involving participants in this process would likely help map designers identify what it is that people want from maps, and also what it is that lay-persons think about the map making process itself. This type of transparent process could work especially well with small communities or with specific practice led groups such as those identified in this thesis. Focus groups and 'mapping parties' might be one way to begin this process. Based on my fieldwork, attracting groups interested in the map making process would be easily done if participants knew their involvement had the potential to provide social value for themselves and others. Providing the space, facilities and opportunity to map and socialise will likely attract an enthusiastic group, which has the potential to benefit everyone involved. Nonetheless, organisers of such events should be careful to select a representative sample of participants to be involved in these projects. Without such precautions the maps produced are likely to represent heavily skewed ideas about what is important for map users. In an effort to attract a representative sample, future research should seek participants that best reflect the area of study. This could be done through random or stratified sampling techniques, regular and widely publicised public consultations, or through targeted sampling based on preliminary fieldwork as was the case in this research.

3.4 Conclusion

This chapter described the rationale, processes, participants and implications of my research. In the first section I unpacked the rationale for my chosen ethnographically-informed methodological framework. Specifically, I described the advantages of using an ethnographically-informed framework when studying contemporary mapping practices. I highlighted the flexibility of short and long form ethnographic methods as an advantage when studying mapping practices over multiple sites and mapping practices that unfold on the move. I also argued that ethnographic approaches are well suited to studying the minutia of everyday life. Moreover, I showed how utilising an approach grounded in 'digital ethnography' is useful when attempting to unpack the everyday practices of digital culture. This methodology, I argued, provides a suitable framework for examining digital mapping practices from a holistic, non-media-centric perspective.

In the second section, I described my research participants and fieldwork processes in detail. I gave a critical self-reflexive analysis of my sampling methods,

research sites, methods of data collection and analysis, and gave a detailed indication of who my participants were (see appendix 1 and 2 for further details). In the third section I outlined the implications for my research methods and how they might be applied to future research in this area. By critically examining these processes I have identified the benefits and limitations of doing ethnographically-informed research that focuses on the cultures of mapping practice. Alongside chapter 8, which gives details about how this research might be used in future policy and design, this chapter may also be consulted as a guide for future ethnographic enquiries into mapping practices.

CHAPTER 4

MAPPING INTERFACES

4.1 Mapping interfaces on the Piccadilly Line

I'm on a Piccadilly line train as it arrives into Kings Cross - St Pancras during the evening's rush hour commute. The train is full enough that the carriage vestibules are a little squeezed but not so tightly packed that the aisles are jammed up; not yet. The personal space of passengers has yet to become aggravatingly infringed, and yet the opening of the doors still offers everyone a light moment of oxygenated relief. Moments later we are still there, waiting for our verbal warning and the sound of the doors. More time and still it does not come. The anxiety and annoyance of lateness, the threat of claustrophobia, and the universal 'what's this?' and 'not now' is written across faces up and down the carriage. Many of us have been here before, and I suspect most of us are praying for the doors to shut so we can get on our way.

Tannoy announcement: *Good evening ladies and gentlemen. Due to a faulty train further along the line, this train will be terminating here. Please change here and seek alternative routes. TFL apologies for any inconvenience caused.*

There is an intermittent pause while everyone registers what's just happened: the ball has been dropped. This is followed by a few audible moans and a general reluctance to move, just in case. Finally, there is movement and some leave disgruntled but clearly confident whilst others consult their phones, carriage and platform maps, or discuss their routing options with one another. There remains the unfortunate; those fast asleep dressed in reinforced construction clothes and steel capped boots, and those surrounded with tagged bags, just off the plane from what I expect is Heathrow. They are clearly unaware of what's just happened.

Groups huddle with each other and talk; others cocoon themselves with their devices in hand but most gather around the public maps. Some are giving directions and advice whilst others tap and swipe away. Those around the maps point and trace routes and options with their fingers and eyes. Station staff can be seen helping on the platform and heard giving general advice and updates on

> the tannoy. All, including myself with my own map displayed on my phone, are trying to get a hold of this situation. We will all at least attempt to use these maps to help us; we are all subject to the power they behold. Most, I suspect, are used to this sort of thing: the frequent recalculations of everyday life on London's transport network. And I suspect most are grateful for this to happen at a station with so many other potential options available.
>
> (Except taken from field notes, February 2016)

Cases such as this exemplify the kinds of engagements people have with maps in London on a daily basis. They show how urban life often involves ad hoc and different encounters with maps of many kinds, be they graphic representations, verbal directions or spatial imaginaries. For many, these instances are typical of everyday life in the city. Similar mapping encounters were simply part of the urban experience for many of my participants.

This example also highlights the dynamic and context dependent use of maps in everyday urban practice. It subtly reveals how every map user may potentially employ maps, perhaps the same maps, for different purposes and for different reasons, and yet remain constrained by what information the map itself can provide, by her or his ability to 'read' maps, and by the situation at hand. This is to say that using a map is a context dependent practice. Without extensive fieldwork it would be impossible to decipher the multiple ways and reasons why these passengers used different maps in this particular instance. It would be equally impossible to understand how these mapping encounters were embedded into the idiosyncrasies of their everyday lives. For some it could be simply re-routing themselves in the most efficient way to get home on time, but for others the potential of this encounter could make a significant difference to what they do next, which could have a knock-on effect in other areas of their lives. The point here is that the subtleties of everyday mapping encounters can teach us much about the ways in which maps get deeply interwoven into daily life.

Throughout this thematic section on maps, which this chapter introduces, I aim to uncover these subtleties using examples from my ethnographic fieldwork. The purpose is to reveal how everyday engagements with maps produce dynamic socio-spatial and material practices of interaction, performativity and place-making.

In this chapter I introduce *mapping interfaces* as a theoretical framework for understanding everyday mapping practices as relational zones of possibility and limit in

which the materiality, representation and performativity of maps and mapping encounters are taken into account. By doing so, I situate the subsequent chapters in this thematic section under the broad conceptual notion that engagements with maps in everyday life are constituted through dynamic processes of practice and place. I build on the argument that everyday mapping encounters are processual and ontogenetic (Kitchin et al. 2013). I use my ethnographic findings to explore different kinds of ontogenesis in mapping practices. More specifically, I develop a theory of mapping interfaces to argue that encounters with maps are processual encounters of possibility and limit, which need to be understood through the lens of practice if we are to fully grasp the work which maps do in the world.

Of course, as I showed in the previous chapters, mapping practices have been the subject of recent innovative studies (see, for example, Brown and Laurier, 2005, 2012; Crampton, 2009a). Where my approach differentiates from these is in my usage of the term 'mapping'. Mappings take into account a wider range of spatial representations than those that are graphically represented in the typical fashion commonly understood as maps (after Cosgrove, 1999). My theory of mapping interfaces is thus a theory which accounts for a wide range of spatial representations and practices. It is different from previous theories of mapping practice in that it creates a single framework that draws together the notions that maps are objects of representation, have a materiality that matters, and have a performative capacity that is realised in practice. In using my ethnographic materials to draw these notions together, I hope to add some empirical colour to the sentiment that maps and mapping practice are processual, which is something rarely done but strongly encouraged in studies of maps to date.

This chapter has three parts. The first explores the notion of an interface based upon the theoretical assumption that an interface is zone of possibility and limit, and not simply a surface upon which interaction occurs. In this section I engage with two theoretical strands of literature that define interfaces: one from the position of the technical and the other from the socio-technical. In the second part I develop the notion of mapping interface as a form of socio-technical interaction, and explore how it might be used to explain the dynamic processes and performances of navigational mapping practices. I show how hunting for geocaches in London and navigating the streets of New York can both be considered mapping interfaces in which the materiality, performativity and representational effects of maps are seen to unfold together in practice. In doing so I address how interactions with maps have the potential for a great many socio-spatial practices and performances, and yet remain limited by the context in

which they unfold. In the third part I explore the role of mapping surfaces and how these afford mapping interfaces different possibilities and limits. I focus on three types of surface in order to highlight the effects that different surfaces have on two navigational mapping interfaces. In the first example I unpack how the surfaces of paper A-Z maps had an effect on Tori's (see appendix 1 and 2) navigational practices. In the second example, I examine how the surfaces of digital maps had an effect on Stephen's (a member of the WCC) cycling practices.

4.2 Interfaces

The vernacular understanding of an interface is the point at which two entities meet and interact. Commonly it is understood as the surface that mediates an interaction. In contemporary parlance this has often come to mean the point of interaction between bodies and the surfaces of digital technology, otherwise known as the Graphical User Interface (GUI). These include the touch screens, keyboards, control pads, buttons, and mice which we use to interact with a variety of digital devices. Within geography (see Ash, 2015; Rose, 2015) and beyond (see Bolter, 2007; Cramer and Fuller, 2008; de Souza e Silva, 2006; de Souza e Silva and Frith, 2012; Drucker, 2011, 2013; Farman, 2012; Galloway, 2012; Hookway, 2014; Kirschenbaum, 2008; Nusselder, 2009; Verhoeff, 2012) the concept of the interface has certainly become the favoured tool to frame interactions with digital technologies. In thinking about the conceptualisation of the 'digital' and 'data assemblages' more widely, theories of the interface have also been used to explore the human-facing (or perhaps 'end user') element of digital stacks; that is the facings of the multiple layers which make up the assemblage of digital objects (Ash et al. 2016; Kitchin, 2014). Antic and Fuller (2011) have also discussed how interfaces can be theorised to understand how computing devices interact with one another, without any human interaction. For instance in the case of automated computing systems, interface theories have been used to understand how the softwares working within these computing assemblages interact with one another.[5]

Drucker (2013) has argued that because the metaphor of the interface as a surface of digital objects is so familiar to us, we forget the proper function of the interface, which is to account for relational occurrences beyond the physical interaction between two facing surfaces. The surfaces of digital objects are important to consider, but they are not interfaces in and of themselves. They are simply the outward facing exteriors of the entities involved in an inter(facing) encounter. Hookway claims 'the

[5] This is also commonly called the 'interoperability' of software.

interface may be distinguished from the surface in that it does not primarily refer back to a thing or condition but rather to a relation between things or conditions, or to a condition as it is produced by a relation' (2014:13). As Drucker elaborates, the interface is an environment, 'a space of affordances and possibilities' that structure how people interact with things. It is a 'set of conditions, structured relations, that allow certain behaviours, actions, readings, events to occur' (2013: 4). Further still, Galloway defines the interface as not a thing, but as a 'process or a translation' which is more than the sum of its inter(facing) surfaces. For Galloway an interface draws from the entities it's translating between, but it also has its own properties and structure which are independent from the entities involved. The interface is not then, exclusively the point of interaction between bodies and digital technology. Instead, the interface accounts for the entire dynamic context of interactions which unfold between inter(facing) entities (see Figure. 1, which shows the difference between a point of interaction and an interface, albeit a simplified one consisting of only two entities).

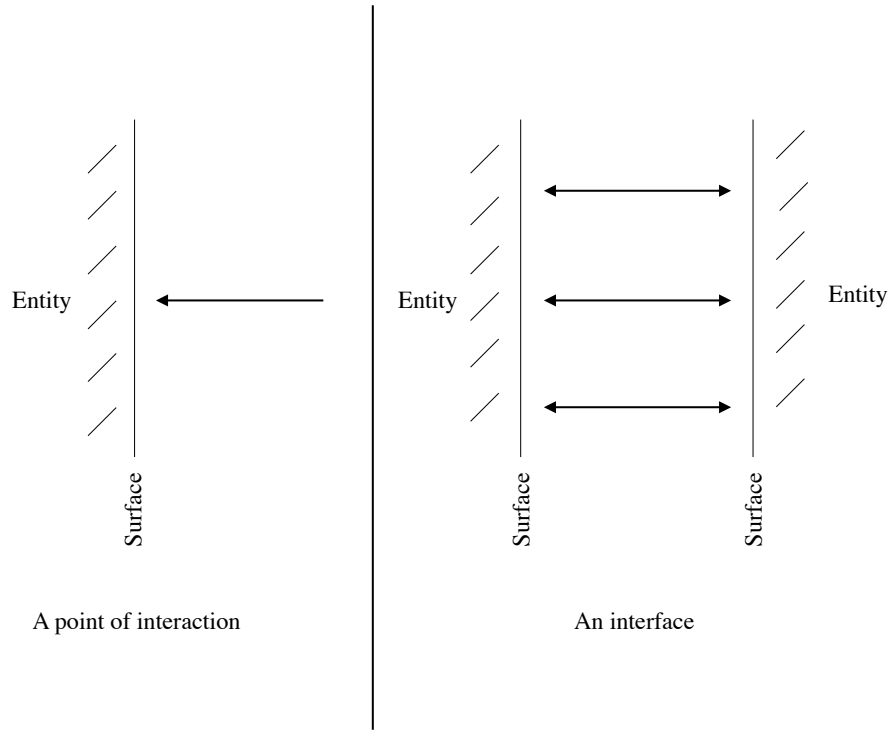

FIGURE. 1 A surface and a simplified interface

Hookway (2014) understands interfaces as zones of possibility and limit. He suggests that interfaces have a great many capacities which can be realised to produce

action in the world. Yet these possibilities, he argues, are always limited by the affordances of the entities involved. In short, the capacities of an interface cannot be realised, or actualised in practice, unless the entities involved have the capacity to be affected by one another (after DeLanda, 2006). For example, there are many possibilities and limits to interfacing encounters that occur between a smartphone and its user. These possibilities and limits are afforded, in part, by the capacities of the device and the user to affect one another. In its simplest form, interfacing encounters between a smartphone and user are dependent on the capacity for smartphones to be operated by fingers and thumbs. Anyone who has attempted to use a pair of gloves to work the screen of a smartphone will know this. Smartphone's don't have a capacity to be operated with gloves in the same way as they do for fingers, which has an effect on how an interfacing encounter may unfold. DeLanda (2006) suggests that this is an important point to make about theories of emergence (and I include that of the interface here) because it allows us to speak about emergences as dynamic coming-togethers which have a capacity to produce multiple outcomes, without suggesting that the coming-togethers of entities can produce any old outcome.[6] In this regard, the capacities of an interface, although plentiful, remain limited in their actual realisations by the capacity that its assembling entities have to be affected by one another. The result is that the processes of the interface are constrained by their own dynamics of interaction.

Interface theories have become commonly associated with theories of the digital and human-computer interaction (HCI), and yet there is much potential for these ideas to be applied in far wider contexts of interaction between entities (see Ash, 2015; Farman, 2012; Galloway, 2012; Hansen, 2006; Hookway, 2014; Rose, 2015). In many ways it could be said that theories of interface have a correlation with theories of the virtual and the actual, in that they both deal with the possibilities, capacities, potentials and limitations of actual practice (see DeLanda, 2002; Deleuze, 1966). Interface theory could thus be applied to studies of social-technical interaction of many kinds, and not just those interactions with digital technical objects.

This is the case for my research. My ethnographic work made it clear that a focus on contemporary mapping practices must still include non-digital mapping practices. My research suggests that the digital mapping revolution is yet to win over all map users or dominate all mapping practices. Other forms of mapping still play a prominent role in people's lives. In developing a theory of mapping interfaces I aim to address the dynamic interactions that occur in relation to both digital and non-digital

[6] Specifically Delanda (2006) is referring to assemblage theory here, which is also a theory of emergence.

maps. I argue that the zones of possibility and limit inherent to interfacing encounters are not exclusive to HCI, but instead may be used to understand other forms of cultural practices, namely everyday interactions with different kinds of mapping. In this sense mapping interfaces may, for example, be applied to the events which unfold between a paper map and its user(s) and digital map and its user(s).

In his work on mobile phones, Farman (2012) suggests the need to take note of social practice when thinking about interfaces, thus offering a theory of the human's involvement in interfaces. Going beyond its technical workings he suggests investigating interfaces from the position of social practice, whereby we think relationally about how the technical is folded into social practice. I agree with Farman when he suggests that the embodied practices of social space are far too often neglected in technical theories of the interface. Using my empirical materials I respond to this throughout this thesis and demonstrate how a better understanding of social practice is necessary in trying to detail the intricate ways in which mapping interfaces have been folded into everyday life. By doing so I build on the work of Shove et al. (2012) who argue that in order to understand the social we must take a closer look at practice.

4.3 Mapping interfaces

Having given an insight into how interfaces may be theorised as zones of possibility and limit, rather than simply surfaces, I now argue that interactions between maps and users can be understood as mapping interfaces. I propose that mapping interfaces are the relational and context dependent encounters which unfold between a map and a user in practice. Figure 2 shows two examples of a navigational mapping interface. The image on the left shows an interface between a user and a digital map whereas the image on the right is an example of an interface with a non-digital You Are Here map. These mapping interfaces will play out differently. However, the underlying principles of the interface, as outlined above, may be applied to both contexts regardless of the mapping technology used.

I use this definition of mapping interfaces to suggest that every instance of map use is a different one, however subtle, based upon a dynamic range of socio-spatial factors which come together ontogenetically in the practices of using maps. As my fieldwork suggests, using a map does not simply mean responding directly to their representational properties. It is a far more complex practice, which is open to a multitude of possibilities and limitations determined by the capacities of the social and technical entities involved.

Understanding encounters with maps as mapping interfaces is useful in that the framework is set up to examine dynamic, rather than one-way, forms of interaction with maps of various kinds. Whilst this framework does recognise the importance and power of a map's representational properties - a mapping's surface - it encourages a holistic contextualisation of mapping practices which goes beyond a representational analysis of maps. As I described in chapter 3, the aim of this study is to examine contemporary mapping practices using a holistic understanding of place and social practice. In developing this framework I intend to move the conversation about maps away from the common analysis of maps as representational artefacts and into a recently established domain which seeks to understand mapping encounters from multiple perspectives, which include the more-than-representational work on maps and the cultural contexts in which their use unfolds (Caquard, 2015; Della Dora, 2009; Kitchin et al. 2013; Kwan, 2008; Lammes, 2016; Perkins, 2008, 2009).

In adopting this framework I have intentionally neglected other relational ontologies such as actor network theory (ANT) (see Latour, 2005), assemblage theory (DeLanda, 2006) and practice theory (Shove et al. 2012). The reason for this is twofold. Firstly, a theory of interfaces permits me to unpack the multiple relations of mapping encounters whilst maintaining a focus on surfaces in a way that ANT, assemblage and practice theory do not. In my interpretation of the interface, both the relations between surfaces *and* the surfaces themselves (of maps in my case) co-constitute any inter-facing encounter. ANT, assemblage theory and practice theory all account for the relational properties of entities which emerge together in practice. Indeed, much can be said about how these theories contribute to an understanding of mapping practices as emergent processes (see, for example, Perkins, 2014 analysis of OSM using ANT). Nevertheless, these theories do not focus explicitly on surfaces in the same way as the strand of interface theory which I have identified and use here. By understanding maps as having relational properties *and* as surfaces with distinct material and technical properties, as I do throughout this thesis, interface theory was determined to be the most suitable of these ontological apparati for investigating the representational, material and performative aspects of everyday mapping practices.

Secondly, using interfaces to describe the relational dynamics of digital *and* non-digital maps allows me to put this framework into contention with practices that it is not often associated with. Using my interpretation of the interface I am able to discuss it as a framework for understanding digital and non-digital mapping practices. This is

contrary to the popular use of the framework for exploring only the relations between users, practice and digital technologies.

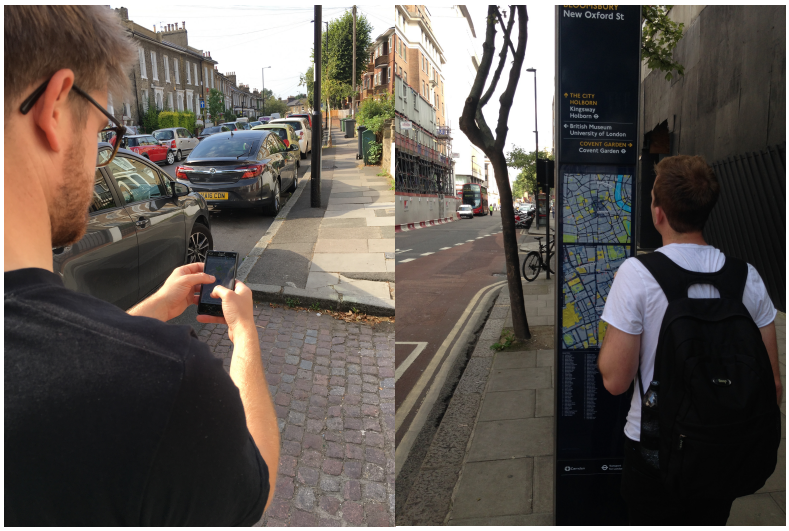

FIGURE. 2 Two examples of a navigational mapping interface found in everyday life.

In the following I unpack mapping interfaces by using specific examples of navigation taken from my fieldwork with Debra, a geocacher, and a group of undergraduate students on a fieldtrip to New York. Navigation was by far and away the most talked about and observed mapping practice during my fieldwork, and there are many examples which I could have picked. However, these two case studies offer an example of how diverse and context dependent navigational practice may be and therefore are well suited to explore the dynamic properties of mapping interfaces. As I will show, these two instances of navigational mapping interfaces were relational becoming's that were laden with possibility and limit. They were idiosyncratic affairs which often unfolded in contexts that were not always immediately obvious.

Debra the geocacher

In my conversations and go-alongs with Debra about her use of the Groundspeak geocaching mobile application, the dynamics of navigational mapping interfaces were particularly apparent.[7] She walked me through the ways that she used the app for navigation, highlighting which aspects of her use she deemed to be unique to her, and

[7] This mobile geocaching application is the official app of Groundspeak Inc, a popular geocaching platform (see geocaching.com). The application provides both a map and further contextual information including clues and points of interest, which be used to find hidden caches.

what it was about the app's map that encouraged or discouraged certain navigational practices.

Primarily the geocaching app shows where a cache can be found on a map, to the nearest 5 meters (see Figure. 3). In most cases it is used as a navigational aid to guide players to caches. Without it the cacher would simply not know the whereabouts of hidden caches, making it an integral part this practice. Also included in the app is other contextual information and clues, which may be used to find a cache (see Figure. 4). Debra frequently made use of all of these tools in her hunt for caches. I asked her to explain the process of using the app and she described how starting it up always produced familiar feelings about a forthcoming cache hunt. She described these feelings in differing terms of excitement, eagerness, anxiety and dread. Like most in the geocaching group, she really was committed to this activity. As a veteran of the practice she had already found many of the 'easy' level 1 rated caches in central London. Only those more difficult finds remained. Opening the app and visualising the unfound caches on the map reminded her of this; these moments were haunting reminders that she still had much work to do in her aim to 'collect them all'.

Choosing which unfound caches to navigate to at these times was based on a variety of factors. For instance if she was feeling particularly agile then she might navigate towards the cache she knew to be hidden up a tree, or the one she had an inkling was buried deep within a particularly unwieldy bramble. At other times she might favour the more mentally taxing finds; the caches concealed by cryptic clues and math's puzzles. Giving two examples' she suggested that a long day at work or inappropriate clothing might cause her to choose a less physically demanding cache to navigate to.

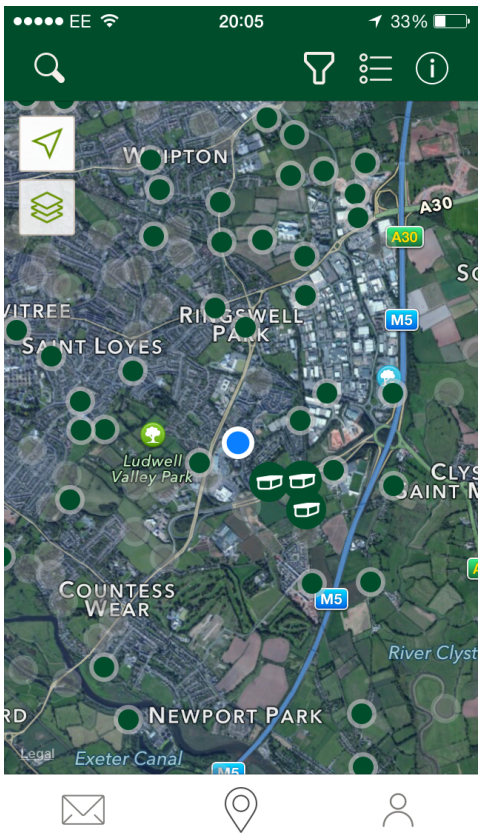

FIGURE. 3 Screenshot of geocaching app showing a map with nearby caches on it

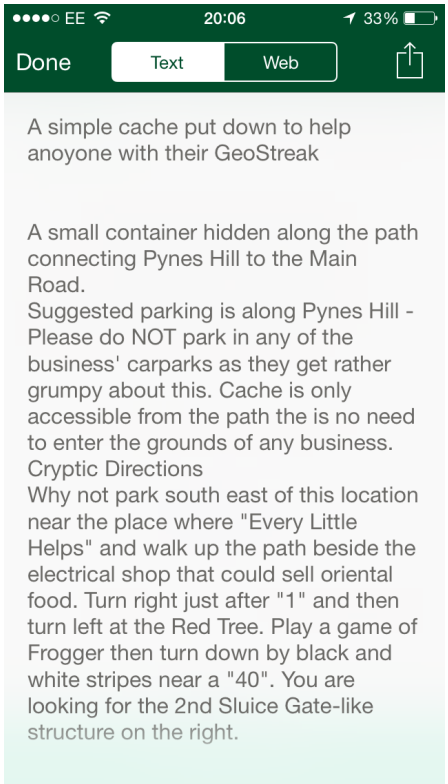

FIGURE. 4 Screen of contextual information provided on the geocaching app

The map provided Debra with the spatial information she needed to navigate to these caches, and the distinctive context of her encounter with this map determined whether she had the enthusiasm to hunt down one cache or another. In using the geocaching map at these times, Debra was enfolded in a mapping practice, using the map as a tool in the playful practice of hunting down caches. Using the app's map, she had entered a zone of possibilities and limits in which both the capacities of the map and the capacities of herself affected how her involvement in the practice of geocaching unfolded. The map, providing the spatial tool she needed to navigate, and her personal reasons as to which cache she wanted to navigate towards constituted a socio-technical situation. I suggest then, that all of Debra's navigational practices whilst geocaching could be termed mapping interfaces, for neither the entity of the map nor Debra herself had the capacity not to be affected by the another in the context of navigation.

In the broader context in which geocaching takes place, there is also potential for mapping interfaces such as these to produce the possibility for different actions and passages of thought. The point is that mapping interfaces may unfold in ways that are not intended by the makers of maps. There were, for example, times when Debra used the geocaching app not to hunt down caches, but rather as a map of London used to help get her around. The app was so often visited that it sat on her phone's home screen and often replaced the other types of map app that she might use. She noted how illogical this could seem, particularly when apps such as Google Maps could have given her a 'better overview and more precise directions'. Nevertheless, she was used to the form and features of the geocaching app and had become accustomed to this way of navigating. This is an example of how unique a mapping interface may be. Certainly no one else I spoke with in the geocaching group navigated in the same way. Using the app's map as her primary navigational aid she had the capacity to utilise the possibilities of the map to be used in other contexts, despite it being limited as an aid when compared to other maps designed specifically to assist in everyday navigations.

Navigating New York

In running a test with an undergraduate cohort of students on two consecutive field trips to New York, I asked my participants to navigate to unknown areas of the city without the use of their smartphone maps. It quickly became clear that the ability to find one's own position on the map was consistently rare for most. In effect, GPS-enabled digital maps had eroded (if not repressed) many of my participants' capacities to use a map in ways considered traditionally conventional whereby one must co-ordinate their position

before determining a route (see chapter 7, where I discuss this detail further in relation to contemporary understandings of place). Navigating using digital maps had by and large become a mapping interface in which the possibilities and limits of these participants' mapping encounters had shifted because of the capacities of the technology involved.

I do not want to suggest that GPS technology affects navigational mapping interfaces in a positive or negative way (again, I discuss this further in chapter 7) but rather to suggest that the presence of GPS technology in navigational practices produces mapping interfaces that are different when compared to other forms of mapping (see also Speake and Axon, 2012). Moreover, it is worth noting that GPS technologies had been pervasive for much of this group's teenage and adult lives, and therefore it could be suggested that they didn't know traditional non-digital technologies in the same way as older people did. This suggests that younger generations of map users have already crossed the line at which navigational mapping interfaces rarely, if ever, unfold without the use of GPS technology.

Considering the project's urban focus, it would be interesting to see how this particular dynamic of mapping interfaces is played out in rural settings where mobile phone GPS signal coverage is experienced in different ways. Where my work with students in New York may be useful in this respect is in its focus on the practices of navigation and route planning whilst abroad, which are often costly and subject to issues of connectivity. The following highlights how the capacities of connectivity and associated costs can cause variations in navigational mapping practices.

Over the two trips I found that both the possibilities of the students' and indeed my own navigational practices were often constrained not only by our limited ability to read maps without the GPS location being shown, but also by our mobile phone tariffs which played a vital role in how navigational mapping interfaces unfolded. Without wishing to pay the extortionate fees charged by mobile carriers for data roaming outside of the UK, the possibilities of mapping interfaces were severely limited by technical means, which was rare for these students who mostly had data heavy phone contracts and lived in the relatively well connected area of South East England.

More often than not the students accepted the fact that their digital maps, or indeed many of their smartphone's functions, would not work in the same ways abroad. They quickly understood how this might affect how they got around the city. In efforts to overcome this problem, the students employed a number of tactics. Grasping the fact that their digital maps would work in a similar way if they had a WIFI connection,

many of the students simply checked a route using a hotel, coffee shop, fast-food or public WIFI network. Although this did not provide them with full coverage it did mean that with a little effort, meandering between free WIFI spots, the possibilities of navigating the city using their digital maps were less likely to be limited by issues of connection.

Offering an alternative picture were those students accepting that getting around using their phone maps was going to be a nuisance, even if they did manage to get intermittent connections. These students, of which there was only three out of the fourteen, opted to use paper maps made freely available in the hotel's lobby. The mapping interfaces to emerge in the context of these students navigational practices were open to different possibilities and limits, based on the form of the maps involved. For instance, because these maps were primarily tourist maps the possibilities and limits of subsequent navigational mapping interfaces became bound up in very a specific spatial representation of the city. As made clear by Ciara:

> 'It's easy to get to Time Square and theatres using this [the map], but anywhere else like off Manhattan, then you've got to find another way'.

In this instance the possibilities of the mapping interface are limited by the capacities of the tourist map to provide useful spatial information beyond Manhattan's boundaries. This could also be used as an example to suggest that the possibilities of such a mapping interface were limited by the capacities of that particular map as a finite resource offering a specific cultural representation of New York, an imaginary in which a tourist experience of the city is confined to boundaries of Manhattan as shown on the map. Navigational mapping interfaces involving students using WIFI intermittently were not limited in the same respect. Following Graham et al. (2013), it could be said that they were able to access far richer information about Manhattan and beyond due the dynamic capacity of digital maps to provide more information about particular places than these aforementioned paper maps. Moreover, following Urry and Larsen (2012), I contend that tourist maps continue to play a major part in the geographical imaginations of visitors by offering a rich resource for navigating and contextualising tourist locales. In the following part of this chapter I address the possibilities and limits of different forms of maps, which should give further indication as to how digital maps have the capacity to produce different mapping interfaces when compared to other forms of maps.

As this section has demonstrated, there are multiple possibilities and limits to mapping interfaces based upon the context, form and practices in which moments of mapping take place. In unpacking two examples of navigational mapping interfaces here I have only scratched the surface of how such encounters could unfold based on the capacities of the entities involved. Throughout this thematic section of the thesis I will continue to give examples of mapping interfaces in relation to other contexts and for the purpose of making different arguments about mapping practices.

4.4 The surfaces of mapping interfaces

I use the remainder of this chapter to unpack the role that map surfaces play in the emergence of mapping interfaces. I wish to argue that although not defining mapping interfaces, mapping surfaces need to be taken into consideration when unpacking everyday mapping encounters because different surfaces have the capacity to produce mapping interfaces with different possibilities and limits. In the following I focus on three types of mapping surface: paper, digital and immaterial surfaces.

The etymology of 'surface' derives from the French for sur (above) and face (face). It is the 'outermost boundary, outside part' (Oxford English Dictionary, 2016) of something that is usually but not always material. There are many surfaces which come together in a mapping interface. Most obviously are the surfaces of maps, the outermost boundary of maps. These are usually graphical in some way or another. Other surfaces include the exterior facings or expressions of the other entities that are involved in mapping encounters. These surfaces could refer to the outermost boundaries of the people or practices involved. Here I focus on the former for the sake of building an argument about how different material mapping surfaces have different effects on how mapping interfaces unfold. This section responds directly to my aim to examine the effects which digital technologies have on contemporary mapping practices, and everyday experiences of place. By comparing different analogue and digital mapping surfaces, I demonstrate how the surfaces of digital maps may produce novel mapping encounters.

A sketch map drawn in the sand, or a map printed on glossy paper, wood or cotton all have material surfaces which users can engage with. Similarly, digital maps presented via code and electronics onto OLED screens have material surfaces which users can expect to decipher useful information from. My fieldwork suggests, perhaps unsurprisingly, that the common understanding of a map remains something which spatial information in represented on. Maps are almost always understood as surfacing

objects in this regard. Nevertheless, my use of term mapping suggests that other less tangible forms of map should also be considered when thinking about the different surfaces of maps. What, for instance, constitutes the surfaces of verbal or imaginary maps? Do they have surfaces? Evidently they do not. These mappings express themselves in different ways, primarily through cognition, conversation and gestural performance. For instance, when Dennis, a black cab driver, recalled his methods of route planning he was expressing a spatial understanding of the world. Though these expressions could be considered a mapping of sorts, they cannot be considered as a map with a tactile surface in the same way as, say, a paper map. Similarly, when out walking with Lauren, gestural performances were given to convey directions between her and two old friends (see chapter 6). Though these were mappings, they could not be said to be maps with tactile surfaces. Even if the interface framework is not easily applied here, it is important to note where the boundaries of mapping interfaces lie. In this case the interface framework is limited to discussing tactile map surfaces.

Paper surfaces of mapping interfaces: Tori

Analysing my conversations and observations of Tori's use of the London A-Z pocket map book is a good place to begin unpacking the possibilities and limitations of paper surfaces in everyday mapping interfaces. As I will show, paper maps still play a prominent role in the everyday mapping practices for some people. The surface of this particular map, I argue, affects how it was used and equally why it was used in Tori's everyday mapping practices. I highlight how the A-Z made serendipitous encounters with unknown parts of the city possible for Tori, and show why the limitations of paper mapping surfaces were important in her decision to continue using this map rather than adopting digital maps.

Most of my participants had not touched a copy of this infamous map in a long time, despite its prominence in popular culture only a decade earlier (see Hornsey, 2016). The reason was that many had since brought smartphones that came preloaded with mapping software, which were considered better tools for the job of navigation. Tori did have a smartphone and was certainly no technophobe; her interest in smartphone technologies actually grew over the time I spent working with her. Every time we met she talked me through one new application or another, citing its positive and negative potential. Nevertheless, she remained resistant to switch from her pocket A-Z to digital maps over this time for a few reasons. Firstly she had grown quite attached to it as an artefact. It had been her guide to London when she first moved to the

city ten years previously, long before digital maps had become the preferred choice of city map. She had learnt how to use it by cross referencing what she saw out of the top deck windows of buses with what she saw on the page.[8] Over time she had used this method to build up her own spatial imaginary of London, which was very specific to her own experiences of living in the city. She did not think that digital maps could not do the job better, but she had become accustomed to this way of working and saw no reason to make a switch at this point.

