Thinking the Geoweb: Political economies, 'neo'geographies, and spatial media

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Abstract

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Critical GIS and GIScience face tremendous methodological and conceptual challenges at present as they grapple with the emergence and proliferation of a diverse range of new, Web-based geographical information technologies that cannot be defined or engaged in terms of conventional geographic information systems (GIS). Together, these new hardware/software objects, the new content forms that spatial data are assuming, and practices around these technologies and information artifacts are referred to by geographers as 'the geoweb.' The emergence of the geoweb is fundamentally transforming the ways in which society, space, and technology intersect and are co-articulated. Against this backdrop, this research takes the material and digital presences of geoweb phenomena as primary evidence of a transformative moment in the production, distribution, commercialization, circulation, and public awareness of geographic information technologies. On the basis of a content and discourse analysis of textual material thematically about the geoweb that I archived and coded over a period of three years (June 2009 – June 2012), I advance propositions that address the intellectual challenge of *thinking* – apprehending, conceptualizing, and engaging – the geoweb as a multi-faceted socio-spatio-technical phenomenon. These propositions constitute three threads of an empirically-grounded framework for theorizing the societal transformations wrought through the geoweb on multiple, intersecting levels: i) the political economic relations from which these

transformations emerge; ii) the discursive practices that have been used to ensure the sustained consumption and proliferation of geoweb technologies; and iii) the epistemological frames that help us as scholars fully interrogate the diverse material practices/objects that co-constitute the geoweb and the forms of communication and social, spatial, and technological relations it is used to foster.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

This research makes propositions for engaging, conceptualizing and theorizing the disciplinary and societal shifts ensuing from recent changes in the production and commercialization of geographic information and technologies. In February of 2005, Google launched Google Maps, its now ubiquitous Web mapping service, and in June, and released Google Earth, its virtual globe. Simultaneously, Google made the Maps application programming interface (API) public, allowing users to 'hook' into the service from other Web sites and develop their own applications by mapping their own interests/themes over Google Maps base data. The release of the Google Maps API is significant because it signaled the beginning of a much broader, now ubiquitous merging of geographical information with Web content. It furthermore allowed for practices heretofore largely unsupported by server-side Web GIS: the curation and sharing of user-generated geographical content over the Web by lay users with no formal background in cartography, geography, or GIScience who 'voluntarily' contribute spatial information online. Michael Goodchild (2007) has consequently termed these contributions 'volunteered geographic information' (VGI).

Since the launch of Google Earth and Google Maps, and the release of the Maps API, we have witnessed the further proliferation of a diverse range of new, Web-based geographic information technologies including virtual globes such as Google Earth, interactive mapping platforms such as OpenStreetMap, 'geo'-social applications such as Foursquare that allow users to share their locations by broadcasting them over the Web. These services rely on new techniques such as the automated geotagging of online content, and the proliferation of GPS-enabled smartphones and other mobile devices. Together, practices such as the 'volunteering' of geographical information by non-expert cartographers, the forms of data that are generated, and the series of new hardware and software objects used to create, compile, and share them

are together referred to as 'the geoweb' (Elwood and Leszczynski 2011; Scharl and Tochtermann 2007).

The rise of the geoweb signals a profound transitional moment in the production, distribution, and public awareness of geographic information technologies, with far-reaching implications for GIScience, geography, and society at large. GIScience and Critical GIS face tremendous conceptual and methodological challenges as they grapple with this host of nascent, emergent information technologies that cannot be conventionally defined as 'GIS' (geographic information systems). The ubiquity and public nature of these technologies, as well as the technical interpenetration of daily life that arises from their broad-scale adoption and use, are materially transforming technology-society relationships. They are changing the ways in which we build and express attachments to place(s), form spatial imaginaries, and interact with landscapes as well as with each other across those landscapes, requiring that geographers re-examine the ways in which they understand and engage the intersections between society, space, and technology.

Against this backdrop, my doctoral research evaluates the social, philosophical, and political-economic contexts of the geoweb. Over a period of three years, I have developed and analyzed a conceptually-relevant sample of blog entries, media coverage, Twitter posts, and other Web documents that comment on geoweb phenomena and developments. Based on a qualitative content and discourse analysis of this material, my work theorizes that the geoweb must be understood as more than a series of constituent objects and participating technologies. I have developed an hermeneutic framework for theorizing the societal transformations wrought through the geoweb on multiple, intersecting levels:

- the political economic relations from which these transformations emerge;
- the discursive practices that have been used to ensure the sustained consumption and proliferation of geoweb technologies; and
- the epistemological frames that helps us as scholars fully interrogate the diverse material practices/objects that con-constitute the geoweb and the forms of communication and social, spatial, and technological relations it is used to foster.

My dissertation is the first empirically-grounded effort to broadly theorize the geoweb and its societal significance in the emerging area of geoweb research. It advances the geoweb research agenda by going beyond early description, anticipatory work that speculates on the implications of the geoweb, and projects that examine dimensions of geoweb impacts through studying individual applications (e.g., Ushahidi, an open-source online information compilation and mapping platform) or specific kinds of applications (e.g., crisis mapping). Specifically, I evince that the geoweb is both emergent from, and is constitutive of, i) broader political-economic shifts that involve the restructuring of the state - and the state mapping enterprise – under neoliberal regimes of governance; ii) a series of discourses of 'neo'geography that present emergent, Web-based geographic information technologies as ahistorical, inevitable, and necessary in order to socially naturalize and better market them; and iii) a philosophical shift that grants these technologies an epistemological and material status as 'media', which emphasizes the diversity of materialities that co-constitute the geoweb, captures the basis of many of these technologies in communication, and accounts for the increasing ubiquity of these technologies and their presence in everyday life.

The objective of this dissertation is to fill in identified gaps in the existing literature by theorizing the real-world social processes that structure the forms that the geoweb assumes, the data practices it makes possible, and the altered ways in which society relates to and interacts with geographic information and spatial technologies as they have become Web-based. The product of this research is a theoretical framework that helps us to 'think' – apprehend, engage, and conceptualize – the geoweb as a broad social, spatial, and technical phenomenon. The contributions of this research stem from these theoretical interventions, and in its effort to empirically discern geoweb phenomena, practices around these developments, and the societal discourses about them in the real world.

1.2 Engagements of the geoweb in the geographical literature

1.2.1 Early engagements

Geographers have turned their attention to these new spatial data technologies and data authoring practices, and have sought to account for their nascence, and, increasingly, to examine their societal significance and implications. Early engagements of the geoweb were overwhelmingly descriptive. The descriptive bent of the nascent literature is consistent with the novelty of the phenomenon and our disciplinary attempts at coming to terms with what, exactly, the geoweb 'is' by itemizing that which is new and unique about it. In describing how the geoweb 'came to be,' geographers isolated its emergence in the technics and pragmatics of 'Web 2.0,' a term which designates the evolution of the Web into a platform for interoperable applications and services, which may be contrasted with the data repository nature of the 1990s Web (O'Reilly 2005). Accordingly, some of the alternative neologisms for designating the phenomenon of the ascendance of geographic information over the Web proffered in the early literature, including 'Maps 2.0' (Crampton 2009b), 'Where 2.0' (Newitz 2006), and 'GeoWikis' (Guptill 2007; Sui 2008), reference the characteristic architectures, participatory frameworks and interactive functionalities of Web 2.0 that enable the user-contribution of geographical information. 'Volunteered geographic information' (VGI; Goodchild 2007) speaks to the nature of these contributions and practices of their curation. Outside of disciplinary geography, 'neogeography' (Eisnor and Wilson; Turner 2006) attested to the lay backgrounds of contributors themselves as well as the non-expert rationalities of VGI production regimes. 'The geospatial web' or 'geoweb' originally designated the merging of locational referents with Web content (Scharl and Tochtermann 2007), but has come to more broadly denote the socio-technical phenomenon constituted by new spatial data forms, new data practices that attend these emergent geographic content forms, and the new ways in which hardware and software are coming together to support Web-based geographic information praxes (Elwood and Leszczynski 2011).

Aside from these naming debates, which emphasized differential aspects of the same phenomenon, geographers sought to further describe volunteered contributions in terms of

their validity and/or credibility (Crampton 2008a; Flanagin and Metzger 2008; Goodchild 2009b; Haklay 2010). Whereas some authors emphasized modes of VGI contribution, others described particular instances of mapping services such as OpenStreetMap (OSM) or Google Maps, or detailed specific deployments of geoweb applications such as Google Earth (Crampton 2008a; Crampton 2008b; Crampton 2009b; Haklay 2008; Haklay et al. 2008; Miller 2006; Nourbakhsh et al. 2006; Sui 2008; Yarbrough and Easson 2005).

In addition to being *descriptive*, early research in the area of the geoweb may be characterized as *prescriptive*, setting out the research agendas for a (critical) geography of the geoweb, emphasizing the need to attend to and theorize new forms of data and attendant modes of representation, emergent subjectivities, spatial and knowledge politics, and transformations to regimes of geographic information governance (Crampton 2009b, 2010; Elwood 2008a, 2008b, 2010).

Of these identified directions for research, the first wave of critical work in the area of the geoweb emphasized the subjectivities and subject positions presumed by and bound up in geoweb practices. Contrary to a model where geographic information is produced by cartographic experts and disseminated by them to passive end-users, VGI efforts represent a distinctly different regime, whereby it is private citizens - increasingly addressed as consumers – who create spatial data over the Web (Budhathoki et al. 2008; Elwood 2008a, 2008b, 2009a; Goodchild 2007). This radical shift in the production of spatial data is seen as engendering new subjectivities (Crampton 2009b; Elwood 2008a; Flanagin and Metzger 2008; Haklay et al. 2008). The ease of use of geoweb applications and services are seen to signal the 'death of the expert' cartographer or GIS technician (Crampton 2008a; Goodchild 2007; Goodchild 2009b; Newitz 2006; Sui 2008). The rise of the 'citizen sensor' as simultaneously the active producer *and* end-user of geographic information is seen as associated with these new subjectivities: the user as 'produser' or 'prosumer' (producer/consumser) of geographic information (Budhathoki et al. 2008; Goodchild 2007; Haklay et al. 2008).

However, geographers have also recognized that not all of the contributions generated over the geoweb are freely 'volunteered' (Blamont 2008; Crampton 2008a; Elwood 2008a, 2008b,

2009a; Haklay et al. 2008; Harvery 2013; Tulloch 2008). Tulloch (2008) suggests that the ways in which applications and services running on location-enabled devices surreptitiously collect user locational data and relay them back to data network providers or sell them on to third parties constitutes a form of "geoslavery" (169). Harvey (2013) argues that because of the ways in which these devices and applications collect geographical information and locationally track users without their knowledge and/or prior consent, 'volunteered' geographical information should more aptly and accurately be described and referred to as 'contributed' geographical information or CGI. He encourages geographers to take care in differentiating between instances where there is evidence to support that geographical datasets have been comprised of information freely volunteered versus those where the provenance of the data contribution is unknown. Accordingly, whereas 'prosumers' suggests individuals who make informed choices to both use and contribute to the geoweb, it does not capture the ways in which the geoweb produces unwitting subjects who are nevertheless caught up in the geoweb in ways beyond their control, either passively (and unknowingly) generating geographical information over the Web, or, in other instances, having locational information being generated *about* them by others. For example, the website RottenNeighbor.com, which has since been taken offline, was constituted by a Google Maps mashup that allowed users to pinpoint, on the map, the residence of any neighbor with whom they may have had any kind of dispute, and attribute those geotags with negative (often discriminatory) commentary about their neighbors' behaviors (Elwood and Leszczynski 2011).

1.2.2 Recent interventions

More recently, geographers have began broadly examining the social, cultural, and political implications of the geoweb. Zook and Graham (2007a, 2007b) investigate the ways in which digital encodings of space structure our spatial experiences and imaginaries. Google Maps locational search results, in which businesses pay to have their establishments appear higher (first) in the returned venues matching a search query for pizza, for example, influence our actions and activities in material space by skewing our patronage decisions. For Lin (2012),

however, public geoweb technologies do not only structure our experiences of space, but are simultaneously mediums for building and expressing attachments to, and political sentiments around, particular places/spaces through what she calls neogeographic mapping practices. Other geographers likewise engage the mediating effects of emergent, Web-based geographic information technologies. Graham and Zook (2013) and Graham et al. (2012) investigate the ways in which these digital encodings of space comprise 'augmented realities' in which these encodings seamlessly become part of our physical experience(s) of material spaces. Focusing specifically on mobile devices, Wilson (2012) theorizes the pervasiveness of digital locational technologies and information artifacts in everyday life in terms of the rise of a 'conspicuous mobility' that characterizes the locationally-aware present.

Geoweb technologies are themselves bound up in new scopic regimes with significant implications for practices of seeing, watching, and surveilling. Elwood and Leszczynski (2011) argue that the pseudorealistic nature of the high-resolution images that comprise Google's Street View service disclose "'virtual selves'" in very immediate ways that grant them discursive authority as veritable representations of 'truth' (7). For Parks (2006), the amalgamation of spatial information from multiple sources and sensing apparatuses into seemingly seamless, uniform, and singular representations of the world constitute a new form of vision, which she refers to as "cyber-visuality" (285), that presents the world as something over which we can have technical mastery. Boal (2007) and Bratton (2009) similarly argue that visual metaphors of 'the globe' are implicated in an ideology of globalism that presents space to viewers as an empty expanse that acts as a container for politics – i.e., territory as a natural entity within which politics occurs - rather than as the product *of* political contestation. For example, Parks (2009) argues that the interactive affordances[1] of virtual globes such as Google Earth encourage users to overlook spatial contexts of conflicts in ways that annihilate geopolitical considerations.

[1] Affordances are the perceived functionalities of technological devices and interfaces; alternatively, what the functionalities of a device or interface are presumed to be (for example, we assume that by moving a mouse in various directions, that will enable us to move the digital cursor on-screen; a mouse, therefore, has navigational affordances).

Conversely, Kingsbury and Jones (2009) argue that the use of geoweb technologies such as Google Earth can also be an exercise in anti-geopolitics, as the public availability of satellite imagery affords citizens opportunities to surveille-back at the state (Aday and Livingston 2009; Dodge and Perkins 2009; Perkins and Dodge 2009). While publicly accessible, high-resolution commercial satellite imagery may indeed challenge state secrecy regimes, Elwood and Leszczynski (2011) argue that it is not only the state's privacy that is compromised through the introduction and ubiquitous proliferation of public, Web-based geographic information technologies. The geoweb and its constituent technologies are actively reconfiguring the social contract around privacy by eroding our expectations to locational privacy – namely, that our locations are not being surreptitiously monitored, stored, and disclosed without our consent and/or knowledge.

Elsewhere, geographers acknowledge the ways in which the geoweb reproduces and engenders new digital divides. These divides may manifest in terms of uneven geographies of access but also uneven geographies of contribution where digital encodings of and about particular spaces/places may be disproportionately volunteered by individuals halfway around the world rather than by the people who occupy and live in those places (Graham 2011; Graham and Zook 2013; Graham et al. 2012). This research on the 'geo-linguistic contours of the geoweb' addresses the cultural politics of the geoweb. Graham et al. (2012) assert that that not only are geoweb encodings powerful in the sense that they structure our experiences and senses of space, but indeed the practices of generating those encodings are simultaneously themselves exercises in power and reflect digital divides in terms of who has the authority to generate geographic information, whether it be a geotag or a Wikpedia entry about a specific place, geographical object, or other spatial phenomenon.