As with many of my participants, habit played a major part in why Tori used this map. Aside from this use value, Tori had developed a deep distrust in maps in recent years, which was only exacerbated by digital maps. Initially sparked by an interest in the map art of her peers, she had become much like a critical cartographer in that she would often question the work that maps did in the world. Without being able to put her finger on it she assumed that the dynamism of digital maps was a reason that made them even more suspicious in the work that they did, which is a point often made by critical cartographers (see Wood et al. 2010). Finally, digital maps were bracketed in the same category as surveillance technologies by Tori. She thought that by using the maps on her phone she would have her location tracked and then analysed by commercial companies and national governments.[9]

Tori's affection for the A-Z was made clear by its state of appearance. Taking it from her bag, 'where it lives', I could see its dog-eared corners, tatty pages, an out-of-date tube map printed in the back page, and scribbled annotations included across many of its pages. The date printed on the front was 2004. Such use and affection cannot be seen on digital maps in the same way. The material properties of digital surfaces do not lend themselves well to the aesthetics of long-term use, to which personal meanings are often attached. They are only made possible by capacities of the paper surface (and book format). As Jacob (2006) has argued, the meaning of maps is often dispersed, and indeed felt, through the effects of their material properties. The same could be said about the annotations Tori had made. Arrows, words and circles littered many of the

[8] This is a common navigational technique when using paper maps, which had become problematised by digital technologies which give users their GPS position. As noted by November et al. (2010) this way of understanding space has been affected by digital mapping technologies. I discuss this further in chapter 7, arguing that this technology has had an effect on how place is now understood.

[9] In many ways she is correct about this. There has been a great deal of evidence to suggest that mobile phone manufacturers, cellular providers and government organisations are tracking what smartphone users do on their phones and where they do it (see Edward Snowdon revelations). However as the recent case of the FBI vs Apple makes clear, exactly how this information can be legally captured, stored and shared remains a complicated issue. Interestingly, Tori was prepared to make this trade off when using other apps, which have similarly been cited for their ability to track a users actions and location.

book's pages. While digital maps can certainly be annotated, this particular type of personalisation is again only made possible by the capacity of the paper surface to be drawn upon. In Tori's case these annotations were often made on the fly for a variety of reasons as she moved through London. In most cases they signaled bus routes, numbers and stops as well as where certain galleries and material suppliers were located, and estimates of walking times between locations that she had calculated after walking them.

The capacity of the paper surface to retain all this information without having to be refreshed or reloaded upon every new encounter made these annotations stable in ways which would not be the same when using maps presented on digital surfaces. Being able to quickly revisit these annotations became invaluable to Tori when she was first getting to know the city. The slow accumulation of this knowledge, presented on the same pages over time had become bound up in her practices of way-finding. By adding notes and points bit by bit, she layered her own spatial understanding of London in a way that could now be done instantly using a digital map. But it was exactly the speed in which these annotations could now be added which was a problem for Tori. To add everything at once is to add nothing. Tori assumed that the clarity of her spatial understanding was only made possible by the slow accumulation of knowledge, which was added to the map over a long time, after multiple experiences of the city.

In many cases the technical dynamism of digital maps was lauded by my participants, but in the case of Tori it was the very opposite that she had become accustomed to. The capacity for paper surfaces to keep spatial knowledge static, and accumulation slow, was what made Tori's way-finding practices possible. As Ingold (2000, 2007) notes, way-finding is the practice of learning as one goes along whereas navigation is following a line between two determined points. In the case of Tori it could be said that the capacities of the paper surfaces produced mapping interfaces that were capable of producing a process of way-finding that was preferred by her as she got to know the city. I argue that the surface of the paper map was intimately bound up in how her mapping interfaces emerged, and also in her practices of place-making.

Digital surfaces of mapping interfaces: Stephen

The surfaces of digital maps can generate different understandings of the city. Here I focus on the possibilities and limitations of digital surfaces with regards to the 'live GPS tracking' of Stephen's cycling practices. I bring to attention the possibilities of digital maps to provide many layers of useful information for the practices of cycling.

After which I show the limits of these maps when they provide too much information, to the wrong people.

Digital surfaces are inherently more dynamic than paper surfaces. Without question they appear to do more.[10] Digital maps, particularly those on personal devices owned by the majority of my participants, can display and store far more spatial information in far more ways than paper maps. An astonishing amount of spatial information can now be afforded by digital mapping technologies, although the extent of this complexity may only be determined by looking specifically at digital devices. Smartphones and stand-alone GPS devices, for example, offer different affordances determined by their own technical capacities. In the case of smartphones, which made up the majority of devices I examined during my fieldwork, spatial information may be layered, juxtaposed, refreshed, updated, annotated and shared using digital mapping apps. Moreover, digital maps on these devices can be used in dynamic ways which are different from those of paper maps. For instance, they are engaged with in different haptic ways owing to the size and working of touch screen technologies, and often linked to other softwares offering different services. The result being that in practice digital maps are rarely used in isolation of other software on the same device. As noted by Haklay and Weber (2008), digital maps are 'slippy' in ways which paper maps simply cannot be.

The dynamism of digital surfaces undoubtedly affects the possibilities and limitations of everyday mapping encounters. It is the workings and functionally of digital surfaces that offer novel encounters with maps in everyday life. When comparing digital surfaces to other surfaces of mapping, it could be easy to submit to the arguments that such encounters are better. More is often conflated with better, and digital maps certainly appear to do more. However, I wish to make a counter argument by suggesting that encounters with digital surfaces simply produce different, not better, experiences of mapping practice. As my fieldwork suggests, every mapping encounter is different based on a constitution of many dynamic parts, with the surfaces of maps being just one. To suggest otherwise is to fall into the trap of technological or social determinism. I use the example of Stephen, a 39 year old cyclist from South London, to develop these points.

Stephen had been using MapMyRide for a few months when I first met him. MapMyRide is a digital mapping application which is specific to the practice of cycling.

[10] The aesthetics of digital surfaces should also be noted here. In many cases there is an assumption that because it looks complicated it can do more (See Rose, 2015).

It is a smartphone application used to track a route using GPS and record a series of metrics using other sensors. It can also be used as a desktop service for ride analysis. The most important feature to note here is its 'live tracking' function. Marketed as a competitive way to live track and compare a friend's (or foe's) ride, the function is primarily used to keep track of the GPS position of a rider shown on a map in real time.

In the case of Stephen, this feature created a problem he wished he didn't have with his wife. Having briefly discussed this feature with his wife, who had a passing interest in cycling, he found himself continuously tracked by her when he went out for a ride. She had become particularly worried about his safety on the bike since he had had a major accident the previous year. Using the live tracking function helped her to overcome these concerns. When she knew Stephen was out on a ride she would intermittently check the software to see if he was still moving. If the green dot marking his GPS position continued to move, she assumed he was safe and still cycling. For Stephen this wasn't a problem at first. He appreciated her concern. However, after a few weeks it did become a niggling problem when she kept phoning him during the middle of rides.

> *I was stopping at lights, or having a coffee or a quick break and she'd always phone…[laughs]…to see if I was still alive!...[laughs]. The irony is that if I had been properly hit, or what have you, I wouldn't have answered the phone, would I?*

After this happened a few times he had to ask her to stop phoning so often. It was having a negative effect on his riding as he came to anticipate these calls, the result being that he made more stops to check his phone to see if she had called. After becoming something of a thorny issue, the couple eventually came to the agreement that she would phone only after twenty minutes of apparent inactivity as indicated by the live-tracking technology. After which he said he could enjoy his ride and breaks, whilst she was satisfied about his safety.

This example of Stephen's use of a digital mapping surface highlights how digital maps may produce mapping interfaces that are different from those produced with paper maps, as seen in the previous example of Tori. The same encounters would not have been possible using paper maps, which highlights the possibilities and limits of digital surfaces. The effect of Stephen and his wife's use of MapMyRide was only made possible by the digital technologies involved. Indeed, for Stephen these possibilities

eventually became limited by the same entity which made them possible. His rides felt constrained by his wife's use of the software, while she simultaneously felt empowered by it. As the example shows it wasn't just the technology nor the social situation which made these mapping interfaces, but rather a messy mix of the two. This follows Amparo Lasén's (2006) work, which suggests that mobile technologies are bound up in the intimate details of people's everyday lives. In this case it was clear that the ways in which Stephen and his wife used these technologies could be understood as a socio-technical situation in which the details of their relationship played a key role. Whilst the possibilities of the technologies are important to consider here, it is equally important to consider the context in which mapping interfaces unfold. For instance, were it not for Stephen's accident the previous year, these interfacing encounters would probably not have unfolded in the same way.

4.5 Conclusion

This chapter began by developing a theory of mapping interfaces based on the notion that an interface is not simply a surface, but rather a relational and context dependent encounter that unfolds between interacting entities which have the capacity to shape events. I argued that all forms of mapping encounter can be described as mapping interfaces, for they are made up of converging entities which each have a capacity to affect the possibilities and limits of how and why maps are used in everyday practice.

I firstly developed this theory by showing how and why users might engage with maps in everyday navigational scenarios. I gave examples to suggest that navigational mapping interfaces may be produced by a set of highly dynamic and potentially endless set of social, cultural and technical reasons. I demonstrated how different contexts and different maps produced different mapping interfaces in everyday life. Following that I explored the role of surfaces in mapping interfaces. I argued that whilst surfaces do not define (mapping) interfaces, they are important to consider when thinking about how (mapping) interfaces unfold in the context of everyday navigational practice. In this section I used examples taken from my fieldwork to show what is novel about digital surfaces when compared to other types of mapping surface. The result, I suggested, is that digital surfaces afford mapping interfaces novel possibilities and limits. By showing how non-digital surfaces affected mapping interfaces I also made clear, as I will continue to do throughout this dissertation, that contemporary mapping interfaces are not exclusively tied up with digital mapping technologies.

My notion of mapping interfaces offers the theoretical framework and foundations on which the following chapters in this thematic section will build on. The remaining chapters will cover other ways in which mapping interfaces can be understood in everyday practice. In the following chapters the interface will be considered in relation to the co-authorship of maps, both in terms of amateur and professional cartographic production, the socio-spatial practices made possible by mapping encounters, and the affective and performative potential of mapping interfaces. Concluding this thematic section I look at mapping interfaces through the conceptual lens of place, arguing that mapping interfaces may affect understandings and experiences of place in a contemporary context.

CHAPTER 5

MAP MAKING INTERFACES

5.1 Map making interfaces

In this chapter I focus on contemporary map making. By unpacking the sites, social practices and processes of production for both amateur and professional cartographers, I show that contemporary map making is a diverse socio-technical practice. The aim is to argue that map making, much like the use of maps, may be understood in terms of a mapping interface, for it unfolds in sites and amongst social practices and technological processes that can be framed as dynamic and context dependent zones of possibility and limit. Moreover, this chapter will provide further evidence to build upon my claims about the surfaces of mapping interfaces outlined in chapter 4. I attend to explaining the dynamics of these surfaces by demonstrating how different forms of map surface afford the processes of inscription, and ultimately map making, different possibilities and limits.

Investigating the sites, social practices and processes of production is important if we are to further understand the correlation between how maps emerge in the world and the work that maps do in the world (Dodge et al. 2009). This is particularly pertinent when exploring how the perceived objective reality of cartographic representation filters down into everyday understandings of maps (Crampton, 2010; Ingold, 2000). In making my case explicit through examples of amateur and professional map makers, I intend to show how making sense of the micro-practices of production complicates the notion that all maps are lies told by a powerful few. Building on the deconstructive analysis of Western cartography (see Crampton, 2001; Harley,1989; Monmonier, 1991; Pickles, 2004; Wood and Fels, 1992), I provide further insights and discussion about the social, cultural and political contexts in which maps are made. Where I differ from these studies is in my assertions that maps are made in a variety of different social settings amongst a diverse range of political attitudes, personal opinions and performative actions. Contemporary cartographers, I argue, are no longer necessarily the faceless lone figures that have often been associated with cartography of the past, but rather a diverse group of practitioners involved in map making for a complex set of social and cultural reasons, which have been afforded by

new forms of digital mapping technology (see Gekker, forthcoming; Perkins, 2009).[11] By highlighting the cultural contexts of map making, and map use elsewhere in this thesis, I hope to show the indirect and often dialectic ways in which a map's power is produced as it ebbs and flows between policy makers, producers and everyday users.

The chapter is split into three sections. The first examines the sites and social practices of cartographic production. This section shows how different places and social practices shape the map making process. The aim here is show that map making interfaces unfold in contexts that are made possible, but also limited by, particular places, socialities and institutional practices. This is to say that the social and material geographies of map making interfaces matter. In the second section I describe the processes of production. This section highlights the complex relationship between map making processes, techniques, technologies, mapping surfaces and 'finished' maps.[12] Detailing how different people and organisations make maps in different ways - based on the specific knowledge's, project time frames, policies, opinions and technologies that they bring to the map making table - I provide further evidence to suggest that map making interfaces are always the result of specific ways of working, which are laden with political and cultural assumptions about maps (see also Haklay, 2013; Kitchin et al. 2013; Perkins, 2008). Specifically I show how the inscriptive processes of map making shape the perception amongst map makers that maps offer a neutral perspective on the world. I argue that map makers are susceptible to the lures of truth and fact that maps appear to provide. I also use this section to detail the role of digital technologies in contemporary map making, which feeds the discussion about the affordances of different mapping surfaces. I describe how the processes of map making are increasingly intertwined with digital technologies, but also how other analogue processes remain important the production of maps. In the third section, I provide a commentary on the use of Google Maps in contemporary map making. Throughout my fieldwork Google Maps was frequently seen to be used in the production of maps in both an amateur and professional context. Due to its powerful position in the field of contemporary mapping it is worth describing exactly how this company has come to influence map making interfaces for both amateur and professional cartographers.

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[11] I acknowledge that others have also come to this conclusion in reference to historical map making (see Turnbull, 1996)

[12] I denote 'finished' maps to suggest that maps, and particularly digital maps, are only finished insofar as they appear complete to users. Of course, maps are never entirely finished. They may be updated and frequently are in the digital age.

In all three sections I draw from my fieldwork with Hannah, a professional cartographer working at a leading British cartographic institution and with two specific groups of amateur cartographers; a group of London based Humanitarian OpenStreetMap Team (HOT) mappers, and a group of London based OpenStreetMap (OSM) mappers. Comparatively, I show that the practices of cartography are now more accessible and varied than ever before, but also that an amateur – professional divide remains. By examining both amateur and professional map making I contribute to the debates about how power is exercised, understood and represented by maps and mapping technologies in the contemporary context (Crampton, 2009b; Elwood and Leszczynski, 2013).

5.2 The sites and social practices of contemporary map making

The modern history of professional cartography has primarily been characterised by the practices of professional mapping agencies that worked in closed environments to produce maps (Perkins, 2009). It has only been in recent years, due to social and technological affordances that this has begun to change (ibid). Contemporary cartography has since become a practice available to many more amateurs and interested enthusiasts through various practices of prosumer-based humanitarianism, practical social activism and novel forms of hobby (Crampton, 2009a). The result has been that many more maps are being produced and taken seriously as legitimate sources of spatial representation. In the following I examine three different map making contexts in order to give examples of what these contemporary forms of map making involve. Firstly, I give an example of what the work of professional mapping agencies looks like in this new climate, showing where it has and has not responded to these changes. Secondly, I highlight the practices of two specific forms of amateur cartography; community map making as a form humanitarian aid and community map making map making as a leisure / hobby practice.

Hannah: The professional cartographer

The only site of professional map making that I encountered during my ethnography mirrored that of a typical open plan office. Workers sat along rows of tables equipped with multiple screens, scanners, printers and stationary were placed in an orderly fashion throughout a large, modern, airy, glass clad office space. There was little doubt

that it was a working environment. Perhaps as a result, the enthusiasm for map making seen elsewhere at HOT and OSM events was less well defined here.

A quiet calm of office chatter filled the space; something which made HOT and OSM events seem raucous in comparison.[13] It is interesting to compare levels of enthusiasm here with mapping output. At HOT events especially, participants are frequently reminded that they are making a positive difference to the world. Organisers need to provide this motivation, which also includes a free pizza dinner incidentally, in order to get maps made quickly and efficiently. In contrast, the professional map making that I was witness to unfolded in a much more mundane, day-to-day manner in which cartographers are expected to do the work in accordance to the deadlines which have been set. It was their job to be there. Professional cartographers are contractually obliged to make maps whereas HOT participants are not; the result being that enthusiasm plays a different and perhaps less prominent role in the map making process. I suggest instead that skill, experience, institutional norms and protocol had a greater effect on what made it onto the map in this professional environment. For example, the quality control processes that went into producing maps in this professional environment were far more stringent than those placed upon most HOT and OSM mapping outputs. Edits to professional maps in this case were initially made by trained cartographers, verified by line managers, sent to a team trained in identifying discrepancies and then finally signed off by that team's manager before being added to salable products and data bases, and being open to further changes and updates on a 12-24 month cycle.

In and amongst the busy office worked Hannah (see appendix 1 and 2), the cartographer I spent most time with. Hannah had been working at the institution for over ten years, was clearly good at her job, and during the time I spent observing her work, rarely got called into question by the line manager. She had her own desk, which was dominated by three large computer monitors, drawing equipment and stacks of papers (see Figure. 5). In contrast to HOT and OSM events Hannah was used to working alone when making maps. Typically, she was designated a task assigned according to her specialism, given a deadline and left to get on with it. During my time with Hannah, she had two main tasks that would contribute to two larger projects within her team. The first was working on applying the recent findings of a topographical survey taken in Northumbria to the companies base map, with which all of the

[13] The absence of alcohol is important to note here. Enthusiasm for the cause at HOT and OSM events often went hand in hand with a bottle of beer, or two.

company's maps drew data from. This meant referring to the survey and changing the designation of existing map features such as contour lines and topographical shading accordingly. By doing so she was contributing to the numerous thousands of changes that were made to this base map each day. Hannah's second task was making edits and updates to a leisure map series based on recent high-resolution aerial photography. In a similar fashion this meant consulting this visual data and using a graphics pad and pen to inscribe or alter features from digitally rendered maps that were presented on the three screens in front of her. As outlined in chapter 4, the surfaces of these mapping interfaces are important to note here, for they came to afford how Hannah's working practices unfolded. The affordances of the graphics pad and pen, for example, made it possible for Hannah to make inscriptions in way that suits free-hand inscription, which was necessary when drawing contour lines on the map.

Only if Hannah encountered a specific technical problem did she have the need to get up and go ask for help, as was the case when she sought clarification on whether a new symbol for a stile should be applied to the leisure maps she was working on. Once a portion of each task was complete Hannah would send the file she had been working on to her line manager, Patrick, who sat to her left. Patrick would then verify the edits she had made and converse directly with her to discuss any discrepancies in the work she had done. Maps were co-authored in this manner, but certainly not to the same extent as at HOT and OSM events, which, as I will come to demonstrate involved a far greater sense of collaboration in the process.

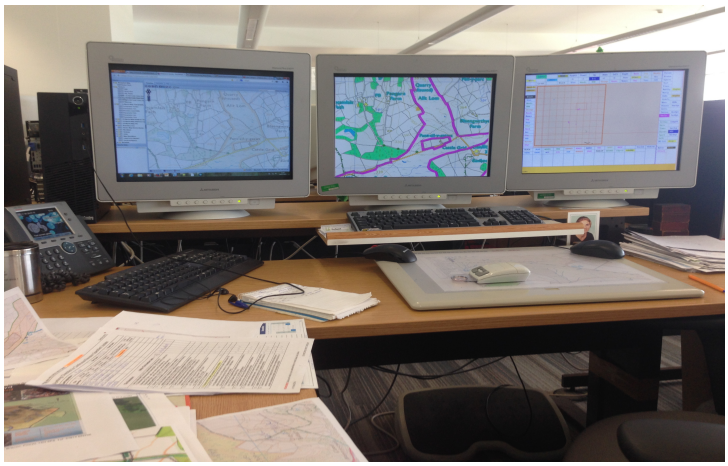

FIGURE. 5 The desk of a professional cartographer (Hannah)

HOT mapping parties

Originating in 2006 at the OSM Isle of Wight Mapping Workshop (5-7th May), mapping parties have become a way for OSM enthusiasts to physically gather in social contexts to produce and discuss OSM maps. HOT mapping parties have become a popular offshoot of these events which aim to produce OSM maps for humanitarian causes. Although these parties both have an OSM focus, they are distinct contexts in which maps are produced and discussed in different social, political and practical ways. However, as I will demonstrate, what both these contexts do share is a sense of enthusiasm and collaborative working practices that are somewhat distinct from the practices of Hannah and professional cartography. In the following I report first on HOT mapping parties and then on OSM field mapping parties.

Drifting between the people, laptops, tables and whiteboards filled with instructions and WIFI passwords, was the feeling that we were all there doing worthwhile work; contributing our time and varying technical skills to a needy cause. It certainly looked like a working environment (see Figure. 6). In many ways these sites, which often differed in location but not style, resembled the kind of offices associated with collaborative working.[14] Collaboration was at the forefront of HOT events and participants were often asked to 'partner up' or 'join a table' in an effort to encourage co-authorship in the map making process. On a number of occasions, those seen to be quietly working alone were gently encouraged to partake in wider discussions about the process. Moreover, sessions were regularly interrupted by HOT representatives giving updates on the collective process and asking how everyone was getting on. Subtly, this signals a shift away from the historical image of the cartographer as a lone figure, as seen in the case of Hannah, and asks us to rethink the role of collaboration and co-authorship in the practices of contemporary map making. Research into the participatory potentials of mapping and GIS have made similar sentiments to this, particularly in a developmental context as well as in reference to participatory map art (Crampton, 2009a, Elwood et al. 2012; Wood, 2012). However, in the context of British map making, many cartographic practices including the role of co-authorship remain an understudied phenomenon (Dodge and Perkins, 2008).

[14] Throughout my ethnography I often attended events housed in offices described as collaborative work spaces. These spaces were open plan offices rented out to start-up companies at relatively low costs.

FIGURE. 6 The typical scene at a HOT 'mapping party'

In many ways it was clear from the material and social set-up of these events that they were tailored towards fostering something similar to the creative and collaborative working environments which have become increasingly popular in the world of office work over the past two decades (see Myerson and Ross, 2003). I suspect that the ways in which these environments are created and run is partly down to which spaces organisers have been granted access to by office partners. However, I also suspect that these events are set-up intentionally to mirror what's commonly come to be understood as creative workspaces. Organisers clearly wanted to make these 'mapping parties' enjoyable experiences for all that attended. The open plan office environment has become a conventional model for encouraging enjoyable creative practice (see Haynes, 2007) and HOT events could be said to be based on such a model.[15] Getting people to work together in the context of HOT events certainly produced a vibrant, noisy and infectious atmosphere which evoked *a sense* that important things were getting done, even if this was not always actually the case. For example, for the extended period of time it took to get people settled into making maps many were not discussing maps but rather talking non specifically about anything and everything.

[15] This was not the case in 100% of cases. Indeed, some who attended HOT events wished to be left alone to do their own mapping. They had come to help, but not to socialise.

Grouping participants in this way was also a way in which organisers and the more experienced mappers of the group could keep efficiency in the process consistent. Throughout a typical three hour session, the red t-shirts of organisers and the well known faces of regular attendees circulated the room with the aim of helping mappers, but it was clear that they also monitored and queried (and on occasion quietly rubbished) the work being done by some. For example, Whilst working on mapping a flooded region in Northern Bangladesh, I was once asked to 'tidy it up a bit' by an organiser as he waved his finger over a number of minor inaccuracies he could see on my screen.

John, a GIS analyst by day - and an example of how professional cartographers and amateur cartographic practice become blurred during HOT events - was prompted to say 'I like to put my skills to good use' when asked why he regularly attended these events. Others responded with similar lines, declaring their participation as a good use of their spare time. It was a 'fun and interesting sacrifice to make in order to help those less fortunate than ourselves', declared Sophie. Most people were glad to be there, and enthusiastic about being there. Their participation was evidenced by an optimistic atmosphere that deliberately encouraged participants to feel like they were part of a movement making positive improvements to the world. In any case, participants were frequently reminded of the good work being done by the representatives in red. We were regularly thanked for contributing our time and varying technical skills to a needy cause. From my own perspective it certainly did feel like we were putting our time to good use. We were mapping the world for a humanitarian cause and it was difficult not to be seduced by some sense of self worth as we surveyed and plotted the roads, rivers and buildings of the places we were told were at risk to natural or human disasters. Such actions went far beyond the monthly cheque often required in humanitarian efforts. These events were regularly talked about as places where people could come together and do something more than simply handing over money not knowing how it would be spent. People were willing to hand over what they considered as so much more than monetary aid: their time. In exchange participants valued being able to see, quite literally, where their efforts (their maps) could be used. The handing over of cash did not bring the same feelings of self worth for many. For regular and passionate attendees, the act of giving money was often described in terms that were incomparable to what they could give at HOT events.

A sense of enthusiasm was certainly felt in the way that many of the participants talked about HOT events. As Geoghegan (2013) notes, it is enthusiasm itself that often

brings people together in the leisure activities of everyday life. Whilst HOT events should not be taken strictly as leisure – they do involve distinctive practices of prosumer labour (Dodge and Kitchin, 2013; Ritzer and Jurgenson, 2010) - enthusiasm for the cause was clearly a major factor that brought participants together. I also suggest that such enthusiasm had a bearing on what made it on to the maps. A major theme of HOT events was to map quickly. Participants were frequently reminded that getting maps done quickly was crucial to the effectiveness of the project. Enthusiasm for the cause was often channeled into this assumption and the result was that maps were often rushed and messy. In one case, Sophie (a relative newcomer to HOT events) declared a map 'finished' with rivers omitted and roads not yet completed. In cases such as these it could be argued that generating a collaborative working environment was actually detrimental to the projects primary goals for it encouraged a pace of working that could have an effect on the use value of maps going out to be used in the field.

OSM field mapping events

In contrast to HOT events, the structure and appearance of OSM field mapping events was seasonal. During the cooler months these events were primarily central London pub meet-ups in which conversation wavered between talk of maps and almost anything else. During the warmer months mappers would meet in a predetermined part of central London, map either together (usually in pairs) or alone, and then retire to the pub. The pub as a site of contemporary cartographic practice cannot be understated in a study of OSM mappers. Amongst the beers, which often flowed, were important conversations that would come to structure future mapping practices and protocol. Moreover, in addition to the pub being a site at which cartographic practice could be restructured, it was also a site at which the technical apparatus of OSM itself could be rethought. The majority of mappers I encountered were directly involved in the digital infrastructure that ran OSM; the result being that conversations could shift freely between mapping practices and coding practice. This is to say that the informal sites of OSM map making often play key roles in moving the practices forward, and sometimes in a completely new direction all together. As identified by Livingston (2003), the venues of science are diverse and not fixed to the laboratories often assumed to house the production of scientific knowledge. The venues which host OSM map making are no less diverse. Indeed, OSM maps are always produced at various sites and in various social contexts, all of which have a bearing on how this form of scientific knowledge is produced.

Similarly to HOT events, OSM field mapping events (and the OSM map itself) were a product of enthusiastic practitioners getting together to do something they considered enjoyable and worthwhile. Perhaps due to their unstructured atmosphere and material settings, OSM events resembled leisure practices in ways that HOT events did not. Indeed OSM events unfolded in a much less organised fashion than HOT events, which was an attraction for some people. For attendees the practice of mapping was an interesting social hobby, and not something they wanted to associate with work. In many ways OSM events resembled a social map club in which the socialising led, framed and tied together the practices of the mapping which followed. Enthusiasm could be regarded as the adhesive which bound the practice and practitioners together (Geoghegan, 2013; Collins, 1990), but also as a major influence on what made it onto the OSM map. The simple act of deciding where to have an OSM meet-up affected which area of central London was likely to be mapped. Who attended also had an influence here. When versed mappers attended it would encourage others to go out and compete with how much they could get mapped in the time which they gave themselves.

Another factor that drew people to OSM events was the politics of the project. OSM is often marketed as an open (implying democratic) mapping platform, and therefore tends to attract practitioners intent on making what they feel is positive difference to the world (Chilton, 2011; Goodchild, 2007; Haklay and Weber, 2008; Turner, 2006). Like HOT participants, those that attended OSM events certainly saw their mapping practices as something that gave back to society at large. Many were adamant that the mapping work they did offered a positive alternative to other forms of map making.[16] The effect of this could be seen on the map itself. Intent on mapping differently to well established mapping companies, OSM mappers would seek out features not regularly mapped in order to highlight how this form of mapping was more open to the possibilities of map making. Participants were often reminded that they could map any feature that they saw on the street.[17]

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[16] Scholars have rightly challenged these democratic assumptions in recent years, suggesting that technological change might actually reproduce rather than reduce the top-down hierarchies of map making practices (see Haklay, 2013; Lesczcynski, 2012; Perkins, 2014).

[17] This was not always possible. Mappers could only map features which had a corresponding identifier coded into the OSM system (aka a map symbol). Those that did not have the technical skills needed to do this coding would not be able to add any feature, which contradicts the democratic assumptions made about OSM.

In this section I have shown how different sites and social practices might produce different forms of cartographic knowledge and practice. As I argue throughout this thesis, mapping interfaces must be understood in the social and material contexts of where they emerge. Map making interfaces are no different. Where and with whom map making happens, I have demonstrated, plays a significant role in how map making practices unfold. Contemporary map makers and cartographic projects are far more diverse than ever before. I argue that such diversity has brought about many positive uses of maps, as well as negative ones. Maps can, and are, used for positive purposes in a number of different contexts despite their epistemological instability which is often regarded as a barrier to kinds of positive work which they can do in the world (Crampton, 2010). In light of my ethnographic work in this area, I argue that the under researched processes of map making need to be considered when making claims about the work that maps do in the world. I suggest that the process itself has many positive benefits, many of which are felt by map makers themselves. This is particularly the case for the amateur cartographers mentioned here. Indeed, whilst I suspect the rise in amateur practices will largely sustain the historically bound epistemology of map making, I also think that the emergence of such practices can teach us much about the many ways in which people are engaging with maps in the contemporary context.

In the next section I focus on the processes of contemporary map making in order to highlight how the micro-practices of production effect what ends up on the map. I suggest that the processes, techniques, technologies and surfaces involved in production - as entities in the constitution of map making interfaces – are equally important to consider when thinking about how maps and map making practices come into being. Moreover, I show how looking at the intricacies of map making can reveal how the perceived assumption that maps are neutral representations are brought into being by map makers. Following Shove et al. (2012) I aim to focus on the minutia of everyday practice in order to speak to the broader impacts of cartography.

5.3 The processes of cartographic production

Collating facts and reproducing representational artefacts

Underpinning HOT and OSM events was the assumption that maps produced at or as a consequence of these events were neutral artefacts, which had a positive impact on the world. The democratic ideals of these projects were often seen favourably, despite the fact that the end result were maps which carried as much bias as any other

representational artefact. Maps produced in the context of the professional institution were assumed to be completely transparent representations. In the eyes of their producers maps were simply neutral artefacts produced with detail in mind for practical everyday purposes, such as for walking, cycling or driving. For Hannah, a map's primary purpose was to be an accurate representation of the world; she saw no politics in this sentiment when questioned. For her it was only a matter of graphical detail. Whilst mapping can have positive connotations for the world, the process can be equally damaging (Crampton, 2010). During my time in the field, the full social and political extent of a cartographer's broader actions was rarely realised.

Amongst the most striking observations made was that many cartographers seemed to know well that their additions to maps, although often subject to review by those more experienced and restricted to the parameters set by policy and software, were made at their discretion. At no point was this contradiction between knowledge and practice recognised by cartographers as a problem. When pushed on this, John (a HOT participant) suggested that map making was a process of collating the facts into a representational form. He was unclear why anyone would want to produce maps based on inaccurate facts, particularly when the maps being produced were for the purposes of humanitarian aid. Similar sentiments were voiced by others. Ultimately both the professional and amateur cartographers I spoke with seemed convinced that a map's purpose was to present the facts of the world for practical purposes. This reflects the notion that a map's power – its assumed neutrality - is deeply embedded in everyday cultures of use (Wood et al. 2010).

In the case of mapping for the HOT (and in some respects OSM field mapping), such facts were bound up in the satellite imagery used to produce maps, much of which was sketchy at best (see Figure. 7). Members of the HOT group were expected to treat these images as if they were a bank of facts from which to pick and choose information to be represented on the map. It was never clear how old or from which specific source these images were derived. The only information given on this was that they were derived from Bing's open source image data.

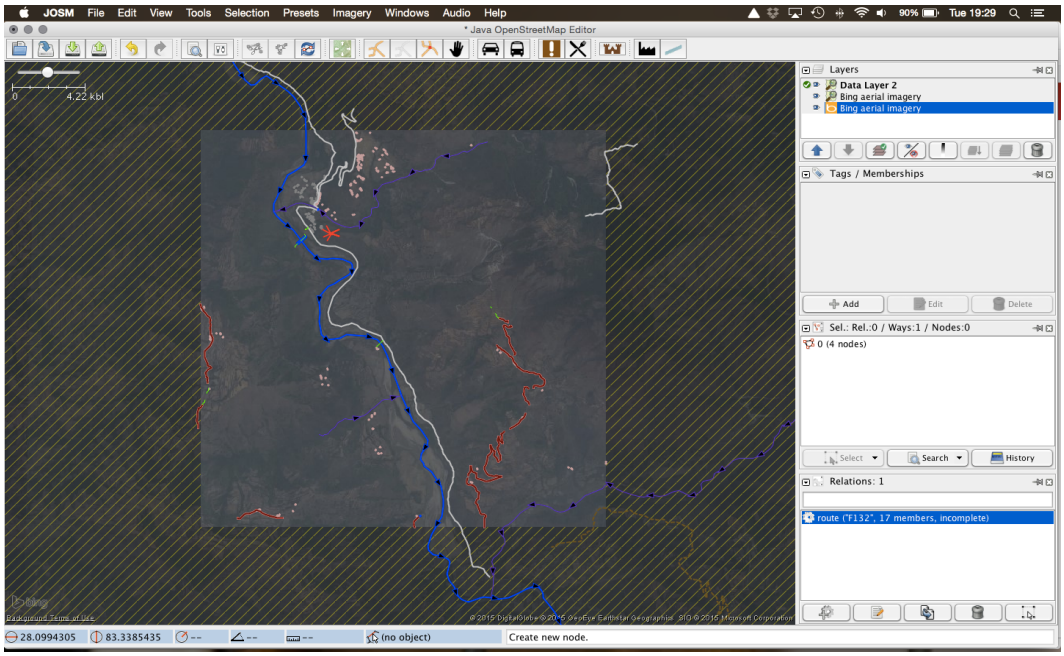

FIGURE. 7 An example of the satellite imagery that HOT maps are made from

The facts used by OSM field mappers on the other hand were usually those which mappers themselves could see with their own eyes. Whilst out surveying the streets, which would later be mapped on a computer, these mappers would make notes on what they considered to be facts of the world. Such facts could include the purpose of a building derived from which signs appeared on the doors, or the driving direction of a one-way street derived from signs and arrows painted on the road. One aspect which Robert (a regular participant at OSM meet-ups) liked to map was the number of parking spaces a street had. He would count all the spaces by eye, make a note on paper and then later add them to the map on his computer. Robert explained that there remained something 'clunky' and 'awkward' about making edits on a smartphone or tablet as he went along. Such editing, he remarked, was much better suited to desktop computing whereby a mouse and keyboard could be used to be precise with his actions. Using a smartphone or tablet, although capable of making edits, was seen to present technical challenges to making precise edits, which was important to him. The affordances of the surfaces in these mapping practices had a direct impact on how he went about the field mapping process. For example, Robert mentioned that pinching and zooming in on a map using his fingers on a smartphone or tablet was not nearly as precise as using a mouse and slider found on desktop based maps. These were basic steps for editing that Robert preferred to do at home. That said, others in the group were seen to be making edits on the go using smartphones and tablets, which suggests that the affordances of some surfaces were not experienced in the same way in the mapping practices of others. Indeed, this points to the practice of inscription itself as being an

individualised socio-technical activity that unfolds within the broader cultural norms about mapping practice at this OSM event.