In addition to geopolitical implications, and considerations of the cultural politics of geoweb practices and information artifacts, Elwood and Leszczynski (2012) examine the ways in which the leveraging of geoweb technological devices and information artifacts in practices of civic engagement and activism are constitutive of a new knowledge politics around spatial information that breaks from the cartographic legitimation practices of GIS-centric practices.

They identify a new form of knowledge politics in which the credibility of geographic information is increasingly asserted through peer verification and transparency rather than being grounded in notions of cartographic 'expertise,' and new geovisual epistemologies bound up in the deployment of geovisual objects to structure individual visual experiences that prioritize exploratory ways of knowing over conventional practices of cartographic abstraction and communication.

1.3 Research rationale

1.3.1 Gaps in the literature

While geographers have begun to identify and examine the social, cultural, and political significance of emergent, Web-based geographic information technologies, they have not productively theorized what the geoweb *is* beyond a series of constituent objects identified in the first wave of geoweb literature. More recent work fleshing out the broader implications of these new technologies and practices is, furthermore, not equivalent to conceptualizing the geoweb as a phenomenon – rather, it emphasizes its *effects*. Initially, geographers did grapple with how to 'think' – engage, apprehend – the geoweb itself, but they accounted for the phenomenon by enumerating specific instances of participating technologies and comparing the forms that the phenomenon was assuming in relation to GIS (Crampton 2008a; Crampton 2009b, 2009c; Goodchild et al. 2007; Haklay 2008; Haklay et al. 2008; Sui and Goodchild 2011; Sui 2008; Wilson 2009). The use of GIS as a lens for reading the geoweb manifest as more than a comparison of geoweb services and applications to GIS functionalities and architectures (see Haklay 2008; Haklay et al. 2008). For Farman (2010), Google Earth does not simply remediate certain GIS functionalities, it *is* a GIS. Miller (2006) sees the Google Maps mashup as the realization, finally, of GIS/2, a late-90s/early 2000s vision for a historically self-aware, inclusive, participatory GIS. Wilson (2009) engages the emergence of the geoweb in terms of a singular genealogical thread that links qualitative GIS and VGI. Sui and Goodchild (2011) see the convergence of geographical information with Web content to be indicative of a 'GISification' of

media. In other words, for many geographers, the geoweb's applications, services, and hardware/software objects are either (a) GIS, or else, an expansion in terms of what constitutes GIS.

The commitment to GIS expressed in these attempts to grapple with what the geoweb 'is' is inherently polemical. The rise of what we refer to as 'the geoweb' presents us with new constituent objects that are materially *other*-than-GIS, and/or *more*-than-GIS. Engaging new spatial information technologies, data form, and praxes in relation to a pre-existing entity is inherently limiting in that it elides "specificities of the form[s]" (Boyd 2006; Leaver 2006: n.p.). What is needed, therefore, is a theorization of the geoweb that consistently and adequately accounts for the unique ways in which hardware and software are coming together to comprise the geoweb's technical objects; that accounts for the broader historical, political, and economic contexts or their production; and that identifies the social in addition to the technical dimensions of the geoweb's construction.

1.3.2 Motivations for research

The question, then, that motivates this research is, broadly, '*what* is *the geoweb?*' In asking what the geoweb 'is', I am interested in addressing the constitutive materialities and socio-technical relationalities of the geoweb, and in theorizing ways conceptualizing the significant shift that that the convergence of geographical information with Web content constitutes. Specifically, this research asks:

- if geoweb constitutive objects are *not* GIS' then what 'are' they, both in terms of new constitutive objects (ontic entities) and epistemologies (of apprehending or engaging said new constitutive objects)?
- building on the Critical GIS insight that "spatial technologies are many things simultaneously[:] …digital systems for storing and representing spatial information; …complex arrays of social and political practices; and …ways of knowing and making knowledge" (Elwood 2009: 257), what is the geoweb *beyond* a series of constitutive objects?
- how do we account for what the geoweb 'is' in ways that allow for a subsequent theorization of significance of the presence of geoweb technologies in our daily lives?

A theorization of the geoweb in terms of the social, cultural, political and economic contexts of its production, its constitutive materialities, and its discursive construction is essential to geographers' further work on the geoweb. It is these dimensions of the geoweb – its materialities, discourses, and social/cultural/political/economic contexts of emergence and development – that structure the kinds of engagements with the technology that become possible, enable particular kinds of social practices, and enact and are used to naturalize changes to the technology-society-space relationship. In other words, our ability to 'think' – i.e., apprehend, conceptualize, and engage - the geoweb as a phenomenon in its own right is inimical to our identification, examination, and theorization of the societal implications and significance of these technologies. Going forward, a framework for engaging the geoweb beyond GIS-centric theorization opens the door to power new interdisciplinary intersections, such as those with rich digital humanities scholarship on new spatial technologies and practices.

This research works to fill two pervasive gaps in the literature. In the first instance, it frames the technical objects and instances identified in early engagements of the geoweb in a comprehensive and consistent way that acknowledges the geoweb as a phenomenon outside of GIS and its conceptual and epistemological categories. Secondly, it moves engagements of the geoweb forward by recognizing that as a broader phenomenon, the geoweb is more than a series of constituent objects by interrogating the political, economic, cultural, social, historical, and discursive contexts of its emergence and development. As per Jensen (2011), digital media – and the Internet – are not "discrete entities, but …constituents of layered social and technological networks" (57). For geographers, the foci of research have shifted from the geoweb's constituent objects to its societal effects and broader cultural implications. However, they have bypassed investigating the ways in which the geoweb is a new articulation of space, society, and technology. This research accordingly addresses this disparity by beginning to theorize what the geoweb 'is' as a series of discourses, political economic positionings, and materialities.

1.4 Research design and methodology

1.4.1 Overview

This research takes the material and digital (online) presences of emergent, Web-based spatial information technologies (information artifacts and devices) as primary evidence of a transformative moment in the production, distribution, commercialization, circulation, and public awareness of geographic information technologies. It pursues a grounded theory (Glaser and Strauss 1967) approach to developing a hermeneutic framework for 'thinking' the geoweb. That is, the framework I develop is constituted by central themes that emerged from an inductive content and discourse analysis of a conceptually relevant sample of social commentaries about practices around geoweb phenomena, business discourses about location-based technologies, news coverage, government and institutional responses to these phenomena, and corporate practices vis-à-vis the geoweb.

Grounded theory is a methodology for building theory inductively such that the theory reflects, or is 'grounded in,' the actual content of the data and/or the social conditions that those data reveal or represent (Glaser and Strauss 1967; Knigge and Cope 2006). Rather than using an extant theoretical framework to guide the interpretation of the data, the data inform the theoretical framework and guide the selection of any other bodies of theory that may be used to enlighten data interpretation, the explanation of results, and the framing of conclusions (Glaser and Strauss 1967; Knigge and Cope 2006). Generating theory in this manner involves systematic data collection; recursive coding of the data; and, most importantly, *comparative analysis* (Glaser and Strauss 1967; Strauss 1987). This involves the constant comparison of emergent themes against the data themselves (content) and the coding structure, leading to the iterative adjustment and refinement of both the coding structure and any theoretical insights and/or propositions (Glaser and Strauss 1967; Strauss 1987).

Grounded theory is an ideal framework for my study for two primary reasons. First, no central theoretical framework has yet emerged for apprehending the geoweb that provides the kinds of conceptual tools and epistemological axioms for engaging geographic information technologies that Critical GIS provided for studying conventional GIS. Second, the geoweb is a

continuously developing and rapidly expanding phenomenon. Grounded theory is an approach to theorization that recognizes social (and technological, in this case) phenomena to be constantly 'in flux' (see Knigge and Cope 2006), and as such, accommodates the dynamic nature of the objects of study and the subsequent need to continuously adjust the data categorization (coding) structure and to reflect upon and refine any insights that emerge.

1.4.2 Empirical sources of evidence and objects of analysis

The social and professional commentaries, business discourses, and government and institutional responses and policies that comprise my body of evidence consist of *Web materials* – that is, specific forms of digital media that are have been uploaded to and made public over the Internet (Brügger 2011). I compiled these texts from Web-based sources such as personal, corporate, media, and industry blogs; news feeds, coverage and editorials; other documents such as corporate and product websites and press releases; and, microblog posts generated over the social media platform Twitter. A list of blogs and news feeds that were 'followed' – mined for content – may be found in **Appendix 1.**

These texts are an excellent source from which to theorize what the geoweb 'is' because they reveal how it is branded, promoted, marketed, represented, perceived and understood in the world at large outside of disciplinary geography. Simultaneously, these texts constitute evidence of the social, cultural, political, economic and historical contexts of geoweb productions and emergences. In addition to the Web texts themselves, which are thematically *about* the geoweb, empirical objects of analysis include the *discourses* "arising from or addressing" the geoweb (Jensen 2011: 49). That is, these discourses point to not only mainstream representations of the geoweb, but indeed also *practices* around those representations (Doel 2010).

I relied upon Web resources because they are 'global' in scale, giving me the ability to sample huge cross-sections of textual content thematically focused on the geoweb. This range of content could not be found in any one archive, particularly given the rapid ongoing generation of these texts throughout the course of my data collection and analysis (June 2009 –

June 2012). Interviewing subjects would have provided a very limited and narrow perspective on what the geoweb 'is', whereas I was looking to collect data at a macro scale. Furthermore, Web-based resources proved the best leads for identifying new, emerging Web-based spatial information technologies as they were being developed and introduced to markets. The rapid pace of the proliferation of what I in this dissertation term 'spatial media' renders resources such as scholarly journal articles, for example, insufficient as primary sources for identifying new technological developments given the lag times associated with publication.

1.4.3 Data collection

I identified conceptually-relevant sources of content by searching for personal, corporate, and technology industry blogs dedicated to geoweb phenomena. I carefully excluded the blogs of academics also working on the geoweb so as to avoid being influenced or guided by their interpretations of events, technologies, and practices. Many blogs reference other thematically-related blogs in their blog-roll[2], and I used this as a form of snowball sampling to identify more blogs and sites as sources. I subscribed to the RSS (Rich Site Summary) Web feeds of these blogs, using a Google homepage as an RSS reader, which allowed me to view the titles of the most recent posts to any one blog from a centralized location. I also subscribed to the Web feeds of the technology sections of major reporting and/or news organizations and publications, as well as those of technology blog and news aggregators. Additionally, I began following geoweb researchers on Twitter, a social media microblogging platform that supports posts of 140 characters of less, as a means of harvesting links to articles, blog posts, commentaries, etc. that were not otherwise not relayed in the blogs, news feeds, etc. identified above. Following researchers on Twitter avoids the caveats associated with reading academics' personal blogs in that the platform only permits statements that may be expressed in 140 characters or less. This makes it an inappropriate platform for sharing nuanced interpretations of or thoughts on geoweb-related topics that would inadvertently influence the development of

[2] A blog-roll is a list of other blogs that a blog curator and/or site reads, 'follows,' and/or recommends.

my framework. Given the constraints of the platform, which demands terseness and brevity, many users use the service to share links to content, including links to a recent blog post. I avoided following links to personal blogs, instead following links to online media coverage, technology industry blog posts, and non-academic commentaries about the geoweb.

I mined these sources for commentaries, news stories, and other documents that were thematically *about* the geoweb, particular instances, specific technologies, practices, and events. Together, these sources constitute a "Web sphere" (Foot 2006): "a collection of dynamically [and selectively] defined digital resources spanning multiple Web sites deemed relevant or related to a central theme or object" (88). A Web sphere does not have definitive borders or boundaries, nor is it necessarily defined by any one timeframe, but in addition to this thematic overlap, it is constituted through a constellation of linkages. Indeed, many of these resources reference and link to each other, through inclusion of other blogs in a blog-roll, but also through retweets (the reposting of other users' Tweets).

A Web sphere may itself comprise a unit of analysis, particularly for researchers interested in the network of linkages between elements of a Web sphere. Web spheres may in this way be used to identify "relations between producers and users of Web materials, as potentiated and mediated by the structural and feature elements of Web sites" (Foot 2006: 89). I, however, am concerned with the actual content of the digital resources (blogs, news coverage, technical press, corporate documents, etc.) themselves as opposed to the links between them. Specifically, I am interested in which aspects, features, or instances of the geoweb they comment about; and, *how* those features/instances are commented about, framed, represented, marketed, etc. Thus, in my case, I used the Web sphere to identify resources (particular elements of sources, such as individual blog posts, specific news stories, etc.) for collection and subsequent analysis.

I collected and archived these data over a period of three years (June 2009 – June 2012) using Zotero, an open-source citation and Web-archiving software that supports capture and storage of 'snapshots' of the Web. The purpose of Web archiving is to both capture and preserve the *texts* that are the objects of analysis, and, to compile a "stable object of study [to]

refer to when the analysis is to be documented" (Brügger 2011: 24). This is particularly important with respect to working with Web resources as content may be removed by curators without notice, comments may be censored at future dates, and items that were once publically accessible may become inaccessible or accessible only to select individuals. As a recent report indicates, 11% of content links to and/or disseminated through social media within a year of an event disappears, and merely 20% of content is ever archived in large-scale, longitudinal institutional archives (Chatfield 2012). In other words, because the Web is such a dynamic content medium, storage of data for later analysis and reference in a digital collection is crucial.

The archive I constructed is small in scale compared to large institutional archives, built to accommodate this immediate need to capture the objects of study. My archiving strategy was *selective*, an approach Brügger (2011) defines as purposively concerned with collecting and preserving a "limited number of [web resources] that have been selected individually prior to archiving, because they are considered important," conceptually or thematically relevant, etc. (28). In other words, I mined content from the thematically relevant sources that were included in my Web sphere, and archived this content for later reference and analysis.

1.4.4 Analysis

While building this archive, I was also coding items being added to the collection with 'tags,' or codes, inserted directly in Zotero. These were attributed to the items at the time of capture (as they were being added to the archive). Data collection and coding were thus simultaneous, and ongoing over the course of the three-year study period.

Coding consists of the assignation of "interpretive tags or text (or other material) based on categories or themes that are relevant to the research" (Cope 2010: 440). As a qualitative analysis technique, coding allows for categorical and thematic patterns to emerge that inform how the data is conceptualized, interpreted, and subsequently queried (Strauss 1987). The utility of coding as a method for this project was to identify 'core' codes or themes that then informed the hermeneutic framework I develop in this research. During the first phase of data collection and analysis (first year of archiving), my coding was initially *open* (Cope 2010) – the

tags were descriptive, capturing the main topics relayed in the content (e.g., location-based advertising; neogeography) and identifying key actors (e.g., corporate actors; the state). At this stage, my analysis emphasized content, and the purpose of coding was to "[fracture]" (Strauss 1987: 28), or differentiate, the data along thematic and topical lines to identify what aspects, features, or instances of 'the geoweb' were receiving attention, and being engaged and commented upon.

Concurrently, while still 'openly' coding the data with descriptive tags, I began developing new tags through a *discourse analysis* of the archived content. At this stage, I focused on the material, social, and ideological *interests* served through particular narratives and commentaries about geoweb phenomena, practices around technologies and events, and framings and representations of information artifacts, devices, developments, and occurrences (Babbie 2008). For example, I developed the tag 'discourses of technology' to flag instances where the rhetorical bent of a Web resource was intended to sway or influence its audience (usually favorably) regarding a technology, practices around particular kinds of technologies, and their societal implications.

From these initially descriptive codes, I developed 'core' categories, or themes, that designated patterns or trends in the archive data. I accomplished this largely by identifying very frequently recurring codes (such as 'corporate regimes of governance'), and by looking for significant co-occurrence between codes. This was achieved using the Zotero software, which displays which other tags have been attributed to resources marked-up with any one code or group of codes. Such co-occurrence was evident between, for example, 'discourses of technology' and 'neogeography,' leading to the development of a new, amalgamated code, 'discourses of neogeography.' 'Discourses of neogeography' emerged as a central theme persistent across a wide swath of the archive content. To identify what forms these 'discourses of neogeography' assumed, how they represented geoweb phenomena, and how they encouraged/discouraged certain kinds of practices around spatial information artifacts and technological devices, I looked for further co-occurrences between this 'new' code ('discourses

of neogeography') and other thematic and conceptual tags (such as 'privacy' and 'location-based advertising').

In addition to the aforementioned ones, other 'core' codes included 'location-based advertising,' as well as 'convergence,' 'the state,' 'privacy,' 'geosocial,' 'monetization,' 'newness,' 'profitability,' 'self-actualization,' 'marketing,' 'communication,' 'space/place,' 'mediation,' and 'mobiles.' At this stage, my coding became *selective* (Cope 2010). Other themes became secondary to the core codes, and I proceeded to re-code content flagged with descriptive codes during the open coding phase with these thematic codes in instances where it was appropriate. The final coding structure is the result of making multiple passes of the archive content (iteration), identifying common codes and co-occurrence between codes (recursivity), and using co-occurring and/or disparate but conceptually related themes to develop 'core' codes. These core codes subsequently inform the 'themes,' or propositions, that together comprise the hermeneutic framework for 'thinking' the geoweb. In some instances, the core codes themselves emerged as one of the central conceptual threads, as did 'discourses of neogeography.' Elsewhere, however, translating the core codes into themes, or propositions for how the geoweb should be apprehended, involved an inductive, recursive comparison of coded content against all other data in the archive. For example, 'geosocial,' 'communication,' 'convergence,' 'mediation,' and 'mobiles,' among other key tags, all reference, in different respects, the materialities of emergent, Web-based geographic information technologies, as well as the social experiences of the material properties of geoweb technological devices and information artifacts.

The three themes that emerged from a recursive, iterative tacking back and forth between were those of *governance*; *discourses of neogeography*; and *materiality and mediation*. I subsequently explored, contextualized, and elucidated these themes using the theoretical frameworks of political economies of neoliberal governance; Foucauldian discourse theory; and media studies and theories of mediation, respectively. I selected these broader theoretical approaches for their appropriateness vis-a-vis the content, scale, and nature of the data. For example, political economic theories of neoliberal governance and state restructuring proved a

superior theoretical framework for contextualizing and helping to explain the shifting power dynamics between the state and corporate/business actors around the production, dissemination, and institutionalization of geographic information signaled and represented by the geoweb.

As per Cope (2010), the identification of patterns through coding is important in structuring the kinds of questions that may be asked of, and with, the data. One of the key lines of questioning that emerged through the qualitative coding and discourse and content analysis was, given that these tags (above) pertain to different facets of materiality, *how should the materialities of the geoweb be engaged?*, and *how does any material status we accord the geoweb help us to account for the social experiences and significance of its technologies (information artifacts and technological devices)?* Similarly, an inductive, recursive evaluation of the group of qualitative tags including 'corporate regimes of governance,' 'labor,' 'the state,' and 'ownership' all suggest a broader theme of (changes to) geographic information governance regimes, posing the dual questions, *what is the nature and context of these shifts in governance, and how should their significance be theorized?*

1.5 Theoretical propositions and dissertation structure

On the basis of this analysis of the archived data, this project evinces that i) the geoweb's constituent objects are *spatial media*, and must be epistemologically engaged and granted a material status as media. Beyond being a series of spatially-oriented technological entities (information artifacts and devices), the geoweb is ii) a set of discursive formations that represent these technologies as always-already new and leverage their purported 'newness' to depoliticize them, stimulate their adoption by normative neoliberal subjects seeking to self-actualize through being constantly-connected, and rationalize their societal effects. The geoweb phenomenon is furthermore iii) emergent from and historically specific to contemporary political economic restructuring of the state and associated shifts in governance under neoliberalism, and must be contextualized and understood as such.

These three interventions constitute a hermeneutic framework for 'thinking' - theorizing and critically engaging - the geoweb beyond an indexing of constituent technologies that are framed in terms of GIS. Situating the geoweb within a contemporary political economic context of neoliberal state restructuring historicizes the phenomenon by enriching geographers' accounts of the geoweb as emergent out of little more than the development of Web 2.0 functionalities. As the state is 'rolling back' from public aspects of making and circulating geographic information, market regimes are simultaneously 'rolling out' and subsuming the mapping enterprise to the imperatives of technoscientific capitalism. This belies 'discourses of neogeography' which suggest that the geoweb is the result of decontextualized, autonomous, necessary technological progress. Such narratives of the 'new' geography elide the ways in which technology is always socially produced, contingent, and contested, and thereby mired in the polemics of representation, knowledge production, and the digital divide. Epistemologically framing new spatial information artifacts and technological devices as media speaks to the diversity of materialities that co-constitute the geoweb, captures the basis of many of these technologies in communication, and accounts for the increasing ubiquity of these in daily life. It moreover breaks from seeing geoweb technologies as genealogically emergent from GIS, and recognizes that the geoweb constitutes a unique genre of geographic information content forms and technologies.

This work is structured as a paper-style dissertation. The body of this work – Chapters 2, 3, and 4 – are organized as three distinct papers which should be read as stand-alone components scripted towards individual publication. Chapter 4, the political economies section, has already been published as an article in *Progress in Human Geography* (see Leszczynski 2012), and is reprinted here in slightly modified form. These three chapters nevertheless represent the three threads of the hermeneutic framework methodologically developed using the grounded theory approach described above, and are thus methodologically, thematically, theoretically, and conceptually intertwined. As stand-alone papers, each substantive chapter (2, 3, and 4) includes an individually-tailored literature review, presentation of empirics, and

theoretical discussion. The central findings and broader significance of this work are summarized and presented in Chapter 5, the conclusion.

CHAPTER 2

POLITICAL ECONOMIES

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2.1 Introduction

There has been a noticeable shift in the production and dissemination of geographic information since 2005, marked by Google's launch of Maps, its Web mapping service, and Earth, its virtual globe. In July of the same year, Google made the Maps application programming interface (API) public, allowing users to hook into the service from other Web sites and develop their own applications over top of it. Google's activities coincide with and have contributed to the development of the 'geoweb,' the aggregate of geographically-referenced or marked-up[3] information that is increasingly used to organize and deliver content over the Web (Elwood and Leszczynski 2011; Haklay et al. 2008; Scharl and Tochtermann 2007).

Much of this locational-based data is curated by users with no formal background in geography or cartography who 'voluntarily' contribute spatial information over the Web. Michael Goodchild (2007) has consequently termed these contributions volunteered geographic information (VGI).[4] The crowdsourcing of geographical information - a term that refers to the practice of harnessing the 'power of the crowd' to create collective resources - signifies a profound change within regimes of spatial data authoring and provision, which have historically been the preserve of national mapping agencies and cartographic experts. The geoweb represents a pronounced shift in what constitutes geographic information at all levels of data, technologies, and practices, but the impetus for this shift is not geographical *per se*. Its

[3] 'Marked-up' means annotated, or described, using a machine-readable syntax (e.g, XML).
[4] VGI is a particular instance of user-generated content, which describes lay Web contributions such as Wikipedia entries and videos uploaded to YouTube.

emergence and development have been overwhelmingly driven outside of academic geography by the Web business and computing communities.

Geographers have turned their attention to these new spatial data technologies and data authoring practices, and have sought to account for their nascence. Early engagements with geoweb phenomena have emphasized the enabling technics (participatory frameworks and interactive functionalities) and pragmatics (business correctives) of 'Web 2.0'.[5] Without these developments, the geoweb would certainly not be. But geographers have yet to attend to the conditions of possibility that have made for the extension of Web 2.0 technological and commerce innovations to the realm of geospatial information. Beyond being enabled by the technical and business innovations of Web 2.0, I argue that the rise of the geoweb is implicated in contemporary political economic transitions that have allowed for the coming together of information technology and markets, a historically specific articulation of technoscience and capitalist exchange (Sunder Rajan 2006).

These changes are evidenced, in the North American and European contexts, in the changing role of the state vis-à-vis the 'cartographic project' – the entirety of the enterprise of making and circulating geographic information and its representation(s) for boundary-drawing, territory-enforcement, and data provision to a citizen base. Implicated in broader processes of contemporary state restructuring, these reconfigurations are manifesting as pronounced shifts within regimes of spatial data governance - the production, dissemination, and institutionalization of geographic information. Peck and Tickell (2002) characterize these governance shifts in terms of 'roll-back'/'roll-out' neoliberalism, whereby as the welfare state is either being eroded or actively rescinding itself from securing certain services and goods in the public sphere (roll-back), their provision is opened up to market regimes, which subsume the delivery of these goods and services to their own logics (roll-out). Drawing upon selective examples, I suggest that as the state is being rolled back, or actively withdrawing itself from, the public curation and dissemination of geographic information (GI), markedly non-state

[5] Web 2.0 describes the transition away from a Web of the 1990s that served as a data portal and repository to one that functions as a platform of networked services and applications.

(market and corporate) regimes of spatial data governance are rolling out in its place. This is not to suggest that the state is no longer present where 'the map' is concerned, or is being in any way eclipsed by market-based mapping activities. Rather, it speaks to the ways in which the state's role in relation to the mapping enterprise is altered in significant ways. As the cartographic project is increasingly opened to markets and their logics, relationships between citizens, the state, and the market are being simultaneously transformed. This is most immediately discernible in how - and from whom - citizen subjects access and interact with geographic information.

In this chapter, I strive to enrich and deepen geographers' extant account of how the geoweb 'came to be' by historically situating the rise of the geoweb within the contemporary political economic restructuring of the state and the associated shifts in governance regimes under neoliberalism. By 'political economy,' I mean that this situating operates from the fundamental premise that within any economy, there is a system of (re)distribution, and this (re)distribution is always political. Bringing contemporary theories of governance to bear upon our thinking about the geoweb allows us to begin to flesh out how regimes of the production, regulation and institutionalization of geographic information - its (re)distribution - are substantively transformed by the emergence of the aggregate of phenomena and practices that collectively constitute the geoweb. These transformations are rendered invisible if we are left with accounts of the phenomenon as solely technologically and pragmatically driven.

I begin by examining how the geoweb has been engaged within the geographic literature. I argue that while the descriptive emphases of early engagements is appropriate given the nascent nature of developments, it does not capture the ways in which the geoweb is politically and economically produced beyond being technically enabled. Situating the geoweb within political economy reveals the phenomenon to be immediately implicated in, and made possible by, emergent forms of governance that are best described as 'neoliberal'. As evidence of new regimes of spatial information, and a changing balance of power between the state, markets, and individual actors in the governance of geographic information, I draw upon the recent activities of corporate entities such as Google; citizen activities and movements centered

around OpenStreetMap (OSM), an open-source Web-based mapping application crowdsourced by users; and state-based actions around GI, including responses of individual states to the geoweb. I broadly organize this evidence, discerned largely from a North American and European context, in terms of Peck and Tickell's (2002) 'roll-back'/'roll-out' dynamics, suggesting that as 'the state' is rolling back (or is being undermined) from select aspects of the 'cartographic project' writ large, the rolling out of market-based regimes of geographic information governance is signaled in terms of the neoliberal imperatives of free labour, corporate/private ownership, and supra-accountability.

2.2 Writing the geoweb

From a data perspective, the geoweb consists largely of information 'volunteered' or generated by lay cartographers over the Web. While much of this locational data curated by users is certainly geographical, little of it is map-based in the traditional sense, consisting instead of geotagged blog posts, georeferenced digital photos, GPS waypoints, locational updates to social networking sites, and other texts. Much of this information is largely quotidian (Elwood 2009), but these contributions are nevertheless valuable. Attributing locational referents to content allows geographic details to be used as a primary way of *indexing*, or organizing, the Web such that, for example, search result relevancy is based on the proximity of a user's location (Crampton 2009b; Haklay et al. 2008). Google has accordingly termed the crowdsourcing effect the "'geoindex'" - the notion that all information may be organized, and is therefore searchable by, location (Crampton 2009b: 95).

Even more importantly, as per Haklay et al. (2008), the geographical annotation of Web content provides this information, which is otherwise dominantly abstract, with *context*. The ascendance of locational data has alternatively been referred to as 'Where 2.0' (Newitz 2006) because the ability to volunteer GI is premised upon and enabled by Web 2.0 functionalities and applications. Thinking of the geoweb as an outgrowth of Web 2.0 accurately captures the extent

to which it is pragmatically and technically driven outside of disciplinary geography, and this understanding is reflected in early disciplinary engagements of the geoweb.

Initially, geographers largely engaged the geoweb descriptively. The descriptive bent of the nascent literature is consistent with the novelty of the phenomenon and our disciplinary attempts at coming to terms with what, exactly, the geoweb 'is' by itemizing that which is new and unique about it. Early engagements of the geoweb chronicle its genesis and enabling conditions and the forms that this phenomenon is assuming in relation to GIS (Crampton 2008a; Crampton 2009b; Elwood 2009; Goodchild et al. 2007; Haklay 2008; Haklay et al. 2008; Sui 2008). Elsewhere, researchers have sought to describe volunteered contributions in terms of their validity and/or credibility (Crampton 2008a; Flanagin and Metzger 2008; Goodchild 2009b; Haklay 2010). Whereas some authors emphasize the modes of VGI contribution, others describe particular instances of mapping services such as OpenStreetMap (OSM) or Google Maps, or detail specific deployments of geoweb applications such as Google Earth (Crampton 2008a; Crampton 2008b; Crampton 2009b; Haklay 2008; Haklay et al. 2008; Miller 2006; Nourbakhsh et al. 2006; Yarbrough and Easson 2005).

Geographers have also begun to attend to the functionalities – and subjectivities – that the geoweb enables. In particular, they emphasize the participatory and interactive frameworks that make the 'volunteering' of GI possible (Budhathoki et al. 2008; Crampton 2008a; Guptill 2007; Haklay et al. 2008; Sui 2008). The ease of use of geoweb applications and services are seen to signal the 'death of the expert' cartographer or GIS technician (Crampton 2008a; Goodchild 2007; Goodchild 2009b; Newitz 2006; Sui 2008). The rise of the 'citizen sensor' as simultaneously the active producer *and* end-user of GI is associated with new subjectivities: the user as 'produser' or 'prosumer' (producer/consumser) of geographic information (Budhathoki et al. 2008; Goodchild 2007; Haklay et al. 2008). These emergent subjectivities are related to a radical shift in the production of spatial data (Crampton 2009b; Elwood 2008a; Flanagin and Metzger 2008; Haklay et al. 2008). Contrary to a model where GI is produced by cartographic experts and disseminated by them to passive end-users, VGI efforts represent a distinctly different regime, whereby it is private citizens - increasingly addressed as consumers - who

create spatial data over the Web (Budhathoki et al. 2008; Elwood 2008a, 2008b, 2009a; Goodchild 2007).