It is important to note here that the act of mapping itself at OSM events took place at a later time when map makers worked alone. This is something mirrored in many of the studies about OSM practices, which suggest that most of the work is done by individuals working alone (Mooney and Corcoran, 2012). Moreover, this is interesting considering the historical assumptions I've been arguing against. As I have shown, contemporary cartographers are not lone, faceless figures. However, in the case of OSM, the editing of the 'finished' map itself often happens behind closed doors and away from other members of the group. In these instances, at least momentarily before mapping edits are called into question by members at future meetings, OSM mappers are similar to the lone, faceless figures of cartography's past.

Whilst professional cartographers used more than just imagery, incorporating many sources of data which were certainly more detailed and scientifically accurate than that used by the HOT and OSM field mappers, the principle remained the same. Maps in this context are produced using information sources that tell incomplete truths of the world. Much of this information is based on the premise that science can tell us the objective facts about the world. Following Daston and Galison's (2007) call to be cautious of claims to scientific objectivity, I agree with Crampton (2010) when he suggests that despite the well earned privileged position of maps as rational, practical and accurate artefacts that seemingly work, there remains no reason not to question them with a critical eye.

In my observations and practice, whether a line was drawn here or a symbol added there was largely up to the cartographer in question and the affordances of the technology available to them. In the case of HOT events, mappers used two different softwares (ID Editor and JOSM) to process and map satellite and aerial imagery onto the OSM platform, which would then be made publicly available after review.[18] The hope was that aid operatives 'on the ground' would be able to use these maps for the practicalities of humanitarian aid, such as finding areas cut off after natural disaster.

[18] Mappers are introduced to ID Editor as a tool for beginners and JOSM as a tool for more experienced mappers, which results in a room split between beginners and more experienced mappers. Having spent time on both sides of the room there is little difference in the reasons why members attend these events, but many difference in the kinds of technical knowledge each group has. As a general observation, people using JOSM are familiar with coding and programming languages - many using them in their day jobs - and those using ID editor are not.

Individually members were given the task of scrolling across image tiles and adding inscriptions where they were advised to do so at the beginning of each session. Primarily these actions were tracing lines on or around what were thought to be roads, houses, rivers, lakes and ponds using a mouse to make edits shown on screen. After some basic tuition, how mappers did this was largely up to them.

Due to the poor quality of some image tiles it could be surprisingly difficult to distinguish between one block of pixels and the next; for example between a road and river, or house and fenced off farm land (Figure. 8 shows an example of what mappers were sometimes presented with.). Indeed, as Thomas, a relative newbie to HOT events, declared in a moment of frustration he had with the software's zoom function, 'I find that if you go in closer, you see less!' Such instances often resulted in either questionable cartographic inscriptions or a failure to commit a blurry object to any specific category, in which case no trace would be made. The result was that individual and small group decisions about what to include and what not to include on the map were being made all the time based on the quality of the mapping surface. Members wanted to get it 'right' and produce the 'correct' map for the people that needed it the most. No one wanted to get blamed for producing a map which was 'useless'. This may well have happened, but we were never informed directly.

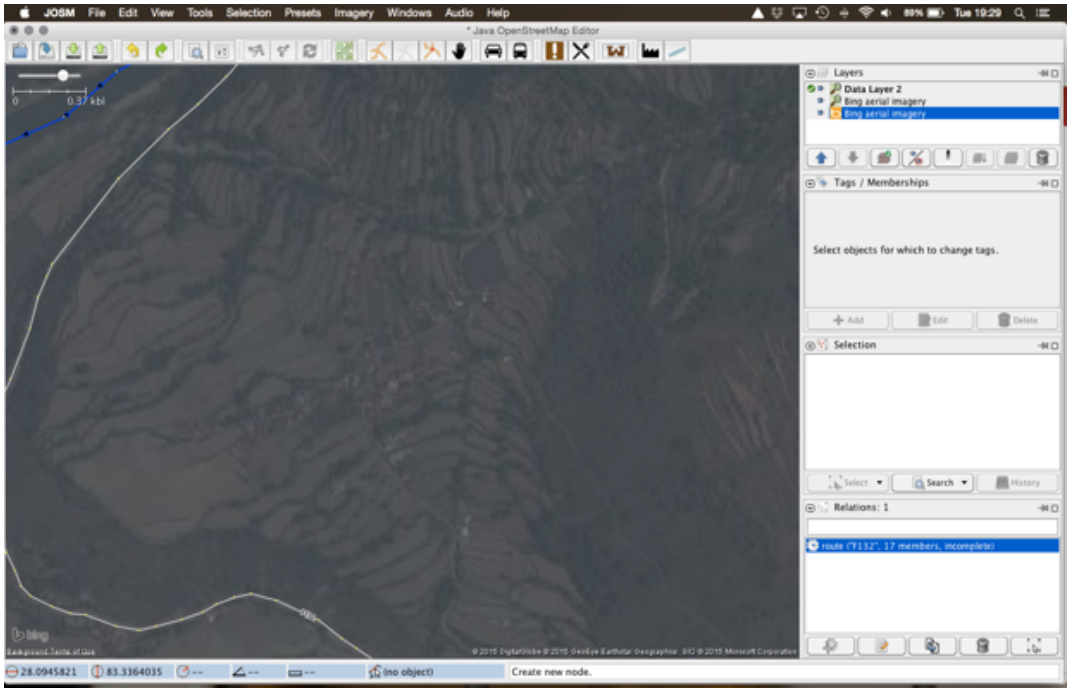

FIGURE. 8 A screen shot showing an example of the distortion of satellite imagery that mappers were expected to use when inscribing features on the map.

Reviewing the facts

In order to limit the inevitable inaccuracies and obvious omissions from this process, those more experienced within the HOT were tasked with reviewing the edits which people made throughout the sessions. Whilst there was a common assumption that no one at these meetings had come to cause any cartographic trouble, it was certainly still possible, even if it was via an honest mistake. Those given this role are the gatekeepers of the map in this instance, for it is they who decided what was sent out into the world as a complete map and what was sent back to the mappers to continue working on. No one was penalised for their mistakes, but rather are sent a short private message via the HOT online task manager detailing which aspect of their map needed work (see Figure. 9).

Similarly to HOT events, the efforts of an OSM field mapper were also reviewed by experienced members, although not in every instance and not directly at mapping parties. There were simply not enough people with the time to do this. In the cases that there was, edits were taken and reviewed mainly using image data, and based on the historical accuracy of a mapper's edits. Inaccuracies did make it through unchecked - something unavoidable when trying to work quickly as was the case at HOT events - but this step did prevent abuses to the system, and for the most part those given this job were trusted as the people with the knowledge and expertise to do this.

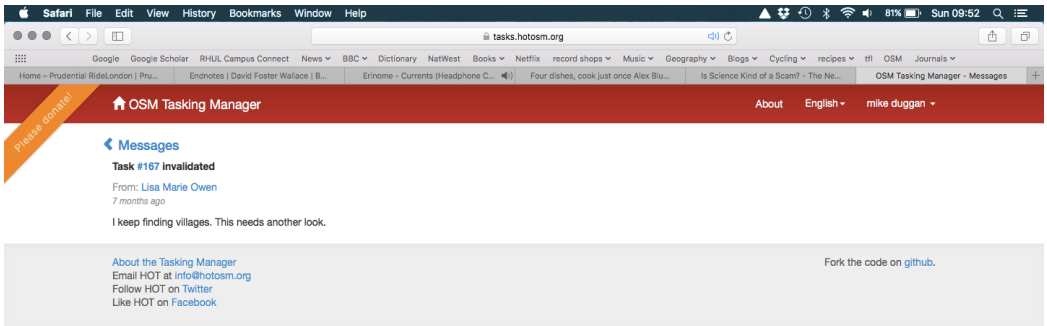

FIGURE. 9 A screen shot showing a typical message received from a HOT reviewer after failing to complete a map tile

Although the HOT and OSM field mappers both shared the OSM platform and both used digital technologies, the OSM group that I worked with would begin their process by going out into the streets to directly make notes of the world which would then be transferred onto the map. Again, these were made at a mapper's discretion and not subject to any strict guidelines. The difference in how the world is mapped using this method was quite striking. HOT mappers traced buildings, roads and rivers on image tiles, whereas OSM field mappers took photos and jotted descriptive notes whilst wandering the streets. In many cases it did not look like they were mapping at all. Again, the surfaces involved in these moments of mapping interface are important to consider, for they had no small effect on how, what and why mapping took place in these contexts. When asking Robert what he was looking out for specifically he suggested a two-tier system. Firstly his aim was to add the 'fundamentals' missing from the map. These were the objects which he commonly associated with the most basic maps: the buildings, roads, rail lines and waterways. Following that, he said that it ultimately came down to his personal preference at the time. One evening he took a particular interest in mapping the parking meters of a residential area. On another, the street lights. On another, post boxes. Needless to say it took me a long time to *see* like Robert.

As there was no one telling anyone what to map, he said, people just mapped things based on what was not already on the map, as well as features which appealed to them as features that they thought should be included on the map. Once a mapper had their 'style', as he put it, it was difficult for these features not to jump out at them and end up on the map. OSM field mappers undoubtedly get a better sense of the place which they are mapping through this method. However, their 'styles' produce no less subjective representations of the world. Neither, I suggest, do they reflect critically on a particular way of seeing and inscribing spatial representations (after Berger, 1972; Rose and Tolia-Kelly, 2012). This group was made up of predominantly white middle class western males, which tended to reproduce an epistemology of mapping practice that reflected a masculinised view of the world. Such a finding reflects the work of others who have suggested that visual practices and digital cartography reproduce the western, white male gaze (Kwan, 2008; Rose, 1993; Stephens, 2013).

In the case of a professional cartographer I observed similar practices of individualised map making. Hannah's inscriptive decisions were also loosely based on her subjective interpretation of image data (a mapping surface), albeit with a much greater quality and produced within far more regulated parameters than at HOT or OSM

field mapping events, as noted above. Watching her demonstrate a typical task amongst the technical apparatus scattered around her desk plainly showed where the creativity in the edits she was making to the map were. Much like mapping at HOT events, Hannah would search images and data banks picking and choosing what to include and exclude from the map she was currently updating. This process was far closer to that of the HOT group than that of the OSM field mappers. Moreover, as she was one of the only a few people left working on the 'old' system of computer and graphics pad, the drawing element of her work still abided to a traditional form of cartography; one in which inscriptions into surfaces are perhaps more obvious.

Time pressures

In addition to the loose autonomy granted to cartographers as to what to include on a map, my observations highlighted to me that map makers, and therefore map making were also sensitive to time pressures. Time pressures were put upon these people and processes by those further up the chain of command, or more generally by everyday life. Cartographers and cartographic projects have deadlines like any other, and the work is inevitably squeezed and sometimes rushed as this time runs out. Cartographers got careless or bored with their work at times. This was made clear on a number of occasions, within both amateur and professional mapping projects, despite the extra rigor implied and often abided to in commercial mapping. At HOT events there was frequently a rush from organisers to fire up participants in order to finish an important section before the end of a session. Towards the end of one particular HOT meeting, Jen, a representative, voiced the enthusiastic prompt, 'It's more important that we get coverage rather than detail!' in a pseudo attempt to rally the troops. In response, an apathetic Gill announced, 'I'm not even feeling like mapping anymore' quietly as she buried her head on the table. Although often sociable events, it did feel like volunteers were putting in a shift at times. In the commercial sector other aspects of work or life - an overrunning team meeting or a sick child - would often squeeze a cartographers time, and mapping projects would suffer as a result. OSM events, by contrast, were much less concerned with issues of time and deadlines. Participants were not under the same contractual or social obligations, which again speaks the leisurely nature of this particular set of map makers.

The politics of contemporary map making

Offering a different perspective to that of Harley's (1989) faceless deconstruction of map makers, I wish to point out the human in cartographic practice here. I argue that it is inevitable that the production of maps is affected by the idiosyncratic practices of everyday life. Maps go out into the world with varying degrees of quality and satisfaction based on the experiences of those producing them. The signage, symbols and numbering of maps are all examples of the details that can be affected by these factors as map making practices unfold.

In detailing the processes of map making I have shown how contemporary map making is a dynamic practice in which the socio-normative and apolitical assumptions about maps are reproduced in various ways through the making of maps. This follows similar research in the field, which suggests that the power of maps is reproduced through everyday use (see Dodge and Kitchin, 2007; Kitchin et al. 2013). Following Foucault, power is reproduced and made normative through the reproduction of our everyday practices (Brock et al. 2011; Crampton and Elden, 2007). I believe this to also be true in the reproduction of power in contemporary map making.

In outlining the processes of contemporary cartography I have described how digital technologies have adjusted the power and politics of map making in recent years (see Lin, 2011, 2013, 2015). This is particularly in reference to the HOT and OSM field mapping events, which would not have been made possible where it not for Web 2.0 technologies. Cartographic knowledge is now being produced from the bottom up as well as from the top down (Elwood and Leszczynski, 2013). However, whilst I agree that digital technologies have had a positive effect on the practices of map making and therefore on the ways in which maps have and represent power, I still believe that this has not lessened the fundamental power of maps, which is to convince us of incomplete truths or a point of view. The power dynamics of mapping making interfaces may be shifting, but power itself simply moves with the shifts in the sites and practices of map making. Even as many more people can now call themselves cartographers, many of which I believe are doing good beneficial work for those that need it, this does not necessarily mean that more people recognise the incomplete truths which they tell. From my experiences of mapping with the HOT and OSM field mappers I am unsurprised with the criticisms that these events have received from scholars (see Eades, 2015; Haklay, 2013). Many of these groups mapping practices are problematic, specifically in the ways which they claim to be democratic, and in the ways that they reproduce certain positionalities onto the world, many of which favour Western and

colonial ideals. Despite HOT's insistence that their events are democratic activities, I am in agreement with Haklay (2013) when he points out that events similar to these operate under an unfounded guise of democracy. From my experience there is little democratic reality to these events (only potential). Non-democratic policies at these events are clear to see; from those unelected representatives wearing red branded t-shirts, to those regular attendees which volunteer themselves as instructors to which newbies look up to for guidance. Moreover, the software platform on which OSM maps are produced cannot be described as a democratic tool. Despite its claims to be an open source software for all to use it remains a tool, albeit different from that used in professional cartography, with gatekeepers to knowledge and access (Haklay, 2013; Perkins, 2014).

That said I am also sympathetic to these groups having been a part of them. Those that attend are generally enthusiastic and fulfilled by their work, and they can see the benefits of their work, which keeps them coming back. I suggest that their actions offer a positive service to society that is not often seen elsewhere in map making. I believe it is something to be worked on rather than rallied against.

5.4 The role of Google Maps in contemporary map making interfaces

Having described the processes of contemporary map making, it is worth making an extended note about Google Maps before concluding this chapter. Google Maps was used in various ways by many of the cartographers I observed, and yet it was often considered an enemy of sorts. In this section I argue that Google Maps has become significant not only in the mapping interfaces of everyday life (as seen elsewhere in this thesis) but also as an uneasy companion in how contemporary map making interfaces unfold.

Many of the professional and amateur cartographers I spoke with had contradictory relationships with Google Maps. This was in stark contrast to participants engaging in other practices. Google was considered either a dominating and unethical presence in the world of web-based map making, as it was in HOT and OSM projects, or as competitor in the cartographic market space, as it was in the context of professional cartography. And yet, practitioners from all projects remained loyal to using it in their own map making practices. This is to say that what these participants said about Google Maps did not align with what they did in practice with Google Maps.

Google's dominance in the world of Internet search can be similarly understood in the world of digital maps. The fact that map makers were using Google Maps as a

legitimate source of spatial knowledge to inform their own cartographic practices despite moral or commercial objection came as little surprise. Google search, and Google Maps, are presented in such a way as to convey a sense of transparency and authority about the world. Google's deceptively simple and easy to master exterior masks the reality of its workings (Rogers, 2009) to such an extent and effect that the assumed neutrality presented is often unquestioned.

The effects of Google Maps in contemporary map making interfaces were primarily seen in the practice of production. At HOT events Google Maps was often used as an alternative source of 'raw' data, for instance if the image data they were using (made freely available from Bing, a competitor) was incomprehensible. Participants were asked to find the same section of the earth on Google Maps using GPS co-ordinates, and then flip between the two images they had in order to make a decision about what to include on their map tiles. Members were sometimes apprehensive about using Google's image data, but more often than not they were pleased to subvert its data in order to produce their maps.

In the case of the professional cartographers I spoke with, similar actions were taken. Google Street View - a subsidiary of Google Maps - was used frequently by Hannah to cross reference and clarify data points. For instance if a section of her base map obscured some minute detail, say the location of a stile or cattle crossing lost within a dense patch of symbols, she would use Google Street View to double check its existence. Although Hannah shied away from congratulating the competition on their excellent image data, she was less concerned with the presence of Google in the commercial mapping sector. Much of the time Google was simply a tool which made her job easier.

OSM field mappers on the other hand were far more vocal in their objections to using Google Maps. In the context of an OSM event Google Maps was not a mapping tool championed by any. In private, however, I was told by Robert that he regularly uses Google Maps for navigation whilst driving. He found that OSM was severely lacking as an adequate interface in this area and therefore felt he had little choice not to choose a commercial alternative. Moreover, Robert admitted that he would sometimes cross-reference parts of the OSM map he was contributing to with information obtained from Google's mapping services. For instance, in the cases when his camera's GPS tagging had failed, Robert would use Street View to verify the location of the photos (data points) he had taken during field mapping events. This suggests that the ideals of an

OSM mapper could be somewhat fickle when coming up against the unstable realities of the digital world.

In laying out the role of Google Maps in contemporary map making I argue that one set of maps can claim to be more influential than any other in the contemporary map making context. I suggest that Google has been integral to the recent shifts in cartographic practice because of its domineering position in the broader cultural contexts of everyday life. That said the overarching presence of Google Maps in much of contemporary map making is clearly problematic. Google now holds an immensely powerful position in the production of maps as well as in the consumption of maps. As such Google Maps should be heavily scrutinised, particularly if the company continues to operate in a closed system inaccessible to outside research.[19] In many ways Google Maps operates in a similar way to sovereign cartography of the past (Dalton, 2015). Cartographers working for Google Maps are not easily identified or accessible; they are the faceless figures of the map making world working behind closed doors, and their maps are deeply trusted by those that use them. Nevertheless, Google Maps has taken a step beyond traditional sovereign cartographers (Crampton, 2010). It operates on a global scale in ways that historical map making could not compete with, meaning that its influence is felt in multifarious ways for an increasing number of people around the world. This is problematic when thinking about the dissemination of power and politics through digital mapping practices. Projects such as OSM and HOT do offer viable alternatives to Google Maps. The fact that they are more open and accessible allows us to see this, as well as question their own practices. However, if these map makers continue to use Google Maps then the sovereign mapping power of Google on will only be further reproduced. Whilst scholars have made the resulting political problems of Google's mapping products be known for sometime (see Della Dora, 2012; Lee, 2010; Graham and Zook, 2013; Zook and Graham, 2007) the message to be weary of this powerful company rarely gets through to the general population, and as I've shown, map makers.

5.5 Conclusion

I used this chapter to present empirical evidence about how map making unfolds in a contemporary context, which is often missing, and called for, in theoretical studies of map making (see Dodge and Kitchin, 2007; Dodge et al. 2009). Specifically I unpacked

[19] After a promising start my efforts to access and study cartographers working for Google was eventually denied. A non disclosure agreement came between myself and a willing employee.

the sites, social practices and processes of contemporary map making in order to argue that contemporary map making is a mapping interface. Much like the navigational mapping interfaces I discussed in the previous chapter, I demonstrated how map making interfaces are zones of possibility and limit, which unfold in complex socio-technical and socio-spatial contexts. In the first section I described how the sites and social processes of map making invariably shape how maps are produced. Using my ethnographic fieldwork, I presented evidence to suggest that map making unfolds in formal and informal sites, and amongst an increasingly diverse group of practitioners engaged in the production of maps for different reasons. These findings, I argue, offer an alternative perspective on the view that map making is done by faceless individuals working behind closed doors. As Crampton (2009a, 2010) notes, cartography is no longer always the product of sovereignty, and as I have shown, the rise of web based mapping technologies (OSM in particular) has fostered a more democratic movement in map making, which we are only just beginning to see the effects of. Whilst there is certainly some truth to the claims that so-called 'democratic' forms of web mapping foster their own hierarchies of power, I do contend that map making has undergone a significant shift in recent years, which should not always be considered negatively (see Zook et al. 2015). We are however, not yet at a stage where we can say that map making is for everyone. I highlighted how this shift is not as straightforward as some have suggested (see Chilton, 2011; Goodchild, 2007; Turner, 2006). Internal hierarchies of power, politics, gender and technical abilities play a significant part in how these novel forms of map making interfaces unfold. For instance, maps produced at OSM events reflect a predominantly white, middle class, technically minded and male dominated view of the world. In many ways this reflection and a belief in the illusion of stability and objectivity of maps is similar to that of traditional cartography, which remains a problem (see Fernández and Buchroithner, 2014). At HOT events there is broader gender mix and the technical barriers to entry are lower. Although this does have an effect on the dynamics of the group and on the types of maps being produced, this form of mapping interface should also not be called all-inclusive. For the most part, those attending these events are made to produce maps which conform to standardised practices put in place by the HOT organisers. That's to say that HOT maps also reflect a problematic view of the world that is bound up in specifically Western ideals about humanitarian aid (Reid-Henry, 2013), which in this case means projecting power and authority over the process through the (digital) exportation of a Western mapping epistemology.

In section two of this chapter I unpacked the processes of map making interfaces. I argued that the processes of map making are bound up in specific knowledge's, project time frames, policies, opinions and technologies of different map making organisations. Presenting evidence from my fieldwork, I demonstrated how these dynamics of map making interfaces shape how and why specific maps, and mapping epistemologies, are produced and reproduced. I demonstrated how a perception of maps as neutral artefacts is similarly reproduced in three contemporary map making contexts, albeit using different tools, technologies and protocols. I also used this section to highlight the role of digital and other technologies in contemporary map making processes. I argued that the shift from traditional to digital map making is not (yet) completed. Conversely, I showed that it is a complex and context dependent practice in which a mixture of analogue and digital technologies are techniques are used. Nevertheless, I also argued that one digital mapping technology has been more prevalent than most. I made an extended note on the role of Google Maps in contemporary map making in order to show how this technology is being used across different map making contexts, sometimes in ways that contradict the politics of particular ways of mapping. As I showed it's difficult to escape this pervasive technology, even by those who claim to be in direct competition to it.

CHAPTER 6

THE PERFORMATIVITY OF MAPPING INTERFACES

6.1 The road to the Cold Spring Tavern

I was unaware of how reliant I had become on the digital maps in my pocket. They were right there, always accessible and easy to use. They provided me with rich navigational and contextual information which did the job more than adequately. Now, with my phone dead for the past few days, accessing this information required a different approach to mapping: an alternative, distinctly analogue approach.

On the post-it note I had scribbled *The Cold Spring Tavern*.

"I don't think it's too far from here," I declared with some hesitation as I slid the paper across the wooden counter to Jaclyn, a willing Samaritan manning the winery gift shop. I was confident that she could help. Everyone we had met so far seemed more than willing. Accepting my request she scrolled audibly through her memory, mumbling numbers and names aloud in an attempt to locate it for herself.

"Kelly Creek."

"Cold Canyon Spring?"

"Hmm."

"Paradise Road… No."

Her mental mapping meant nothing to me. Such spatial thinking is a unique experience. With further utterances, barely audible this time, she bent down and brought up to the counter a pile of large-scale maps laminated in dusty plastic. The pinholes were still clearly visible in each corner and I was sure that these maps had once been hung on the wall, at a different time. Perhaps they redecorated I thought. Perhaps they were no longer needed I speculated. The dead weight of my phone suddenly seemed all the more of a burden.

"Stagecoach road!" she finally exhumed with relief.

"Yeeaaah. There it is. See." she said, pointing to a short stretch of road on the map.

"Just off the one-five-four as you go up the hill."

Grateful that I was, finally having the location of this illusive stagecoach bar so well recommended to us by our hosts some five hours earlier, I still had a pertinent question. It was entirely necessary.

"So where are we then? Now?" I said.

She bent down and returned with another, smaller map this time and handed it over to me across the counter. It was a leaflet for the vineyard and it had a small, sparse looking map printed on the back giving us our location. This one was for me I thought, to take away and use. Jaclyn penned a cross at the point to leave the 154 highway, scrawled a note about an arch bridge beside it, which I would understand later, and then circled where she estimated the tavern was situated.

"I'm sure it's here. That's my best bet," she said, with a smile that I agreed was confident enough to trust.

(Excerpt taken from field notes, October 2014)

As this opening vignette suggests, maps and acts of mapping encourage people to do, feel, see, be, and behave in particular ways. This is to say that mapping interfaces have a performative dimension. Through empirical analysis, this chapter will show that mapping interfaces are both performative and have the capacity to produce performative encounters in the world. By doing so I build on existing geographical research detailing the performative capacities of cultural practices (Butler, 1993; Gregson and Rose, 2000; Last, 2012; Thrift, 2004, 2007), that which explicitly refers to the performativity of maps (Cosgrove, 1999, 2007; Crampton, 2009a; Della Dora, 2009; Wood, 2012), and that which seeks to promote ideas of performative materiality (Drucker, 2013). In an effort to further reveal the intricate and explicit ties between mapping practices and cultural performances, which are still somewhat lacking in research on maps (see Dodge et al. 2009; Kitchin et al. 2013), this chapter details how maps can be bound up in the micro-performances of everyday practice; an aspect of life which is particularly useful for describing the complexities of culture (Pink, 2012; Shove et al. 2012).

Notwithstanding the critical importance of the work that maps do as cartographic representations (Crampton, 2001, 2010), I argue that maps should also be understood as things bound up in complexities of the life-world (Ingold, 2010). Maps are cultural artefacts with a performative materiality that affects the practices of everyday life (Cosgrove, 1999; Drucker, 2013). In this sense I argue that maps are not

irreducible to their representational form. They have a materiality that matters insomuch as they have the capacity to produce actual affects in the world in as much as they have the capacity to produce virtual effects from their representational form. The 'virtuality' of something, object or process can be described in terms of its 'capacity' or 'potential' to have an action/effect in/on the world (see Delanda, 2002, 2006). This is in contrast to the concept of the 'technological virtual' that has come to be associated with the effects of digital technologies in recent decades (De Souza e Silva and Sutko, 2011: 25). In many ways contemporary maps straddle the actual/virtual dichotomy, regardless of the material form they take.

Made clear by Ash (2015) and Rose (2015), geographers must continue to go beyond deconstructing representational forms as purely representational devices. Indeed, geographers must explore further the other ways in which representations, including maps, do work in the world. To study maps purely in utilitarian terms does a disservice to the cultural milieu in which maps are made and used in everyday life (see Brown and Laurier, 2005, 2012; Kitchin et al. 2013; Perkins, 2006, 2008; Pickles, 2004; Wood, 2012). Maps cannot be used outside of culture and therefore should not be considered as simply objective scientific devices used for pragmatic needs, as they commonly are (Crampton and Krygier, 2006; Ingold, 2000). It is precisely because of the complexities of culture that maps must be read beyond their representational form. As Perkins (2008) notes:

> Maps may reassure the lost, encourage debate, support arguments, keep the rain off, fire the imagination, help win or lose elections, sell products, win wars, catch criminals: an endless list of uses becomes possible, limited only by the imagination of its author: motivations may well be beyond science, even if most researchers investigating map use remain constrained by realist notions of scientific progress (p. 151).

Accepting the dialectic between mapping and culture takes us away from an understanding of maps as purely representational, immutable mobile's (see Latour, 1986). Instead, this understanding asks us to question maps as mutable mobiles, open to the multiple possibilities and affordances of everyday practice (Della Dora, 2009; Kitchin and Dodge, 2007).

This chapter aims to add further empirical colour to the post-representational notions that mapping is ontogenetic (Kitchin and Dodge, 2007), co-authored (Della

Dora, 2009), cognitive (Caquard, 2015), emotional (Kwan, 2008) and embodied (Perkins, 2009) in the practices of everyday life. I aim to show how understanding cultural performances is fundamental to understanding the dynamics of mapping interfaces as they unfold in everyday life.

I draw from my ethnographic fieldwork with the Wheels Cycling Club (WCC) and Lauren (see appendix 1 and 2) as a means to focus primarily on three types of cultural performance which have prominent ties to the everyday uses of maps. These are socio-spatial performances, identity performances and corporeal performances. I begin this analysis by detailing how GPS mapping devices had the performative capacity to affect the social, individual and corporeal dynamics of cyclists and cycling practices within the WCC. By doing so I highlight the important role that GPS devices played in the cultures and practices of this amateur road cycling club, as well as how these devices were used by different age groups within the club. I argue that these devices had a performative role in the WCC, which went far beyond their capacity to act as maps in the conventional sense. I suggest that the performative materiality of GPS devices was deeply embedded in who these riders were or wanted to be, and how these riders were embodied in road cycling practices. In the second section I go on to contrast this analysis with the ways in which a set of analogue maps (paper, verbal and gestural maps) produced cultural performances between Lauren and two close friends in the context of preparing for a countryside walk. I firstly show how gathering around a paper map and determining a route within the context of shared localised knowledge produced specific gender-identity performances. Secondly I show how these performances were played out as this route was undertaken my Lauren. By detailing this distinctly analogue mapping practice I shed further light on how maps with different forms, functions and materialities come to produce different cultural performances.

6.2 The performativity of digital mapping practices: GPS devices and road cycling cultures

Cycling and technology have long standing relations; all cycling practices harness technology in one form or another. In recent years digital mapping technologies have come to play a major role in this constitution for road cyclists, particularly at the level of enthusiastic amateur practitioners. Reflecting the broader permeation of digital mapping technologies in everyday practice, as reflected throughout this thesis, amateur road cyclists now use digital maps for a multiplicity of tasks. These range from personal to collective performance tracking technologies enabled by Smartphone applications or

standalone digital devices. My fieldwork led me to focus primarily on GPS units, which had both mapping and route planning functions, and also the capacity to monitor the corporeal, kinaesthetic and embodied processes of the sport.[20] Throughout my time riding with the WCC the performative role which these devices played in the practices, conversations and identities of members became abundantly clear. In many respects these devices were fundamental to the production of the cultural performances that unfolded within the club.

Like all maps, GPS technologies, I argue, cannot be reducible to their representational form as simply maps or data display devices. Nor can they be reducible to just their mapping functions. Crucially, such devices are designed and used for the purposes of mapping *and* data collection. Documenting only the effects of the mapping features would ignore aspects of this technology that are often used more frequently, particularly on club rides that regularly follow the same routes which people get to know in quite specific detail without the aid of a map. This reflects a broader trend in this thesis, which suggests that digital maps are increasingly intertwined with other functions, features and applications on the same device. Digital maps are often designed with a broader digital assemblage in mind; one in which their technical capacity as softwares is harnessed to be used alongside and in conjunction with other softwares, for a number of uses. With this in mind, I argue that in the context of the WCC, the functions of GPS devices as a whole, are performative. In describing these technologies as cultural artefacts (Cosgrove, 1999) I aim to highlight the performative materiality of GPS devices in the constitution of socio-spatial cycling practices.[21]

The performative acts of non-users

As a point of departure it is important to note that not all members of the WCC owned or used GPS mapping technology. Nor were all the club's socio-spatial practices and identity performances mediated by this technology. The WCC is a complex microcosm of cycling culture in itself and is clearly mediated by a multitude of norms, values, customs, people and things, of which GPS devices are but one. This was obvious even within the small pocket of riders that I worked with. For much of the time GPS devices

[20] Although there is a variety of tracking and GPS mapping technologies used in cycling practices, Garmin cycle computers dominate the market. In my experience with the WCC, many riders specifically favoured the 510, 810 and 1000 models. A small minority used smartphone applications such as Strava and Garmin Connect.

[21] See Spinney (2006) for alternative, non-representational, ways in which the socio-spatial practices of cycling can be constituted.

were ignored or disregarded in the practices and discussions of the club. Nevertheless, the role of GPS devices in the constitution of this group's practices should not be ignored either, however minor their part may have initially appeared. A holistic approach to researching how mapping technologies are used in practice often reveals the subtle and intricate, rather than necessarily explicit ways in which they act upon the constitution of practices. Within the WCC this was no different.

Although not actually used by all, GPS devices were still well known and discussed amongst most members. Such technology has become a feature of the cycling landscape regardless of whether riders decided to use them or not. Indeed, those members that did not use them often had more to say about why they chose not to than members that did. The simple act of not using a GPS device was a political one at times. It was a statement that separated them from the rest of the group in some cases. These members wanted to remain identifiable as road cyclists. However, rather than being identifiable with the 'new generation' of cyclist cladded in premium Lycra outfits, carbon framed bikes and the most up to date GPS technology available, which make up the majority of club members, this group of riders would rather by identifiable with the imagined (and it must be said, decidedly masculine) traditions of cycling. These could be anything from the social imaginaries of 'hard graft', 'grit' and 'determination' associated with iconic professional riders from the 20th century, to the kinds of apparel, bike frame and components they chose to wear and use. Recalling Bourdieu's (1984) ideas of 'distinction' it could be said that this particular sub-group rallied against the dominant tastes of the larger group by adopting a particular aesthetic that challenged modern cycling aesthetics. Being generally older and having more experience than other members of the club, these riders carried enough cultural capital to pull this off.

The performative capacity of GPS devices in this case was to act upon these cyclists desires not to be associated with them, something which was clearly bound up in their identities as cyclists. GPS devices were material possessions which often acted as status symbols. To not have one was as much a symbol of status as it was to have the latest device. This was not always a case of neo-luddism either, for many of these riders carried smartphones (for emergencies) and used digital technologies elsewhere in their lives. Rather it was a way of carving out a practice of their lives which they could largely separate from digital technology. It could be said that they were adopting a post-digital aesthetic (see Berry and Dieter, 2015). The point here is that the performative capacity of GPS mapping devices is not limited only to the immediate users of the devices in question. Looking to the performative materiality of these mapping devices

in the context of who chose to have one and who did not, often gave a good indication as to where riders saw themselves within the social make-up of the club.

Embracing the ideals of the non-users was Simon (aged 41), a keen rider with a preference for a vintage steel bike, downtube gear shifters and 'classic' cycle jerseys. After meeting at the club, he pointed me in the direction of an online article where he had made the following comments:

> Here's a nostalgia-filled, future-proof, low-tech battery-independent alternative [to GPS devices] with zero faff suitable for all ages: don't plan route, don't take mobile phone. Just ride.

For Simon the act of riding was described as a profoundly freeing activity. His busy life meant that his Saturday morning rides had become ritualised, sacred even.

> My world, like most, is packed with screens and numbers, instructions and orders. The world sees ours lives on Twitter and Facebook. Sod taking on more exposure and having to keep up appearances. I just want to ride.

In effect, Simon used these rides to get away from it all. Much of this meant freeing himself from digital technology more broadly, and therefore it was an easy decision for him to opt out of using a GPS device for his own cycling practices. Seen elsewhere in my fieldwork digital mapping technologies were often associated with digital technologies more broadly. For those wishing to escape, momentarily or more permanently, the grasp which digital technologies have on our contemporary lives, the decision to also exclude digital maps was simple enough.

In an exchange with Colin (48), the self segregation of non-users was seen in a different way. His decision to not use GPS devices had little to do with a desire to return to the 'traditions' of road cycling, but instead to do with how he thought way-finding knowledge should be learnt, practiced and essentially performed.

> My teenage map reading means I can read a map. This means when the iPhone is dead or the GPS doesn't work, I can find my way home. I have a very visual memory of the roads I ride and their place together...I tend to know whether I'm heading north and what direction to turn even without sun. It's got me out of

> some nasty fixes in foreign cities and unlit roads. That [sense] was trained, from having grown aware of my surroundings.
>
> I live to look around and absorb. Memorise the sights. Despite finding numbers fascinating and having a sports science degree, I refuse Strava [a popular digital ride tracking application] like a Neanderthal.

Furthermore, James (39), described the ways in which paper maps were simply more suited to his desire to treat cycling as a social activity, rather than simply a navigational exercise. He acknowledged the benefits of digital maps in other areas of his life, but found that digital maps would not produce the kinds of social interactions he liked about cycling with paper maps.

> I love a good map for C2Cing [coast to coast riding]. The fun you can have mapping out your C2C in the pub with mates over a pint or two. The fun you can have at a cake stop, plotting the next section of a route. The satisfaction you have when you reached the other coast to open the crumpled map to digest the endeavour! What is not to like?

James preferred the performative materiality of the paper form. He felt it was a form that encouraged interaction between friends whereas the digital map was seen to encourage more isolated, individual mapping practices. As I'll show in the second section of this chapter, the paper form (especially of a certain size and scale) does produce specific spatial arrangements which could be said to foster different social relations when compared with the use of digital maps.

In other cases it was often a point of pride, rather than cost, that these members would carry a paper map or simply follow their instincts on rides which differed from the usual club route. Being someone that knew an interesting route certainly endowed him or her with a degree of respect that was not given to rider's simply following instruction from his or her GPS device.

As a final note it must be said that the WCC, much like the practice of road cycling more broadly, attracts comparatively wealthy people when considering the spectrum of sport. Equipment, even the vintage gear, is not cheap and frequently needs replacing. I only came across one instance of a cyclist not using a GPS because they could not afford it. With this in mind I suggest that the financial cost of GPS mapping

devices had very little to do with how their performative capacity affected the dynamics of this group.

Having described some of the ways and reasons why GPS devices were not used in the cycling practices of the WCC I now turn to those that did use the technology in order to highlight how the use of these devices had an alternative, and perhaps more explicit, performative capacity to affect the constitution of the clubs socio-spatial practices. In this section I will discuss the riding and social practices of two groups of riders categorised only by the format of the weekly club ride as the 'fast group' and the 'intermediate group'. In combing ethnographic description alongside analysis I aim to show how GPS devices have folded themselves distinctly into the socio-spatial practices of different tiers, or perhaps hierarchies, of the club. Those riders previously discussed were part of a group which always followed these aforementioned groups. This is not to say that these riders were particularly slow, but rather to suggest that they intentionally separated themselves from these forerunning groups. Again, this was observed as a practice of identity performance; a subtle but certainly not antagonistic way of declaring their role as the 'old school' members of this particular club.

The performative acts of the fast group

It could be strangely quiet in the fast group. There was often little conversation to speak of. Many were instead busy focusing on their breathing, cadence, speed and heart rate. The bikes were so well oiled, so well tuned, that all which could be heard was the mechanical whirl of machines in action. If conversation was happening it was more than likely to be about bikes, training or cycle racing. All of these riders were male and had specific yearly goals they wanted to achieve. Weekend club rides were primarily opportunities for them to train as a group. The club has a long and successful history of producing professional riders and many openly aspired to being part of that lineage. As a result it was almost impossible to keep up with this group without any prior training.

GPS devices were on almost every bike throughout this group. The screens glistened in the sunlight and emitted bleeps whenever we were held at the lights. They added to the distinct chorus of bodies and machines working in unison. They were studied at the lights, fiddled with, adjusted, tapped and wiped. Everyone's device was mapping their ride, but it was only the group leader who would be focusing on where we were going. It was his responsibility to navigate the group for the day. Everybody else was focusing on the other data that these devices produced; the average speed, cadence, power wattage, heart rate, time and distance covered. This was the information

most wanted; the information they cared about. Throughout rides many could be seen looking intermittently at the road ahead and then down at the screen below. Some barely looked ahead at all.

The WCC fast group was made up of riders who took their cycling seriously. Most were young men and many of these riders were the complete antithesis of Simon (mentioned above). Clad head to toe in expensive Lycra, riding on carbon frames and all equipped with a GPS device of some kind or another, these riders could be described as those which most fully embraced the technological frontier of the practice. That said, it would be a misconception to suggest that these riders fully utilised the mapping functionalities of their devices. For the most part these riders were primarily interested in the data that these devices displayed and recorded. In training for races or sportives these riders would often stick to a few routes which they all knew well. This enabled them to concentrate on the corporeal data which GPS devices record. This information was considered far more important to a training plan than the mapping or routing of rides. Maps were an afterthought for many in this group. It could be said that GPS maps in this group had a very limited performative capacity to affect socio-cultural practice. Comparatively, the corporeal and kinaesthetic data which these devices generated and stored had a significant performative capacity to affect socio-cultural practice. These rides were all about the numbers; generating those few extra watts of power, sustaining a regular cadence, raising average speed and keeping within the parameters of different heart rate zones. All such data was displayed and stored on the rider's devices, available to access on and off the bike for the purpose of improving a rider's performance. As David (26) noted:

> While I'm training I use a GPS solely to track ride data such as heart rate and use it for zone training. The maps not so much.

The performative acts of this data could be seen by observing individual and collective practices on and off the bike. Whilst riding, the data generated could be seen to actively perform disciplinary action on a rider's corporeality. For example, when a training heart rate threshold was reached riders would often resist pushing any harder. Similarly, if a desired average speed was not being maintained, riders would push that extra bit harder on a downhill section in order to increase this metric. Moreover, these groups would often decide amongst themselves before setting off what their average speed would be, and these devices would be used to ensure that they stuck to it. Riders who joined were

expected to perform accordingly or be shamefully 'dropped' off the back when the going got tough. If we want to consider the performative capacities of these devices off the bike we can look at how they are linked in with a broader digital ecosystem of a rider's metric data. For many of the members I spoke with in this group, the data generated from one ride was rarely considered in isolation. It was much more likely to be compared with the data from other rides, displayed using computer software. As comparisons were made, the desire to push harder on the next ride would often arise. Riders had an unquenchable thirst to improve based on these metrics; in some cases they truly were quantifying themselves as cycling bodies. As a result rides and riders would frequently get competitive. In many ways that was the point for this group of riders. These findings mirror that of other studies, which have shown how digital devices and quantitative data enact and encourage ideals of the body in competitive practices, produce certain corporeality, and evoke feelings of accomplishment and disappointment in cycling (Sumartojo et al. 2016), sporting and leisure practices (Lupton, 2016).

Bound up in these corporeal and kinaesthetic performances were undoubtedly performances of identity. Many of these riders had aspirations to be professional cyclists. This was never more the case than with the younger members out to prove themselves. In order to build and maintain these identities as aspiring riders with a point to prove, members actively relied upon the data collection capacities of their GPS devices. For these riders, GPS devices were a significant part of the broader socio-technical assemblage shaping their performative acts of identity and corporeal acts of riding performance.

The performative acts of the intermediate group

Slowing things down a little are those riding in the intermediate group. This group is by far the largest of the club, with the greatest diversity in terms of age and gender (although it is certainly not gender equal, with men still dominating the group). As a result it has many sub-groups and friendship cliques within it. It is also the group in which the performative capacity of GPS mapping devices can be seen to affect the cultural practices of the WCC most prominently.

The intermediate group certainly took its cycling seriously. It was easy to spot how many of them could have joined the faster rides if they wanted, and no doubt some would have in the future. However, this group did not take it so seriously that they were willing to forfeit the opportunity to socialise with friends. These rides did take place at

the weekend, after all. The beginning of these rides was usually at a very steady pace whilst everyone caught up on the previous week's events. Although the conversation did eventually die down as these rides increased in speed, and ascended up hills, there remained a pleasant and jovial atmosphere across the group throughout. During the post-ride coffee stop this sense of community was even more pronounced. Large groups lined up and down long benches inside the café whilst engaging in loud chatter covering all manner of topics (see Figure. 10).

FIGURE. 10 The WCC post-ride coffee chatter

The dynamics of the intermediate group differed from those in the fast group. Riders in this group were primarily there to socialise, have fun, keep fit and train for sportive events, rather than racing events. Tied up in these differing dynamics were the differing ways in which GPS devices were used before, during and after group rides. There were three primary ways in which I saw this group use GPS devices. First, riders mapped their rides, whereby rides were tracked and traced onto a map which they could view either on a device itself or via connected computer. Second, riders created maps on computer software which could then be downloaded on to their devices, or shared with others, to be used as a navigational aids whilst riding. Third, riders designed and exported route maps in other ways, for instance as .GPX files to the club forum, via email or to a host of other devices.[22] The various ways in which GPS maps could be created, shared and used had a profound effect on the ways in which the sociality of the

[22] GPX files are specific data files commonly used in GPS systems.

group unfolded. In stark contrast to the fast group it could be said that maps, rather than metrics, played a fundamental role in the performative acts of the intermediate group. The performative capacities of the digital metrics described in relation to the fast group were less well defined here. The desire to track ride data was still somewhat prevalent in this group, but perhaps more for the purposes of personal rather than professional development. Many of this group's socio-cultural practices on and off the bike were explicitly bound up in the use, dynamism and distributive capacities of digital maps.

During rides the primary way in which GPS maps affected the socio-spatial and identity performances of this group was to produce performative encounters with navigational practice. Group leaders would often cite the benefits these devices had for navigation and way-finding, with some being staunch defenders of the new technology. For example, on the WCC forum, Peter (41) pointed towards what he considered to be a clear advantage of GPS mapping in cycling practices, which was as a tool for not getting lost:

> There is much less 'faff' involved in 5 minutes on Viewranger [online digital mapping software] stringing together a 60-mile route, 10 seconds to sync to phone, another 20 seconds to get running/set screen to low/set auto-lock to off. I've led hundreds of long rides over strange roads over the last 3 years using exactly this method. Apart from the odd 2-minute phone reboot, it's been bulletproof.
>
> Seriously people, quit with all the 'things were so much better in my day' faux-hipster-Luddite bragging BS. They weren't. Things move on. Unless you also eschew every single technical innovation/evolution in cycling over the last 30 years, quit bagging GPS/mobile navigation. Jeeeeze…. p.s. anyone wanting to play the 'but half the beauty is getting lost and seeing roads you'd never ride' card - we ride very minor roads often not even marked on large-scale OS [Ordnance Survey] maps specifically *because* we plan and use online navigation. It *enables* discovery, not discourages it.

Using these devices riders often felt like it was harder to get lost or lead a group astray.[23] Peter's comment suggests that he was much more comfortable using digital maps for riding. For him they had technical affordances which he trusted and would result in him staying on a suitable route and not getting lost. Indeed, using GPS devices whilst riding was often considered the easiest form of navigation across this group.

The performative act of these maps was to reduce navigational worries by inducing a sense of confidence in the navigational ability of riders. Riders felt they could go further and explore new routes without having to worry about getting lost. Such performances also had secondary effects concerning issues over safety. The GPS position highlighted on the map often gave these riders an increased sense of safety whilst on the move. From knowing their location they felt they would know how far from help they would be if a serious incident did occur. In chapter 7, I will expand on this finding by suggesting that always knowing one's location has an effect on how people understood and experienced the concept of place.

Off the bike the primary way in which GPS maps affected this group was in the ability to create routes and share maps amongst the group. Riders would frequent the WCC forums 'routes' page in order to share and download map routes created by other members. Although there was clearly more members downloading than uploading maps, the practice did create social performances both on the forum pages and in the café after rides. On the forum members would request and share all kinds of routes ranging from the relatively short, hilly or flat to the extensively long and variable. Discussions were often had underneath these posts about how useful or useless these routes were. In some cases these discussions would spill out into the conversations at the café. In other instances at the café, certain riders would challenge one another to tackle these routes in the fastest time and then report back the following week, or via the forum.

Route planning and sharing was particularly useful for a specific set of riders known as the Tourers - cyclists interested in traversing long distances, sometimes over a few days. For the long distances they travelled, GPS devices played a vital role in navigating themselves towards their destinations. In an exchange via the WCC's online forum, Steve (36) noted:

[23] Although this did happen sometimes. From personal experience following a GPS whilst riding a bike is not always straightforward, and there were a number of times when I became lost despite using the device.

> For the longer distances covered on a bike give me GPS every time. Just as I once poured over O.S [Ordnance Survey] maps, I'm very happy these days to sit in front of Garmin Connect [an online software designed to be used in conjunction with a Garmin GPS device] and plot out a new 80 mile epic. Garmin's maps (based on Google I think) aren't as informative as an O.S, so many a time I've ended up riding along some god forsaken bridle path, but frankly, that's just part of the adventure, and there's always the option of launching Google Street View in a separate window to check out roads beforehand.

In describing and comparing how GPS devices affected the dynamics of the WCC from the perspective of these groupings (non-users, fast and intermediate groups), it is possible to see how the performative capacities of GPS devices can vary depending on the cultural contexts in which they are used. From these examples I argue that every act of mapping (and importantly mapping with digital devices that also have data generating capacities) emerges as a performative act, based on the cultural context in which it takes place (Cosgrove, 1999; Kitchin and Dodge, 2007; Della Dora, 2009).

6.3 The performativity of analogue mappings: cultures of map reading and gender identities

Having demonstrated how the performative capacities of GPS devices affected the socio-spatial, corporeal and identity performances of the WCC I now move on to contrast these findings with the performative capacities of other types of map and mapping practice. The aim is to highlight how different materialities, cultures and contexts may produce different mapping performances. This time I focus specifically on the gender-identity performances that occurred between a group of old friends as they gathered around an Ordnance Survey map to plan a route, and then how this route was subsequently put to use in a subsequent way finding exercise.

The performances of map reading and route planning

Lauren and I had been walking for all of ten minutes when we ran into Susan and David, a couple which Lauren knew well from her thirty odd years of living in the village. We had planned a walk to a nearby village some four to five miles away, taking a route she had never taken. The point was to explore Lauren's use of maps in rural walking practices. However, upon meeting the couple, David insisted we formulate a

'proper route' using one of his maps from his shed, and so it was that we found ourselves at their home a few minutes later. Although this wasn't strictly necessary (we had by this stage already done some pre-planning) I gathered it was also a chance for the three of them to catch up. What followed led to a series of events in which the cultural performances of mapping were brought into being in a number of ways for those involved.[24]

Spread out across the garden table under the glare of the mid-summer sun, the four of us gathered in a very specific spatial configuration around David's Ordnance Survey Explorer map. We all stood bunched together at one end of the table, slightly leaning in towards the map to get a better look. Lauren eventually pulled up a chair, removed her glasses and leant over the map using her elbows to hold herself in place. The map's representational orientation had arranged our bodies in a way which gave this performance a specific spatiality, one that was unique to that place and time.

The map demanded our attention as David traced his finger down and along the axis to find our position. There was no blue dot here. Neither was it needed; David located us in seconds, tapping gently at the spot that connected us with the map. He then spent the next few minutes verbally drafting a proposed route. He pointed his finger and slowly pursued the dotted footpaths leading out of the village and into the fields beyond as he muttered through streets and place names. Clearly he had good map reading skills, and it didn't take him long to decipher a suitable route. David's actions all but said 'competent map reader'. From the moment the map was taken off the well-ordered shelf of some thirty plus maps in 'his' shed, it was obvious that this was his domain. David's actions were undoubtedly a performance in which paper maps and map reading skills were his territory. Sticking to stereotype, he performed this role beautifully, making it clear through his actions that he was in charge of our conquest across the territory represented on the map.

David worked with the paper map to give us his performance. Like an overseer of spatial knowledge, he stood over the table and described the route at the same time as tracing it on the map, stopping his finger to give direction about specific points. 'At the barn…well, the cow shed, make sure you take a left at the fork' was one comment. 'You'll cross a stream here' was another. Not once did Lauren question his route or the map. She simply nodded in agreement. Using the paper map gave this performance the

[24] My own performances as a researcher were not left unaffected by these mapping encounters. For much of the time I was forced to let these encounters produce performances that I would not have taken if these events were to take place in a different context. In order to act as the observer in this instance I chose to take this step, sit back and bite my tongue.

authoritative backing of the Ordnance Survey, which as Wood et al. (2010) have argued, has the finished form of 'professional' maps, which carry an authority in their aesthetic qualities that other less tangible forms of map do not.

Neither women got a look in at this stage, despite any mapping knowledge they might have had. That being the case, Lauren and Susan were also happy for him to lead, if only to indulge his identity performance with their own for a few minutes. Susan confessed 'I'm useless at this map stuff, you know?' as she wandered off to put the kettle on, whilst Lauren waited expectantly for instruction. It was not known whether Lauren or Susan were actually better map readers than David. They may well have been. What was clear was that gender played a role in how this particular performance of map reading unfolded. As Lloyd and Bunch (2008) have shown, competency in map-reading skills is not necessarily gender specific, but rather a more complex process. Moreover, other factors should be noted here. For instance, the maps being used were from David's collection, which he had accumulated over the years and clearly had an attachment to. He was certainly interested in sharing his knowledge of them with a sense of enthusiasm towards the task at hand. Leading the way was an expression of his passion for these artifacts. Indeed, such enthusiasm was well received by Lauren and Susan who were happy to let him lead.

From my experiences with Lauren, Susan and David, the evidence suggests that culture and context should be taken into account when thinking about map reading (see also Laurier and Brown, 2008; Perkins, 2008). I argue that map reading practices do not necessarily relate to how efficient or accurate one is at reading a map. They also, as exemplified here, relate to how gendered relations and materiality play a role in the cultural context of a map reading encounter. In the case of Lauren, Susan and David it was not only map reading competency itself that was affected by these factors. Rather, it was the entire context in which this map reading took place, produced by broad cultural stereotypes or the minutia of their friendships, that also affected how this particular mapping interface unfolded.

Returning to the table some minutes later with a tray of tea, Susan began working with her memory as David finished working with the map. A keen and experienced walker herself, she knew a rough route we could take. She wanted to offer some further information that perhaps David's map reading could not. Susan talked us through how we might find the footpath leading us out of the village and then described some landmarks which could be used to guide us across the fields between the two villages. 'Past Cathy's', 'Left at the barn' and 'Over the bridge' were three important

notes that Lauren jotted down. Bound up in this mapping performance were two distinct, but corresponding actions: verbal description and gestural movements. Susan used memory and shared knowledge to provide basic but context specific descriptions of the route that Lauren would understand. Having known each other well for many years, both Susan and Lauren shared certain spatial knowledge's about the village which gave Susan familiarities to work with. Hence why Lauren nodded without hesitation at Susan's advice to go 'past Cathy's'. Susan also used plenty of gestures designed to make particular points about the journey. For instance, 'left at the barn' corresponded with the momentary formation of a rectangular shape and a drawn out arm to the left. It could be said that these gestures had a momentary materiality which added to the performance of giving directions. I doubted these interactions would have been so well understood by a stranger. A shared cultural milieu between the two had been built up over many years, and it was clear that it was playing its hand in this mapping performance. In this sense Susan's mapping performance differed from David's in that she didn't make use of the paper map, but rather years of shared experiences. Her performance was one that was perhaps more subject specific than David's because of this.

The performances of way finding

David eventually lent the paper map to Lauren, which she was grateful for despite not knowing fully how to use it, which was something that became apparent during our subsequent walk. Along the route she often stopped to unfold and consult the map, and frequently asked for my help. Her use of the map produced its own unique verbal and gestural performances as she tried to orientate herself with the map and the route in mind. She confessed to agreeing with David's instruction for the sake of it, suggesting that it was easier than getting into a dispute with him. She knew he was doing us a favour and didn't want to offend him, or his map reading skills. This instance reinforced the cultural assumptions about gender and map reading that were played out earlier, but it also fueled these assumptions because Lauren's map reading skills were lacking in practice.

Later, talking through her process as we walked, Lauren said she took bits and pieces from what both Susan and David had said, and combined them with the paper map in her hand, and her own knowledge of the village and surrounding areas to inform her decisions about which direction we should be heading in. In this way she interpreted their information from her own unique experience of way finding. As noted by Ingold

(2000, 2007) in relation to analogue maps and November et al. (2010) to digital maps, way finding differs from navigation in the practices of everyday life. One does not go through the world in the same way that one traces a route on a map or follows a set of directions. Maps, I suggest, cannot be used in isolation as navigational aids. They can only be effective when used in conjunction with a way finding skill or technique embedded in the users accumulated knowledge of knowing the world. In the case of Lauren, she found her way to the next village in ways that were not entirely dependent on the information presented to her by Susan and David's mapping performances.

In laying out these mapping performances I have given a brief insight into how different gender-identities are performed in the cultural context of map reading, route planning and way finding. By doing so I argue that gender is an important factor to consider when thinking about the performativity of mapping interfaces, for as I have shown using the case of Lauren, Susan and David, it can determine the ways in which the possibilities and limitations of these encounters unfold.

6.4 Conclusion

Performativity, culture, maps and mapping practices are undoubtedly a messy mix. Throughout this chapter I aimed to unpack this complexity in order to highlight how maps and mapping practices affect users in ways which go beyond their commonly assumed function as graphical representations of space. Exploring the uses of GPS devices in an amateur road cycling club, and the map reading, route planning and way finding practices that unfolded in a chance encounter between a group of friends, I argued that maps and everyday acts of mapping have a performative materiality and capacity to act upon the world in ways not always recognised in studies of maps. I focused on three types of cultural performances which I found to be tied up in everyday uses of maps. These were socio-spatial performances, identity performances and corporeal performances. Using this framework I suggested that studying only the practical application of maps hides from view the other ways in which maps and mapping practices produce action in the world. This is an important point to make when considering how maps are generally described, and used, outside of critical cartography and related fields. I argue that exploring maps and mapping practices in this way can teach us much about the role that maps play in a variety of cultural contexts.

Maps and mapping practices do not simply tell us where we are, where we are going and how to get there. As I have shown they are also deeply tied up in who and what we are as people bound up in wider cultural processes. By focusing on this angle, I

suggest that maps and mapping practices are in fact constitutive of and constituted by a multiplicity of cultural performances. As I showed in the first section, the cultural performances of the WCC were deeply intertwined with how digital GPS devices were used within the club. The decisions to use and not use these devices had an effect on where riders saw themselves, and others, within the cultures of the club. This in turn had an effect on how riding practices unfolded, with GPS enabled riders picking up ways of riding that non-users did not. Moreover, I showed how age and cultural capital might affect how GPS devices were used within the club. I argued that it was not enough to simply suggest that older riders did not use these technologies. Instead, I complicated this relationship by suggesting that this group of riders were not neo-luddites, but rather used cycling a specific practice to escape the always-on digital cultures in which they primarily lived. In the second section I demonstrated how cultural assumptions about gender produced performances had an effect on how making and taking map routes unfolded. I showed how these practices might still unfold in male dominated cultural assumptions about how maps should be used. By doing so I argued that gender remains an important factor to consider when thinking about how mapping interfaces unfold.

Drawing this chapter together I argue that all mapping interfaces have a context dependent performative capacity, whatever their social, material or technical make-up. Every map produces different performances each and every time they are used. As this chapter describes, digital maps do produce distinctly different performances than paper, verbal, or gestural maps. However, this is not to say that the digital form has the capacity to produce more or fewer performative acts, but simply to suggest that in many ways the dynamic and material nature of digital maps open them up to different kinds of performance when compared with more static form of paper, verbal or gestural maps. As this thesis suggests, non-digital maps still play a prominent role in contemporary mapping practices, and as such the performances which they produce should not be ignored simply because digital mapping technologies are becoming increasingly prevalent.

CHAPTER 7

CONCEPTUALISING PLACE IN A DIGITALISING WORLD

This chapter makes a contribution to theories of place by examining the ways in which digital mapping technologies, are increasingly intertwined with the locations, locales and everyday experiences of place. Using my ethnographic work, which sought to examine place and practice in the digital age from a holistic perspective, I describe how digital mapping technologies can be thought of as the threads which weave place together in complex and often unforeseen ways. The main aim of this chapter is to untangle such threads in order to question the extent to which digital technologies are affecting our understandings of, and our relationships to, place.

7.1 Location, locale and a sense of place

When defining place there is always a certain degree of ambiguity. One of the criticisms of relational thinking, which I discussed in chapter 2, is that it remains largely a theoretical, and academic pursuit (Jones, 2009). The question of 'so what?' looms large over studies of place which suggest that everything is relational. That every place is an assemblage of relations does not go far enough in determining which relations matter for identifying and examining the significance of place. In order to rectify this in my own work, I use this chapter to show how specific people, things and practices (relations) come together to constitute place-making practices. I focus specifically on how people, digital mapping technologies and everyday practices come together to produce places for particular individuals and groups and how the sense of place is mediated by surfaces. In doing so, I break down and use John Agnew's (1987) conceptual triad of place to show how each dimension of place may be constituted, understood and experienced by different configurations of people, digital mapping technology and practice.

Agnew (2011) suggests that three interconnected and scalable dimensions underpin place: *location*, *locale* and *a sense of place*. Simplifying place in this manner is a useful way to empirically study what is frequently referred to in abstract terms. By breaking place down into three core components, Agnew provides a suitable, if only simplistic, framework to tackle the complexity of place. Although this trialectic of place cannot realistically be separated, for the three dimensions are mutually constitutive of place as a lived processual experience (see Agnew, 2005; Anderson, 2012; Cresswell,

2004), categorising them as such allows one the opportunity to explore the relations unfolding in constitutions of place.

Location refers to 'a site in space where an activity or object is located and which relates to other sites or locations because of interaction, movement and diffusion between them (Agnew, 2011; 326). It refers to precisely where events, actions and relations unfold.

Locale refers to the form of place, or the 'settings where everyday-life activities take place' (ibid: 326). In other words, locale refers to our perception of where things happen. It does not always refer to a specific location or site and may in fact relate to a series of locations, for instance in its application to studying the places of mobile practices. Whereas location refers to something concrete and specific, locale can be defined in looser terms as the aspect of place which structures social relations and behaviours.

A sense of place refers to the embodied, emotional, haptic, sensory and meaningful attachment one has with a particular location and/or locale. Brought into contention by humanistic geographers taking heed from phenomenological philosophy in the 1970's (see Relph, 1976; Seamon, 1979; Tuan, 1974) it remains the most evasive dimension of place to pin down and determine, for it is something experienced differently for different groups and produced by multifarious practices. One may have a strong sense of place should they repeatedly interact with a particular location and/or locale such as their home, but one may also have a weak sense of place if they are unfamiliar with a particular location and/or locale such as a new office environment. Even in cases of being lost, confused or simply uninterested in a location and/or locale, one can never be out-of-place and therefore must have at least some sense of place at all times.[25]

Differing slightly from Agnew, it has also been suggested that a sense of place is a relational dimension and therefore does not always correspond directly to where one physically is (Anderson, 2012; Moores, 2007, 2012). For instance one may feel more at home in locations and/or locales which are some distance from their actual house. Similarly, one may try to invoke a sense of a particular familiar place in locations and/or locales that they feel they want to distance themselves from. Using music to evoke a particular sense of place in order to escape the crowds on a busy commuter train is a common example of this (see Bull, 2007), which leads me to my next point.

[25] I disagree with Augé's (1995) notion that there can be such a thing as a 'non-place'.

Offering a different take from humanist geographers from the 1970's, a sense of place may be manipulated or reconfigured, for instance if a relationship to a particular location and/or locale has been mediated by technology of one kind or another. Meyrowitz (1986), Moores (2007; 2012) and Scannell (1996) have all suggested different ways that digital media technologies may be used to manipulate our sense of place, with the former author implying that it acts as a catalyst to feelings of placelessness and the later two authors advocating that it is actively used in the place-making process. Evidence from my fieldwork has shown how people have used media technologies in their place-making practices. It has not shown that media technologies produce feelings of placelessness. I am therefore inclined to agree with Moores and Scannell when they suggest that media technologies and place are intertwined with each other in complex co-constitutive ways.

In the contemporary context it is increasingly the case that our sense of place is always-already mediated in one way or another by the technologies that come to constitute our everyday experiences of the world. Following the argument that the spaces of everyday life are increasingly constituted, and always-already mediated by digital technologies (Kitchin and Dodge, 2011; Lesczcynski, 2015), I suggest, as have others (see Thrift and French, 2002; Wilken and Goggin, 2012), that our understandings of, and ties to place have become inextricably linked with digital technologies. This, I contend, applies to the technologies we know we use, such as our smartphones, as well as to the technologies that we aren't always aware that we are using, such as the digital systems which now run in the background to many of our daily activities.

As I show in this chapter, looking at the ways in which everyday mapping interfaces have changed in recent years offers a particularly interesting example of how technologies can reconfigure and actively be used to reconfigure place across all three of these dimensions. Maps, and especially location-aware digital maps, are purposely designed to manipulate spatial understandings of the world, which I will show affects how particular locations and/or locales are understood and experienced in practice.

My fieldwork highlights how digital mapping technologies and practices can affect perceptions of and engagements with everyday location(s) and locale(s). It also shows how digital mapping technologies can be used to inform place-making practices, which contribute to a sense of place. Moreover, it demonstrates how digital maps and everyday practice might be thought of as the ties which bind these dimensions of place together. In order to show this, I divide the chapter into three main parts.

The first details how digital mapping technologies affect understandings of location. This section builds on much of the existing research outlined above by adding further details about the ways in which people use digital maps to understand where they are. I provide details of how location is increasingly pre-given by digital maps and therefore not often considered in practices of navigation. I argue that location is perhaps the dimension of place most affected by digital mapping technology. In this section I use examples taken from my work with my participants, Harry and Hannah (see appendix 1 and 2), to highlight two contrasting ways in which location is understood in everyday navigational practice.

In the second section I give an account of how digital maps can manipulate the perception of locale by focusing on the practices of geocaching. I show how digital mapping technologies can create new contexts for understanding locale by examining the ways in which geocachers must hunt down caches based on a range of spatial and contextual information made accessible via these technologies. Again, this section builds on the aforementioned arguments that suggest that place is increasingly augmented by layers of digital information. However, throughout this section I also comment on how locales are not solely understood based on the spatial and contextual information provided by digital technologies. I show how the locales of geocaching practices are incredibly complex dimensions of place which often escape the influence of digital information altogether. By doing so, I begin to offer some resistance to the notion that locale is always-already mediated by digital technology, even within practices that have grown as a result of prevailing mapping technologies.

The third section details how digital mapping technologies have come to impact everyday experiences of, and relationships to, place. This section deals explicitly with how digital mapping technologies are used to produce mapping interfaces in everyday place-making practices. I use ethnographic observations taken from driving trips with my participants, Sally and Tom (see appendix 1 and 2), to describe the nuanced ways in which mapping interfaces are enfolded with other socio-technical interfaces in ways that permit individuals to *tune* and *be tuned* by the journey-making of practices of driving. By doing so I highlight how digital mapping technologies alongside other technologies can be used as tools to reconfigure relationships one might have towards a particular location and/or locale.

7.2 Digital mapping practices and the location(s) of navigation

Most digital mapping technologies now have the capacity to locate their users on earth using GPS technology. This was made possible after 2000 when the U.S. military made the technology open and accessible to all (Milner, 2016). Without question this has changed how many people use maps in everyday life. It certainly had an effect on how my participants used maps. Most commented on the fact that they no longer needed to decipher where they were on the map in order to use it. Their (approximate) location was pre-given, usually as a coloured dot, when they opened a mapping application on their phones or turned on their dedicated GPS unit. Taking this step out of the equation when using a map has had an immeasurable effect on map use for it negates the need to consider location as something other than that which is represented on screens. Users of digital maps have never been more location-aware; they are reminded of it every time they look at the map. Many of my participants had become accustomed to seeing their location represented on screen by blue dots, small arrows and pulsating icons. However, being location-aware does not equate to an understanding of location. In contemporary mapping practices there is a frequent tendency to believe that location can only be understood as a digitally mediated dimension of place.

This is particularly the case in common practices of navigation, in which maps 'follow' the location of navigator as he or she moves through space. Maps are increasingly centred on the user, giving them little need to check their location in a broader spatial context. In many cases, users now only need to check they're following the correct route. From my observations, it now seems common practice to use mapping software to produce routes for the purposes of navigation. Some plotted routes themselves (see, for example members of the WCC) using mapping software to do so, whereas others simply let the software calculate and represent routes from A to B (see, for example, Harry). Very few of my participants simply used digital maps to show only their location. That said, I acknowledge that maps are used for many more reasons than navigation. What I present here are case studies from a specific focus on leisure and navigational map use. Further research would be needed to explore whether this was the case with maps used for other uses.

When examining Harry's navigational practices, it became obvious very early on that location was only ever considered as the blue dot which appeared on the screen of his smartphone. Without the map he would not know his location, he said. I suggest, instead, that he would only know his locale. For Harry, location was understood as the where of his next work meeting or gathering of friends as represented by the blue dot on

the map of his smartphone. It was his locale that he used to understand his spatial whereabouts. He knew, for example, that we met and talked in the locale of Bloomsbury but he did not know the precise location of our meetings without referring to the map. Moreover, it was not important for Harry to know the precise sites at which these events would unfold simply because the mapping software he used would do much of the job of locating him. As such it was not uncommon for him blame the technology for being late. Navigation had come to mean following a recipe of sorts, rather than a continuous process of co-ordinating his position in order to understand which way to go. For Harry the practices of navigation were a world away from a compass and co-ordinates. It had become a process augmented and assisted by the technology he appropriated to do the job for him.