While changes to user identities signal changes in modes of geographic data production, geographers question the extent to which these practices constitute a form of voluntarism (Blamont 2008; Crampton 2008a; Elwood 2008a, 2008b, 2009a; Haklay et al. 2008; Tulloch 2008). These challenges have, however, been raised largely with respect to the degree to which new technologies fully disclose 'participation' to end users - for example, are users aware that their GPS-enabled devices are 'calling home' and reporting data to the geoweb (Tulloch 2008)? While these are valid concerns, questions of voluntarism are effectively reduced to concerns with how 'participation' is engineered into applications and hardware. These hardware/software objects are themselves subsequently engaged as natural extensions of Web 2.0 technologies and functionalities to the geographical domain. This is evident in the isolation of, for example, the development of the AJAX group of programming languages which enabled 'mashups' by allowing the embedding of content across browsers, or the rise of wiki architectures that support the editing of content by multiple users (Crampton 2008a; Guptill 2007; Haklay 2008; Haklay et al. 2008; Malik 2005; Sui 2008).

This reading of the geoweb as technics and pragmatics on its own would suggest that the geoweb is but a natural outgrowth of Web 2.0. This Web 2.0-centric narrative inadvertently reduces the geoweb to be the autonomous outcome of linear technological progress that is inevitable, natural, and cannot be stopped. This leaves us with a socially and politically ahistorical account that fails to contextualize the very technological and business transitions underwriting the geoweb's emergence. Moreover, geographic information, software/hardware, and data praxes associated with the geoweb do not represent a radical historical rupture with their antecedents. As Haklay et al. (2008) point out, many geoweb functionalities parallel existing capabilities built into 'old' GIS architectures. While new developments may not represent a fundamental change in terms of how geographic information is delivered over the Internet, geographers agree that they do represent a radical shift in its production (Crampton 2009b; Elwood 2008a; Flanagin and Metzger 2008; Haklay et al. 2008)

These changes to production cannot, however, be explained solely in terms of enabling technologies that transfer data-authoring capabilities to everyday cartographers. Rather, they constitute fundamentally new regimes of production that make the 'prosumption' of geographic information valuable. These regimes of data production themselves have not emerged out of the technological ether, but are instead historically coincident with, and implicated in, political economic shifts associated with changes in practices of governance.

2.3 Neoliberal governance and the state

Sparke (2006) defines 'governance' as "sensual-cum-socialized forms of political control" that may be contrasted with coercion (Sparke 2006: 357). Governance constitutes a 'structural' thesis of power, which suggests that power assumes particular 'forms,' be they political (governments), economic (markets), or social (e.g., patriarchy) These forms materialize in processes of regulation, or the exercise of authority, over persons and territory (Rose 1999), and also over data (Singh, 2002).

'The state' is one such material form of governance. This does not mean that the state is a monolithic entity that secures hegemony by monopolizing the use of force. Theories of the modern state maintain that the state has been governmentalized, such that the mechanisms by which it secures itself are not necessarily state-based (for example, sustained by social hierarchies or the control of sexuality; Foucault 1980b). Governmentality represents the location of 'governing' beyond the state in the sense that power relations exceed the available categories and apparatuses of the state. Although 'the state' does not exhaust the field of power relations, Rose (1999) argues that the governmentalization of the state is that which has allowed it to endure within the contemporary power matrix, where it functions as a connective force that brings together "a diversity of authorities and forces… within a whole variety of complex assemblages" (Rose 1999: 18). It is precisely in this way that 'the state,' though governmentalized, remains a meaning category. It persists as an instrument of gover*nance* that

functions to impose "fixity (and hence stability)" onto the politico-economic order via regulatory and other mechanisms (Harvey 1990: 109).

While Foucauldian approaches emphasizing governmentality help us to understand power as relational, positive, and productive, Foucault's emphasis on what Jessop (1990) calls the "dispersed multiplicity of 'micro-powers'" does not connect the praxis of power to the particular "interests" that are served, or satisfied, in any exercise of power (238). Foucault impressed upon us the capillary nature by which power circulates through the social fabric. Ontologically, Foucauldian theses of see power as *a priori* in the Nietzchian sense of the will to power rather than as originating with particular subjects, institutions, or regimes ('interests'). Asking *how* power circulates but not *why* it is exercised in particular ways (and by whom) is a useful exercise, but it does not present us with an entry point for the analysis or critique of power.

There is an established geographic tradition - often attributed to the pioneering work of the late J. B. Harley - of understanding spatial information and its (cartographic) representation as inherently implicated in practices of securing and exercising power. In other words, the 'cartographic project' has always served particular interests (of power). 'Interests,' per Jessop (1990), "presuppose a certain level of structural determination" (238). If we wish to attend to changes in regimes of regulating the production, distribution, and consumption of geographic information, a theoretical lens that allows us to link particular exercises of power to interests is required such that we may engage "the use of institutions, structures and processes of collaboration to allocate [geographic information] resources and … coordinate or control [mapping] activity in society or the economy" (Christophers 2009: 87). Barnett (2003) argues that the nature of these political economic transitions - which constitute an "institutional shift of government from the state to the market" (98) - necessitate a theory of governance precisely because it makes visible the ability of both the state and the market (as structural forms) to accrue and exercise power.

'Governance' is, ultimately for Sunder Rajan (2006), a question of political economy. Late capitalism has facilitated a particular co-articulation of markets, technology, and science that

he terms 'technoscientific capitalism'. In the wake of the 1970s energy crisis, this took the form of radical experimentation with modes of social and political regulation introduced as correctives to Fordist modes of production (Cooper 2007; Haraway 1997; Harvey 1990; Sunder Rajan 2006). In the United States (US), this radical restructuring of labour and production was realized by transitioning away from manufacturing to an "innovation-based economy, one in which the creativity of the human mind (a resource without limits) would replace the mass-production of tangible commodities" (Cooper 2007: 17-18). What is unique to technoscientific capitalism is this very capitalization upon the creative potential of human intelligence (Sunder Rajan 2006; Terranova 2004). It is exactly the kind of creativity that is latent in the crowdsourcing of geographical content over the Web.

Technoscientific capitalism raises questions about the changing balance of powers between the state and private sectors. Fluctuations in state/market dynamics are consonant with the restructuring of the state under neoliberalism. Neoliberalism does not exclusively refer to changes in state dynamics, but it is associated with the emergence of new modes of political-economic governance that may be engaged in terms of policy (the planned transference of public services to the public services to the private sector and the deregulation of markets), 'I'deology (the hegemonic maxim that human wellbeing is maximized by enacting the policy triumvirate of privatization, liberalization, and deregulation), and governmentality (the transference of the onus of responsibility for social welfare to individuals themselves, and the attendant formation of the hyper-responsibilized, entrepreneurial, self-actualizing subject) (Foucault 2008; Larner 2000; Mann 2010; Navarro 2007b; Peck 2004; Read 2009; Rose 2007).

Whether understood as policy, ideology, or governmentality, neoliberalism is nevertheless fundamentally associated with the "restructuring of welfare state processes" (Larner 2000: 6). The introduction of novel modes of political economic governance may be evidenced in the 'rolling back' of the state (Peck and Tickell 2002). Theories of state 'roll back' are not, however, tantamount to the hollowing out of the state (Peck 2004). Neoliberalism, much like capitalism, is always incomplete and contradictory (Larner 2000). Furthermore, it assumes unique forms in different political, socio-cultural, and geographic contexts (Harvey 2005; Larner

2000). It less signals the disappearance of the state than a reconstitution of state power vis-à-vis the market. As per Sunder Rajan (2006), governance, neoliberal or otherwise, is "always already a melding of 'state' and 'corporate' forms and rationalities" (80).

Roll-back/roll-out dynamics are a useful way of thinking through this shift in the balance of power between state and private actors. As categories, they begin to capture - albeit at a very coarse level - the ways in which welfare state processes are being recoded in the image of neoliberalism. The emergence of the geoweb signals a shifting relationship between the state and market entities such as corporations in accordance with neoliberal rationalities that are uniquely structuring the production and dissemination of geographic information.

2.4 Rolling back…

Mapping has always been intimately bound up with the state. The very notions of 'state' and 'map' "developed together and in reference to each other" (Edney 2009: 12). Maps and mapping emerged not only as tools for state-making, but also as instruments of governance (Pickles 2004). The establishment of governmental order via cartographic systems such as cadastres make a land and its people not only taxable, but render them legible and thereby governable (Mitchell 2002; Pickles 2004; Scott 1998). As a complex of the ways in which geographic information is produced, circulated, and represented, the cartographic project is one of a series of 'state projects:' sets of practices that give 'the state' form, delineating it as an internally cohesive entity and endowing it with substance (an exclusive territory, population) (Jessop 1990).

Historically, mapping was not only the responsibility but indeed the preserve of the state or sovereign. The dissemination of maps was strictly controlled, not only for reasons of geopolitical security or strategy, but also because the knowledge they contained was considered democratizing and empowering, and therefore subversive (Hannah 2000; Harvey 1990). The state governed GI in almost all aspects of its production, dissemination, and usage. This

historically tight coupling between the state and the enterprise of mapping is, however, no longer exclusive.

For Michael Goodchild (2009b), the rise of VGI and other geoweb practices signals the end of what he has termed the 'modernist era of mapping.' This era was characterized by the authoritative production of 'the map' by the state, which acted as the purveyor of geographic information and the guarantor of its (in)accuracy (Goodchild 2009b). In the public provision of mapping and cartographic services, the state is now beginning to look to private actors to not only supplement the curation and dissemination of geographical information, but also to take over responsibility for it in instances of, for example, natural disasters such as Hurricane Katrina or the more recent Haitian earthquake. As the state is partially 'rolling back' from the mapping enterprise, distinctly market regimes of spatial data governance are simultaneously 'rolling out.' This is not to imply that the state no longer maintains any role in the provision of GI. In the West (the US and UK in particular), rather, the state's role is changing from that of sole purveyor of geographic information and arbiter of cartographic truth to that of one of many producers and facilitator or institutional body of oversight. Corporations, non-state actors, and private citizens are now performing and fulfilling functions that were long the exclusive preserve of state mapping organizations.

VGI is not the same as the data authored within formal institutional contexts (Elwood 2008a). It diverges from the Spatial Data Infrastructure (SDI) model by which formal agencies made information available through state geodata portals, which secured the 'credibility' of data as vested in the authority of the state producers and cartographic experts (Budhathoki et al. 2008; Elwood 2008a; Flanagin and Metzger 2008). The state, however, is actively undermining itself as the seat of cartographic legitimacy by abdicating itself from serving as the arbiter of geographical truth. Instead, geographical 'truths' are now being created by millions of users. As per Michael Jones, Google Earth's Chief Technologist, the hope is that the dissemination of geospatial tools with result in a "'big number of users converging on a truth'" (cited in Crampton 2009b: 97). This is guided by the premise that people in a place know the 'local' better than an institutional map agency.

It is under this premise that the state is actively looking to VGI as a "[resource] to augment, update, or complete existing spatial databases" (Elwood 2008a: 176) . Goodchild (2007) describes this in terms of a "patchwork" approach to curating and maintaining spatial fabrics, where users supplement existing grids where "public funds and staffing cannot generate a common data set," as in, for example, the annual Christmas Bird count (Elwood 2008a: 176). But the more salient examples are those that demonstrate an increasing reliance of the state upon the mapping practices of its citizens to fulfill functions that it can no longer sustain economically. In the US, spatial data has long been 'free' under the auspices that it was collected using public revenues. The inability of the state to recoup its costs for spatial data has translated into the state recruiting its citizens to 'patch' the national geographical grid. Although now defunct, the United States Geological Service (USGS) began a program soliciting the time of volunteers who, through the National Mapping Corps, would contribute spatial information to the US National Map to spare agency resources (Sui, 2008). The US Census Bureau, which is one of the largest public producers and distributers of public spatial data in the US, now uses volunteers to collect information on the homeless (Sui 2008).

These examples, though few, are indicative of the state's devolution of (cartographic) responsibility to individual citizens (Rose 2007). Elsewhere, the state is also actively looking to the corporation as both content provider and spatial delivery mechanism. The much-cited aftermath of Hurricane Katrina is illustrative in this regard. On the day after Hurricane Katrina made landfall on August 29th, 2005, Xeni Jardin, of the popular *Boing Boing* blog (boingboing.net), commented on previous posts advocating the use of Google Earth to analyze US National Oceanic and Atmospheric Administration (NOAA) imagery that had started being flown earlier that day (Jardin 2005). Specifically, the blogger was suggesting using Google Earth to visually map out areas that had been affected, and to mark the extent of the inundation as a means of helping residents identify whether or not their properties had been flooded. NOAA flew high-resolution aerial photo non-stop for ten days in the immediate aftermath of the disaster, taking over 8,000 images (Nourbakhsh et al. 2006; Yarbrough and Easson 2005). NOAA then passed the images on to the Carnegie-Mellon University-based Global Connection Project

(GCP) to process the imagery. GPC members calculated the proper alignment of the images, georeferened them against Google Earth, and disseminated them as KML files to be overlaid with Google Earth such that they could be used by emergency responders on the ground (Nourbakhsh et al. 2006; Yarbrough and Easson 2005). This was deemed a much more efficient means, over the use of OGC[6] standards, of making the most current and relevant information available for crisis response (Haklay 2008).

While the state (NOAA) was the primary supplier of data (aerial imagery), it turned to private citizens (GCP) to process that information and relied on a proprietary technology, Google Earth, as a platform for not only disseminating that data, but also rendering it *meaningful* - both useful and useable. NOAA's use of Google Earth and GPC evidence an increasing incidence of state reliance upon lay citizen mapping and the use of proprietary Web-based geovisualization technologies. More importantly, it represents a political economic reconfiguration of the state vis-à-vis the cartographic project.

Although state power is being reconstituted in relation to mapping, the state retains a presence in the 'brave new world'[4] of the geoweb. This is demonstrated by, for example, recent state-level attempts to regulate Google Street View, a perspective available in Maps and Earth that allows users to view high-resolution panoramic images taken at street-level along roads in major cities throughout the world (Elwood and Leszczynski 2011). The governments of several industrialized countries, including those of Canada, Japan, Switzerland, Greece, and Germany have charged that the technology, and the inconsistency of blurring algorithms for eliding identity (faces and automobile license plates), constitute serious privacy violations (BBC News 2009; Timmer 2009; Schmidt 2009; Siddique 2009; Williams 2009; Wong 2009). These states have accordingly attempted to restrict, with various degrees of success, Google's Street View imaging and data handling activities. Mandated privacy 'fixes' include improvements to blurring algorithms, advanced public notification of imaging, lowered camera heights, and finite raw

[6] Open Geospatial Consortium, a consensus-driven organization for geographic information standards.

image data retention periods (BBC News 2009; Capper 2009; Kirk 2009; Paul 2009; Schmidt 2009; Timmer 2009; Wong 2009; Zafra 2009). The state is still very much present with respect to geoweb activities, but its role is fundamentally changed from that of sole or dominant provider of geographic information to its citizen base to, in the case of Street View, a regulatory body of oversight and an intermediary between citizens and corporations (Elwood and Leszczynski 2011).

Following Peck (2004), the neoliberal state continues to intervene, albeit in an entirely different capacity. Rather than intervening on the behalf of labour, it functions to create conditions for private enterprise (Peck 2004). The reduction of the role for the state in the enactment of neoliberal policy agendas, as well as economic pressures which further underwrite the partial withdrawal of the state from the 'cartographic project,' are creating conditions for the entry of non-state entities into the provision, dissemination, utilization, and visualization of geographic information. As they secure an increasing presence in the enterprise of public spatial data provision, these entities are subsuming geographic information to distinctly market-based regimes of governance.