These findings reflect a similar argument made by November et al. (2010) whereby digital maps are used in a mimetic rather than navigational sense. They suggest that users of digital maps follow representations of space rather than spending time cross-referencing that which is on the map to that which is actually in front of them. The result is that a user's understanding of location is distorted by technology. Others would agree here, arguing that location-aware mapping technology has had an adverse effect on our ability to navigate 'properly' (Carr, 2015).

Despite the benefits Harry associated with digital maps - their convenience, ease of use and ability to provide a wealth of spatial and temporal information that non-digital maps could not - there was a hidden cost to his frequent use of this technology, which he was well aware of. He admitted that using digital maps had detrimental effects on his local knowledge of London. Even after living in London for over a year, he still struggled with his local geography in central London, an area he had visited countless times in the previous twelve months. This was surprising considering his background in GIS and geography. When questioned about this, he once again referred to how extensively the use of this technology had been folded into his daily practices in the city. He viewed the technology as vital in his making sense of the city, and as someone not particularly interested in the in-between places of weekday travel in London, he failed to make sense of the urban maze without it. Ultimately digital mapping technology had successfully simplified the complexity of navigating London for Harry, but at a cost to his understanding of location.

In stark contrast to Harry, Hannah had a strong preference for navigating using paper maps, which affected how she understood her location as a dimension of place. She often said she had a need to know where she was at all times, based on a fear of

getting lost. She didn't trust digital maps to provide her with accurate information about her location, but rather put faith in her own abilities to locate herself using a paper map. Rather than employing a compass and coordinates, this was done by orienting a map to fit her direction of travel, cross-referencing the physical features around her with those on the map, and using her finger to trace a route and pinpoint her location on the map. Contrary to Harry's mimetic understanding of location, Hannah's understanding was based on far more than that which was represented on, and augmented by the map. It could be said that her location was understood through practices of navigation, through practices of map use, rather than way-finding, the practice of knowing as one goes (Ingold, 2000).

These findings raise pertinent questions over what location is, or has become, in contemporary practices of navigation. It will remain the site of where things happen, but will that site have any meaning outside of the context of the coloured dots that inform everyday practices such as navigation? Moreover, will we become disconnected from the wider landscapes we find ourselves in as a result of this shift? Based on my findings it could be said that digital maps are making location increasingly irrelevant for some, with all responsibility for determining location being passed over to the technology. In other cases, however, my findings suggest that location does remain an important dimension of navigation to consider. As my fieldwork seems to suggest, perhaps we are in a transitionary period in which determining location is becoming less important in practices of navigation.

7.3 Digital mapping practices, armchair travel and the locales of geocaching

Maps of all kinds represent particular locales of place each and every time they are used. As discussed in chapter 5 the form of place represented on maps is always based on the rationale of the map maker. Regardless of scale and detail, maps give the user some indication as to the form and structure of a place. This might be a sketch map which represents a few roads and buildings or a detailed printed map which gives an indication of topographical features, public facilities and points of interest. Digital maps also represent particular locales. The difference being that digital maps have the capacity to perpetually update their representation of locale as they perpetually re-centre themselves around user movements. That is to say, digital maps are 'slippy' and dynamic (Crampton, 2010; Della Dora, 2012), which has an effect on how digital mapping interfaces unfold. Moreover, because the locales represented by digital maps may be scalable in ways that other forms of maps cannot be, they often offer more

detailed forms of place, which are increasingly algorithmically tailored to individual map users. Those signed into Google Maps, for example, are offered a representation of locale based on their cumulative use of these maps, and other Google products. In reference to this phenomena Graham et al. (2013) have noted that Google Maps creates an 'uneven reality' in which the locales that are represented for individual users mirrors what Google's accumulated data says about them as users fitting into specific socio-economic groupings. Indeed, whilst maps have long been produced with individual users in mind (see Crampton 2010), this does suggest that maps are being reproduced for individual users in novel ways in the digital age, especially as the maps presented are increasingly based on an amalgamation of an individual's digital footprint collated from various (big) data sets on the same platform (e.g Google's many services).

Sally, Street View and armchair travel

The locales represented on maps have wide ranging effects on how map users might act and behave in place. For example, a walker's route is likely to be affected when using a map which represents an area of private land or a motorway. Alternatively, imaginaries of place are likely to be stirred by someone browsing through a collection of maps from the comfort of their home. Sally, a keen arm-chair geographer, would often use this method as way to get an understanding of places before she visited them. In the lead up to holidays she used Google Maps and Google Street View to give her a sense of where she was going, both in terms of its form - what it might look like, and how it might feel like to be there. She said that this, along with other information, affected her decisions about what she might do on holiday and even what clothes and footwear to bring with her.[26] As Jenkins (2003) noted, tourist experiences may shape and be shaped by photography. In the case of Google Street View it could be said that this mapping photo-technology is used to shape geographical imaginations in new ways. Following Rossetto (2012), new mapping technologies have a capacity to shape the tourist experience in ways that go beyond the static representations of analogue maps. The technology allows for new levels of detail and saturation that analogue, and indeed most digital photography, cannot compete with. For instance it allows users to make virtual

[26] Augmented reality (AR) technologies, of which many could be considered digital mapping technologies, offer further examples of how the locales of place are being affected in the digital age. Pokemon Go, for instance, has become a hugely popular AR application that overlays a users actual locale with digital information. It would be difficult to deny that this technology does not have an effect on how users understand their locale of place, particularly with reports that some users of the game have found themselves in precarious and dangerous situations after using the app (Cary, 2016; Morris, 2016).

movements and see 360 degree views, and is updated on a regular basis.[27] Whilst most photography offers static images of the world, Street View gives photographic images a dynamism that is similar but distinctly different to the moving images of video. It stutters transitions rather than moving smoothly between them. Observing this in practice with Sally, I suggest, shows another take on how the planning practices of tourists may be seen to unfold before trips are taken in the digital age.

Geocaching locales

Geocaching offers a particularly useful example for understanding how the representation of locale on digital maps can affect everyday mapping practices. This is because searching for caches is all about acting and behaving in response to particular forms of place, which are represented on digital devices. Using a GPS unit or a geocaching smartphone application, cachers use digital mapping technology to determine the approximate location of caches (within five meters). Many of my participants also used their smartphones to access additional information such as clues and place descriptions, which were used to give them more contextual information about a cache's locale. Before setting out to find a new cache they used this information to assess the locale surrounding the cache, making judgements over how best to approach it and what to bring with them in order to find it. In hunting down level five caches, by far the hardest to find, it was not uncommon for cachers to find themselves on roofs, amongst tress or beneath bridges. In preparation for these hunts, cachers would often consult this information should they need to take a pair of boots, gloves or waterproof jacket. This shows how mapping technology can lead one to engage with and discover new aspects of place.

The purpose of not giving the exact location of caches is to allow cachers to get close to caches without making them too easy to find. Much of the fun of this treasure hunt is involved in deciphering the clues which indicate the precise location of caches and then getting physically involved to search it out. It is about engaging with the locale of place, and often seeking out new locales of place. Once within five meters of a cache the digital maps' cachers were using became void, and it was only the contextual information provided on their smartphones which was used to make partial sense of their locale. Whilst more experienced cachers rarely needed this information - they had a good understanding of the various ways that caches might be hidden - for those less experienced, including myself, clues and descriptions were essential when thinking

[27] StreetView is continuously being updated, but the frequency of updates is geographically determined.

about the exact location of caches. It is at these points that digital maps have little to no effect on how cachers understand their locales. Rather, it is other digitally presented spatial information that is used alongside references from their actual surroundings. Digital maps are often part of dynamic systems in which many types of spatial information can be accessed on the same device and within the same application. The official geocaching smartphone application, for example, is designed so that users can quickly switch between a map view and a view displaying descriptions and clues about caches.

Geocaching locales are affected by maps and contextual information provided by digital technologies in as much as they are affected by the physical forms of the environments that cachers find themselves in. This is to say that geocaching mapping interfaces are not isolated from the broader practices of geocaching, which are made up of multiple non-mapping interfaces that emerge together throughout this practice. The interfaces between cachers hunting, hiding, climbing, crawling and socialising all play a role alongside the use of maps in how this practice unfolds. As such, digital mapping technologies are not solely responsible for producing the locales of geocaching practices. When thinking about geocaching in reference to place it is perhaps best to take a holistic view of place as something which is tied up with digital technologies, but also to many other threads which constitute place. Indeed, the same could be said about all locales in which digital mapping technologies now have an effect on.

7.4 Digital mapping technologies and a sense of place

Maps are regularly used to represent a sense of place. For example, maps have been used as tools to represent and address how place is experienced by specific cultures and communities (see Harmon, 2003; Roberts, 2016)[28], and as a way to represent specific embodiments and imaginaries people have in relation to places (Nold, 2009; Obrist and McCarthy, 2014). Much of this work has shown how maps can be as tools for representing how individuals and groups are relating to particular places.

In this section I provide evidence from my fieldwork which shows that maps, with both their digital and non-digital surfaces, can have an impact on how people experience and relate to particular locations and/or locales in the context of everyday navigational practices. I argue that they are tools actively involved in the place-making process. As I mentioned in chapter 6, maps have a performative capacity, which may be

[28] This has become a popular methodology for 'Action Researchers' to use when asking people to identify problems in their area (see Mitchell and Elwood, 2012).

realised in practice. I suggest that one of these capacities is the way in which maps can be used to affect a person's sense of place during certain practices. I have suggested that digital maps have different capacities to other forms of map, and as such I argue that their ability to elicit experiences of, and relationships to place is different to other forms of maps. The dynamic properties of digital maps give users greater scope to do this.

Digital maps may bring forth a sense of place in various ways, depending on their context of use. One of the simplest examples I can use is when I introduced my participant, Lauren, to Google Maps for the first time. Sitting alongside Lauren as she used the software on her iPad I witnessed her searching for her hometown and then the house she grew up in. As she did this, she pointed out how much it had changed since she moved away by hovering over certain features and making comments about them. For instance she spent time zooming in to where her old school was (and still is) and pointed to where she used to play after class, and even where she fell off the roof one day while exploring with friends. She then used her finger to pan across the town to show me where she used to go shopping at the weekends and made a comment about how much the area had built up since she lived there, noting an extension to a shopping centre and a new road layout. Her sense of living in that place was evoked and described to me by using the map, despite the fact that we were 170 miles from that actual place. Indeed, whilst this could be done in similar respects with a paper map, the digital map, its surface and functionality did offer possibilities and limitations to this mapping interface that would not be possible on a paper map. How Lauren conveyed these details was directly bound up in the ways she handled and interacted the map. For instance, zooming-in on the aerial photo view was used by Lauren to get closer to the action and thus make comparisons with her previous experiences of this place in ways that would not have been possible with a paper map with a set scale.

In more complex configurations, my observations of Tom and Sally's mapping practices whilst driving showed how digital maps may be used to create a particular sense of (driving) place, which suited their individual journey-making needs. Following Coyne's (2010) assertion that place is increasingly tuned by the digital devices we use in everyday life, I use extracts taken from my field diary to show how these two participants used the capacities of mapping technology (amongst the use of other technologies and technological surfaces) to tune their journey-making practices, and therefore their senses of place.

Tom

We sat stationary in the car for a few minutes outside the station while he typed our destination into Google Maps, his go-to mobile application for navigation. He then placed the phone, screen-up, on the car's central console rather than on the inside of the windscreen, as is common for many people. The bracket he did have had broken months ago and so he was forced to fashion a suitable place to see the phone from the limited apparatus he had available. After inputting his destination he went to the setting's menu, turned off the default voice navigation function and then switched on the radio.

(Field diary, October 23rd 2014)

Both of these acts were considered essential for creating the kind of experiences he wanted to have whilst driving. Driving, for Tom, was a meditative exercise of sorts. He claimed he was aware of his actions but used the practice as a way to switch off from almost everything else, including paying little attention to the places we were driving through. He explained that the motions of driving created pleasing rhythms in which he could relax and not think about the stresses of life and work. Whilst the action of intermittently checking his mobile phone for directions amidst the ambience of afternoon radio was not seen by him to break these rhythms (it had become a part of them) the interjection of verbally assisted directions was. The voice was 'distracting and annoying' he said. It took him out of his zone. In this sense Tom was able to partly curate his driving experiences using the digital technologies available to him. That said, such practices would also not have been possible without the other technologies and technological surfaces constituting these pleasing rhythms. Riding on tarmac, being enclosed in the car, warmed by its heat, sat behind a windshield, and in control of a steering wheel, dashboard interface and mechanical foot peddles could all be said to constitute Tom's journey-making practices. Considering these multiple technologies and technological surfaces, all with their own properties and capacities, Tom's mapping interface with Google Maps on his smartphone is but single a interfacing encounter, part of a wider assemblage of interfacing encounters that emerge through the socio-technical practices of driving. Following Delanda's (2006) notion of an assemblage - an emerging whole constituted by the relations of exteriority from constituent parts – mapping interfaces could be said to co-constitute larger wholes of practice as their relations of exteriority interact with those of other socio-technical formations.

These insights highlight one such instance in which the spatial practices of driving are produced, in part, by the digital technologies involved. In this case, a smartphone loaded with Google Maps and the car's radio were especially significant in the constitution of Tom's driving practices. Furthermore, these insights describe how digital technologies have come to affect the experiential element of driving practice. There is little doubt that Tom's experiences of driving would have been different without the presence of a smartphone, Google Maps, or the radio. He had purposely appropriated these technologies to curate an experience of driving which suited his needs. He had, in other words, intentionally tuned his use of technology in order to try to produce a certain sense of place, to make sense of his place. This could be called a mobile sense of place. Place is not simply a location or locale in this regard - it is neither the locale of the car nor his global, regional or local position - but rather an event which unfolds as a constellation of trajectories which include multiple processes, practices, histories, possible futures and experiences (Massey, 2005). Through his tuning of technology Tom attempted to make sense of and control of the ongoing flows of place, even if this would not be entirely possible were he to recognise the multiplicity of such flows. He had not simply appropriated the technology in the ways that were prescribed by its makers, but rather knowingly intertwined them with his own cultures of practice, many of which were unique to him. Unknowingly he had also folded these practices into wider socio-technical assemblages of driving practice involving not just him, a map and radio.

Sally

Secured by a bracket attached to the windscreen, Sally tapped our destination into Google Maps. She drives with her phone. It is often consulted, tapped, swiped, adjusted. Her attention is divided between the phone and the road.

(Field diary, August 19th 2014)

Google Maps was not always used specifically as a turn-by-turn navigational aid. Sally would often switch between a turn-by-turn view to a view which displayed the entire route-map. She would frequently reach out to switch between views on our trips together. This way she could switch between a map which gave her the reassurance that she was traveling in the right direction, and a map which gave her the immediate directions she needed; something which she considered entirely necessary. The turn-by-

turn view was used to accommodate the more immediate need to know which way to go, and the zoomed out view was used to assess where she was in relation to where she was going, and also as a tool to plan where she could take a suitable break. Taking breaks, she told me, had become an important part of Sally's driving practices in recent years. The niggling pain of an ongoing spinal injury often forced her to do so, especially when she was required to travel over long distances. Google Maps had by no means solved this issue, but it had helped her to manage it on a day-to-day basis. When commenting on this way of use, Sally acknowledged its peculiarity, but claimed that having tried the 'proper' way of using the software, she found this way much more suited to her style of driving and navigation.

Similarly to Tom, Sally had appropriated the technology, through practice, to curate the journey-making practices she wished to have. It had become bound up in her place-making practices. However, somewhat differently to Tom, she had used digital mapping technology to curate a socio-technical situation that served her corporeal need to take regular breaks from driving. Tom' experiences of socio-technical situations appeared far more bound up in the atmospheres of driving whereas Sally's experiences had become tied the sensory and embodied experiences of her life world (see Pink and Mackley, 2013). The example of Sally highlights how the instability of place can be intertwined with the digital technologies available to hand. Moreover, it demonstrates another example of how mapping interfaces have a performative capacity to produce embodied experiences (as we saw with the WCC in chapter 6). Throughout her driving practices Sally frequently tuned and re-tuned her sense of place using the digital mapping technology available to her. Indeed, it could be said that she used the flexibility of the technology to accommodate the unpredictable needs she had to regularly stop and take a rest from driving. Nonetheless, as with Tom, Sally's mapping interface and its effects were bound up with broader socio-technical assemblages that similarly had an effect on her journey-making practices. For instance, the interface between Sally and her seat and peddles, which co-opted her corporeal position in the car, and the interface between her and the road ahead, which demanded her attention for long periods of time, all had an impact on why she needed to take regular breaks and also how she took them.

For Coyne, 'the tuning of place is a set of practices by which people use devices, willfully or unwittingly, to influence their interactions with one another in places' (2010, p. 16). Using these examples, I suggest that both Tom and Sally willfully tuned their sense of place based on the technologies they had to hand but also that these

experiences were unwittingly tuned by an array of complex socio-technical assemblages that were tied up in these practices. The tuning of place I suggest, is not simply determined by how devices influence interactions with who is present or absent, as Coyne suggests, but also by how devices (in this case digital maps) and other technical forms (in this case the tarmac, car, windshield, steering wheel, dashboard, seats, peddles etc.) influence interactions with practice itself.

Following Kitchin and Dodge (2011), Tom and Sally's experiences could be said to be unfolding as differing constitutions of coded space, rather than as a product of code/space. The reason being that their practices of driving and navigation would remain possible if Tom and Sally did not make use of smartphones, radios and digital mapping technology. The drivers themselves made conscious decisions to appropriate the locale(s) of the car themselves by incorporating these technologies into their respective cultures of driving practice, and their individual preferences highlighted how they had influence over how the space is appropriated by technology. Nevertheless, for Sally and Tom, the experiences of driving rarely, if ever, unfolded in spaces absent of digital technology. These include both the technologies that I have described and the technologies which I have not. As mentioned there is clearly the road and the car itself alongside other in-car technologies, but there is also GPS satellites and traffic monitoring technologies amongst many others to consider when examining the assemblages of such socio-technical situations. Moreover, there is the specificity of the mapping technology that they were using to acknowledge. Both Sally and Tom were using Google Maps, which have a specific functionality and aesthetic that affected how they are used. Other mapping technologies would likely have had a different effect on the way these journey making practices unfolded. For instance, as Alex Gekker and Sam Hind (2016) have shown, the mapping platform *Waze* would have introduced these drivers to a ludic functionality that may have altered how they engaged in these practices of navigation.

Ultimately, it could be argued that Sally and Tom's journey-making practices were mediated by multiple digital technologies and are indeed code/space. I suggest that these experiences of place would not be possible without the interfaces between them and digital mapping technology because the technologies themselves have become instrumental in the constitution of Tom and Sally's driving experiences. Following Leszczynski (2015), their experiences could be described as always-already-mediated by digital mapping technology. In the same way that a theory of code/space edicts the constitution of code and the production of space, I suggest that certain experiences of

place, when understood as a processual concept, are only made possible by the co-constitution of technology and culture in practice. They are codified experiences of place, or to use Kitchin and Dodge's terminology, code/places. When comparing Tom and Sally's practices it is clear that there can be many nuances to the ways in which such constitutions are experienced in everyday life. As these case studies highlight, codified experiences of place are experienced in the unique milieu of one's social, cultural and embodied life world. Nevertheless, caution must be taken here for in declaring all driving practices codified experiences of place, for to do so runs the risk of neglecting the many other the other socio-technical interfaces that emerge alongside and with the use of digital technology.

7.5 Conclusion

This chapter set out to explore how place as a fundamental geographical concept might be understood in a digitalising world. I used Agnew's (1987) triad of place to frame my empirical materials, and demonstrated how location, locale and a sense of place have been affected by digital mapping technologies in the context of everyday mapping practices. Over three sections I highlighted the often subject-specific ways in which digital maps were used in everyday understandings and experiences of these three dimensions of place. Focusing on everyday practices of walking navigations, practices of armchair tourism and geocaching I suggested that whilst digital mapping technologies were having a significant effect on some people's relationship to place, this was not true of everyone or of all contemporary navigational and leisure mapping practices (or at least to the same extent). In addition I used this chapter to further explore mapping interfaces in relation to other interfaces, thus putting my theoretical framework (outlined in chapter 4) into contention with practice more broadly. Using the journey-making practices of two drivers I demonstrated how mapping interfaces co-constitute everyday practices with and alongside many other socio-technical interfaces. Ultimately this chapter has shown that practices and place are formed, understood and experienced as socio-technical situations, which are the product of multiplicitous socio-technical assemblages.

CHAPTER 8

CONCLUSION: CONTRIBUTIONS AND SUGGESTIONS FOR FUTURE RESEARCH AND MAP DESIGN

8.1 Contributions

In this thesis I responded to two primary aims, which I used to explore everyday mapping practices in the digital age. Firstly, I showed different ways in which mapping practices and technologies are embedded in the cultural geographies of everyday life. Secondly, I showed the ways in which digital technologies have come to affect mapping practices, and everyday experiences of place.

Ultimately, my findings suggest that digital technologies have had profound if not always revolutionary, effects on how maps are used, produced and understood in the everyday practices of place making. This thesis has shown that unpacking the minutia of mapping practices is vital if we are to properly understand the work that maps do in the world, and to what extent digital maps contribute to novel understanding of place. Maps, I have argued, are not merely representational artefacts, and therefore a representational analysis of maps will only reveal so much. Rather, maps are deeply intertwined with everyday practices in ways which speak to their more-than-representational effects. Throughout this thesis, I have presented evidence that shows how these effects come into being through a variety of embodied, enthusiastic, performative, playful, material, social and spatial practices.

What sets this thesis apart from previous studies of maps and everyday life is its broad scope, its ethnographically-informed methodological framework, and its theoretical underpinnings. Whereas comparable studies to date have tended to focus on one type of mapping practice, I have used empirical evidence taken from a diverse range of everyday mapping practices, especially those including portable digital media. I carried out an extensive ethnography which focused on bringing together ethnographically-informed methods to study everyday mapping practices from a holistic perspective. This thesis thus contributes to a growing body of work that focuses on everyday mapping practices and the effects of digital technologies from an ethnographic perspective (see Brown and Knopp, 2008; Laurier and Brown, 2012; Laurier et al. 2016; Perkins, 2008; Pink et al. 2015, Rossetto, 2012; Shove et al. 2012; Wilmott, 2016a, 2016b).

With regards to its theoretical contribution, this thesis has made the case for a novel way of understanding everyday mapping practices. I developed a theory of *mapping interfaces* to argue that mapping practices should be understood as relational zones of possibility and limit in which the materiality, representation and performativity of maps and encounters with maps should to be taken into account. Framing mapping practices in this way, I argued, further develops the notion that maps and mapping practices are processual, ontogenetic and context specific (Dodge et al. 2009; Kitchin et al. 2013).

In making these claims I also acknowledge the limitations of this thesis. The methodological approach and theoretical framework that I used to inform this work are not without flaws. For instance, my fieldwork was limited by my intentions to study a broad range of mapping practices. Applying ethnographically-informed methods to a diverse range of mapping practices meant that at times I spread my time too thinly between people, places and practices. Nevertheless, I do maintain that my research practices have provided a rich source of ethnographic data, which I draw upon in this thesis, and will continue to draw upon in future publications. Having had more time and resources to carry out this research I could have added further depth to these case studies. Theoretically, I acknowledge that my notion of mapping interfaces may be labeled essentialist in its tone. Some may see its broad application as an ambiguous and overly ambitious attempt to cover all bases. To counter, I would simply suggest that this theory is an initial attempt to frame the variety of everyday mapping practices that I recorded in my ethnography. My hope is that it will pave the way to further studies and serve as a useful framework for thinking about everyday mapping practices.

In this concluding chapter I wish to draw this thesis to a close by focusing on four ways in which it could be used to frame and inform future research and cartographic design. Firstly, I provide some general conclusions about everyday mapping practices in the digital age. Although this thesis offers culturally specific snapshots into how mapping practices are being shaken up by digital technologies, I do contend that some general observations can still be made. Indeed, multi-sited ethnographies such as my own can, and have, generated generalisable data despite the specificity of each case study (Atkinson and Hammersley, 2007).

In the first section I highlight the socio-technical constitution of mapping practices at a time when these practices are in a period of transition. Specifically, I show what is familiar about digital mapping practices, and give some indication as to what is novel about digital mapping practices. I also sum up some findings which complicate

these general statements. The purpose for doing so is to demonstrate that general statements about contemporary mapping practices, although helpful for future research and design, can always be complicated by the minutia of cultural practice. In the second section, I suggest ways in which my methodological framework may be used in future research and design contexts. I propose that an ethnographic and dialogical approach to research can be extremely useful when trying to understand how people use maps, and what people want maps for. I argue that qualitative approaches should always be taken into consideration when thinking about how maps are being used, and when thinking about how maps are being made. In the third section, I offer some suggestions for future map design that take into consideration how our relationship to place is being effected in the digital age. By noting the ways in which digital technologies affect understandings and experiences of place, I provide some suggestions as to how maps might be tailored towards specific social and cultural groups in the future. In the final section, I extend this theme into the academic realm and suggest ways in which future research may want to think about the nexus of everyday mapping practices, digital technology and place. I finish by identifying the limitations to this research.

By laying out these conclusions and suggestions for future research and design, I primarily turn to the practical ways in which this research may be used as it ultimately aims at contributing to both academic debates and industry-led practices.

8.2 General findings

A transitional moment

Digital technologies are having increasingly significant impacts on everyday mapping practices. Mobile and GPS based technologies in particular have made these effects more profound than ever before. In this thesis I have presented evidence which further backs up these already well documented claims (Crampton 2009b; Dodge et al. 2009; Kitchin et al. 2016b; Milner, 2016), insomuch as I have given specific examples of how digital and mobile mapping technologies are used in a variety of ways by a diverse body of everyday practitioners. Nevertheless, I have also presented evidence to suggest that digital technologies have not (yet) made all non-digital mapping practices redundant. Maps are still used in many non-digital forms. The reasons for this, I suggest, are threefold. Firstly, there remains somewhat of a generational divide between map users, which has affected how and why new mapping technologies have been adopted. Generally speaking, the younger generations of my participants embraced digital

mapping technologies in ways that the older generations did not. This in turn affected the kinds of mapping practices that these groups became involved in. As I will describe below, mapping practices are more diverse than ever before, and it was the younger rather than the older participants in this study that were more likely to be involved in this diversity. This reflects the broad notion put forward in both academic and commercial studies that younger generations of people are more likely to adopt digital technologies far quicker and in many more diverse ways than older generations (Ipsos MORI, 2016; Thomas, 2011).[29]

Secondly, issues of cost and connectivity still play a major role in how people use maps in everyday life. Whilst this study primarily focused on participants in London and the South East of England, where cellular connection and smartphones were in abundance amongst my participants, I did find cases in which digital mapping technologies were not used because of these factors. This was made particularly clear with regards to the student participants using mobile maps abroad. The high costs of 'roaming charges' meant that these students were forced to adapt the ways in which they might have used these mapping technologies at home. The result was that many stopped using their mobile maps and instead opted to use alternative paper-based maps. Until these kinds of barriers are removed, which is something that remains in the hands of a few dominant mobile phone providers, a more substantial shift to digital mapping practices cannot be completed. Indeed, in future research this is something that might be explored further. Tourist practices are often intimately bound up in the use of maps (Urry, 2002) and it has yet to be shown how these intertwinements have been affected by digital technologies and the barriers users of these technologies face in foreign contexts (see Rossetto, 2012 for a rare exception).

Thirdly, the prevalence of digital technologies more broadly has created something of a backlash against such technologies in specific contexts. Digital mapping technologies have not been exempt from this. In some cases the backlash against digital technologies has made non-digital mapping practices more buoyant than ever. For the most part however, digital mapping technologies made the lives of my participants easier, more convenient and more enjoyable. Digital navigation, for example, was welcomed by many of my participants for the simple reason that it was considered easier and less time consuming than resorting to navigation using non-digital methods. Moreover, for others, these technologies facilitated new forms of leisure practice, which

[29] That said there remains some debate over whether this is always the case. As shown by Helsper and Eynon (2009), other factors also contribute to divisions in the uptake of digital technologies.

had a positive impact on their lives. However, for a small minority of my participants the increasingly prevalence of digital technologies (and to some extent surveillance technologies) had encouraged a backlash against mapping technologies to the extent that they were intentionally disregarded in certain practices. For instance, in exploring the practices of cyclists I found that a certain sub-set of riders intentionally rode without the use of digital mapping technologies because they wanted a way to detach from their ever-connected lives.

This thesis therefore represents a particular moment in time. Perhaps this moment is a transitional one, and in future years non-digital mapping practices will become redundant as future generations cease to be interested in learning or exploring mapping practices that are not tied up with digital technologies. Conversely, perhaps we will forever be in this transitional moment, for as I have shown, the ebb and flow of cultural practice in the digital age always complicate map use. As has been seen in other forms of cultural practice, the implementation of a fully digital world is being challenged (van der Heijden, 2015). One needs only look at the resurgence of vinyl records (Fortune, 2016) and physical book sales (The Publishers Association, 2016) to see this resistance in practice. Indeed, in the world of maps a similar rise in the sales of paper map has also been noted (Ordnance Survey, 2015). What I suggest is that for the time being, the full extent of this transitional moment remains to be seen. What is clear from this study is that *many but not all* map users have become accustomed to the ways in which digital mapping technologies have become folded into the background of their everyday lives and culture.

Digital maps and cultural practice

Digital technologies are transforming the cultures of everyday mapping practices insomuch as the cultures of everyday practice are transforming how and why we use digital mapping technologies. This is to say that everyday digital mapping practices are complex socio-technical practices mutually constituted by the dynamic coming-togethers of culture and technology. Although this is not a particularly novel finding, for the use of maps has always been a socio-technical practice (Dodge et al. 2009), it does reinforce the notion that contemporary mapping practices are not technologically determined, despite the prevailing influence of digital technologies. What is novel, however, is the variety of ways in which this constitution is now played out in everyday life. For many of my participants digital maps had become part of their everyday experience, so much so that their everyday lives would be very different were these

technologies to be removed from their daily routines. This thesis has drawn out and unpacked this complexity with the aim of explaining how and why the cultures of mapping practice are changing.

In line with other studies (Brown and Laurier, 2012; November et al. 2010; Speake, 2015; Wilmott, 2016a), I have presented evidence to suggest that digital maps have had a significant impact on how many now navigate the modern world. I argued that the ways in which my participants navigated, and understood navigation in the context of the places they were in, had been greatly affected by the shift away from paper maps. As I showed specifically in chapter 7, some have become reliant on the technology to such an extent that their spatial understandings were significantly altered without them. In the case of Harry and a group of undergraduate students, for example, I showed how mobile maps had affected the ways that these people routed themselves around the urban areas of London and New York. Many relied heavily on this technology, which in turn affected how they understood the spatial layouts of these cities. I argued that mobile mapping technologies augmented their experiences of the city, which gave them a specific geographical and spatial imagination of these places that was directly bound up in the cultural and political views of the makers of these technologies. This finding adds further detail to studies that have examined how digital maps effect experiences of place (Graham and Zook, 2011; Zook and Graham, 2007). Moreover, it builds on much with the field of critical cartography, which argues that maps produce culturally and politically laden ways of seeing the world (Crampton, 2001; Crampton and Krygier, 2006; Harley, 1989; Pickles, 2004).

A further finding in relation to navigation was that the practice had become a passive activity for many of my participants. Much, if not all, of the responsibility for getting from A to B was frequently passed over to the technology. The digital maps involved in these practices had become an integral part of the experience for most of these people insofar that navigation itself had become an activity of coded/space (Kitchin and Dodge, 2011). Future research should explore this notion further, particularly with regards to how, as I suggested in chapter 7, understandings and experiences of place are increasingly becoming influenced by our intentional uses of digital technology. As Bull (2007) and Coyne (2010) note in relation personal digital technologies, we are increasingly carving out intimate spaces in the world with the help the technologies available to us. Digital mapping technologies, I suggest, are also being used to do this. This may be of interest to designers wishing to consider how the design and usability of digital maps produces more-than-representational effects on users. As I

have shown, the ways in which digital maps are used can add or remove value from one's experiences of the world. The implication is that future design of maps should take into account how users tweak technology to suit their own preferences.

Across my fieldwork I saw many novel instances of mapping practice which went beyond the practices of navigation, many of which were partly constituted by digital and mobile technologies. With reference to geocaching, cycling and driving practices, for example, I showed how digital technologies made novel types of mapping practices possible on a technical and social level. These novel forms of practice, which millions of people are now involved in, would not exist without the GPS enabled mobile technologies that many of us now carry in our pockets and bags. Nor would they exist without the social shaping of these technologies, which has a direct effect on how they are being used. For instance, in reference to cycling and driving practices, I demonstrated how the decision to use and not use digital maps could be tied up in more than whether it was an efficient way to navigate. Road cyclists, I argued, are a complex group with many internal social hierarchies which dictate how such devices are used and discussed, both on and off the bike.

I also showed how digital technologies have transformed the reasons behind, and practices of, map making in contemporary life. Using examples taken from my work with amateur and professional cartographers, I demonstrated how digital technologies have become embedded in the social, cultural and technical practices of map making. To make a general claim, from the evidence presented, it seems likely that amateur and professional map making will continue to make use of new technologies in the future. As I showed in the case of HOT 'mapping parties', some maps are now produced with a global context in mind. Digital technologies have made this shift possible. Moreover, in the case of professional cartography I detailed how 'old ways' of production using analogue instruments were on their way out in favour of more up-to-date digital methods. It is perhaps in the world of map making (rather than map use) where we will first see the eradication of non-digital mapping practice. Indeed, it could be argued that we are already at this point and have been for some time, owing to the fact that the design, manufacture, distribution and sales of paper maps cannot be separated from digital technologies of one kind or another.

Whilst the aforementioned claims remain valid, they should be taken only as a general overview, for as I've demonstrated throughout this thesis, mapping practices are culturally specific encounters which unfold in context dependent ways (Kitchin et al. 2013; Perkins, 2008). This thesis has demonstrated that there is a multiplicity of ways in

which maps are used which are not always seemingly obvious, nor are they easily generalisable. For instance, by examining the minutia of everyday mapping practices in a road cycling club, within a group of geocachers and two groups of amateur map makers, I highlighted how such practices facilitated a variety of social relations, corporeal practices and identity performances. By doing so, I shed light on the multiple and often subject-specific ways in which maps affected the cultural practices of these groups. In other cases, I showed how maps were being used to evoke geographical imaginations and a sense of place, and how maps were being used to shape gendered identities and represent social status in groups.

In addition to showing the diversity of mapping practices, the breadth of these examples suggests that further research with a different set of participants is likely to yield many more ways and reasons why digital mapping practices have become intertwined with cultural practices. As such, future research would benefit from focusing on how these intertwinements take place within the cultural dynamics of different everyday practices, rather than giving all their attention to the technology itself.

Digital maps amongst other software

Digital maps are software and hardware, and in many cases they are used within a complex ecology of other softwares and devices. For example, many of my participants would switch between digital maps and other applications on their smartphones and tablets, or other tabs on their website browsers. Often, this switching was relevant to what they were using the maps for. In Harry's navigations (see appendix 1 and 2), for example, I noted how he switched between using maps, email and social media applications in order to maintain communication with the people he was going to meet, whilst also keeping an eye on his route and the all important estimated time of arrival, which the software had estimated. Another example of this was shown in reference to Sally in chapter 7. I demonstrated how the possibilities of armchair tourism have been greatly affected by users combining digital mapping technologies such as Google Maps and Street View with other contextual information about the places they are interested in, all on one computer system.

Whilst maps have long been used in conjunction with other tools for a diverse range of practices, digital technologies have affected how, why, where and at what speed these processes take place. Maps are now part of a broader digital culture which can be described as 'always-on' and increasingly attention seeking. One way in which

this has been seen in my research is in the frequent, banal and sometimes addictive switching between digital maps and other sources of digital information which go on in the practices of everyday life. Although these micro-practices may seem meaningless, I argue that they are having a significant effect on how maps are being used within the broader socio-spatial practices of map users.

Designers and further research may find this helpful, for this technical ability to switch can have great influence on which maps are being used and in what context. In this sense digital maps now have the capacity to be more than just maps; they have become complex softwares that now deal with a range of spatial information. Some existing digital maps have already begun to experiment with this. For example, Google Maps now incorporates travel information, places of interest and places to eat and drink into its application. This keeps users in their application for longer because users no longer need to travel between their application and another to combine this type of spatial information.

8.3 Implications for map design

Map design affects how people use and understand maps. This has been well documented in this study as it has elsewhere (Wood et al. 2010). What I've aimed to make clear in this thesis is that cultural context and practice also affect how people use and understand maps (see also Kitchin et al. 2013; Perkins, 2008). The findings presented in this thesis could be useful for future map design because they highlight this complexity. Most notably this complexity has been unpacked in the contexts of navigational and leisure practices, in which there is some clear cross-over.

In reference to navigation I demonstrated that navigational practices are complex contexts in which maps are used for a wide range of reasons. This being the case, I suggest that future maps designed for navigation should take the multiplicity of these contexts into account. This does not necessarily mean designing maps for the individual needs of everyone, but rather designing maps which suit a broader range of navigational contexts. For instance, those using maps when walking in urban, sub-urban or rural contexts might require different forms of map and different mapping technologies to suit their navigational needs. From my fieldwork, those using maps in London certainly had different requirements than those using maps in the rural areas of the South East. For example, in everyday urban navigations, I showed how Harry would struggle without maps that provided travel information. Conversely, in everyday rural

navigations, I showed how the Wheels Cycling Club (see chapters 3 and 6) had different requirements based on maps that also highlighted corporeal data.

In future map design this could mean increasing or reducing the number and range of icons which users see on a paper map, or it could mean designing digital maps which 'follow' the paths of users notifying them of points of interest or information relevant to them. This has already proven to be successful in navigation systems for driving (e.g. Waze), which alert drivers to upcoming traffic and provides them with alternative routes. Many of my participants used digital maps out of convenience, particularly in navigation. If relevant geographic information comes to them without them having to search it out, many would no doubt approve. Nevertheless, I suggest a cautious approach to thinking about what types of geographic information people might want to be alerted to. As I showed in the case of Sally, some may actually want maps to provide less geographic information and not more. In future design, there should at least be an option to turn off such notifications. A dialogical approach (see above) may be useful when thinking about how to apply these features to future map designs.

Specific maps designed for practice led pursuits should point out things relevant to the practice in mind. For example, urban walkers are interested in maps which show practical information such as transport hubs, travel information, cash points, places to eat and museums to visit. However, they are also interested in aspects of urban life that are not so obvious such as quiet walking routes, the whereabouts of public events, peaceful places to eat lunch or work.

Those using maps whilst cycling may also require different maps to suit different forms of cycling. For example, maps designed for road cyclists could be designed to show the gradient percentage of hills, state of traffic, quality of the road surface, or even the location of bike shops and bike friendly cafés. These were all features that participants from the WCC suggested would be very useful. Equally, I can envision that other types of riders, for instance mountain bike riders, may find value in maps which indicate the level of expertise needed to tackle one trail over another. As my research suggests, cycle maps may also benefit from further integration of social media and ride tracking technology.

Conversely, at a time when digital mapping technologies are increasingly tailored towards the individual, perhaps future maps could highlight the position of the user in their broader spatial context, as paper maps have traditionally done so. As I showed with regards to Sally, the assumption that individuals want maps increasingly tailored towards themselves is not necessary the case for everyone. Indeed, as I brought

to attention in chapter 7, there is some concern about how maps tailored towards the individual affect one's understanding and experiences of place. Perhaps there is some responsibility for future map design to reduce the isolation seen in current forms of digital map so to preserve the broader spatial understandings of future generations of map users.

8.4 Everyday practice, digital technology and place

In closing this chapter I now return to the relevance this study has for future academic research. By doing so I give some suggestions as to what future geographic research into the digital cultures of everyday life and everyday mapping practices may wish to attend to.

Studying everyday life in the digital age

Geographers are increasingly interested in the effects of digital technology. Many have already shown that these technologies have important ramifications on a wide range of social and spatial practices (Ash et al. 2016; Kitchin and Dodge, 2011; Kitchin and Perng, 2016; Leszczynski, 2015; Rose, 2015; Thrift and French, 2002). Much of this work has focused on how digital technologies are increasingly intertwined with everyday practice, experiences of place and the social and material production of space. With regards to the changing face of mapping practices, my research makes a contribution to this body of work, for it shows that everyday digital mapping technologies are having a significant impact on our relationships with place and on our socio-spatial practices. What is clear from this study as well as others is that everyday life is increasingly always-already intricately connected to the forms and functions of digital technology (Leszczynski, 2015). Socio-technical forces have long constituted our socio-spatial practices, but digital technologies (and particularly those resulting from the Internet) now shape our lives in far more diverse and accelerated ways than were previously apparent. There is little doubt that geographers will continue to develop insights into the effects of digital technologies, including mapping technologies. What I suggest is that these studies focus on the intricate, daily and often mundane ways in which these impacts are being felt. It is important to study the broader picture, but as I have shown, detailed perspectives can always complicate these assumptions. A way to do this, I suggest, is to focus on ethnographic approaches to studying life in the digital age.

I suggest that future research ought to continue this qualitative trend alongside its quantitative investigations. Indeed, best practice might call for a mixture of the two, which although may require extensive research training for those involved, could uncover insights into the effects of digital technology that neither branch of research could do in isolation. Moreover, it may require that geographers work with other disciplines to strengthen the research process. Where I struggled most in my fieldwork was understanding the technical side of digital technologies. Algorithms, code, software and hardware are all intricately connected to the social practices I have been describing throughout this thesis. The future research of social and cultural geography may benefit from interdisciplinary endeavours with more technically driven subjects such as computer science, mathematics and engineering in order to overcome these technical barriers. Doing so would be an accomplishment rarely seen in geographic studies of digital technology.[30]

Future research in this area may also benefit from studying everyday life outside of large urban contexts. There has been a tendency to couple studies of the digital with those of the urban, which I suggest needs rectifying. Studying everyday life in different geographical contexts such as sub-urban, rural and remote areas is likely to reveal subtle and yet important nuances in how life is lived in the digital age. Once again, I suggest that qualitative approaches might work well to unravel the socio-technical constitution of non-urban life.

Studying everyday mapping practices

Due to the rise in digital mapping technologies, there has been a resurgence of interest in studying maps in the past decade (Kitchin et al. 2016b). I suggest that this growing body of work needs to pay more attention to the cultures of mapping practices in the future. Research in this area remains largely focused on the representation of maps themselves. This is especially the case with regards to how the political and commercial power of maps, and capacity of maps to augment places and practices is being affected by digital representations. Whilst this research is certainly important, particularly with regards to the reproduction and slight shifting in where the sovereign power of maps now lies, I suggest that this work does not examine the full extent of the work that maps do in the world.

It is likely that digital mapping technologies will continue to become tied up in the practices of everyday life and therefore it is more important than ever, that future

[30] See The Programmable City project led by geographer Rob Kitchin for a notable exception.

research pay attention to how and why maps are used and understood in the broader contexts on people's lives. This means unpacking the spatial and temporal rhythms of daily practices, and examining how and why maps have become enfolded in them. To continue the focus on digital maps as purely representational devices would neglect the deeply complex roles they play in the socio-spatial constitutions of daily life. As I've demonstrated in this thesis mapping practices are afforded by representation, but they also have materiality and performativity that matters.

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APPENDICES

APPENDIX 1: RESEARCH PARTICIPANTS

In the following I briefly describe my research participants and document the time that I spent with them. All of these participants have informed the arguments made in this thesis. Some of these participants are not explicitly referred to in this thesis, and will be used in future publications. I have removed, wherever possible, any clearly identifying features in order to preserve their anonymous participation. Where possible I have included the ages and genders of my participants. For those where age and gender was not openly given during discussion I provide a rough approximation.

Amy

I carried out two lengthy unstructured interviews with Amy, a middle-aged British woman, in July 2015 at her workplace. Working as a personal assistant to a professional cartographer she used maps almost everyday to plan personal and work related travel. For much of the time however, we discussed how she used maps during the regular sailing trips she and her husband made as amateur sailors. We discussed how digital mapping technologies had transformed the practices of amateur sailors, making navigation both easier and safer.

Barbara

I met Barbara, a middle-aged Dutch architect, three times between February and August 2014. She was a member of the WCC. The main focus of our meetings was to talk about how digital mapping technologies had affected her long distance road cycling practices. After interviewing her first in central London about her use of maps and digital technologies more broadly, I met up with Barbara on two further occasions to accompany her on training rides through South London and the Kent countryside. During this time I observed her and asked her to talk through the ways in which she used a digital GPS device during and after riding.

Dennis

I met Dennis, a middle-aged British black cab driver, on four occasions between October 2014 and February 2015. Sitting in the back and then the front of his cab I observed his practices and carried out four unstructured interviews as we drove between destinations around central London. We discussed how black cab drivers used material

and mental maps of London, both in terms of their training for 'the knowledge' test and in their everyday practices as a taxi driver. We also had lengthy discussions about the ways in which digital mapping technologies had changed the state of the taxi industry in London, and the impact they have had on driving more generally. Contrary to the popular discourse at the time, Dennis was unfazed by the significant changes to his industry. Rather than being adverse to the technological changes, he actively wanted to pursue how digital technologies could be used to his advantage.

Hannah

I met with Hannah, a thirty-one year old Polish woman, twice in July and August 2015. Our first meeting consisted of an unstructured interview and observation of her typical working practices as a professional cartographer. In our second meeting we spent a day cycling in order to discuss her use of maps in leisure pursuits. This was followed by an unstructured interview with Hannah at her home in a city in South East England in which we discussed the ways that maps were used in her everyday life.

Harry

Harry, a twenty-eight year old British GIS professional, worked with me three times between May and July 2014. Meeting first at his home in South London and then at two further times in central London locations I interviewed Harry about his heavy use of digital technologies, including that of digital mapping technologies. I also observed how Harry used digital maps in practices of navigation across the city. What resulted were lengthy talks about his reliance and compulsion to use digital technologies of many kinds in his everyday practices. In addition Harry accepted an invitation to complete a diary of his use of maps when traveling abroad in June 2014, which we discussed on his return.

Lauren

I worked with Lauren, a sixty-one year retired British primary school teacher, on two occasions in September 2014. Firstly I accompanied her on a walk through the Oxfordshire countryside where we discussed her use of maps for the practices of walking, alongside the benefits of local knowledge and asking for directions. On our second meeting I interviewed Lauren in her home, where we discussed her use of maps more broadly. Relatively new to mobile and digital technologies at this time, digital maps were only just beginning to be used in her everyday practices.

Sally

Sally, a twenty-nine year old British pharmaceutical market research consultant, accepted the invitation to be interviewed twice between June and July 2014. After a short unstructured interview at her home in East London about her broad use of digital technology, the majority of our time together was spent in her car driving around London. In observing and interviewing Sally about how she used digital mapping technology whilst driving much of our discussions focused on how GPS devices had affected her everyday driving practices in the years since she started using one regularly.

Stavros

I met Stavros, a twenty-six year old Greek-Cypriot, twice between August and November 2015. At our first meeting in central London I interviewed him about his use of digital mapping technology as a semi-professional road cyclist. We discussed the trickle-down nature of technology in road cycling and how mapping technologies in particular had transformed aspects of training and racing. On our second encounter I accompanied Stavros on a training ride through the Hertfordshire countryside. During this time I observed and asked him to talk me through his practices of using digital mapping technologies for training.

Tom

I interviewed Tom, a twenty-three year old masters student, three times between June and December 2014. Following a similar format to my work with Sally, we first met to interview at his home in Surrey and then followed up with two interviews in his car as he drove to complete errands in the greater London area. The primary focus of our discussions, and my observations, were about how his driving practices had been affected by digital mapping technologies, and mobile technologies more broadly.

Tori

I interviewed Tori, a thirty-five year old British artist, on five occasions between October 2014 and August 2015. Always preferring to meet at her home in North East London we discussed, at length, many of the ways in which maps had come to affect her everyday experiences of living in London since she became a resident ten years previously. Amongst discussions of how digital technologies had changed her use and understanding of maps, we also talked extensively about Tori's distrust and scepticism

towards the representational qualities of maps, as well as her attempts to 'get lost' and experience urban environments without using maps.

Other individuals and groups

In addition to studying these groups, I spent smaller periods of time interviewing or simply observing other groups in an effort to broaden my sample further. These were as follows.

Jen and Sue

I accompanied Jen, a young British police officer, and Sue, a more senior British police officer during a Friday evening shift in May 2015. Sitting in the back of their Interceptor vehicle I observed and interviewed them about how digital mapping technologies had affected their everyday policing practices. Amongst relatively brief discussions about maps, we had lengthy talks about how digital technologies more broadly had affected policing practices. Sue, the older and more experienced of the two officers attested to the significant changes that she had experienced since joining the police force twenty-one years previously.

Technology meet-up groups

I attended regular technology-related evening meet-up groups around central London over the course of my fieldwork. These groups specialised in bringing together enthusiastic amateurs and industry professionals to discuss, show and tell, and present ideas about digital mapping technology, self-tracking technology and wearable technologies. For the majority of my time I simply observed the practices of these groups, which gave me valuable insights into these areas of the technology scene that I could use when working with my participants.

Uber drivers

Uber is a 'ride-hailing' or 'ride-sharing' mobile application designed to connect drivers with riders (Uber, 2016). It is essentially, for the time-being at least, a taxi-cab service facilitated by mobile technologies. Between April 2015 and August 2015 I interviewed three drivers working for uber during paid for trips between locations around London. These drivers were Genci, a middle-aged Albanian, Martin, a thirty-six year old British man and Daniel, a Nigerian medical student. Between them the drivers had been working with Uber for between six months and two years. The reason for these

interviews was to examine the ways in which digital mapping technology were affecting the working lives of taxi drivers, which could complement my earlier work examining how maps were used by a black cab driver (see Dennis above).

APPENDIX 2: ETHNOGRAPHIC PORTRAITS

In the following I provide all of my ethnographic portraits with individual participants.

2.1 Barbara – The road cyclist

Similar to most popular cultures, the world of cycling is full of difference; different types, different styles and different personas. Amongst the two wheeled types are, to name but a few, the Roadies, the Mountain bikers, the Trail bikers, the BMXers, the Brompton commuters, the Hipster single-speeds, the Everyday practitioners, and the Unnoticed. Then there are the different styles and personas, which come to match these different types in a typically stereotypical fashion. The Roadies are said to expel flashy arrogance as they speed by, hunched over, at pace. The Mountain and Trail bikers are never caught without a smile as they leave muddy traces in their wake. The BMXers simply scoot by on the way to skate parks in clothes considered unpractical by others, and the Brompton commuters commute, usually to a train station. The Hipsters act cool on rusty bikes desperately in need of a service, and the Everyday practitioner wobbles by, never in a hurry. The Unnoticed? Well, they go unnoticed.

It should be of little surprise that every cyclist has their own thoughts and feelings about where they fit into this broader notion of a cycling public; they make the purchases and adopt the style of that which they affiliate themselves with. Indeed, it should be even less of a surprise that every cyclist has their own thoughts and feelings about where others, peers or otherwise, slot into the complex cycling landscape. Judgements of self and others are forever being made on the road, within clubs, at the café or in the shop, and a cyclist's behaviour is often dictated by such judgements, on or off the bike.

I offer this introduction as a way to introduce Barbara, a cyclist who could slot into at least three of the above stereotypes. Her practices distort the conventions set out above. She owns three bikes, all of which offer a different persona on the road. She rides a City bike to work, a Road bike for training and a Mountain bike for off-road adventures. These choices are clearly not the product of a bicycle-induced identity crisis, but rather a show of Barbara's broader interests in cycling cultures.

With that in mind it would be unfair to deny her particular interest in Road Cycling, of which she is especially passionate. Indeed, without discussing her broader

interests in cycling it would certainly appear that Barbara sits firmly in the centre of the Roadies camp, judging by the style she appropriates on the Saturday morning club run. She looks the part, cycling with good grace, an efficient posture and peddle stroke, the kind of technical clothing that wouldn't be misplaced on the Tour de France and on a colourful Colnago bike which screams 'classy chassis'. The Roadie type regularly applauds all of these attributes. Her persona is however, anything but arrogant or flashy. She expels none of the elitism commonly associated with road cyclists, and almost always offers valuable contributions to any queries that I may have. On a number of occasions she explicitly stated her interest in, and continued support of the project.

Although a busy, and by her own reckoning a fairly successful interior architect by day, Barbara is often dismissive of her daily role, and eager to return to the subject of cycling; her real passion. Having grown up in Holland, a country with notoriety for the practice across all levels, Barbara fits undeniably into the model so often presented to us Brits. This is made most clear, when at our first meeting on a damp Thursday morning in March, she's obviously and openly still morning the loss of her 'best' bike, which was recently stolen after a break in at her home. Cyclists have a particularly special attachment to their bikes - some would call it a material love - and this is certainly the case with Barbara. The body-machine, come tool for transport, vehicle of embodiment, symbol of cultural practice and divine material object create strong human-material bonds, the likes of which are often seen, overheard and written about in the world of cycling. When Barbara said she really did love that bike, I couldn't help but believe her.

There is no denying Barbara's love for the sport, although I would call it a lifestyle. It purposely filters its way through many aspects of her life, intentionally so. It is firmly embedded in her everyday behaviour - through commuting to work, training at the weekends, to keeping abreast of developments in professional cycling in the evenings - and also in her social life, in which most of her friends are cyclists, and all but one of her recent holidays have had a cycling focus. A recent break from work, for instance, was spent at a 'training camp' in Tenerife, and an upcoming 600km endurance sportive in Norway is something she's especially looking forward to this summer (2015). She acknowledges how strange it may seem to an outsider - to take this 'strange practice' so close to one's heart - but she's also confidently unabashed by it. Barbara clearly goes that extra mile to fulfil her passion.

Having spent time with Barbara throughout the months of winter and early spring, it was little surprise to find that she was training for events she had planned for the summer. Winter and spring are traditionally the time for training in road cycling, with

summer being the season for racing, sportive and endurance events. Barbara had a number of events planned for the summer, the most prominent being the ride across Norway. As she retold the arduous training plan to me, week after week, I couldn't help but feel exhausted sat there listening to it. Training really did mean training, to the extent that a successful week could be characterised by a combination of the X number of miles ridden, an incrementally decreasing resting heart rate, a 90-100 RPM average cadence and nutrition plan full of complex carbohydrates.

Bound up in this plan and perhaps laying claim to the organisation of this plan, is Barbara's Garmin 810 GPS enabled cycle computer. In a similar tethering to that of the smartphone and person seen elsewhere, Barbara's Garmin is never too far from one of her bikes, for which she has the appropriate mounts for all three. The device and accompanying software acts to collect, store, analyse and present data relevant to Barbara's cycling practices; something which has become invaluable to her training regimes. In other circles, Barbara might be labelled a 'quantified selfer', for she is keen to analyse her daily practices based on the quantifiable data that computational devices, such as her Garmin, produce. She is a true believer that the data will help her improve, and I'm inclined to believe her, considering how much time and money successful sports teams pump into collecting and analysing quantifiable data for purposes of efficient performance. What's more, it *is* working for Barbara. She can see, and feel, incremental gains each week by working with the data being produced. When effort and outcome are measured by machine and data, as they are in the world of sport, it's difficult to argue with 'the numbers don't lie' approach, particularly when I can see how pleased Barbara is with her progress.

Sitting at the centre and arguably running the 'cockpit' of her bike, the Garmin converges seamlessly with the human-machine that is Barbara and her bike. The importance of the Garmin in this unfolding assemblage is clear to see in practice. It is often consulted, studied, tapped, wiped and swiped before, during and after rides - certainly it receives more obvious attention than the remainder of the assemblage, save for a few exploratory glances at her 'rear mech' after some stubborn gear changes. She explains these frequent engagements as necessary, for the small screen doesn't allow for all the data that she wishes to see be shown at one time. She is swiping through different 'pages' to reveal different aspects of her ride; from a page which displays her cadence, speed, time, distance and heart rate, to other pages, which display the profile of the terrain, climbing pace, split times and navigation information. With each ride, her interest in these data is subject to change, depending on the particular training she has

planned for that day.

Providing a distinctly different kind of data is the navigational information displayed on the Garmin, which Barbara uses regularly on training rides, and indeed throughout the events she attends. As noted, Barbara is a fan of endurance events and in order to train efficiently for such events one must put in regular 'long rides' (up to 80% of the total distance of these events in the weeks leading up to them). Not content with simply doing laps of a small circuit or even repeating a few different circuits on rotation, Barbara uses the navigation features on her Garmin and accompanying software to plan a wide range of different routes that she can use for training purposes. Doing so eliminates the sense of repetition she would feel doing the same thing over and over again.

At their most simple, these features are used to limit the boredom of long solo training rides. Whilst Barbara does ride with others semi-regularly, it's sometimes difficult for her to convince others of the benefits of such arduous training rides, particularly if they don't share her persuasion for endurance events. Moreover, and crucially for Barbara, following these routes gives her a safe and legitimate excuse to access areas of the country which she would never normally visit; something she is particularly enjoys about the process. Rather than closing off her world, as has been suggested elsewhere, the Garmin's navigational features have opened up her world to new cycling experiences and possibilities. Often heard elsewhere, she finds the map evocative of new places yet to be visited, yet to be experienced. They provide an invitation and a means to explore.

That said, this 'opening up of the world' requires some effort from Barbara, and there's plenty of metaphoric legwork needed before the actual legwork can begin. This is usually done sat at home on the sofa. The process by which Barbara creates and updates routes using the various softwares and websites available is something that can be extremely fiddly, frustrating, and time consuming. We frequently discussed the pros and cons of .GPX files, storage capacities, the limits of Garmin's Connect software and the advantages of Strava and OSM route planning. Each platform offers some advantage over the other and each has its own specific environment that takes time to master. And then there is the task of getting it on the device; a case of plugging in, updating firmware's and freeing up the space needed. All in all, route planning is 'a fine art' says Barbara, 'not as easy as you might think'. And like an artist, it has taken her a while to hone her craft. After a number of years practicing, she is now quite capable, and has many routes (or courses as they're known on the Garmin software) stored on her home

computer, which she can upload, put into rotation, edit, and share with others on the club's online forum.

Proper planning does prevent poor performance. This is as true with cycle route planning as it is with any other route planning. However, this is not to say that proper planning *always* translates smoothly into practice. There is a disjuncture in how we see the world at the planning stages, via the map, and how we experience the world in practice. My rides with Barbara have proven this to be the case on a couple of occasions, whereby we are forced to avoid the one-way roads which we are suggested to take on the digital map or sent the wrong way over new road layouts yet to be updated on the map. At first there is frustration with having to slow down, find a suitable place to turn and head back the way we came. Then there is the not so simple task of re-adjusting the route, which must be done manually rather than automatically. The Garmin has a habit of beeping incessantly at these times, feeling the need to let it be audibly known that you've gone the wrong way multiple times. Only necessary once, possibly twice, this soon becomes mildly annoying as we quickly try to shut it up by cycling quickly back onto the designated route. It is at these times that I feel like we are being told what to do, by these machines attached to our handlebars.

Barbara is perhaps more obedient than me when it comes to obeying the devices' dictation. Indeed, it could be said that she actively wants to obey the media, for it is in doing so that she will improve her performance as a cyclist. It, as an entity in the assemblage is actively disciplining her body, much like the bike itself. She is very restraint and I often want to just speed ahead because I feel like it, but she maintains her plan, which includes not exceeding the heart rate, average cadence and speed that she had planned and programmed into the device for that particular day. Following the guidance of the Garmin, she says, is proven to improve her performance and as self-imposed rule she won't stray too far from what the data is suggesting she do. This includes the navigation information which she follows as a precaution for not getting lost, and as a record for how long she has left to ride on any particular training route. Knowing this plays a huge role in determining the efforts she puts in, to the food and drink she takes on board. To have this information displayed has been invaluable to Barbara, and once again shows the degree to which the device has folded itself within her personal cycling assemblage.

The Garmin clearly improves cycling for Barbara. It is employed not as necessary to her cycling practices, but as extremely welcome, offering her new experiences both on and off the bike. Yes, she has her frustrations and problems, but these won't

persuade her to stop using it. Simply put, it has become an invaluable component in the make up of her sense of place on the bike.

2.2 Dennis - London black cab driver

Considering Dennis's day job - a London black cab driver - he's a remarkably calm man. He drives the cab so smoothly, without any hesitation that at times I wonder what all the fuss is about. London's roads have a bad reputation (I've experienced them) but this was not evident as I sat comfortably on the back seat. Throughout all three of our meetings together, two of which are at rush hour, we seemingly glide through London's road network with little sign of trouble, all the while Dennis is chatting to me with intermittent eyes in the rear view mirror and on the road. Not once does Dennis lose his cool, which perhaps speaks well to his thirty years of experience of being a cabbie. He is in total control and at times a sight to behold, citing one such incident when he barely raised an eyebrow at the prospect of being slammed by blue van clearly exceeding both the speed limit and any sense of the Highway Code.

Dennis is a great driver. He is also a great talker, which fulfills perhaps two of the most common cabbie clichés. Talking is synonyms with driving for black cab drivers in my experience, and Dennis is no exception. Much of his day is spent doing both simultaneously, which he admits to being a perk of the job. This makes for a great interview on all three occasions and we chat continuously throughout our sessions as he drives me from place to place.

Dennis and digital technology

Dennis is clearly very interested in the affects that digital technologies are having on both his day-to-day practices as a taxi driver, and the taxi industry as a whole. He is well aware of the changes these technologies have had and is not shy about sharing his opinions. Generally speaking he is optimistic and keen to embrace new technologies where he sees that there are advantages.[31] That said he is extraordinary cautious about not falling for just another popular fad and is therefore almost always reluctant to make the investment into any new digital technology; he needs to be sure that they will be worthwhile in the long term. This dichotomy does cause Dennis some issues, which it

[31] He certainly doesn't have the negative attitudes toward new technologies that I have come across elsewhere in this industry. For instance when asking a taxi driver in Southampton about the multiple screens he had on display his response was, 'What? All this crap. That's what I call them. I've got four and they're mostly crap.'

must be noted he is not overly concerned about - again reflecting his calm demeanor. For instance, he is keen to install a cashless payment system into his cab but has spent such a long time thinking through whether it's a worthwhile investment that he feels he has now been left behind by early adopters across the taxi network, which can now accept both cash and card payments.

For the time being he is happy with his iPhone, which sits in its bracket attached to the windscreen, rarely ever touched throughout our discussions. It is an old model, which perhaps reflects his resistance to rapid change. Again, he is unconcerned, noting that it works well enough for him.[32]

GPS devices in London

As expected he doesn't use his phone for GPS navigation; he's completed 'the knowledge' and therefore has no need for it, he says. The only times where he would use his phone's mapping capabilities is if a customer needed picking up or dropping off at new buildings, to navigate the growing number of one-way systems being put in place throughout London or to make drop offs outside of London. His lack of a need for GPS navigation is clearly evident in the way that he drives me to my destinations. He knows London's road network inside out, which is what you would expect from a black cab driver.

Take him out of London and it's another story however. London is unique for Dennis: the result of thirty years in business. He says that if you take him anywhere else and either ask him to drive or navigate on foot, he'll be completely lost within no time. When picking up fares that request drop offs outside of London, he admits that it isn't long before he's using his phone as a GPS like everybody else. Moreover, when he's abroad he notes how often he's completely reliant upon either asking people for directions, using his smartphone's GPS ('because you have to. Just like everybody else, you know.') or his wife, who he says is much better at navigating new places than he is. He comments that he'll be the one pulling over every five minutes in a panic to check he's going the right way. He gives the example of driving from Paris to Mont Saint-Michel a few summers ago and explains how stressful the journey became. The road signs and systems of Paris proved to be a nightmare for Dennis, and because the maps

[32] My reaction to this perhaps says something about digital devices as material objects which we are inclined to replace regularly. Digital devices in particular appear to have obsolescence built into them by the culture(s) that use them.

were unfamiliar they became useless. Only after few hours did he find himself on the right track, thanks to the help of a petrol station cashier.

The expectation that a black cab driver wouldn't need to use a GPS device became a recurring topic of our discussions, and we explored what that meant in relation to being cabbie in London, and how the media and general public perceived cabbies. Perception came up a lot with Dennis, and across many topics that included the socio-cultural value of black cabs, the economics of black cabs and the politics of black cab drivers. We discussed the value of black cabs and their drivers in terms of social and cultural symbols of national heritage, safety and security, status and trust, but also as functioning sources of spatial knowledge to which people came to with the expectation that they knew London's roads like no other. It was this thread that lead back to the reasons why GPS devices were not used by black cab drivers. Dennis explained that customers had a certain amount of trust in him to know where he was going without the needs for any GPS. 'The knowledge' is as iconic as the vehicle itself, he said. He noted that a customer would have every right to question him if he simply typed in their destination to a GPS. He asserts that that is partly why people are paying him - because they trust that he'll be able to take them anywhere they want to go by the most efficient means. The customer gives responsibility for navigating London to the driver; that is the terms of sale. As a result they also hand over all the associated issues of driving and navigation. Dennis notes how customers can treat the back of cabs like bubbles - once they get in they needn't worry about what's going on outside because that's now the responsibility of the driver.

'The knowledge' and Spatial Memory

The knowledge is the test that all black-cab drivers must take before they can buy or rent their own Hackney Carriage and operate as a certified driver. We talked about what it was, what it used to be and what it is now. Dennis completed his some thirty years ago and so could only really talk about his experience, rather than the processes involved today.

Looking directly at me through the rear view mirror, he credits 'the knowledge' as the single hardest thing he's done to date. And I believe him. He recalls the four years in which it took him to complete it, working Monday to Friday, 9-5, in an office before spending the evenings driving around London on the back of an old beat-up scooter with giant sections of the A-Z attached to the front with a makeshift clipboard, trying to memorise any of the possible 250-260 routes the examiners may have

questioned him on.[33] He recalls the test itself as a series of one on one verbal examinations whereby he was asked to recount and describe routes that were given to him by the examiner. Although the knowledge gave him a strong foundation to the road network of London, giving him a complex framework of known routes he admits that London's roads are changing all the time and he is constantly having to update his own knowledge. 'You never stop learning' he says, 'because the streets are always changing.'

This comment led to the admission that he still refers regularly to the A-Z map of London, both the paper version which was shoved down the side of his door and the digital version accessed via his smartphone. Incidentally he now prefers the digital version because it is constantly being updated, which saves him time and money in terms of going out and buying a new paper copy with every new edition that comes out.

Dennis explains that the knowledge of 'the knowledge' is all in his head, and that the A-Z is only there to jog his memory, which he says is done by the way it creates shapes of London's road network. When I said lets go to South Kensington, he recalls how he thought of Hyde Park as a shape, using the A-Z like an index of shapes, to determine which route he will take. He says that, in his mind, he divides London up into large and small shapes which represent different road networks, significant places and the relative traffic depending on time of day. These are then matched together to form a semi-structured (always subject to change) route almost immediately after a customer has given a destination. To get to South Kensington he recalls thinking of a large shape - Hyde Park - and then of nearby smaller shapes - the rectangle of museums and university buildings down Exhibition Road - and then made a kind of personalised navigational map for our journey.[34] He thinks the shapes are made unique by him and isn't sure whether other drivers think in the same way, suggesting that this was just the way he learnt 'the knowledge'.[35] In effect, he simplifies the sprawl on London's road networks in a way that he finds most useful.

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[33] Today's 'knowledge' test involves an assessment on approximately 320 routes and is expected to be learnt between 2-4 years.

[34] This is fascinating. Dennis works similarly to software that creates personalised journeys based on the information that it knows. Every journey is a product of a series of calculations based upon context - perhaps not only by Dennis, but also the passenger and the current driving environment of London. The assemblage of navigation in full effect.

[35] Interestingly there is no one way to learn 'the knowledge'. It is often done in isolation and therefore left open to the individual.

He also simplifies London for the customer, particularly when they give him a general destination, 'like Vauxhall', he says. 'I'll always take them to the station, or close to it', assuming that is where they'll want to go. And in the majority of cases it is. He notes how customers have a spatial idea of London which is based around its tube stations and often use them as points of reference when navigating the city. Dennis explains how he learnt to appreciate this within his first few years on the job, suggesting that customers expect to be dropped off at or near stations when they give only a general destination.

Sat-Nav and Uber

By our final meeting one major point of discussion had been neglected, and intentionally so. Uber was clearly something that needed discussing in detail.[36] I was initially hesitant but also curious to bring this up due to the controversy it had caused within the pages of the popular press. Dennis clearly had a lot to say on the matter, and was glad I brought it up citing it as an important issue. He began by suggesting that in London, Uber is often criticised for undercutting black cabs and driving down business. He refers to the recent grid-lock protests in central London initiated by thousands of black cab drivers in June and September 2014 as examples of the repercussions of this. It is clearly flaring the tempers of the industry. In his opinion however, Uber has not made any significant difference to the industry - apart from the stirring of hot air. Indeed, in his everyday practices it has been nothing more than a talking point. His takings were up on last year, which is contrary to the perceived belief that Uber is poaching black cab customers. He speculates that the general perception amongst the public is that Uber offers a cheaper service than a black cab. He admits that in some respects this is true - for instance at peak times of the day - but he also adds that this should certainly not be a generalisation, for at the majority of times the black cab will

[36] Uber is a location based media service which is 'seamlessly connecting riders to drivers through our apps… We make cities more accessible, opening up more possibilities for riders and more business for drivers' (Uber, 2015). In everyday terms the service allows for anyone with a certified car and a clean driving licence (these specifics of these factors vary from country to country) to become part of a network of drivers that use Uber's smartphone mapping and GPS interface for the purposes of taxi hire, private car hire and lift share services. Customers with the Uber application can then request drivers within this network based on a ratings system, type of car and approximate cost of fare. Although not limited to these purposes (see company website) the taxi hire element is currently the focus of the company and also the focus of the media attention it receives.

always offer a cheaper service.[37] It is this belief amongst both the public and other cab drivers which Dennis aligns with the media coverage and subsequent protests.

That said it is Dennis's view that the Uber model is damaging to mini cab services, for their drivers often rely upon sat-nav devices in the same way that Uber drivers do. We return to the subject of what 'the knowledge' means, and in this respect decide it means being in a different league to systems such as Uber's, who are reliant on digital devices. There are black cab drivers and then there are minicab and Uber drivers. Black cabs don't rely on their phones for navigation in the same way that other taxi services do.