2.5 …and rolling out

The 'rolling out' of' corporate' regimes of spatial data governance is consonant with new, post-dot.com logics of free labour, private ownership, and supra-accountability that may be framed in terms of the imperatives of technoscientific capitalism. Free labour, private ownership, and unaccountability are not exclusive to, nor sufficiently definitive of, technoscientific capitalism, nor of neoliberalism. Rather, they constitute three dimensions of contemporary political economy - which we may call neoliberal - in which the market regulation of the geoweb is particularly (and increasingly) evident.

2.5.1 Free labor

The ethos of technoscientific capitalism is that it valorizes not just the accumulative tendencies of capitalism, but its creative propensities, realized through crowdsourcing. To invoke Tapscott and Williams (2006), the champions of this new mode of capitalism, "the object of production is information or culture, which keeps the cost of participation low for contributors" and the cost of production low for capital (70). Haklay (2008) summarizes this with reference to the geoweb as an ease, on the part of 'Where 2.0' companies, with exploitation: companies happy not only to avoid paying market value for cultural commodities, but happy to use crowdsourcing without giving anything in return. This represents a new mode of capital accumulation in that it does not necessitate the extraction of profit from surplus labour. It is rather premised entirely on free labour.

Terranova (2004) theorizes 'free labour' as characteristic of the business models of many Internet startups. She argues that the Internet is the vanguard of the extraction of profit from "continuous, creative, innovative labour" given either freely or at nominal cost (90). The dependence of companies such as Google upon freely and continuously volunteered 'piecemeal' labour is discernible in the fallout of Google Maps' 2009 dropping of NavTeq and TeleAtlas as its longstanding spatial data providers, and the introduction of it's own, Google-branded base data (Batty 2009b; Schutzberg 2009b). The quality and accuracy of this data proved sporadic and lacking in multiple instances, including glaring errors such as the misnaming or entire omission of places. For example, Canton, OH was identified as 'Colesville,' a non-existent town (Pritchard 2009). Bloggers detailed their experiences of reporting these errors to Google and the frustration they experienced in terms of the lack of accountability, delays, and incorrect error rectification on the part of the company (for examples see Ball 2009b; Batty 2009a). What is interesting is that Google was depending upon lay volunteers to identify and report errors to its map base. The company has been using this feedback as the basis for correcting and updating its map data. Google's utilization of the free labour of its citizen cartographers is all the more apparent in the instance of its Map Maker application, a wiki that allows users to submit edits

to the Maps data fabric. A good portion of this feedback has become assimilated or incorporated into the Maps framework (Siegler 2009).

Certainly not all the voluntary labour of citizen cartographers is co-opted for corporate profits, as attested to by the prominent example of OpenStreetMap (OSM). OSM is a free and open-source (FOSS) online spatial data fabric that is entirely crowdsourced by volunteers. It was started in the UK in response to the prohibitive costs of accessing and using state-curated spatial data from the Ordnance Survey (OS). Until very recently (April 2010; see Stratton 2009), maps and map data were not in the public domain. As FOSS, OSM is not a corporate entity *a la* Google, and users contribute, at least in part, because they know and feel that they are contributing to a common good by building and enrichng a public resource, and not furthering the profits of Internet giants (Eckert 2010). While its labour may not be coerced or captured by corporate logics upstream, this does not mean that OSM exists outside of market logics. The entity that freely runs OSM's hosting server, Bytemark, a for-profit company, does so in exchange for having their name displayed on the OSM portal - an excellent marketing opportunity. The motivations for some of the leaders and founders of OSM are likewise not entirely unaffected by market rationalities. Steve Coast, who started OSM, launched a company, CloudMade, with parters (Eckert 2010). CloudMade, funded by millions of dollars of venture capital, is a for-profit company that markets software development kits (SDKs) that allows users to build applications over top of OSM, as well as the resale of other value-added datasets. For CloudMade to be profitable, OSM must be gathering data (i.e. requires the labour of volunteers), and this data needs to be accurate (Eckert 2010). The establishment of a corporate entity (CloudMade) that is based upon FOSS data (OSM) is but an example of 'wikinomics' - a new way of 'doing business' that is premised on the ability to generate profits from the commons of a (freely) crowdsourced Web (Tapscott and Williams 2006).

2.5.2 Ownership

While CloudMade is a corporate entity that is privately owned, no one 'owns' OSM. The corporate ownership of geographic information nevertheless deserves consideration as it

represents a significant shift in terms of how spatial data is governed. I turn again to Google. While Google grants 'free' access to its API, it has not made its source code available. It is the source code that counts for Google, which has been able to secure market share in the provision of GI over the geoweb. For Internet law scholar Jonathan Zittrain (2008), this is indicative of the *contingency* of Web 2.0: it is generative in the sense that users can deploy and operationalized applications from one Web site on another, but these applications are still 'tethered' to the extent that they are proprietary to a vendor/curator (in this case, Google). This contingency is the very definition of ownership, the "inherent logic" of which, after Sunder Rajan (2006), "is that the owner can decide what to do with the object (that has, by virtue of its objectification, become alienable) owned" (54). Fleshing out the implications of the unique keys needed to activate the Google Maps API, which the company may reserves the right to revoke without explanation, Zittrain (2008) argues that

> [they put] within the control of Google, and anyone who can regulate Google, all downstream uses of Google Maps – *and maps in general, to the extent that Google Maps' popularity means other mapping services will fail or never be built*.
>
> (54; epmhasis added).

Google further reserves the right to advertise anywhere its Maps API is used, retaining the lion's share of these advertising revenues, which for its geospatial services/applications alone, ranges in the billions of dollars annually (Blamont 2008; Crampton 2009b; Gordon 2007; Tapscott and Williams 2006).

Questions of ownership become paramount when corporate regimes of spatial data governance interface with 'the state.' In 2008, the province of British Columbia (BC), Canada signed an agreement with Google under which it received five annual 'Pro' Google Earth licenses for free, allowing employees at several ministries to print satellite imagery accessed through the service at high resolution and capture video of fly-overs, etc. (Shaw 2010). In exchange, the province agreed to provide Google with all of its publically-funded high resolution satellite imagery for BC, as well as to spend its own time and monetary resources to convert its base map data into Google's proprietary KML format (Shaw 2010). The province still owns the data,

and government representatives have stated that the wholesale conversion of data into KML was to allow the public to view geographic information using software that many people already have access to rather than requiring users to acquire specialized, expensive GIS that requires expertise to operate (Shaw 2010). As of 2009, however, the province began having to pay thousands of dollars annually for use of the Pro licenses; the agreement had only been inked for one year (Shaw 2010). The fine resolution imagery given to Google as part of the deal is extremely valuable to the company as it enriches its image base indefinitely, whereas the province benefitted for only a year. Because many ministries use Pro to model flood and drainage dynamics, for example, the government is now essentially paying Google in the form of Pro licensing fees to view its own data which they themselves converted into KML (Shaw 2010). While there are certainly other mapping APIs out there, many of which have likewise been made public - including those of Yahoo and Microsoft (Budhathoki et al. 2008) – ownership is being consolidated in the hands of corporations, if not necessarily of the data itself, then through intellectual property rights particular to corporate regimes of governance.

2.5.3 (Un)accountability

Crampton (2008b) asserts that the ownership of mapping applications by Google represents an enclosure of the geographic information commons that affects its (future) availability. Under state regimes of governance, the potential for citizens to mobilize appeals to the state to make publically funded data available is reserved. This occurred under the auspices of the 'Free Our Data' campaign organized by *The Guardian* newspaper in the UK, where the OS maintained copyright over geodata and bound users to very strict licensing agreements (Crampton 2009b; Haklay 2008). The private corporation is not similarly responsible to its customers. In the case of Google Street View, individuals who do not wish to be part of the 'scene', or who feel that their privacy has been invaded, may request to have images removed through Google's 'Report a problem' widget. Google, however, does not have to comply with these requests – it does so only of its own volition. In the absence of global regulatory mechanisms, there is no baseline against which to establish any form of best practices or

impose a universal code of corporate social responsibility upon the company. With Street View, however, because Google sources its imagery directly within national territory, state governments have some regulatory recourse as Google's ability to operate on a country's soil is contingent upon its compliance with extant legislation and norms (such as privacy protections). Thus, the privacy arms of several states, including those of Canada and Britain, have informed Google that they will monitor the company to ensure that citizen requests for image removal are met (for a more comprehensive review, see Elwood and Leszczynski 2011)

Nevertheless, where Google physically collects data within national borders, Google has not always been compliant with the operational requests of nation states, ceding to privacy-related demands in one place yet refusing to meet identical mandates elsewhere. A case in point is the requests for lowering the heights of the digital cameras mounted to Street View vehicles made first by Japan and subsequently by Switzerland. Google complied with the Japanese request, re-imaging the entire country in May of 2009, yet refused to meet similar Swiss demands (Bradley 2009; Rodrigues 2009).

This erratic behavior not only infringes upon individuals' rights to anonymity, for which they have no enforceable recourse, but also has geopolitical implications. Historically, Google has ceded to pressure by the Indian, Chinese, and Pakistani national governments to adapt sensitive images by pixilating imagery of secret sites, and uses lower-quality imagery for 'areas of concern' even when higher-resolution data is available such as its dithering of Basra, Iraq satellite imagery (Blamont 2008; Crampton 2008a; Nourbakhsh et al. 2006; Zook and Graham 2007a). Yet Google has continued to release imagery of South Korean strategic sites, sensitive if even by virtue of their geopolitical position next to their Northern cousin (Zook and Graham 2007a). While it has been differentially responding to military requests worldwide, which bears with it potentially global security implications, Google has been dithering and pixilating corporate headquarters and campuses at the behest of business actors (Zook and Graham 2007a).

It is for these reasons that Crampton (2008a) describes neogeography as 'mapping without a Net.' 'Without a Net' refers to the absence of safety nets such as citizenship rights,

but also the eroded ability of states – even in the form of controversial military apparatuses - to regulate the dissemination of geopolitically sensitive spatial data. Although they make recourse to a single company, Zook and Graham (2007a) refer to this as "Google governance" (1334) – a form of governance that is altogether erratic in terms of enforcement, entirely unaccountable, and represents the enclosure of the Internet rather than its democratization. This regime of governance is by no means unique to Google, however, but itself broadly implicated in a series of shifts in governance dynamics between the state and the market.

2.6 Relationships, changed

The emergence of 'Google governance' is simultaneously implicated in, and contingent upon, a reconfiguration of the state's relationship to the cartographic project. The partial withdrawal of the state from the public provision of GI opens the production and dissemination of geographic information to the market, where private actors subsequently engage 'mapping' as an opportunity for capital accumulation. Profit is by no means the only incentive driving the proliferation of geographic information, applications, and services over the Web. Nor are corporations the only force motivating the diminished role of the state - in particular capacities - from mapping. Citizens are active participants in driving a reconstitution of the cartographic project beyond the state. OSM was started in the UK in 2004 as a citizen response to the lack of publicly available geographic information. It was furthermore organized campaigning on the part of citizens that resulted in the recent public release of Ordnance Survey (OS) data in April 2010 (Stratton 2009), a profound shift to historical regimes of spatial data governance in Britain where the OS had maintained geographic information as the preserve of the state via strict copyright and steep cost for access to and use of the data.

The online presence of OSM has not in any way replaced state mapping activities. The OS continues to provide authoritative, high-resolution data accurate to within a meter (Atkinson 2010). It is a dominant GI producer, generating enormous amounts of data with up to 5,000 edits to the national MasterMap a day (Atkinson, 2010). The 'roll-back' of the state from the

'cartographic project' is partial, and is discernible most immediately the ways in which 'netizens' (Internet users) both access and interact with geographic information, rather than the wholesale displacement of state mapping by corporations and other non-state entities. Net citizens now access data from non-state sources that may be considered 'market' to differing degrees. The production and dissemination of GI to the public is increasingly controlled by these non-state entities through their geospatial services and applications, even when the data they serve is 'state' in origin. This is the case in the American context, where state-produced data comprises a significant portion of Google Maps' US base geometry (Dobson 2009). Google however brands this data as its own (© Google). This is possible given a culture where GI collected by the state using tax dollars is publicly available and may then be leveraged at no cost by market actors who subsequently own any 'value added' to the data (Dobson 2009). This is similarly true of Bing Maps, though Microsoft also continues to also use commercial data providers for the US.

The prolific successes and public nature of these online presences change the relationship of citizens to GI. These changes in how citizens relate to 'the mapping enterprise' have subsequently transformed interactions between the state, non-state mapping entities, and geographic information. In late 2010 the Winchester, MA planning department requested local council funding to update its GIS (Petrishen 2010). This was denied, in light of budget shortfalls, due to the misconception, held by council members, that aerial imagery would not provide anything that could not already be acquired from Google Earth (when indeed Google Earth imagery was often not high enough in resolution, or had too much tree cover to be useful for modelling or planning; Petrishen 2010). The consequences of the esteem of applications and services such as Google Earth or Bing Maps in the public consciousness are much more serious when they are geopolitical. In November of the same year, the Nicaraguan military used erroneous Google Maps geometry of the final stretches of the Rio San Juan - which demarcates the Nicaragua/Costa Rica border - showing a portion of Costsa Rican territory as lying within Nicaragua as an excuse to invade the area, which Nicaragua maintains rightfully belongs to it

despite international recognition otherwise (Carr 2010; Geens 2010). Costa Rica subsequently appealed to *both* the Organization of American States (OAS) *and* Google to intervene in the dispute (boz 2010): a clear indication of the emergence of market-based regimes of geographic information governance, even at the international scale. Google, however, claimed that it was not responsible - i.e., unaccountable for any fallout - citing the source of the data as the US State Department (Geens 2010).

2.7 Conclusion

'The state' and 'the market' are coarse categories, and the shifting power dynamics between these two entities are not as cut-and-dried as 'roll-back'/'roll-out'. In the first instance, the roll-out of market-based regimes of geographic information governance does not signal the eclipsing of the state by the market. The issue, as evidenced throughout this chapter, is one of *complementarity* - of a co-occurrence, in many cases, of both state and market-based geographic information governance regimes. Evidenced by the rise of non-state entities in the provision and dissemination of GI and a reconfiguration of the role of the state in certain of its mapping capacities, this coexistence is not always a happy one. Market actors are not simply picking up where the state leaves off. Corporations are aggressively challenging - and competing against - state control of the cartographic project. Google and the Ordnance Survey are embroiled in legal action over Google's desire to include high-resolution OS data in its (Google's) map fabric of the UK (Atkinson 2010). The OS objects to Google's licensing clauses, which stipulate that Google reserves the right to license - i.e., effectively owns - any downstream uses of Google Maps data, regardless of who the original data producer is (here, the OS; Atkinson 2010). Google, on the other hand, is citing favoritism as OS data is available through both Bing and Yahoo Maps (Atkinson 2010).

Similarly, geoweb praxes are not 'market' by virtue of being non-state. In the era of the geoweb, this boundary is not clearly discernible. Online presences such as OSM present new hybrids that do not fit a neat 'state'/'market' dichotomy. OSM is freely volunteered; this does

not however mean that it exists entirely outside of market logics. Bing Maps recently began including OSM as a data layer (Jeffries 2010). According to a popular blogger (Fee 2010), the marriage of Bing and OSM allows Microsoft to compete with Google where Google data is comparatively less detailed or does not have as established a presence (Western Europe, for example). OSM in turn gets to use Bing's high-resolution imagery.