This leads to a discussion about this reliance that Uber drivers have on their phones for their jobs, and what happens when the technology fails them. Without the spatial knowledge that 'the knowledge' provides, Dennis suggests that such drivers are rendered useless for navigational purposes. He recalls one instance whereby an Uber driver had to ask him (yes - Dennis has used Uber once or twice) for directions because his phone lost signal. Moreover, he noted that the driver in question was not at all shy in asking him for help.[38]

In discussing the Uber system in relation to the spatial knowledge of London Dennis explains that the Uber system cannot be equatable to 'the knowledge' for the simple reason that cab journeys are often highly dynamic events. Someone with 'the knowledge' can react to this dynamism in ways that are far quicker and more complex than the Uber system. He gives the example of when a customer, seemingly on their way home, gets a call in the back of a taxi that changes the outcome of their evening. That customer may now want to go pick up friends, go to the cash machine, drop off some shopping at home and then ask to be taken to a restaurant. Dennis suggests that a black cab driver has the ability to react to these changes in a far more efficient way than trying to explain to an Uber driver that the one trip that was booked has now become a series of multiple events that require the input of multiple destinations on their smartphone app. Moreover, Dennis is often asked by customers for suggestions on

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[37] The Uber pricing structure operates on a supply and demand system which is unlike that of a black cab. A black cab has three fare tariffs: 1. Mon-Fri 06:00-20:00, 2. Mon-Fri, Sat-Sun 20:00-22:00 and 3. Every night 22:00-06:00. Each tariff incurs a higher fare than the last. In the Uber system the pricing structure operate on a surge system dictated by the number of customers wanting a taxi at any one time. The more customers wanting a taxi in a specific area, the higher the price will be. It is then up to the customer whether to choose to request the taxi or not.

[38] From interviews with Uber drivers there is clearly a difference in what the two types of taxi service mean for both the driver and customer. An Uber driver is not the same taxi driver as a black cab taxi driver. For one, the expectation that a black cab driver won't get lost are much greater than those put on Uber drivers.

places to go - points of interest, places to eat etc - which is knowledge built up over a number of years, and knowledge that he can apply on a case by case basis. He suggests that an Uber driver just wouldn't be able to compete in the same way. He notes how Uber drivers are rarely in it for the long term and therefore different standards should apply.

Overall Dennis is unconcerned about the affects of Uber on the black cab market. However, towards the end of our third meeting he dwells for a moment on the possible dangers of a system which he sees as an unregulated mess. He notes the dangers of unmarked cars, which Uber cars often are (baring a tiny sticker on the windshield) and gives a couple of examples of when the unmarked taxis have been used for criminal activity. Moreover, he fears for the future of a system that grows everyday but has no set regulations put in place by the government. To give a company carte blanche in a city with long tradition in taxi regulation - both the black cab and mini cab sectors - is equatable to unfair competition in his eyes.

2.3 Hannah – The professional cartographer

Cartography is in abundance as we walk through the offices at Ordnance Survey's (O.S) headquarters. This is hardly a surprise considering its long standing and highly regarded role as 'Britain's Mapping Agency'. However, it is perhaps the 'science' and 'technology' rather than the 'art' behind the practice of drawing maps that is most evidently on display. The ubiquity of screens, all loaded up with one kind of map or another, alongside the big, complicated and technical looking computers and printing machines dotted around the open-plan office can't help but hide the artistic nuances of the term. As one might expect, map making at O.S has not escaped the grasp of the digital world, but instead embraced it. The aesthetic effect being that the office appeared as a lab for the creative *production* of maps rather than creative *artistry* of map makers.

It was only when observing and talking with Hannah whilst she worked that the artistic elements of cartography at the O.S properly became clear. Watching her demonstrate a typical task amongst the technical apparatus that overwhelms her desk, plainly showed where the creativity in the edits she was making to the map were. If art is the creative expression produced through a craft then Hannah's cartographic inscriptions are indeed art, albeit produced within the regulated parameters of the agencies procedures. Whilst she must pass on her work to a quality assurance team, she is given licence to freely make edits on the map in question, based on her own judgements. She has likely earned this freedom having worked at O.S for over ten years, after migrating for the job from Poland with a degree in cartographic design. Moreover, as she is one of only a few left working on the 'old' system of computer and graphics pad, the drawing element of her work still abides to the traditional form of paper and pen (or in this case, computer mouse), giving her the artistic aesthetic one might commonly associate with cartographers often depicted in history.

The links with the 'old' don't stop there either. Working this old system (a system that will be replaced entirely with something completely digital in the coming years) requires Hannah to print out paper copies of map tiles to work on, which are then annotated and used in conjunction with computer software to produce inscriptions on the map. An interesting trend with Hannah was this blurring of the so-called old and new: the paper and the digital. Throughout my time with Hannah, it was difficult to see her attempt any task requiring a map that did not incorporate both a digital and paper

element. As well as at work, she would use both paper and digital maps for walking and cycling practices, usually consulting the digital first before printing it on paper - making further annotations wherever necessary - ready to take out with her. Whilst driving she would always use the Sat-Nav on her phone in conjunction with the crumpled paper maps shoved down the side of the passenger's door. Whilst the two might not be used simultaneously, both are put to use at different stages of a task. They complement one another. Indeed, as Natale (2016) has noted, in everyday practice the use of 'old' and 'new' media technologies is seldom clearly defined. So much so, he suggests, that we should not label media as either 'old' or 'new', for all technologies are in constant states of transition. In the case of Hannah's practices, the 'old' and 'new' were undoubtedly constituted by messy and context dependent uses of digital and analogue mapping technologies.

Despite the obvious overlaps in paper and digital maps, Hannah notes on many occasions that her preference will always be for the paper version. She see's the benefits in the digital, but this doesn't sway her from the material she's always favoured. Rather than the romantic affinity to the materiality of paper maps often seen with those harvesting anti-digital sentiments, Hannah offers simple practicalities for this affection. She is troubled by maps that could disappear with battery life or loose signal if they stray too far from an antenna. She is also distrustful of the digital, citing the well known instances of Sat-Nav's directing drivers into fields far from their intended destinations. Such distrust extends far beyond maps, for Hannah is wary of the role that the digital, and specifically the Internet, now plays in our lives. She voices concerns about Internet privacy and the lack of creative ownership of information distributed via the medium, citing the difficulties she has as an amateur photographer in keeping track of *where* her uploaded images end up online.

Bound up in her reliance on paper maps is Hannah's need to know where she is at all times. Being lost is amongst her worst nightmares, she says. Hence, why, like other participants, she stops every few kilometres to check her position on the map whilst we are cycling. If there's a chance that a digital map will get her lost then she's likely to favour the paper version. She recalls one such story when she was driving with friends on their way to Amsterdam from the UK. When the Sat-Nav had failed to load the maps once they had crossed the Channel into France, Hannah immediately panicked and had to pull over and reach for the paper atlas, purposefully relegating the device for the remainder of the trip. Simply put, she places more trust in the paper map, and her own abilities to locate herself using it. She has excellent map reading skills (clearly

demonstrated throughout our cycling trip) and has little problem in using maps that don't depict the precise locations of their user(s).

Hannah claims to have been taught good map reading skills from an early age, when her father would give her the task of navigating the family on long car journeys, and give her permission to wonder alone around cities in her teenage years. That said, it's difficult to ignore how her map reading skills may have been improved by her time at the O.S, which perhaps gives reason to why Hannah is used to a certain standard of map; one deemed accurate and true, such as the artefacts produced by O.S. Indeed all the paper maps I encountered with Hannah were those produced by O.S. And she certainly knows them well, which was evident on a number of occasions whereby she would point out symbols on the map used to assist us: such as underpasses to traverse motorways, or stiles that prevented us cycling down certain lanes. This knowledge of the map's code and style was impressive.

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It was only when observing and talking with Hannah outside of work, during her leisure time, that the artistry of a cartographer-as-person became apparent. She is without doubt a creative user of maps, but perhaps we all are; map reading is after all a creative act. She created us a enjoyable cycle route through the New Forest using A3 maps tiles she had printed out from work, something which she does regularly considering it a perk of the job. This route wasn't annotated on the map, but rather malleable in Hannah's mind from the start. She had a general sense of where we were going (we were heading to the Rufus Stone at Brook some 15 miles from her house in Southampton) but she didn't want to be forced into a specific route, knowing that things (or other ways) along the road may spark her adventurous spirit and persuade her to adjust the route.

Expanding on this, Hannah comments on how she's always creating routes or whole holidays, either for herself or friends that ask. Part of the process is generating guidelines rather than specific instructions. There's nothing worse, she says, than being expected to follow a strict itinerary whilst on holiday. That said, the tour guide qualification picked up in her youth clearly hasn't escaped her and she could be described as a travel agent in some cases. A travel agent that uses a map as her starting point to build activities on to. Amongst her friends and family she is regarded as the map expert and is expected to act accordingly when asked to plan routes for them. The trouble being that she's also extremely adventurous and often gets blamed for trying to pack too much into one day, thus contradicting her earlier point about packed holiday itineraries. Perhaps the reason is that her expectations of what can be done in a day

exceed those of others. I noticed this myself when after a few hours of cycling without any food she kept up with the mysteries enticing her towards the next corner rather than guiding us back to civilisation, and the café.

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Hannah's experiences of place(s) are likely bound up in assemblages which foreground map threads more than others, perhaps unsurprisingly because of her day job. However, it could also be because of her deep and long standing affection for maps and what they can do practically, as well as her upbringing. Maps aren't prevalent in all areas of her life - clearly not - but they do appear in those assemblages that dictate certain mobilities and socialites in her everyday life, and as seen elsewhere, the artefacts act amongst the foundational elements for a huge variety of daily practices.

If there are artistic nuances to be found in the scientific practices of cartography then Hannah has certainly found them in her passion for maps, both in her day job and throughout her life. She is a creative user and an artistic inscriber of maps. She doesn't fit the bill of the conventional cartographer, and she's proud of that, noting particularly her positionality as a woman interested in maps. Outside of the O.S, amongst friends and family and what she's taken from popular culture, Hannah claims to be 'not normal' in this respect, something I suspect she's quietly pleased about.

2.4 Harry – A self-confessed 'techy'

Harry is well aware of just how much he uses his iPhone on a day-to-day basis. It takes little in the way of questioning for him to admit this, although he is somewhat ashamed of this fact. A day without his phone is clearly not a matter of life or death, but he does cite the anxiety he feels on the occasions when it is not with him. This was made all the more clear by the fact that Harry turned up to this interview, knowing full well that it would be about his use of his smartphone and indeed require him to demonstrate its use, with a well worn portable charger. Within minutes it was put into action in an effort to revitalise a dead battery from the days heavy use.

A self confessed 'techy', Harry has little problem elaborating on the types of everyday practices that are accompanied, or facilitated by his iPhone. It would be fair to say that his iPhone plays a role of varying significance in much of his everyday life. Used for social interaction, economic transactions, entertainment, navigation, exploration or simply a platform on which to kill some down time. It is perhaps the most common physical mediator between Harry and much of what he does in the world. Certainly it is the most visible from my position across the table, with the device between us.

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Whilst the discussion's focus is on his use of spatial media technologies in everyday life, it quickly becomes clear that these uses are rarely isolated, and thus must be understood in the milieu of practices that Harry uses his phone for. The phone is not simply a social device, entertainment portal or navigational device, but rather a device that incorporates much of the multi-faceted practices of everyday life. An example Harry gives does well to highlight this folding of practices. He notes the need to regularly 'check' on his current location whilst navigating a route with the use of the Google Maps application. This quick locational 'check' is however bound up in his desire to 'check' upon other facets of the phone's functionality, and indeed other facets of his life. He may for instance wish to 'check' to see if he has any text messages to read, social media posts to respond to, football scores to view or calendar alerts to attend to, all the while keeping an eye on his location as his makes his way from A to B.

This folding of practices becomes interesting when examining Harry's general experience of using spatial media technologies. Rarely, if ever, is using these

applications in isolation from the use of others. This multiplicity of use does not end there. In addition to this folding between applications, there also exists a folding within applications. Harry notes the ability of one application in particular, Friend Finder, to use locational information to find friends and present their locations on a digital map. This is clearly a spatial media technology that incorporates far more than just the locational, for it has a strong social element. Whilst regularly side-lined, on the basis that such an application might cause issues between friends over privacy of location, Harry has used the app on a number of occasions, either 'just for fun' or for the practical purpose of finding friends in unknown areas where time was a considerable factor. The imagination needn't stretch too far to see some undesirable social consequences to this app, and it wasn't long before we joked about overly inquisitive partners wanting frequent updates on the locations of their significant others.

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Harry notes how location, navigation and way finding have always been interesting to him. We talk for a while about the excitement of being somewhere unfamiliar and having to try to figure out where to go and in what direction. We discuss the anxieties that accompany this. The not knowing, the sheer number choices available, questions of left or right, down that road or *that* road. He also comments on his interest of the tools used to facilitate these notions and practices; most prominently the map, and most specifically the digital maps that he uses on his iPhone. He is no stranger to a map. In fact he's quite well accustomed to them, particularly now that he finds himself working within a company that specialises in the use of GIS for large-scale engineering and infrastructure projects.

Harry is an avid user of digital maps, and has been for some time. He began using paper O.S. maps a child, as a tool for orienteering. He developed a fascination with the map and has ever since been an earlier adopter of the various incarnations of digital maps over the years. He is now well accustomed to their varying degrees of use and knows many of the nuances that exist between rival applications, the most notable example being the differences between Google Maps and Apple Maps. He cites the aesthetic superiority of Apple Maps, using what he calls the 'correct' colours for the differences in road type as an example,[39] and expresses his desire to use the application as his primary map. He is however, confined by its limited use, and at times undesirable and frustrating functionality. Google Maps, he responds, simply offers much more in the way of usability on an everyday basis. He points to how navigation in particular is

[39] Incidentally the 'correct' colours are those used by the Ordnance Survey

made easy by the application. The blue locational dot, the number of routes presented, the accuracy of GPS position, the integrated real-time public transport options and numerous scale options make up just some of the features that persuade Harry to use this digital map over others.

Harry feels comfortable in the environment that Google Maps offers, and with this comfort comes trust. In certain respects, Harry trusts Google Maps implicitly, particularly when using it for navigation purposes. He admits the software is perhaps relied on a little too much, especially in places that he is familiar with. In instances of navigation where time is short, he may view the map countless times in order to update him on his progress, making adjustments to the route as Google Maps' sees fit.

With a fondness for its accuracy and ease of use, Harry relies on the Google Maps application. And why not he comments, for it makes getting from A to B much easier than trawling the travel information elsewhere. He notes how he no longer has to make separate searches for each individual segment of a journey. No longer does he have to check one app for the bus, one for the tube, and one for the train. Google Maps gives him all that information in one search.

Another app that gives Harry a multitude of travel information in one search is the City Mapper application. This app includes much of the information provided by Google Maps integrated public transport services, and yet Harry will use both interchangeably in navigational practices. He notes how City Mapper will give him more nuanced information than Google Maps, such as how much a journey will cost, how many calories he will burn if he were to walk it, and even the driest routes from A to B if it happens to be raining at the time. Despite this, Harry makes it clear that City Mapper is only used alongside rather in place of Google Maps. For one, City Mapper only works in a limited number of places (London being one of them) and also does not provide a number of other key functions such as Google Street View and a navigational arrow, both used frequently by Harry in day-to-day life.

It is clear that a primary reason for Harry's use of Google Maps is its sheer convenience. It has everything he needs in one place and it's simple to use, so why bother learning something new, he suggests. He admits however, looking slightly ashamed with himself, that this one search for all function has had detrimental effects on his local knowledge. Having lived in London for over a year, Harry still struggles with his local geography of central London, an area he has visited countless times over the past twelve months. When questioned about this, asking how this was possible, he

once again referred to just how much the use of this technology had been folded into everyday life.

Another factor that accounts for Harry's frequent use is *time*. For Harry, this software reduces the time he has to think about getting from A to B, freeing up more time to think about the more pressing issues of what to do once at B. A few quick looks at the map and he can spend more time thinking through other concerns. This is contrary to the belief that frequent users of smartphones spend no time looking around because they are forever otherwise engaged on their phones. Harry may 'check' his phone frequently but these instances are brief, leaving much time for Harry to 'look around'. He makes the point that he would probably spend more time looking down at a paper maps, than he would a digital map whilst navigating.

This led well into a further discussion about how digital maps were used in touristic practices, as an exploratory tool. Harry immediately made a distinction between when he would use the technology and when he did not want to use the technology. As a tourist, there is nothing more that Harry likes than getting lost in unfamiliar places. He notes the excitement of being out of one's depth and not knowing what's round the next corner. He seemingly yearns for it as the prospect of being a tourist once again is exhibited in the smile across his face. When asked about his use of Google Maps at these moments he is quick to make clear that in using this technology, his experience would be less fulfilling or even ruined by the knowledge he knows the application could provide him with. When asked whether he would use Google Maps at all as a tourist, he again made a distinction between the types of touristic practices that would require its use. This distinction is somewhat contradictory, for on the one hand, Harry (as a tourist) would not use the software for exploration practices but he would have no problem using its *places of interest* tab to look up local bars restaurants. Both are practices of exploration, but for Harry, one is seemingly more so.

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In addition to navigational practices, which clearly dominate Harry's use of spatial media technologies, he may occasionally use them for other purposes. He points to Runtastic as an example. The application is designed to record spatial and 'health' data for running exercises. Not only does this application show the user *where* their run has taken them, on a map not dissimilar to Google Maps, but it also records how long it has taken, at what speed, and how many calories it has supposedly burnt. This information is then made available to compare with previous runs, or even the exercise of others through its sharing capabilities. Whilst Harry may take a look at where his run has taken

him, Runtastic is more likely to be used as a record for work done. A record of fitness including any gains or any losses.

Despite the acclaimed health benefits of this application, Harry recalls how this can be both beneficial *and* detrimental to his health. When running on a regular basis the app is encouraging as it pushes you to go quicker by comparing like for like with previous sessions. However, at those times when life's chores are at their most pressing, running will take a back seat and fitness will begin to lag. This then erupts into a spiral where Harry can no longer compete with his previous times and therefore runs even less before a new wave of enthusiasm hits. At times such as this, Harry will simply not use the app when running so that there is nothing to compare with. He notes his frustration with this app, suggesting that it is too pervasive and often annoying to deal with. He doesn't always want something recording his everyday practices in such a way.

2.5 Sue and Jen – Friday night lights

Location is key to policing any area. From where I was sat it was everything. It is vital to know *where* incidents have taken place, *where* the suspect(s) is and *where* the officers and resources are in relation to one another. Policing Walthamstow is no different. Our shift is awash with radio calls, computer messages and in-car chat relating to the location(s) of various incidents, known people, potential suspects, other squad cars, officers and even the takeaway we had planned to pick up dinner from. The evening revolves around these locations as we drive between them, stop at them, talk about them, and search for them. And yet, this fundamental aspect of policing is barely recognised by Sue and Jen, my uniformed chaperones for the evening, for whom it must be said were must more interested in discussing Jen's recent 'Hen Do' in Brighton than they were about discussing the importance of location in policing. It's a job like any other, and rarely is it taken too seriously by anyone I meet. Location, and perhaps not place per se, are so bound up in what these officers do on a daily basis that it no longer registers as a key aspect of the job. It was only when explaining my presence to another officer as he accompanied us back to the station at the end of our shift that it was noted that 'location is the most important thing'.

The lack of interest in location is perhaps unsurprising considering all the other layers of the job that are piled onto location, leaving it unnoticed. Location may be the base layer of policing but it is often the *what* and the *who* which take precedence in the thinking behind any incident. What concerns Sue and Jen as they make their way to an incident under the blight blues and muffled sirens is not where they are going, but rather what and who they will encounter when they get there. Location is taken as a priori to any incident. Accepting a radio call to attend to a group of known individuals – 'always up to trouble' - the talk is not of where we are heading but of what these men have done this time. These men are regular minor offenders. Moreover, they are a constant nuisance and a drain on resources, which could almost certainly be put to better use elsewhere. Sure enough, after the excitement of speeding through town, past red lights and on the wrong side of the road, we arrive on a residential street only to be greeted a group of intoxicated men making a mockery of two paramedics diligently attending to one of their associates who'd gone that extra mile in inebriating himself. With some no-nonsense straight talking the incident is diffused and we return to the car with no arrests

made. ‘A waste of time’ says Sue. It had only just gone 5pm and already Friday night had begun.

Computer policing

Idly browsing the streets for criminal activity turns out to be a rarity on my shift. This, I am told, is the prerogative of the walking officer and not the role of the ‘interceptor’ vehicle in which I found myself. All of the policing I witnessed was directed by the array of machines on display in the car and tethered to the vests of the officers. Alongside personal radios, two in-car radios (one for the local area and one for the whole of the London) and a number plate scanner was the Mobile Data Terminal (MDT), a tablet like device covering the cars’ central console. Adopted by the MET from the early 2000s this computer is central to the assemblage of a police car in 21st century Britain. Indeed, it could be said that it is central to the assemblage of how policing is done in the 21st century. From as early as the briefing, to all the incidents we attended to, policing was talked about in terms of numbers and data. Getting the numbers, however problematic this seemed, was vital to a night’s success. And the MDT, combined with the National Police Computer (NPC) was central in generating, storing and gathering the data needed to police by the numbers.

In order to begin a shift, Jen (on the passengers side) ’sign’s in’ the pair with a personal identification number (PIN). After a brief ‘loading’ period and a ‘come on’ from Jen, the computer displays a task-like menu of incidents which need attending to. These tend to be minor incidents - such as house calls and incident follow-ups - rather than emergencies. An ‘operation’ is selected from the task list and Jen is presented with a number of choices, ranging from an option to access real-time updates about the case, to background information held by the (NPC) about the individuals involved, to a route planner that can be used to find the location in question. In other cases the MDT, combined with the number plate scanner, literally alerts Sue and Jen to potential suspects as loud beeps indicate that the system has flagged up a near-by vehicle under suspicion. If a plate has been flagged by the system, officers are expected to pull the vehicle in question over to investigate.

It certainly all looks very exciting, but the way in which it’s bashed about, talked to and interacted with suggests to me that it has limited appeal, at least for Sue and Jen. Whilst not denying that this coming together of various information’s into one hub is extremely helpful - for instance when needing immediate access to suspect or vehicle information in order to make the correct arrest - there’s little doubt that Sue and Jen find

it to be a cumbersome piece of kit that can at times get in-between them and 'real police work'. I am further assured by their lack of interest in computers later, when they both complain at length about how much office work (meaning using a computer, usually for word processing statements and police records) they are now required to do. Having lived through the technological transformation of the force, Sue is quick to point out how much more work they got done ten years ago, 'before all this stuff' - pointing to the desktop computers on display - 'was introduced'. Indeed, from my limited time with the police it does seem like they have openly welcomed a system whereby computers and mobile devices are integral to the running of their operations, regardless of how officers on the ground feel about this.

Whilst these insights highlight the undeniable meshing of police practices and digital technology, it's only when an emergency response is requested that things take a really fascinating turn, for it shows the flexibility within this meshing. In the case of an emergency response, there is often little time to fiddle around with the computer and so a call is sent out via the radio. At particularly busy times there is a number of inaudible (to me at least) calls all happening at once over all four of the radio's present. It's impressive just to sit and watch Sue and Jen pick out their 'call sign' from all the chatter and fuzz that's going on. The MDT plays no immediately obvious role in the policing assemblage at these times; it is simply there, left untouched as operations are directed by officers and desk operators via the airwaves. The incident type and location will be given and officers closest-by are expected to take those calls if they are able. This method is used to get officers to a scene as quickly as possible. It is the police presence which matters at first, Jen says, after which more specialised police can attend when they are able. It is only once an emergency response has been quelled, either by making an arrest or simply dealing with the problem that the MDT re-enters the policing assemblage as a tool used to obtain the real-time and background information needed to move the situation forward.

A particularly interesting angle on the computer policing is the ways in which the officers themselves find their own actions recorded and analysed as data. All actions on the MDT and indeed of the squad car are logged by central policing servers. This includes officers MDT search histories, data inputs, location histories and a record of the vehicles technical history. Sue makes note of how limiting this can be, suggesting that these always over-head pressures can prevent efficient policing such as when needing to drive fast through residential streets in order to catch a suspect. This can only be done at times deemed safe by police management, which in reality means not in the

mornings or evenings. Sue is expected to drop a chase at these times or face a reprimand from her superior officers once they have seen the speed data analysis of the car. Although it now goes unnoticed, it is little surprise that Sue finds this tracking of her actions 'creepy' when I question her about it. Examples such as this highlight the often hidden mirroring of assemblages involving digital components, showing that whilst they come-together and are experienced by the immediate user, they are can also be viewed, analysed and experienced remotely by others - in this case the data analysts which regularly keep track of the data which the police themselves produce.

Navigation

The route planner on the MDT is almost never used on my shift, save for a couple of times when we are forced outside of our designated area by an incident requiring assistance in a nearby borough, or when Jen is explaining how useless it can be. Indeed, on first arriving for the shift, the greeting officer, Billy, notes that *everyone* finds the MDT navigation useless, and that officers are much more likely to resort to the maps on their phones, which are more reliable and easy to use. On our way to a break-in at a local primary school, Jen shows me how it works and these negative points are clearly made when we arrive at our destination only to be met by a barrier blocking the road up to the school. The barrier was not shown on the digital map that Jen was demonstrating on and so we were forced out of the car and made to jog the remaining meters. Whilst this turned out to be a false alarm, it's obvious how much of a hindrance this could have been during a chase scenario.

On a number of occasions, both Sue and Jen affirm the unhelpful mix of police and GPS technology. They complain that it doesn't work quickly enough or that it's too much of a nuisance to use when driving. It's not positioned like most Sat-Nav devices and unhelpfully forces the driver to look down and away from the road to seek instruction. It actually works better if Jen verbally gives Sue the directions whilst she concentrates on driving. Moreover, Sue has policed Walthamstow for twenty years and hardly needs a map to navigate her patch any longer. Like Dennis (the taxi driver) she needs little instruction on moving efficiently around a road network that she knows inside out; something which is easily observed as we travel between many locations in the borough, often nipping down residential streets which are clearly only through-roads for people in the know. Furthermore, there is an aspect of thinking ahead that was similarly present with Dennis. In order to get somewhere by the most efficient means, and especially in the case of an emergency call, Sue is judging her route based on all

manner of factors ranging from the time of day, to the immediate road layout, to the types of street she is rapidly passing through. In addition, she is talking the case through with Jen, who's looking up details on the MDT. It's multitasking at the highest level and a joy to watch.

2.6 Lauren – Digital transitions

Sitting comfortably, Lauren opened the lime green case of her iPad and took her glasses off in order to see things more clearly. At times she finds the icons and text on the screen a little too small to read properly. Incidentally, this is one of the reasons she does not own a smartphone. This does not however restrict her use of the iPad any more so. Since unexpectedly gifted one after retirement from teaching last year she has barely gone a day without using it in one way or another.

Having used a desktop and laptop computer sparingly for her work as a teacher, the iPad has since offered her something different to engage with, particularly because it has no association with work. She recalls never really getting to grips with computers, either at home or at work despite owning one for a number of years. Citing a lack of interest in ever learning how to use these devices to their full capabilities, Lauren only ever used them for basic data entry, word processing and Internet browsing.

With this is mind it came as little surprise that Lauren rarely uses the Internet for anything more than the most basic of browsing. She may send a few emails a week, buy a few travel tickets throughout the year and use a search engine from time to time, but it would be a push to suggest that she is an avid Internet user. She cites a lack of trust and adequate knowledge as two of the reasons why she seldom engages with 'online' activity. The folding of the material and the virtual is happening to a lesser extent for Lauren, and thus the 'online'/'offline' dichotomy remains to a certain degree. That said, she has clearly made a distinction between what she knew of the Internet on her old computer as opposed to what it is on her iPad, as if it were something vastly different. The iPad, she says, gives her an interactive and more accessible way to do things that she previously found quite difficult on a computer, which might account for this distinction. The iPad then, has brought a simplicity to the Internet.

Having owned a tablet device for just over a year, it's clear that Lauren still finds the experience of using the device a novelty, as if it were a new toy. This makes for an engaging interview, for she is always keen to explain her use by showing me how she performs her regular practices. We go through each of the applications installed on the tablet and she comments on her use of each. Her most commonly used were for speaking with friends and family through messaging and video calling, organising her calendar, browsing of the Internet (limited), browsing national trust properties, catching

up on TV shows and practicing driving theory tests in advance of her upcoming test proper.

Lauren does engage with spatial media technologies on her iPad, although admittedly this is not very often. What's interesting here is the novel ways in which she uses them on the device. On the one hand she uses maps as 2D graphic representations, and on the other she experiments with maps in their dynamic digital form.

When asked to describe some instances of her map use, she recalled searching Google for the location in France that her daughter was staying in. She said she did this partly out of interest and partly for reassurance as to where she was. Knowing approximately where her daughter was gave her piece of mind that she was reachable if something untoward were to happen. Moving on, I asked her to repeat this action for me, which revealed that the map she was searching for was found under the image search results rather than the map search results. This map was a 2D image and could not be manipulated in the same way as dynamic digital maps. In this way, Lauren was using the map in its traditional sense.

In another example, she showed me how she used the National Trust app to find a property on a map, and then how the app presented directions to it through the external use of Apple Maps. She then recalled how great it was to be able to use the 3D functionality within the app to navigate herself along the route as she remembered locations and landmarks along the way. In addition, she found the simple zoom functionality meant she no longer had to physically bring the device up to her eye line to see its graphics clearly, thus illustrating a corporeal benefit to spatial media technology. Using this type of map clearly facilitated a novel engagement with digital technology that she found fun, useful and beneficial to her visual practices. Moreover, she mentioned using this information in advance of her friend driving them both to the property, and suggested that it came in handy as a reassuring mental guide whilst driving.

Having used the devices default mapping application, Apple Maps, previously via the National Trust app I then asked Lauren to show me how she might use the app by giving her the task of 'exploring New York' on the map. Immediately she was confused as how to do so. Commenting on how different it was to before, she tapped the screen a few times in what appeared to be a trial and error method before she asked for some assistance. Clearly she had no detailed knowledge of how the app worked, and incidentally cited this as one of the reasons she only uses apps that someone else (usually her son) has taught her to use. If they appear too complicated they will simply

not be used. Once I had explained how the app might be used she began to understand its possibilities, and it wasn't long before she had got to grips with the basic functions. Although admitting to not knowing quite what she was meant to be doing, having only ever used maps as a tool to get from A to B, she saw the potential in the dynamic map. As already noted, Lauren considers the iPad an accessible form of computer, and this action backed this up. It's unlikely that a few basic instructions would have proved so effective when asking Lauren to use a desktop or laptop based mapping application.

In practice

Lauren's everyday practices are more often than not, bound to the well-known geographies of her local area. Her day-to-day movements follow well-trodden routes and usually consist of going between a few selected places that she has known for many years. The rare occasions when she does travel to unfamiliar locations are few and far between; mostly as a result of going on holiday or on the occasional day out. Some of the reasons behind this, she says, are because she lives in a relatively isolated village without the ability to drive, and until recently used to work in a school just a few minutes walk from her house. That said, since retiring last year, her everyday practices are beginning to encompass wider and unfamiliar geographies due to the various activities she is has become involved with, the least of which has been learning to drive.

The local knowledge(s) that Lauren had accumulated came to play key roles in the following practical activity. The plan was for Lauren and I to walk to Steventon, a small village situated approximately 4 miles North of East Hendred (where she lives), following a route that she didn't know. She could use any technology, analog or digital in order to get us there and back, and was asked to explain her reasons of choice and verbally describe her navigation decisions along the way.

With Lauren's knowledge of the area, there was an immediate problem in trying to find a route that she had not taken at some point or another over the thirty years she had been living in the village. With no paper map of the local area, Lauren opted to use the basic skills I had just taught her in order to use her iPad as a map. She brought up a map of the village easily enough (despite the problems just a short while ago), zoomed in and pointed to where we were and made a note of our destination. As the digital map she was using had no indication of footpaths, she noted that deciding which route to take was based on her memories of where she knew footpath sign postings to be in relation to the roads that she knew. She then decided on a vague route based upon her memory of a path that she thought might take us in the general direction of our

destination. In the end then, the digital map simply became a visual image of the village, used to prompt memories on known and unknown ways out of the village rather than as a specific technical tool for navigation.

With the iPad left at her house, Lauren showed little signs of worry as we headed off down the road in search of a path she thought might be there. Whilst discussing how she had accumulated her knowledge of the local footpaths, to which she responded with numerous examples of when she had used them over the years, two friends of hers pulled up in a car and wound down the windows to say hello. Unbeknown to me at the time, this incidence came to have a significant effect on the rest of the walk.

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Susan and David, friends of Lauren for over twenty years, inquired as to what we were doing and where we were heading. We explained, and with much interest from the two friends then began a process whereby Lauren's knowledge of our route became a product of multiple sources.

Susan is an avid walker and had travelled many of the area's footpaths many times. Once Lauren had declared that we were heading in the direction of a footpath that she wasn't familiar with, or even 100% sure was there, Susan was quick to give her some guidance. She confirmed to Lauren that the path she was thinking of was indeed real, and then provided some features to look out for in order to ensure that we were heading in the right direction. 'Left at the barn' and 'across the bridge' were just two pointers.

David then became interested and asked how it was that we were heading somewhere we didn't know without a map. Lauren explained that we had taken a brief look on the iPad before leaving her house, but was perhaps a little unsure about to answer his question. Having none of this, David insisted that we borrow one of his (many maps). So we got into their car, drove to their house and whilst David was in the shed searching for the appropriate map, Susan took a pen and paper and reiterated her points about what we should look out for along the way. Baring in mind that it was only a 4-mile walk, there was certainly a lot to look out for judging by the list provided.

When David returned with a neatly folded map, Susan took a back seat and went to make some tea, stating that she didn't know how to read maps. Lauren then unfolded the map and with David's help, re-plotted the route we were to take with the footpaths clearly indicated on the map. Later Lauren commented on this difference between paper and digital maps, suggesting that for walkers digital maps must be 'useless half the time'.

Now loaded with an assemblage of information; that from her own memories, that from the digital map, that from the paper map (which she took with her) and that which was given to her by a friend, we were on our way again. When asked how all this information had now come to inform our walk, Lauren said that she was much more reassured about exactly where she was going, less worried about getting lost and more aware of how long it was going to take. If anything, this instance highlights how the long-term residencies of people in a place can be intertwined with the everyday practices of navigation.

Lauren also brought up my position as somebody with some*thing* that was reassuring to her, even before we bumped into Susan and David. She mentioned that she knew I had a smartphone in my pocket, which could be used in case we got lost. Interestingly, and unbeknown to her at the time, I knew that I had run out of credit for the month and so in terms of a mapping device to get us out of trouble it would have been fairly useless. This highlights something about how digital devices are perceived by others. Contrary to Lauren's thinking at the time, smartphones are not always on nor always connected. Technical and economic factors can play a considerable role in their use, and in this case they certainly played a part in forming Lauren's cultural understanding of the smartphone.

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Once out of the village, the footpath took us across a vast crop field and it wasn't long before we discussed how isolated we had become all of a sudden. From this, Lauren commented on how she would not have done this walk if it were not for me being there. A), because as a woman she was worried about her safety in isolated areas and B), because she would have no real need to usually come this far. On her own, she said, the map would become even more useful as a tool to reassure herself she wasn't far from safety.

As we approached the barn that Susan mentioned it became clear that the advice to turn left was very useful, and when crossed checked on the map, turned out to save us at least another ten minutes walk across the field under the midday sun. Moreover, as we reached another checkpoint on Susan's list, the stile gate, we knew that we had followed her intended path correctly. Again Lauren found this reassuring, and commented that 'it can't be much further now'.

As we approached Steventon, Lauren did something I was not expecting at the upcoming fork in the path. She stopped, looked at the map and determined that we take a left along a path leading away from the settlement in full view to the right. We

followed the path to the left for about five minutes before she realised that the right path would have been a far better option. We then retraced our steps and began again down the correct path. When asked about her reliance on the map at this stage, she suggested that it had been correct so far and so she had given it the benefit of the doubt, despite as I did, seeing houses in full view up ahead.

Similarly, when trying to find our way back from Steventon, a footpath drawn to the right of a Post Office (P.O) on the map had seemingly moved. It took asking a local for directions to the Post Office to realise that it was now in a completely different location. Later we discovered that the map was some twenty years out of date and that the footpaths had changed course considerably, which raises interesting points about maps in time and how they affect navigational practices. Throughout this exercise it became clear that neither the digital nor the paper map could be entirely trusted. Perhaps the most reliable information came from Susan's local information about way points.

As we made our way back to East Hendred, Lauren found pathways that she recognised and so from using the assemblage of different information given to her earlier, she was back to what she knew from memory. The map, which incidentally had been out the whole time to be referred to when needed, was folded away and put in her bag.

2.7 Robert – The amateur cartographer

Computer programmer by day, Robert is well acquainted with the kind of technical language that's banded about at Open Street Map (OSM) meet-ups. As the acronyms of API, HTML, JavaScript and SQL are fed into conversation around the pub table it's clear that he understands what's being said; unlike me who is always the one asking the simple questions trying to gauge exactly what we're talking about. Luckily Robert is patient and willing to explain things to me in layman's terms, for which I'm grateful, despite some of the looks thrown my way by long term regulars.[40] Such willingness to educate and inform has been evident ever since Robert and I first mapped together. Indeed, it could be said that although from the outside this small group of dedicated mappers may appear like a group of quintessential computer enthusiasts - all white male's in ill-fitting clothing packing any number of electronic devices at any one time (the stereotype most are familiar with), they are on the whole, a very welcoming bunch happy to help wherever they can.

The liberal nature of OSM (a so-called democratic mapping platform) tends to attract people interested in encouraging others to get involved however they can, hence why these events are run. If there's one point that the group want made it's that the project is open to all. Despite being well aware of the academic discourse which suggests otherwise, they abide by this general rule of the thumb and are happy to discuss the democratic values of the project when asked. Robert makes this point on several occasions whilst I question him with enquiries into how map data is verified and plotted onto the online 'live' map. He suggests that some system of verification by people with the know-how and experience is necessary to prevent technical inaccuracies. Furthermore, he notes that it can always be disputed if it's deemed unfair by the contributor. In one instance he goes on to discuss how there are often challenges to the verification processes of undetermined map objects. Giving temporary buildings as an example he describes how people can argue for weeks over the proper symbol for a temporary building. I can understand why: a building site is not the same as a pop-up

[40] A programmer's elitism does exist within this group but rarely is it on display. Like any group, and I refer to the cyclists and geocachers as other examples within my fieldwork, there will always be those that take what they do, and how they do it, a little more seriously than the majority of the group. It is inevitable that a newbie to any group may be cast a few untoward glances when trying to grasp the basics of the culture.

shop, and yet both are regularly classified and marked on the map as 'temporary buildings' until someone has the foresight to appeal against this inscription. Such a process gives the democratic argument some credible clout, I'd suggest. Indeed, having spent considerable time with Robert and this group, I'm inclined to suggest that although there are clearly a number of reasons why people sign up for this pursuit, the democratic ideal is what lies at the heart of why people wish to contribute. This group wants to make a difference by providing an alternative to the corporate maps of Google and alike, and for this reason I'm pleased to attend. For this group there is another way to map and use maps in the world's in which they live, and they have all made a proactive choice in taking this ideal and putting it into practice.

That said, Robert and many of the group do acknowledge the limitations of bottom-up mapping at this scale, and have gone on to admit (without any noticeable shame) that corporate alternatives do offer considerable value in certain contexts. Robert, for instance, will always rely on Google Maps for in-car navigation, for he feels it gives him a more accurate reading of estimated journey times and road congestion than OSM alternatives.

Parsons Green Event

Meeting outside a pub in Parsons Green was nothing unusual. It's a familiar setting to begin an OSM mapping event. These events are almost always held at a central London location with access to a nearby tube station, and importantly for the group, a pub serving good beer and food. It's a balmy summer evening (these events don't happen in the colder months) and four of us have turned up, with another few promising to meet us back at the pub in an hour or so. These events have a strong social element - i.e. drinks in the pub after some mapping - which can encourage people to forgo the mapping part of the evening if they cannot make it in time. Similarly, attendees may already be mapping somewhere else and arrange to meet the group in the pub afterwards.

Harry, wearing a t-shirt embossed with an OSM logo hands out a paper map of the areas we are going to map that evening. This simple act of wearing a t-shirt does give the impression that he is the one in charge, and we all look to him for further instruction as a result. Without intention, this does unsettle the often re-called flat hierarchy of OSM. It is nonetheless overlooked by the group as we each pick an area marked on the sheet, and after a brief chat about the pro's and cons of mapping with a new tablet being used by Derrick, we get on our way. Still not entirely confident with

mapping on my own, I accompany Robert in an attempt to add further detail to OSM in a quiet corner of Parson's Green.

It's immediately clear that Robert is a far more experienced OSM mapper than myself, which is not surprising given his semi-veteran status.[41] He see's the world in a completely different way, noticing things that I simply stroll by, unaware of their potential to be added to the map. His attention to detail is quite remarkable. For instance in one small stretch of street he notices a one-way sign, a parking meter, a dental surgery and post box that could all be added to the current map, which as it stands only shows road names and a few building outlines. It's similar to a treasure hunt, with Robert always searching for that next clue or piece of the puzzle. The satisfaction that Robert has towards the gamification element of OSM mapping is clear to see here. He's certainly enjoying himself.[42]

When asked what he's looking out for specifically, he suggests a two-tier system. Firstly his aim is to add the 'fundamentals' missing from the map. These are objects commonly associated with the most basic maps: the buildings, roads, rail lines and waterways. Following that (and it's only the buildings which need documenting in our case for the roads, railways and waterways have already been mapped) he says that it's all down to his personal preference at the time. This evening he's taken a particular interest in mapping the parking meters of the primarily residential area. There's no one telling anyone what to map, he says, so people just map things based on what's not already on the map as well as features which appeal to them as features which they think should be included on the map. As Robert goes on to explain, once a mapper has their 'style' as he puts it, it's difficult for these features not to jump out at them in other areas of their lives. In his early days of mapping, some 6 years ago, he took to mapping all the post boxes in his home town simply because no one had mapped them yet, and it would continue to be a useful resource for himself to use. Since these initial mappings a post box has never been regarded in the same way again; it has become a mappable symbol as well as somewhere to post letters.

Now that he lives in London, Robert has less of a chance to map completely new features - London being fairly well mapped - but he does keep his eye out for obvious gaps in the 'live' map when he uses OSM in other contexts of daily life. Going abroad

[41] Robert has been mapping on OSM since 2007. He has made 234 edits to date (July 2015).

[42] In a very similar way to the geocaching group, the map is only background to the activity at hand. It is part of the assemblage that makes up the place of mapping, but the enjoyment comes from the combination of other entities in the assemblage. Most notably at this stage, it is the hunting out of features that have potential to be included on the map and recording them, which holds his interest. No doubt the warm summer's evening also plays a role.

is a good opportunity to map the features he has an interest in. He notes how a local and a tourist would want different points on the map, and so when he is away he makes an effort to map things such as a restaurant he enjoyed or a heritage site that other visitors might be interested in.

As OSM is now over ten years in the making, the levels of detail some have gone to is quite astonishing. Robert discusses the example of parking restriction signs. Some have made it their business to lay claim to mapping these signs and their details. Some parts of Germany, he recalls, are mapped to incredible levels of detail.

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After twenty minutes or so I finally get my eye in and begin to spot things that Robert does not. I see bike racks, cycle lanes and zebra crossings and point them out to an unaware Robert, who responds positively and keenly makes a note by photographing the features with a GPS enabled camera.[43] Incidentally, this is how Robert (and by proxy me on this occasion) does his mapping; with his GPS enabled camera and a back up GPS tracker on his smartphone. Once an area is picked out for mapping on a paper map. Robert then systematically traverses the streets in that area and photographs the features he notices along the way. The GPS tagged photos are then plotted onto a map using software on his computer at home. From here he edits the OSM map, adding the details he's recorded to the locations given by the GPS coordinates. Once the edits are made they are sent for verification before going 'live' on the OSM website. In addition to this the GPS tracker on his phone is used as a back up of where he has been, so in the fairly likely scenario (it happened twice in an hour of mapping) of the camera's GPS going down he'll still be able to match a photo with a location using the 'time stamps' from the photo's in combination with the 'time stamps' and GPS coordinates recorded on his phone. This method highlights just one way of mapping for OSM.[44] Moreover, it highlights the material and immaterial assemblages of digital and non-digital objects

[43] Clearly what's being mapped is based on our individual experiences of the city. Our own personalities and interests are reflected in our cartographic practices, which no doubt has repercussions on what kind of map is being produced for all over uses to see. This is the less democratic side of OSM, and the problems associated with academic critiques of it. See Haklay (2013).

[44] In the same mapping session three different methods were used. Harry opted to map using an application on his smartphone which allowed him to edit OSM on the go, and Derrick used his new tablet device to do something similar whilst also making notes on a paper map. The pro's and con's of each method was dissected in great detail in discussions in the pub afterward, with using the paper map to mark edits to be uploaded at a later date considered the most effective way of mapping. The assemblage on cartographic inscription is a dynamic one which includes the personal preferences of the mapper in question, which is the opposite of how commercial mapping companies 'do' their mapping with a tried and tested formulaic system.

that come together to inform cartographic inscription. In addition, it could be said that much of the actual practice of capturing map features - the searching, finding and recording - is done without the use of any map, save for the occasional glance at the paper map to ensure we are sticking within our designated area. Rather than being a memetic activity - a capturing of mimicry - it is an *actual* activity which is then later inscribed into mimicry on the OSM's 'live' map. The inscription itself then, is a post-production exercise done at home on a computer, often days or weeks after data capture. Robert admits that longer lag times can often affect what makes it onto the map. For example if there is a photo for which he can't remember the reason for taking it will simply be discarded, which has the potential for some features to not make it onto the map.

Perhaps unsurprisingly, Roberts use of his camera every few steps gets some peculiar glances from passers by. Although never crossing the line to ask what we're doing, they do seem curious, and at times baffled, and I can see why when we spend twenty minutes or so photographing every door we come to on one residential street. At these moments Robert wants people to engage with him, for he wants to tell them about the OSM project. Clearly he feels no shame, where others might, in doing what he does. Moreover, and in anticipation of this, Robert packs few leaflets[45] in his bag before each trip should anyone want to know more about the project, despite no one ever questioning him.

After an hour or so mapping the relatively small area given we return to the pub from where we started and meet with the others who've already got their drinks and sat down. Once the initial hello's and brief catch-up chats with regulars has commenced, talk folds intermittently between mapping stories, technical discussions (of which I have little to contribute) and everyday chatter. This is no board room meeting for the future of OSM, but rather a time for people with a shared interest to catch-up, have a few drinks and spend an evening in good company. For most, this is a chance to rewind after work: it's a hobby in which participants may come and go as they please, putting in as little or as much time as they can or want to.

[45] A selection of which can be found here http://wiki.openstreetmap.org/wiki/Flyers_and_posters

2.8 Tom – Navigating walking and driving places

From general observation you could be forgiven for thinking that Tom has a personality best described as disinterested. And in many ways you'd be right. He appears to glide through our activities without much fuss or concern, as if simply ticking them off a giant list of life chores. He's a friend of a friend, and clearly views our first meeting as a favour to them and not to me.

In stark contrast, another word that could be used to describe Tom is frenetic. Once engaged in a subject, he flicks through thoughts and actions with such great speed that I want to tell him to slow down. Tom's got a lot to say, and at times it seems that even he hasn't got the time to say it. What does make it out amongst the frantic pace is often veiled in such a complex manner that I'm forced to ask him to explain his responses more clearly.

This certainly made for an interesting first meeting considering that moments after I had asked a question it seemed as if he was already thinking about answers for the next, with barely any concern for my original inquiry. He appeared uninterested in my questions at times, and there were a number of instances when I questioned the validity of my queries, and even the study itself. After that first meeting I had little to report in terms of how he uses digital technology, or maps, in daily life. All I had was a brief set of notes and some general observations about how Tom uses his phone; sporadically and fleetingly. Much like his demeanour I thought.

The more time I spend with Tom, the more these initial impressions continue to wear away. After our third meeting he was no longer the person I thought him to be. More frenetic and less concerned than most, yes, but not as startling as before. He became more open, interested and engaged with the research topic. What became most obvious after our third meeting was the fact that Tom is an incredibly intelligent but similarly frustrated person. He doesn't like the trivial or even the mildly taxing (admitting so himself), and therefore simply does not bother with them. In an ideal world, Tom would only talk about the really important questions of life. The kind of deeply philosophical and ontological questions that most people simply ignore because of their sheer complexity. That, and football, with which he has an ironic and yet similarly deep interest in getting to the bottom of in terms of tactics and strategy. As such, I could now see why enquiries into how he might use his phone in everyday life

might not be the challenge he desired when agreeing to sign up for this research.

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Apart from some very basic information about how Tom uses his smartphone in everyday life - to check football scores, facts, news and use mapping services for navigational purposes or finding the nearest McDonalds - he had very little to say about his use of these technologies. Only that yes, they were used, and used fairly regularly. It struck me that he had very little interest in why he used them. He simply used them because they were available to him. Because they were practical, like a toolset in which he could pick and choose from. And much like a maker of things, it became apparent that the finished article or desired outcome was what interested him, and not the tools themselves. For instance, a text was used to speak with friends, the Internet browser was used to search for or confirm enquires, and the mapping applications were used to get him to where he wanted to go.

In an attempt to prise more information, I led a discussion on how these tools were used in the context of his use of spatial media. Taking his use of Google Maps as an example, he explained that the software was most often used to navigate himself in unknown areas. He expressed much more concern with getting to where he wanted to go rather than in the intricacies behind how he was advised to do so by the software. This point is an important one for I assume that many people feel the same way about navigation practices. I suspect that *how* one is directed through space is subsumed by the practice of actually traversing that space. In this way, the map is black-boxed object, an objective tool used for a means rather than an object of enquiry for its user. For Tom, this was certainly the case when it came to traversing unknown space. Moreover, from what follows, it is clear to see that the same could be said whether he is using a digital map on his phone, a 'you are here' street map or even landmarks used to find his way.

Walking

In a task not too dissimilar to previous participants, Tom and I agreed to test his navigational skills in two distinct ways on two separate routes to and from Store Street to Farringdon Station, a distance of approximately 1.5 miles. Tom was not familiar with either route, or indeed much of the area between the two points. For the first leg, Tom was asked to navigate his way without using his smartphone, and on the return journey he was encouraged to adopt his 'normal' way of navigating when in areas of the city he was not familiar with. It should be noted that Tom is not a resident of London but does regularly visit the city for work and leisure purposes.

Store Street -> Farringdon station

Tom was in a hurry to get this over and done with. I could tell. He asked twice about how long this might take. Forty-five minutes at the most I said. His restless body language called for instruction rather than introduction to the task, and so we got right to it with little preamble. Take us to Farringdon Station without using your phone, I said.

He immediately headed towards a Barclays Bike rack and then to its accompanying 'you are here' map where he studied the graphic for a moment or two and then headed confidently off in what I could tell was the right direction.

For the first ten minutes there was little sign that he was lost or ensure of where we were heading. Clearly he was familiar with this area, and he said so himself. This showed in his relaxed demeanour and comments about how easy navigation was when you knew where you were. 'When you know where you're going, you can just walk you know…and not think about it.' This was interesting when thinking about how familiar space is perceived. For Tom, his confidence suggests that familiar space is perceived as finished space, and therefore a space which can, and in this case had, been learnt and mastered to a degree where he didn't even have to think about how he passed through it.

After leaving the areas which he knew around Bloomsbury he made verbal the fact that he was looking for another 'you are here' map to check where he was going. This being central London, a cycle docking station and its accompanying map didn't take too long to find. We didn't even stray far from the path. Tom took a moment to check he was on the right track and off we went again, heading east down High Holborn. What is interesting about the maps that accompany all of TFL's cycling docks is that they give your location indicated by an arrow and the words 'you are here', which is surprisingly similar to the way that mobile mapping applications work: they show you a blue dot which indicates where you are. By using maps in this way the user effectively skips the stage where they have to work out where they are on the map. It would seem that no longer does one have to be an orienteer in order to use a map for simple navigation exercises.

Knowing the general whereabouts of Farringdon station - to the east of Store Street - Tom had been looking out for landmarks which he knew to be in the east of London. These included the Gerkin, Natwest Tower and much of the financial district. From early on in the exercise these landmarks had been visible so the purpose of checking the 'you are here' maps, so Tom said, was just to make sure he was taking the most efficient route. He had known the general direction from the beginning and was

confident that even without checking the maps along the way he could have found the station eventually. This may be true but he still checked the maps at least twice more, taking more than a moment to study one of them at a particularly complicated interchange. This was the only time where he gave away any uncertainly he might have had. He spoke aloud a street name as he looked across the street, as if to question where it was, but before he had time to locate it, a passer-by interjected. 'Leather Lane? Nah mate. It's up there on the left.' Not used to this kind of public assistance on the busy streets of London, we both looked at each other, and then Tom to the man as if to offer a silent thanks, and then we crossed the road following his direction without saying a word.

Once we were within five minutes walk of Farringdon station Tom was visibly back in control, appearing to know exactly where he was going. So much so that he risked a shortcut at one point, only for it to backfire on him by a dead end. He shrugged it off and made the point that when not in a rush, navigation decisions like that were not a problem. Sometimes they worked out, and sometimes they did not was his point. If he was in a rush, he commented, then he would not be doing this without the assistance of his phone, particularly in areas he was unfamiliar with. Leading on from these points we discussed the role of context in navigation exercises, coming to the conclusion that context was everything in this regard. Navigation exercises always depend on the context in which they take place, and the context is dependent on an incalculable number of social and cultural factors. Tom for instance, suggested that the route of any walk he takes could be based on any number of things that he has seen, read, head or was currently thinking about.

Farringdon Station -> Store Street

Having reached Farringdon Station with relative ease, Tom was then asked to take us back to Store Street using a different a route based on how he normally navigated unknown parts of London on foot.

Immediately he reached for his phone and began pinching and typing on the screen.- Within a couple of minutes we were heading back west along parallel paths to those which had brought us to the station. Instead of using The City as a visible guideline, Tom began to use the Centre Point building as an indication of his general direction. He did use his phone, but only in the same manner to which he used the street maps: to check intermittently that he was taking the most efficient route. He had a couple of texts sent to him on the outbound journey so he took the opportunity to reply

to them while he checked the route. Navigating the return journey seemed fairly effortless, giving him the chance to engage with social activities on his mobile, and of course, talk to me about football tactics.

We got to talking about his everyday navigations in London and it soon became clear that this activity was a little far removed from his usual practices. When coming to London for work he would usually visit the same area every time, meaning that his phone was redundant in most instances because he knew very well how to get there and back to the station at which he uses to commute from home. When coming to London for leisure purposes, Tom always uses the tube and rarely walks any great distance to reach his destination save for any major transport disruption. He described the success to which he navigated that days exercise as something which was based on on-the-spot research rather than any significant knowledge of London's geography. It could be put down to the fact that he knows how to use 'you are here' maps, both on physical and digital displays.

Within twenty minutes we were back to where we began along Store Street. Tom thanked me for the exercise before I got a chance to. He said it was a good way for him to see bits of London that he hadn't seen before, and provided him with a challenge that he enjoyed. This was something that I hadn't expected an hour earlier when he turned up looking like he could not be bothered. We arranged to meet up again, and I suggested that we try a similar exercise in the car next time which he agreed would be a good idea.

Driving

Tom texted me a month or so later, suggesting that the day after might be a good opportunity to get the driving part of the research done. He needed to go somewhere he didn't know followed by somewhere he did, in order to first exchange something and then to collect something. I wanted to explore how he used his phone in the car for navigational purposes and so it seemed like too good an opportunity to miss.

The following morning, Tom picked me up at the station and after the usual exchanges we discussed how the exercise might work. It was quickly decided that all I wanted him to do was do what he would normally did, but explain the process as it unfolded, as if to unpack the assemblage in practice. My role was to pick up on points to discuss further and to generally observe his practices. Amongst and between this, there was of course other discussions far removed from the topic at hand. I'd known Tom a couple of months by this point and so our conversations were far less stilted than on previous occasions. Certainly he was more willing and interested to engage in the

research than he had been at the start.

Driving

The route to Feltham was relatively unknown for Tom, and so we sat stationary for a few minutes at the station while he typed our destination into Google Maps, his go-to mobile app for navigation. He noted that he would have normally done this at home before he left but for the purposes of meeting me he thought it best to wait and show me. I was grateful for it highlighted to me a major difference in the way that he used the app when compared to others in the study thus far. After inputting his destination he went to the settings menu and turned off the voice navigation option. He did this because he found it highly disturbing to the processes of driving.

Driving, for Tom, is a meditative exercise or sorts. He is aware of his actions but uses the practice as a way to switch off from almost everything else. A typical journey usually involves him turning the radio on and turning his brain off. Rather tentatively he tried to explain that the motions (and actual motion) of driving created pleasing rhythms in which he could relax and not think about the stresses of life and work. Whilst the action of checking his mobile was not seen to break these rhythms, the interjection of verbal directions was. The voice is 'distracting and annoying' he said. These insights highlight the sensory experience of kinaesthesia and how it can be affected by technology. Moreover, they do well to show how bodies and technologies can be incompatible in certain contexts. In this case, the technology of the car as a moving object created a pleasant kinaesthetic experience for Tom, and yet another technology - the voice navigation - was thought to disrupt or disturb this sensory experience. In effect, his sense of place in the car is broadly constitutive of technology in this context.

As an afterword to this point, Tom noted how less aware he was to his surroundings when driving when compared to walking. Driving with or without his phone, he said, had more of a 'tunnel vision' effect on movement that walking, which he attributed to the make-up of cars, roads, painted lines and general linear movement. This highlighted how certain technologies and actions can limit spatial awareness. More specifically it showed how the experience of driving is often one which is framed by the context in which it takes place, almost always behind a framing screen (the windscreen).

Just before we set off, Tom placed the phone in the central console of the car rather than on the inside windscreen as is common for many people. He commented that he no longer had a bracket that worked, and so was forced into using two plastic cards and the central console in an ad-hoc fashion to prop up his phone so that when he

glanced down at it, it was readable and easily accessible. He made it clear that using his phone in the car was very different to using it whilst walking. When walking, he said, two hands are always available, which is rarely the case when driving a car and therefore the options available were are also different. This speaks to the haptic sensibility of smartphone use, which often dictates that full and proper functionality is governed by hand gestures and visual aesthetics; something which is limited whilst driving.

After fifteen minutes or so it was obvious how much Tom relied on his phone to navigate himself in the car. At almost every junction, roundabout or lane change he would glance quickly down at the screen to check he was going to right way. Moreover, it was clear that it was not only the phone that was providing assistance. When approaching junctions for instance, a very clear process unfolded whereby he'd glance at the road sign on the left, then down at his phone, and then look up and adjust his driving accordingly whether it be slowing down, speeding up or changing lanes. In this manner, the digital technology is just one constitutive part of the whole assemblage of navigating and driving in the car. Other parts include the technology of the car, the road sign, other road users and individual judgement. When considered in this simple way, location based services are simply an additional component, which perhaps make the job simpler.

Approaching Feltham Tom made the point that locative media didn't always take you to the place you want to go. He had only typed 'Feltham' into the software and so it had directed us to where it thought the centre of Feltham was, which was at least a five minute drive to where he needed to be. He followed this by explaining that he could have typed in the exact address of his destination but had opted to 'see what would happen'. This then led to a discussion about how he sometimes plays games with what the software is trying to tell him. Tom doesn't like to be late, and this is reflected in some of these games. For instance, he will always try to beat the estimated time of arrival that the software generates, suggesting that 'everyone does it, surely!?' Tom reacts badly to people being late, openly stating that he'll give them the cold shoulder for at least the first five minutes after they arrive. Not wanting to be on the receiving end of this may well encourage him to arrive on time, and locative media used in this way may provide him the assistance he needs to ensure it will happen.

After a short stop in Feltham, we continued our journey towards Windsor where Tom had another errant to run. Once we were out of Feltham town centre, Tom stated he would know the way from there and therefore not use his phone for navigation any

longer. Instead, he would rely on knowledge collated from multiple previous trips. True to his word, there was little to report on this second leg simply because he knew the way. His phone, still in its place on the centre console, no longer operated as a navigational aid. The multi-functionality of smartphones provides so many uses that within a press of a button or a swipe of the screen they can change their purpose entirely.

However. As we were leaving Feltham there was considerable congestion, leaving us stuck in a jam lasting for about five minutes. Tom chuckled and made a passing comment about how this would not have happened if he were not colour blind. Tom had not mentioned this once throughout all of our time together and it became a fascinating, and fundamental insight into the way in which he uses locative media. He can see the differences between shades, making light and dark, and black and white colours easy to distinguish. Where he has an issue is the shades in-between; colours such as yellow and green. Road congestion on Google Maps is represented by green for no congestion, yellow for moderate congestion and red for heavy congestion. Essentially green and yellow appear the same to Tom and so he can't tell the difference between no congestion and moderate congestion. Red is darker and so he has less of problem judging heavy traffic. Reciting this after the fact, Tom said that as he approached this particular junction, he had glanced down at his phone and assumed that there was no congestion ahead because he had not seen a dark shade of colour. The yellow on the map indicating the moderate congestion is very similar to the yellow of main roads on Google Maps and so Tom had assumed that this route was clear of traffic, when in fact it was fairly busy.

Discussing this further, Tom made the point that this was not a problem when using digital maps for navigation when walking because walking congestion was never indicated on digital maps. This instance raised the question of visual cues on digital maps and how they favour those with near-perfect vision. With voice navigation turned off and his colour blindness, Toms use of digital maps for navigating in the car is somewhat limited as to how helpful it actually is. The technology is often promoted as being something convenient and easy to use, but from Tom's account it seems like he has to put in a lot of work himself, from continually looking down at his phone to check he's going the right way, to judging traffic based on a shade of colour. That said, Tom is a confident driver and rarely shows any signs that these tasks ruffle him whilst driving. Seemingly, they have just become part and parcel of his driving rhythms.

2.9 Tori – Knowing the world through paper maps

To describe Tori in one word would be difficult, but if pressed it would surely be *aware*. Aware of what she's doing, aware of where she's going, aware of where she's come from, and most importantly aware of what's going on around her. This last point is particularly central to the way she understands the world, or at least how she describes it to me. She is clearly a cynic of sorts; this much is clear, even from the limited number of hours we've spent together. But I don't hold this against her. Tori is often one to question her surroundings on critical terms, always the one to ask the obligatory 'why?' questions. It should come as little surprise then that this made for both a challenging and thoroughly engaging series of conversations.

Tori tends to things with a great attention to detail, which is an important point to make in the context of how she uses her smart phone in day to day life. As she talks me through her primary uses, of which there are not too many - making and receiving calls and texts, reading and sending emails, web browsing and a very limited use of digital maps for navigation - she is precise in letting me know that she has thought through (and has clear opinions on) the consequences of her digital actions. Although not paranoid, it seems, she worries about the sheer networked connectivity that these devices have and what it means to be 'always-on' in a city that is well known for its surveillance habits.

Tori clearly understands the broader social and cultural implications of using her phone and does not shy away from the uneasy juxtaposition that she finds herself in by opting to use one of these devices. As she mentions however, giving in to the draw of a device that is capable of so much was all too easy since ownership of one became the norm amongst her friends and colleagues. It became a case of having to have one in order to keep up in terms of both her social and work life.

Maps

Following a brief discussion about these broader issues, which we agree to come back to in the future, we begin talking more about her uses of maps in everyday life. Generally speaking Tori is distrustful of maps, which came as little surprise considering our earlier discussions and their underlying cynicism. She is a aware that maps *do work* in the world and it is exactly the nature of the work that is done which she is distrustful

of. In a way similar to that of a geographer, she questions the reasons why maps are made and what they are used for, examining their 'real world' impacts in terms of the way social and cultural information is spatially represented on maps. She gives the example of those maps found in her nearest Westfield shopping centre, suggesting that they favour corporate interests by taking her around the building in a manner which encourages her go past either the most amount of shops or the shops which she suspects are paying a premium for a prime location. 'Sometimes it's quicker to go out the exits and walk around building instead of following the map' she says.

It appears that this distrust is not limited to any sort of map, be it physical or digital, on the page or the screen. For instance her use of locative media is constantly in question in a similar manner.[46] She questions why Google Maps directs her one way and not the other, why TFL suggests one series of transport options over another, and why the maps she encounters do not indicate the most interesting shops she knows to be on her local high street. On this point she elaborates. Tori is concerned by the commercial interests of popular mapping applications, suggesting that many maps now favour only those businesses that can afford to pay the premium to be included on these representations. Moreover, she is skeptical of route planning service, giving the example of TFL's route planning service. She suggests that it takes unknowing travellers on routes that incur the most charges to their Oyster cards.

Being aware of the underlying interests of maps and locative media, Tori makes it her business to try to avoid the pitfalls she assumes she is being subjected to by using them. For instance, I note a sense of non-conformity when she outlines how she purposefully walks the 'incorrect' way around the shopping centre and when she doesn't follow the navigation instructions given to her by TFL and Google Maps.[47]

Getting lost

We continue to talk maps and I lead the conversation towards how Tori had used them in her daily life in London, which incidentally she admits to rarely ever leaving. This leads to some detailed conversation about how she moves around London, both when she first arrived over a decade ago and more recently.

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[46] Although Tori uses these services in a limited capacity, she does admit to having used a number of these, including the Google Maps application, Transport For London's (TFL) route planner and City Mapper. Her primary reason is for navigational purposes.

[47] These acts can be related to De Certeau's (1974) thesis, which explores notions of *strategies* and *tactics* in relation to powerful interests and the individual freedoms of mobility.

Tori is a walker of the explorative kind. She is confident in her abilities; this much is clear from her explanations. She can move around known and unknown cities, and only rarely does she get lost. She explains how she got to know London by walking around it. Taking unknown paths on her way home and taking whole days off to explore unfamiliar areas were regular occurrences in her first few years of living in the city. In addition to feeding the need for exploration these practices would also save her money, something which was and still is important to her as artist with little disposable income. Moreover, she recounts tales of when she would purposefully sit on the top deck of buses in order to plan the walk for the next time she took the route in order to avoid future bus fares. When asked if maps were used during these exercises, she seems hesitant to admit it, but does recall always having a dog-eared A-Z at the bottom of her bag in case of emergencies.

I press on and ask about the sense of security she may feel through the map, which eventually turns the discussion towards getting lost and about the last time(s) we were lost. This thread takes some time to unravel for it is clear that we are both trying to protect some level of false integrity about our navigational expertise, but we soon come round to the idea that everyone gets lost but many of us don't like to admit to it, which evidently includes ourselves. Working through this, we both admit that we usually know where we have come from, which usually mitigates the possibilities of getting lost. We have good spatial memory - or at least we think we do. That said, and as the conversation developed, instances of being lost did begin to emerge as we unpacked what it meant to be lost.

Tori recounts the story of walking out of Madrid, from its centre to the desert, past the central squares, across the business district, though the inner city, out past the suburbs and through the plots of land soon to become suburbs, and finally ending up in the desert. All this was done without a map. It was simply an exercise in exploration; a real life derive. She was a flaneur in this respect, wanting to explore the city on her own terms without any guidance except the decision to go in one direction. She recalls the sense of being lost on this day, but also that it didn't matter. Tori said that was the point that day, to intentionally get herself lost because finding her way back would be a fun activity. As an after thought I pointed out that this would not be everyone's idea of fun. She agreed and made the point that she wouldn't have done this everyday, and probably not even in London but that she was on holiday and had the time to indulge a little.

Tori tells me another story about being lost in New York, at a time before the smartphone was prevalent in her life. She was visiting on her own for a week for the

sole purpose of going to see some galleries which her friends had exhibits in. A day after arriving she took to the streets to try to find the gallery district of the Lower East Side and aimed to walk there from where she was staying in Brooklyn's Cypress Hills area. She made it through Brooklyn, across the bridge and through downtown Manhattan without a problem. Then she got lost in central Manhattan where there is a very clear grid system. This annoyed her because she thought grid systems were supposed to be easy. She kept walking around the same few blocks but never found the intended district, having now been out and about for most of the day. At the point of giving up, she sat on a step and asked for a sign, which was then promptly revealed to her in its most literal form - a sign of the gallery she wanted to go to was painted on the wall above the buildings opposite. We both agreed that although this might have appeared like an act of god, it was probably a stroke of luck. Furthermore, when I asked Tori why she didn't use a map when she first found herself getting lost she simply said that she wanted to try to figure it out on her own. Admitting this was perhaps a stubborn move and that her day could have been made a lot easier by either asking someone or picking up a map, this was clearly something she wasn't prepared to do.

These stories prompted the question of whether she has ever, or would ever use her smartphone for maps at similar times. She responds with a definitive no. If she has the time and drive to explore as she did in both these examples then no she wouldn't consider using a map. However, she does admit to these being special cases, suggesting that if she was lost and in a rush then of course she would use the convenience of the device in her pocket. As an aside to this she mentions her concern about her own and societies spatial memory, asking whether it is being damaged by an increasing reliance on maps. This led her to describe the feeling of being lost in the familiar, which often prompted her to use her phone as a get out.

Having lived in the east end for over a decade she tells me she knows it well. And yet she also mentions how frequently she becomes lost or displaced within these areas which she knows intimately; having grown up through her twenties and thirties here, using it as her canvas for art projects and staggering home from nights out. She notes the times when she is asked to give directions to drivers while she is sat in the passenger seat, as if to give me examples of her intimate knowledge of the place. That said, the one-way systems around her local area always seem to be changing. This causes her frequent distress as it confuses the place(s) she thought she knew by introducing new rules about how to navigate them while driving. ‘This is not a problem when walking’ she says. ‘It’s only in the car when you notice these things’. She is often

forced to pull up maps and navigational services on her phone to address these problems. Without it, she says, she would likely be driving in circles most of the time.