Moreover, the state makes the difference. Governments are not responding uniformly to geoweb presences. Individual states' responses to Street View have been distinctly unique, with states seeking the instatement of different privacy mediation measures (Elwood and Leszczynski 2011). The privacy apparatuses of these countries are furthermore distinct. Whereas most European countries and Canada have privacy commissioners or data protection branches, in America, privacy is considered a legal entity, and claims against Street View privacy violations proceed through the courts (Elwood and Leszczynski 2011). The free curation and circulation of geographical information characteristic of many of the instances cited here, is not a worldwide reality. In China, mapping and surveying are activities restricted to the State Bureau and subject to arrest, a fate met by a group of Chinese students collecting VGI in 2008 (Ball 2009a). Here, the state and the cartographic project remain tightly coupled. Even in places around the world where there is evidence that the state *is* rolling back from the public face of mapping, where it seems to disappear in one capacity (as the sole provider and 'governor' of geographic information), it reappears elsewhere - e.g., militarily.

The extension of state mapping activity to the military is nothing new. Many geographic information technologies (e.g., GPS, satellite) are military in origin. Goodchild (2009b) however notes that the US military is actually ramping up spatial data production for strategic and other military purposes. This data, though funded by public monies, is not in the public domain (Harvey 2007). On the one hand, the state is no longer acting as the singular source of geographic information, seeming to partially 'roll back' from sole responsibility for the cartographic project; on the other, it is strengthening it grip on the cartographic project in ways that further remove particular aspects of mapping from the public sphere.

These caveats notwithstanding, roll-back/roll-out and state/market are useful for thinking through the ways that the geoweb signals, and is heralded by, a neoliberal recoding of the production, distribution, and institutionalization of geographic information. As argued in this chapter, the increasing marketization of spatial data regimes may be evidenced in how GI is regulated in terms of labour, ownership, and accountability. Geographers such as Zook and Graham (2007a) and Harvey (2007) have begun to consider the changing political economy of geographic information. Yet without an attention to political-economically driven shifts to regimes of how spatial data is produced, distributed, structured and institutionalized, Zook and Graham's (2007a) nod to 'Google governance' on its own suggests that the ability of Google to capture geoweb market share is based on its corporate prowess or the soundness of Google as a business model (for an extreme example, see Lee 2010). I have sought to build upon these initial accounts by situating the geoweb within a political economic context that allows us to understand these new online presences and attendant practices as implicated within a much broader restructuring of governance regimes affecting state processes and projects that include, but are not limited to, the cartographic project.

This is significant for our thinking about the geoweb because it enriches our narratives of geoweb genesis beyond simply the enabling technical developments and business solutions of Web 2.0. Such a narrative suggests that the geoweb is the result of autonomous technological change, eliding the ways in which technology is always socially produced, contingent, and contested. As socially produced, the geoweb is coincident with real-world political-economic processes that structure the forms that geoweb phenomena assume, whether as data, technological media, or practices. One of the ways in which the geoweb is socially produced is through discourses that 'fix' particular kinds of representations of, and representative practices around, geoweb technologies and their societal effects. These representations and practices serve certain interests - such as the interests of capital – and work to effect particular kinds of changes in the world. In the next chapter, I identify and examine 'discourses of neogeography' that present geoweb technologies as always-already 'new' and leverage the newness of these

technologies so as to socially naturalize them, sustain their continuous proliferation and profitability, and justify and legitimate their social implications.

CHAPTER 3

DISCOURSES OF NEOGEOGRAPHY

> …make no mistake that current trends... will continue… in my opinion, it's the technology that's evolving, blending into the background and disappearing. This will have [a] natural effect…
>
> (Dollins 2009, n.p.).

3.1 Introduction

Since 2005, location has assumed ever-increasing importance with respect to how Web content is organized, 'marked-up' (described), indexed (made searchable) and retrieved (Crampton 2009b; Haklay et al. 2008; Leszczynski 2012). Andrew Turner (2006) proclaimed this ascendance of geographic information over the Web and the opportunities this has created for non-expert cartographers to produce, share, and utilize user-generated locational data online to constitute the dawn of a "new geography" termed "neogeography." As defined by Turner (2006), neogeography is comprised of emergent Web-based geographic information technologies - including spatial encoding standards, applications, programming techniques, and Web services – that supersede and break with conventional mapping practices and hardware/software objects, namely GIS. More important than the enabling technologies and their affordances, many of them associated with Web 2.0 interactive functionalities and participatory frameworks, is what Turner (2006) sees to be the essence of this 'new geography': it is "people using and creating their own maps, on their own terms… about sharing location information with friends and visitors, helping shape context, and conveying understanding through knowledge of place… Lastly, neogeography is about fun" (3).

Turner's definition of neogeography speaks to many aspects of new practices associated with Web-based spatial media (*see Chapter 4*) – for example, the opening up of spatial information technologies and mapping to individuals without formal cartographic training; or, the ways in which user-generated geographic information serves to enrich Web content with

semantic and spatial context. Geographers have themselves proffered many neologisms for the associated phenomena of the emergence of location-oriented applications and services for curating and sharing geographic information online, practices of attributing Web content with locational referents, and new spatial data forms. These include 'volunteered geographic information' ('VGI'; Goodchild 2007), 'Maps 2.0' (Crampton 2008b; Crampton 2009b), 'Where 2.0' (Newitz 2006), the 'wikification' of GIS (Sui 2008) and 'GeoWikis' (Guptill 2007); 'new spatial media' (Crampton 2009b), and, the 'geospatial web' or 'geoweb' (Scharl and Tochtermann 2007). Originally used to designate the practice of merging Web-based content with geographic information, 'the geoweb' is perhaps the most expansive and inclusive of the terms geographers have tendered and/or adopted to denominate these significant shifts that may be evidenced in the production, circulation, interaction with, and governance of geographic information online. Elwood and Leszczynski (2011) define the geoweb as not only georeferenced content, but indeed as the aggregate of new forms of spatial data and of encoding geographic information; attendant data practices for the curation, sharing, and use of this content; and, new hardware/software objects (technological devices, applications and services, architectures, etc.) that enable practices around new spatial data forms.

Whereas geographers have seemingly coalesced around ' the geoweb' as a term to designate new technological emergences and the articulation of space and digital media, 'neogeography' has never been widely adopted or used by geographers. Goodchild (in Wilson and Graham 2012a) attributes this to a disaffection amongst GIScientists towards the implicit attempt, on the part of the Web 2.0-centric business and computing interests responsible for the branding of 'neogeography,' to reinvent the discipline of geography. This 'new geography' is framed as one in which expertise – in particular, the expertise needed to understand spatial relationships and analyze geographic data, as opposed to merely contribute and use locational content – is no longer salient or even necessary (see Wilson and Graham 2012a). I argue, however, that our disciplinary silence on 'neogeography' extends beyond a collective unease with geography being ostensibly co-opted from the outside. Unlike naming conventions such as 'VGI' or 'new spatial media', which emphasize different facets of the same phenomenon (e.g.,

highlighting practices of data curation, or emphasizing constitutive materialities; see Elwood 2010), 'neogeography' does not speak to or capture distinct aspects of the convergence of location with digital media in the same way. Rather it is a discourse, what Foucault (1990 [1976], 1995 [1977]) advanced as a 'theory of interests' that describes how power produces knowledge in its own service by defining, fixing, and policing the terms of representation and behavior around particular subjects and objects.

More specifically, discourse serves to explain how power secures, defines, and produces particular representations or texts as 'knowledge,' which itself is a form of power (Foucault 1980a, 1995 [1977]). In *The Archaeology of Knowledge* (1972), Foucault writes that 'discourse' may be defined

> sometimes as the general domain of all statements, sometimes as an individualizable group of statements, and sometimes as a regulated practice that accounts for the number of statements
>
> (80).

Discourse, then, involves the regulation of the use of language, which is organized such that groups of statements are made to seem coherent (Mills 1997). These coherent discourses are themselves the result of discourses ("rules and structures") which produce those utterances and statements as being internally consistent (Mills 1997: 7).

As per Macdonnell (1986), however, discourses are not mere 'groupings' of utterances which appear cohesive. Rather, they are statements that have "meaning, force and effect" only "within a social context" (11). Not only are discourses exercised, or "enacted," within a social context, but they "contribute to the way that social context continues its existence" (11). Discourse is a fundamentally a social relation. It concerns not only the limits to acceptable speech, but the limits to speech which make it acceptable such that it may be *heard* (Butler 1997), i.e., such that it has desired social consequences. Discourse(s) may in this sense be considered hegemonic - they are a way of securing power, and willful, continued acquiescence to that power.

What is "'put into discourse,'" and *how* it is discursively framed always reflect the interests of power. For example, the discursive repression of sexuality is a means of controlling

populations (by making them go to confession and pay reparations for their sins more frequently; by keeping women subservient to men, etc.) (Foucault 1990 [1976]: 11; 1995 [1977]). Yet 'discourse' is not an object which can be made reference to in and of itself, but it is rather something which is first and foremost *productive* – producing "the objects of which [it] speaks," such as knowledge, or 'T'ruth (Mills 1997: 17). Moreover, there is no singular or monolithic 'discourse,' but rather a series of 'discursive formations', or historically-contingent "clusters of ideas, images and practices" (Hall 1997: 6). And although discourse, as a social relation, cannot be isolated as a monolithic or singular entity, the "effects of power" latent within and/or emanating from particular discursive formations may be identified from "the systematicity of the ideas, opinions, concepts, ways of thinking and behaving which are formed within a particular context, and because of the effects of those ways of thinking and behaving" (Mills 1997: 17).

In claiming that neogeography is a discourse (or discursive formation), I am arguing that it is a particular framing of recent geographic information technologies as 'neo.' Consonant with this framing, 'newness' is leveraged as a discursive tactic to engage and (re)present Web-based spatial information technologies and practices around these technologies in ways that promote and preserve specific interests vested in their propagation and adoption and that effect particular kinds of results in the world. These interests may be discerned in the non-disciplinary language used to describe, define, and brand geoweb phenomena as 'neo.' These interests are also evident in the social effects of such framing(s), for example, in the ways and ends towards which newness is operationalized as a means of normalizing or rationalizing certain kinds of social relationships and/or enacting particular visions of the relationship between technology and society. Simultaneously, neogeography frames both disciplinary geography and geoweb technologies in ways that advance and protect the interests of business and technical interests whilst preempting responsibility for the societal consequences of those technologies and simultaneously creating conditions for their continued proliferation (and profitability).

The branding of a 'new' geography is a political act. Discourses of 'neogeography' are de-politicizing devices which reflect, and act to secure, the social and economic interests of the professional and private sector that lie behind the pronounced shift in regimes of geographic information at all levels of data, technologies, practices, and spatial content production, dissemination, and use (see *Chapter 2*). Hailing the Internet as the "vector of a new geography," (Holmes 2006: 20), discourses of neogeography reify constituent technologies and data practices as not only inevitable results of linear technological progress, but as also radically divergent from their 'paleo' antecedents (geographic information systems, or GIS). Defined as substantively unlike the 'old' geography, neogeography discursively positions itself and its constituent technologies (information artifacts and technological devices) beyond the critiques of representation, surveillance, and knowledge politics that were definitive of geographers' engagements with geographic information technologies under the rubric of Critical GIS.

Connin (2010) has observed a waning of references to the term 'neogeography' across Web content in recent years, which he attributes to the widespread "acceptance" of "the new mapping democracy" (n.p.). While geographers have never expressed overwhelming affinity for the 'neogeography' handle, our preoccupation with disciplinary boundaries has diverted their attention away from the equally and perhaps more important societal implications of discourses of neogeography. I argue that a critique of the 'neo', heretofore missing from the geoweb literature, is necessary to identify how discursive framings of recent, Web-based geographic information technologies as always 'new' do 'work in the world' despite decreases in instances of encounters with the term 'neogeography.' These discourses de-politicize geoweb technologies so as to lay the groundwork for their social naturalization by presenting them as inevitable outcomes of technological progress. At the same time, the interests (social actors) behind the design and dissemination of these technologies make recourse to the 'newness' of these technologies as a means of disavowing themselves of any responsibilty for their social consequences. By framing geoweb technologies as always-already 'new,' these interests simultaneously use 'newness' as a profit model by ensuring an undepletable arsenal of 'new' technologies available for continuous adoption by neoliberal subjects primed to self-actualize

through their consumption. Rather than being solely discourses *about* neogeography, discursive constructions of the 'neo' may be evidenced in the *effects* of the leveraging of 'newness' as a discursive tactic: in its de-politicization of the geoweb, in its use as a rationalization of the social consequences of these technologies, and in the way that it is used to secure their profitability and proliferation.

3.2 Neogeography

Though often attributed to Turner (2006), 'neogeography' was originally coined by Platial.com's Di-Ann Eisnor in 2006 to describe the flourishing of a multitude of practices around what were at the time relatively novel Web-based geographic information technologies that allowed non-expert cartographers to not only access spatial content, but also curate and share user-generated geographic information. What Eisnor and Wilson (2006) saw as making these practices 'neo' was that regardless of whether they "operate[d] outside of, or alongside, or *in the manner of*, the practices of professional geographers… they …usually don't conform to the protocols of professional practice" (n.p.; emphasis in original). For Eisnor and Wilson, these practices were consistitutive of a "new geography" because they made no "claims on scientific standards" or methodologies, nor did they purport to be 'geography' in the scientific sense (understanding geography as a science) (n.p.). As succinctly stated by Elwood et al. (2011), 'neogeography' in Eisnor and Wilson's invocation referenced the erasure of "traditional distinctions between professional geographers and others" brought on by the proliferation of Web-based spatial information technologies, which made geographic information technologies instantaly 'publicly' accessible (4).

Eisnor and Wilson (2006) identified a 'new' geography that was methodologically "idiosyncratic," operating at times outside of, at others alongside and/or "in the manner of" traditional geographic practices (n.p.). It is however the 'outsiderness' of geoweb technologies, specifically their 'outsiderness' to the practices and technologies of GIS, that has become (mis)appropriated within dominant discourses of neogeography, where it is the dissassociation

of geoweb hardware/software objects from GIS that is seen to comprise their very 'newness.' For example, in his formative volume, Turner (2006) defines neogeography by distancing it from GIS; for him, this 'new geography' is constituted by a "set of techniques and tools that fall outside the realm of traditional GIS" and cartography (2). The conflation of GIS and disciplinary geography inherent in these definitions is arguably part of what has distracted geographers from engaging neogeography as more than an attempt to rebrand the discipline. The suggestion that GIS and (disciplinary) geography are interachangeable reignites anxieties of the 1990s 'GIS wars' (Schuurman 2000), precluding geographers from pursuing other important questions, such as the ways in which the purported 'newness' of these technologies is utilized as a discursive tactic that serves and is levraged to secure the interests of capital.

For Turner, it is not only that neogeographic technologies and practices are a distinct genre of technologies and practices as compared to GIS, a point on which I am in agreement (see *Chapter 4*). Rather, the rise of neogeography has rendered GIS irrelevant; as he states elsewhere, neogeography has "killed GIS" (Turner 2009: n.p.). This is a sentiment shared by Steve Chilton (in Treves 2007: n.p.), who, while claiming to not be a 'neogeographer' himself, applauds the 'new' geographers (and –cartographers) for their desire to "turn [cartographic] principles on their head and even throw them out altogether." This euphoric disdain for 'paleogeographers'[7] and their technologies is echoed again by Turner (2009). In response to his own rhetorical question of how neogeographers see 'GISers,' he (Turner 2009) responds that "…they don't" (n.p.) "[We]" – neogeographers – "[are] from the Internet" he proclaims (Turner 2009: n.p.). The implication of these statements is that the privileged status of this group, derived from the Web-savviness of its members, is sufficient for rhetorically writing off any and all non-Web.20-generation spatial technologies and their practitioners. In the keynote address to the same conference at which Turner (2009) made his latter comments, Peter Batty (2009c) compared GIS to the proverbial 'cake' that Marie Antionette (GISers) suggested peasants eat in lieu of bread (openly-accessible mapping technologies).

[7] 'Paleogeography' – and 'paleogeographers' – originally coined by Renee Sieber (2009).

While Batty (2009c) does not set up neogeography in opposition to GIS *per se* in the slides made available from his presentation, equating GIS users with Marie Antionette implies that GIS practitioners are opposed to the opening up of geospatial information and technologies to the non-expert masses; that they are somehow anti-democratic, with Marie Antoinette forever a symbol of elitism, entitlement, and extravagance. This is the flip side of arguments that neogeography is inherently democratic, where this value of being 'democratic' is purportedly derived from neogeography *not* being GIS (see for example Connin 2010; Meier 2011). In all of these instances presented above, the defining essence of neogeography is precisely that it is 'not GIS'. This is an important discursive tactic that serves to distance geoweb technologies and devices not only from antecedent technologies such as GIS, but also, and more importantly, from disciplinary geography. Geography as a discipline has always been closely bound with GIS, claiming the technology as its own and closely policing its boundaries, whether celebrating or critiquing it. The distancing of geoweb technologies and practices from 'G'eography may also be discerned in attempts to appropriate GIS within discourses of the 'neo,' claiming them for the 'new' geography. This is accomplished either by disrupting the association between GIS and the discipline, as may be evidened in Howard's proclaimation (in Schutzberg 2011) that GIS is "not really about geography at all: [it is] really about locations" (n.p.), or by suggesting that GIS will eventually be assimilated within the broader phenomenon of neogeography as

> current trends [towards Web-based spatial media]… continue to the point where 'GIS' components of such systems will be in-distinguishable from the rest
>
> (Dollins 2009: n.p.).

While important, all of these debates regarding disciplinary boundaries and the conflation of geography, GIS, and cartography have effectively ignored the more important societal 'work' done by discourses of newness. As such, they have failed to attend to the societal impacts of both geoweb technologies themselves and the ways in which they are framed and represented in popular culture. The leveraging of 'newness' to break the association between geoweb technologies ('neogeography') and GIS/Geography/cartography is not only

about shifting disciplinary boundaries. It is a discursive tactic that works to preempt critique and effectively de-politicize and de-historicize geoweb technologies so as to socially naturalize them.

3.3 'Newness' as a de-politicizing device

One of the enduring legacies and contributions of Critical GIS is that it has demonstrated, and continues to remind us, that geographic information technologies are always socially constructed and contested. Critical GIS scholarship disputed the presumed neutrality of GIS and related technologies, and challenged GIS practitioners and theorists to clarify the ontologies of their objects and epistemology of their subject(s). By reifying Web-based spatial information technologies as radically divergent from their 'paleo' antecedents (GIS, and its theorists and practitioners), discourses of neogeography position participating technologies as beyond the polemics of representation, surveillance, access, and knowledge production that Critical GIS theorists maintained always plague geographic information technologies and praxes. In other words, this distancing of the geoweb from GIS (and thereby the rest of disciplinary geography) is a device that works to strip these technologies of political content. Discourses of neogeography use 'newness' to pre-empt and negate any critiques of participating technologies and their attendant practices, of the subjectivities it presupposes and engenders, and of the social consequences of its information artifacts and technological devices.

The very proclamation of a 'new' geography pejoratively relegates disciplinary geography and its technologies to the status of 'paleo.' This positions disciplinary Geography and GIS on the losing side of a divide that they are subsequently precluded from crossing by virtue of being framed as antediluvian. Geographic critiques of neogeography are rendered moot even before they are formulated because as 'paleo,' they are antiquated and thereby of no relevance to the 'new.' Geography, therefore, cannot have anything useful or meaningful to say about *neo*geography. Trenchant critiques of geoweb technologies, prejudices encoded into their

design, and the social consequences of these technologies become easily dismissible as nothing 'new.' Indeed, unlike Critical GIS, neogeography is not concerned with the serious trappings of the politics of uneven knowledge production or digital divides – neogeography is rather "[f]un and cool" (Batty 2009c: n.p.). The "'new geography,'" as per Turner (2006: 2), is all about people

> using and creating their own maps, on their own terms and by combining elements of an existing toolset. Neogeography is about sharing location information with friends and visitors, helping shape context...
>
> (3).

Following Haklay et al (2008), there is an implied contrast offered in this definition of neogeography

> between [the] perceived tedious, slow, boring and expensive practices of cartographers and geographers, and enjoyable, rule breaking and relevant uses of geographic information by lay-persons… this disregard for past practices is part of the zeitgeist that is central to Web Mapping 2.0
>
> (2021).

A 'new' geography that is about having 'fun' and 'sharing with friends' is far removed from the dour, Critical GIS-centric concerns of asking, *what kind of technology, by and for whom?* Together, the rhetorical positioning of neogeography as 'fun and cool' by virtue of being 'new,' and the use of 'newness' to dismiss disciplinary geography and GIS as 'paleo' anachronisms, work to very effectively de-politicize Web-based spatial information technologies. The first - discursively framing neogeography as primarily 'fun' - vacates its technological devices, information artifacts, and data practices of political content. The second – the branding of a 'new' geography that sets up the existing one as 'old' in opposition – preempts political critique of the new or any attempts to mire neogeography in political considerations (of power, subjectivity, knowledge production, etc.). By 'the political,' I am invoking an understanding of politics as social power relations; or, more specifically, "struggle[s] over the scarce resource of power" (Mosco 2004: 35). Discursive framings of the geoweb 'de-politicize' its technologies by obfuscating their social construction, which is to say the way in which newly emergent spatial information technologies are imbued with and by

circuits of power by virtue of being designed and produced by social actors who themselves 'struggle' for power by participating in social relations. Web-based geographic information technologies and their rapid ascendance have been and continue to be the results of social, political, and economic contestation - they are the outcomes of 'struggles over the scarce resource of power.' In situating these technologies outside the realm of social relations, discourses of 'neo'geography furthermore work to *a priori* negate the possibility of critiques of politics, i.e., of the unequal power relations that inflect the production, circulation, marketing, adoption, and use of geoweb technologies, as well as the knowledges that they encode.

This discursive attempt to position technologies as neutral is by no means unique to geography, being rather part and parcel of what Vincent Mosco (2004) refers to as 'end of politics' myths about cyberspace. While there are multiple versions of this myth, they all hold that digital technologies "[transcend] politics because it makes power available to everyone and in great abundance" by reconfiguring values such as 'democracy' and freedom' as technology's ends (Mosco 2004: 35). This may be observed in references to neogeography as a "new wave of democratized map making" (Meier 2011: 12), where 'democracy' is enabled by the affordances of the technology (e.g., participatory architectures) and is somehow seen as being evidenced in the existence of user-generated geographic information. Myths, as defined by Barthes (1999), are, literally, "depoliticized speech" (57). Myths negate or eliminate 'the political' by "purify[ing] social relations by eliminating [them of] tensions and conflicts" (31). These are tensions such as those present in the uneven production of geographical knowledge – and uneven power relations - ensconced within user-generated spatial content. Myth serves to hollow-out 'the digital' of political content by "[emptying] reality" of history (Barthes 1999: 58). Indeed, Mosco (2004) considers 'end of' myths about the digital as tantamount to historical amnesia that allows us to forget (or ignore) the struggles over the design, production, and introduction of digital technologies; in other words, their *politics*.

Because Web-based geographic information technologies are 'new' – i.e., unprecedented in history – history itself can be written off with the stroke of a pen because history knows nothing of the geoweb and therefore has nothing to say about it. By "deny[ing] history," the

discursive framing of these technologies as 'new' "remove[s] from discussion active human agency, the constraints of social structure, and real world of politics" (Mosco 2004: 35). In the instance of discourses of 'neogeography,' the belief that because we have somehow transcended what came before (GIS and disciplinary geography), we are now unbound from and no longer beholden or subject to the critiques and/or customs of that which we have successfully relegated to the past ('paleo'-geography) or its conventions (e.g., the expertise needed to understand spatial relationships, or to perform spatial analysis).

Technologies are always historical. They are constructed, produced, and emerge within historically-specific intersections of cultural, economic, social, and political forces and relations. For example, Web-based spatial information technologies have ascended within a political-economic context of the neoliberal restructuring of the state that has created the conditions of possibility for the rapid emergence and proliferation of these technologies (see *Chapter 2*). As such, they are inherently political. Not only are technologies the results of (historical) contestation over their design, introduction, and adoption, but they continue to participate in and are leveraged towards the (re)production of uneven power relations such as those that imbue the reconfiguration of social norms of privacy in service of the economic and political interests of corporate actors (Elwood and Leszczynski 2011).

By way of de-historicization, however, discourses of 'neo'geography situate geoweb technologies as the inevitable products of 'technology creep.' In other words, social media become a foregone conclusion. Rather than being the products of social construction and contestation, the proliferation of 'neogeographic' devices, applications, and platforms is presented as the result of meta-historical, linearly progressing, culturally disembedded technological change that is imposed via some disembodied logic upon the social. Here, 'newness' is leveraged as a de-politicizing device in the service of dehistoricization. Being 'new,' geoweb technologies are unencumbered by the trappings of history (social construction, conflict, remediation).

The power of myth, argues Mosco (2004), lies not in its dissemination, but in its ability to *naturalize* its objects (the objects of that particular myth). Barthes (1999) gives the example

of a 1955 *Paris Match* cover depicting a Black child soldier saluting the tricolor of a French flag in the distance. Rather than challenging or in any way 'laying bare' the politics of French imperialism, the image affirms French colonialism by stating imperialism as a 'fact,' i.e., as *natural.* In so doing, it depoliticizes the entire colonial enterprise. "If I *state the fact* of French imperiality without explaining it," writes Barthes (1999: 58), " I am very near finding that it is natural and *goes without saying*: I am reassured" (emphasis in original). The 'objects' of myth may be thought of as naturalized when they are made (to seem) ubiquitous (Mosco 2004). As objects of the mutually-reinforcing myths of 'the end of politics' and 'the end of history,' Web-based spatial information technologies have indeed become ubiquitous, as may be evidenced in the broad-scale convergence of geographical content with digital media (see *Chapter 4*). Technologies become ubiquitous when individuals in a society adopt them *en masse*. For this to occur, individuals must see incentives for the adoption of said technology/ies: when they believe them to be politically innocuous and friction-free (neutral), the outcomes of scientific and technological progress (inevitable), and where their adoption is seen to promote some social or individual good such as 'democracy' or further 'progress' (necessary), or the acquisition of social capital.

The utility of positioning Web-based spatial information technologies as neutral, inevitable, and necessary by way of discourses of 'neo'-geography is that it serves to socially *naturalize* these technologies *and* their social effects and consequences. To say that discourses of 'neo'-geography work to 'naturalize' the geoweb is to say that they frame its constituent technologies as politically transparent, emergent out of the technological ether (a-historical), and *not questioned* - that their ubiquity and penetration of social life are presumed and taken for granted. Discourses of neogeography accomplish this by depoliticizing and dehistoricizing Web-based social media so as to render them neutral, inevitable, necessary, and thereby amenable to large-scale adoption within digital societies.[8]

[8] Building on Terranova's (2004) definition of network culture, I use 'digital societies' to denote social and cultural formations characterized by an "unprecedented abundance" of digital media

Branding – or naming – is a political act. In proclaiming a 'new' geography, neogeographers have worked to set the parameters of discourse for a phenomenon: how it can be discussed, what constitutes valid knowledge about the neogeography phenomenon, and what the appropriate behaviors around this phenomenon are (Staeheli and Lawson 1995). The ability to name or brand things and events - "people and animals, buildings and spaces, epochs and ages" – is always a "sure sign" of power (Boal 2007: 342). As per Staeheli and Lawson (1995), there is a "dialectical relationship between concepts and language and the material social relations through which they are constructed" (323). In other words, branding reflects, and is an enacting of, the interests of power. Myth and naming are not simply concepts for theoretical consideration. In service of the interests of power, myths and branding effect political and social change in the world. The 'interests' served in the social naturalization of geoweb technologies via the leveraging of 'newness' as a de-politicizing device are twofold: profit, and the ability to deny responsibility for the social consequences of these technologies.

3.4 'Newness' as rationalization of the social consequences of geoweb technologies

In April of 2011, two researchers discovered that Apple-branded mobile devices running versions of Apple's mobile operating system iOS 4+ were recording the locational information of mobile users, including GPS coordinates and coordinates of WiFi portals and cell towers. Up to a year's worth of this highly sensitive, time-stamped geographical data was being stored in an unencrypted file within iOS itself (Allen and Warden 2011; Arthur 2011; Chen 2011; O'Grady and Morgenstern 2011). Furthermore, it was revealed that users had no control over the collection of this information. Even where users deliberately turned off 'Location Services' on their mobiles, which should have disabled location information collection and effectively allowed users to opt-out of being positionally tracked, it was revealed that their personal

– information artifacts and digital technological devices – and an "acceleration" of digital media "dynamics" (1).

geographical data was still continuously being surreptitiously compiled (Apple Inc. 2011; Arthur 2011; Brian 2011; Fried 2011). Apple's response to the fallout over the underhanded collection of personal locational content, popularly dubbed 'LocationGate,' is illustrative of the ways in which the 'newness' of geoweb hardware/software objects is leveraged to justify and/or rationalize the deleterious social consequences of these always-already 'new' technologies that, by virtue of their novelty, are presented and framed as politically neutral and socially necessary within discourses of neogeography.

As per Allen and Warden (2011), the two researchers who discovered the file, the logging of this highly precise, time-stamped information was "clearly intentional" on the part of Apple, "as the database [was] being restored across backups, and even device migrations" (n.p.). Apple collects this consumer geodata – transmitted to Apple from mobile devices in an anonymized form every twelve hours – to populate its own locational database (of WiFi hotspots, cell towers, etc.) (Chen and Isaac 2011). It uses this database to improve locational functionality on its mobile devices by pulling geographic data from this 'cache' when a locational request is made, which is a much quicker (and less energy-intensive), albeit coarser, means of determining real-time position as compared to relying on GPS triangulation.

To both consumers around the world and the governmental bodies of several nation states, however, the surreptitious nature of locational data collection and their retention were seen to constitute a flagrant violation of the privacy rights of individuals (see Chen 2011). Apple (2011) moved to address consumer disaffection and concerns via a press release, stylized in the form of a Q&A. In response to the mock-question, "*why is everyone so concerned about this [if Apple is not tracking the location of my iPhone?],*" Apple stated that these serious concerns over privacy were the result of a lack of understanding, on the part of users, of the technical complexity of 'new' technologies. Apple (2011) stated that

> [p]roviding mobile users with fast and accurate location information while preserving their security and privacy has raised some *very complex technical issues… Users are confused, partly because the creators of this new technology (including Apple) have not provided enough education about these issues to date*
>
> (n.p.; emphasis added).

Consumers' and governments' concerns were not, however, articulated in regards to, nor did they arise from, the "very complex technical issues" that attend "this new technology" (Apple 2011: n.p.). Rather, concerns were overwhelmingly raised with respect to two issues. The first concerned the size and unencrypted nature of the database to which spatial information was being logged (allowing for as much as a years' worth of data to be stored) (see Chen and Isaac 2011; Fried 2011; Siegler 2011a). The second emphasized the social data practices around the way in which locational information was being compiled and stored: namely, that Apple was compiling this information without the consent of users, including instances where users had explicitly *denied* consent for locational data to be logged; and, the long-term retention of this sensitive data on users' devices well after the data had been transmitted to Apple (see Charles 2011; Chen and Isaac 2011; Elgan 2011).

The unencrypted nature of the locational file posed the potential for personal security breaches. Anyone who gained access to the database either via a person's iOS-enabled mobile device or its backup on a computer could easily reconstruct an individual's spatial history – including highly precise, time-stamped GPS coordinates – for the entire year prior by simply uploading the file to an open-source application called iPhone Tracker, which plots the time-stamped coordinates over a Google Maps interface (Warden 2011). Chen and Isaac (2011) recognized that while the risk of a person's spatial data getting into "the wrong hands" was not an "immediate concern" for most users, it is nevertheless concerning because Apple's data practices – long-term retention and lack of encryption – create *opportunities* for malicious access to and misuse of personal geodata, even if those opportunities are not acted upon (n.p.). For example, anyone with the intention to harm or stalk another individual could attempt to access their locational information through this file as use it to gain an understanding of their spatial patterns (where, for example, they are likely to be on a weekday afternoon).

Moreover, Chen and Isaac (2011) note that this information could potentially be accessed by law enforcement, even in instances where individuals are not suspects or persons of interest in criminal activity. For example, around the same time that the 'LocationGate' scandal was gaining traction and attention, the Michigan chapter of the American Civil Liberties

Association (ACLU) was anonymously tipped off that Michigan State Police had been engaging in data extraction practices during routine traffic stops. Using a device capable of breaking user-set encryption (e.g., passwords), the Michigan State Police were alleged to have engaged in systematic practices of electronically swiping and downloading personal information from mobile phones and/or devices, including text messages, contacts, call logs (even deleted histories), ringtones, and GPS coordinates precisely such as those stored in the unencrypted iOS database containing a years' worth of time-stamped locational data (Heussner 2011; Hickey 2011). The Michigan State Police subsequently clarified that they do not extract personal information in this fashion without a warrant (Heussner 2011). At issue, however, is the extraordinarily long retention of personal geodata on iOS-enabled devices which makes this highly sensitive information, which would otherwise be beyond the reach of law enforcement, easily accessible in situations where the persons whose information is being extracted are not implicated in any criminal activity.

Whether expressed in terms of the features or affordances of the technology (storage capacity of the database to which geodata was being compiled) or data practices, the disaffection with Apple arose because its actions – both technical and social – were seen as constituting an invasion of privacy. Apple's locational data collection and retention activities were seen to violate a fundamental and implied social contract between users (consumers) and the company: the idea that, where Apple purported to offer a technical mechanism for opting-out of having one's geodata amassed, shared with the company, and stored on mobile devices, this mechanism should be both effective and meaningful. Moreover, individuals (and the institutional apparatuses that represent their rights and interests in open, democratic societies) expect that their voluntary use of a service and/or device does not put them at undisclosed, unreasonable risk, such as the risk of having their private, identifying information become accessible to persons and/or groups as a result of design features that are unnecessary to the functioning of that service/device. In other words, the uproar over 'Locationgate' involves unease and over the erosion of a social good: privacy.

In responding to consumer and government discontent, rather than directly addressing privacy, Apple (2011) leveraged the 'newness' of locational technologies to rationalize, justify, and explain away the social consequences of the collection and retention of personal geographic information. Rather than acknowledging the consequences of its own data collection activities, the company attributed the deleterious effects of unencrypted geodata storage and backup directly to "complex technical issues" arising from the "new[ness]" of the technologies in question (Apple 2011: n.p.). In so doing, Apple effectively reconfigured the erosion of privacy away from its social practices to arising from the novelty of Web-based geographic information technologies. Framed as emergent from 'new', "complex" technologies, these societal effects – the erosion of privacy – are unanticipated. In other words, because the technology is so new, and any social implications of the introduction and operationalization of these technologies emanate from their technical aspects *and not* from their social construction (i.e., design, programming, engineering, etc.), Apple could not have foreseen any of these outcomes. And even *if* the company could have anticipated any of these said effects, the logic of this discursive leveraging of 'newness' holds that Apple could not have been responsible for them because the outcomes are immanent to the (socially-divorced) technologies themselves. Using 'newness' as a de-politicizing device in this way, social consequences are rationalized as technology's ends, and social actors are absolved of any moral or ethical accountability for them.

'Newness'' has been similarly leveraged by Google as a justification for the privacy-eroding effects of its own spatial information technologies. In 2008, Google was sued by a Pennsylvania couple (the Borings) for punitive and compensatory damages related to invasion of privacy and depreciation in property value arising from Google's trespassing onto their private road during its collection of imagery for its Street View service, and the subsequent public dissemination of an image of their home – otherwise invisible from the public roadway – as street-level data via Google Maps and Earth (Perez 2009; The Smoking Gun 2008a, 2008b). The presiding judge threw out the case (Perez 2009), but what is of particular interest to this discussion is the content of Google's paperwork submitted in response to the legal filing.

In its motion to dismiss, Google (2008, via The Smoking Gun, 2008b) cites 1977 US Tort law (Torts 65D cmt. C), which maintains that "'[c]omplete privacy does not exist in this world except for in a desert,'" only to subsequently argue that "[t]oday's satellite-image technology means that even in today's desert, complete privacy does not exist" (n.p.). This is a line of argumentation that runs similarly to that operationalized by Apple as presented above: the introduction of a new geoweb technologies justifies the privacy-eroding effects of Google's social practices; i.e., its data collection activities. While Google does not explicitly invoke the 'newness' of Web-based geographic information technologies, its leveraging of the novelty of technologies is implied in its formulation that "[t]oday's [read 'new'] technology" renders the desert, identified by legal precedent (1997 Tort law) as the last place in which individuals had a reasonable expectation of (locational) privacy, devoid of refuge. Alternatively stated, that what strips 'the desert' of sanctuary (from surveillance) is the introduction of new technology (satellite-image technology).

The 'satellite-image technology' cited by Google refers not only to state-of-the-art high-resolution capabilities, but indeed more specifically to Web-based vehicles for the public dissemination of that satellite imagery, i.e., geoweb phenomena such as Google's Earth and Maps services which make it widely and freely accessible to anyone with an internet connection. The *a priori* existence of this (new) technological presence (Web-based spatial information technologies for the public dissemination of satellite imagery) is argued by Google to justify the erosion of privacy immanent in its largely unrelated data collection practices. This is a particularly insidious logic in that Google itself is the technological presence – Google Earth and Maps as a vehicle for the public and free dissemination of satellite imagery – on which it justifies the social consequences of its subsequent actions. Alternatively stated, Google is citing itself as a precedent for its own social practices while simultaneously absolving itself of any responsibility for the societal implications of its data collection and dissemination activities that it pursues through its own technologies whilst claiming these technologies excuse the consequences of those actions.

Google's rationalization operationalizes a logic that I characterize as 'technologically defeatist': the sense of the inevitability of technology that overcodes our abilities to affect or control it, its progress, or its societal effects. These societal effects, such as the erosion of privacy, because they are attributed to the technologies themselves rather than social practices of their construction, contestation, or use, are as inexorably predetermined – and inevitable - as the technologies with which they are associated. As a discursive tactic, 'technological defeatism' is used by corporate and other actors to not only justify but indeed also obscure their actions. Google's reasoning, which may be summarized as 'it [invasion of privacy] is not our fault, it is a technological consequence' deflects from the fact that Google is itself part of this very technological advance that it makes recourse to in rationalizing the effects of 'new' technologies.

The rationalization of the social effects of technologies, and the displacement of the onus of responsibility for these social implications, serves to further naturalize the geoweb by presenting the corporate and other business actors behind them as benign and politically neutral purveyors of technology. These 'interests' are however heavily vested in a profit-driven agenda that seeks to secure the profitability of Web-based geographic information technologies through leveraging their 'newness' as a basis for their proliferation.

3.5 'Newness' as profit and proliferation

3.5.1 Profit

Web 2.0, the functionalities and architectures of which underwrite much of geoweb technologies and practices, may be thought of less as an evolution of the Web than a series of business correctives to the dot.com crash of the late 1990s/early 2000s, which was built on the business model of offering free services to users to whom the dot.coms would be able to sell products at some point in the future (Fuchs 2011; Hurwitz 2012). These 'correctives' take the form of advertising, which has been followed as the dominant path to successfully monetizing the Web in the post-dot.com era (Fuchs 2011). Companies such as the Internet giant Google

have built fortunes on advertising as a business model. Since the mid- to late-aughts, location – specifically the convergence of location with digital media and its ascendance as a basis for organizing Web content and structuring interactive experiences over the Internet – has come to be seen as the next frontier of digital profitability. The theme of the 2011 annual Where 2.0 conference was 'The Business of Location' (O'Reilly Media, Inc. 2011). As the conference advertisement proclaimed, "Where" – location – "*is* business:"

> where people live, where they go, and where, when, and how they spend their money are now key factors in business success. From product development to distribution, marketing, and sales, location technologies help companies identify, understand, and serve their markets far more effectively than before
>
> (O'Reilly Media, Inc. 2011, n.p.).

Location data is seen to hold so much promise (for profitability) because it represents the next avenue for targeted advertising in the form of 'deals' and promotions that may be delivered directly to individual consumers based on i) their spatial position in proximity to a business establishment or their presence at a venue that they have digitally check-in to, and ii) the locations visited by their contacts, which is premised on the assumption that 'friends' have similar 'likes'. Targeted advertising through social media services such as Facebook leverages the intimately personal data (age, gender, relationship status, interests, tastes in music, fashion, etc., and even inferred sexual orientation; see Cheng 2010) that users divulge about themselves to deliver highly personalized promoted content to them via the social media interface. The current levels of revenue generated from advertising through social media are however presently seen as being in jeopardy as the majority of users are switching to mobile as the primary way they access social networking services and applications (Barr 2012). Advertising revenues generated through mobile interfaces have proven to be less profitable as compared to advertising through desktops (Barr 2012), as users are less in favor of, and more 'annoyed' with, advertising presented to them via mobile devices, and are less likely to click on ads on a smartphone than on a computer (Levy 2012).

Location-based services are seen as a solution to these shortcomings of mobile advertising (see Peak 2012). *Geo*social networking extends the advantages of proximity (the ability to deliver a promotion to a user on the basis of their presence at, or near, a business establishment; Brustein 2010; Sakr 2011) and, increasingly, that of a real-time component, whereby advertising may be sent to users based on their (mobile's) 'ambient'[9] location signal rather than on self-reported spatial position (as in a check-in). Mobiles "[go] with you to the store," comments Mark DiPaola, a check-in app developer (in Zmuda 2010: n.p.). Combined with location – whether a self-reported check-in or 'ambiently' broadcast – this allows product marketers to "deliver targeted messaging at [the] precise moment a purchase [or consumption] decision is made" (Mark DiPaola, in Zmuda 2010: n.p.).

At the time of writing, Foursquare[10] has officially announced that as of July 2012, vendors and advertisers will be able to purchase and deliver location-based promotions to its users via the application (Ante 2012). This is significant because Foursquare's status as the most popular and most widely adopted geosocial service may very well help it to solidify dominance in the location-based advertising sector. In late May of this year (2012), Foursquare announced that it had established a partnership with the credit card company American Express (Amex) in the United Kingdom. British Foursquare users who are also Amex customers will be alerted of various discounts that become available upon checking-in to participating establishments and paying for purchases with their Amex credit cards, which have been pre-

[9] 'Ambient' social networking applications such as Highlight continuously broadcast a user's mobile location signal and both 'push' this information to other integrated social media applications (Facebook, Foursquare, Twitter) and use it to notify users of 'interests' (persons and places) in their vicinity.

[10] Foursquare (stylized as 'foursquare') is a 'geosocial' application, or location-based social networking service, for mobile devices. It allows users to virtually 'check in' to (report their presence at) a location, known as a 'venue.' Venues include commercial establishments, public spaces, residences, etc. Users can check-in through a Web-based interface, the application itself, by text message, and/or by having their 'check-ins' from other location-based services 'pushed' to Foursquare. The utility of the service is to notify friends and/or contacts of one's location, or be notified of others' locations, to facilitate meet-ups in person and/or to stay abreast of others' spatial positions. There is also a game component to the application, whereby each check-in has a point value users can collect various badges and/or become 'mayors' (users with the most check-ins at a certain location) of venues. Additionally, Foursquare is a platform for location-based advertising, with vendors promoting various 'deals' through the service.

registered through the geosocial service (Lee 2012). Users who wish to redeem these promotions must first disclose their credit card information in order to become eligible for the advertising scheme, handing over a treasure trove of priceless geodemographic and purchasing pattern information about themselves to both Foursquare and Amex in the process. Integrating 'promotions' (i.e., advertising) into location-based services is emerging as a core business model for generating profit from quotidian Web-based activities and practices (Lee 2012). Lee (2012) notes that in addition to Foursquare, other visible social media and technology brands have likewise moved to incorporate location-based advertising as a central feature of their Web presence(s): Facebook promoted what it calls 'Deals' through its Places feature until the locational feature was suspended in 2011; Google has began to display "Offers" through Google Maps applications running on Android mobiles in the US; and, establishments can add check-in functionality to their Yelp profiles as a way of promoting deals through the social review service.

The Economist (2010) reports that revenues from location-based services, the majority to be derived from location-based advertising, are projected to quadruple from $3 billion in 2010 to over $12 billion by 2014. These projections have materialized in a diversion of venture capital investment into location-based services and applications, resulting in the exorbitant valuation of companies in the tens and hundreds of millions of dollars on the speculation that these may become profitable in the future, even where the technology startup and/or application development companies have offered no proof-of-concept for generating profit. More than a year prior to announcing how it would monetize the service (via allowing merchants to promote 'deals' in the form of coupons through its service), Foursquare secured a $600 million dollar valuation solely on its ability to secure investment funding (cumulatively around $71 million to June 2011; Ante 2012; Peak 2012). But it is not only visible brands that are successful in securing investment funds. Glympse (see **Table 1**), for example, secured $7.5 million dollars in an investment round based on the fact that its application had reached the one million download mark.

The ability of these companies to receive such high valuations and to amass so much investment capital is made possible only under the neoliberal "venture capital model of accumulation… where the so-called fundamentals of production are replaced by the… affective skills of the professional speculator" who can generate profit from the sheer "promise of promise" (Cooper: 96, 142). In addition to securing revenues (profitability) through modes of speculative accumulation, geosocial services such as Foursquare, third-party applications built over-top of existing location-based services (LBS)[11], mobile service providers/carriers, and handset and mobile operating system developers and producers are seeking to monetize the vast stores of locational data generated by users. As electronic surveillance practices have increased exponentially, mobile tracking data, which includes more conventional information such as geolocated cell tower pings but also locational (GPS) caches, has become big business for mobile carriers, who charge policing agencies steep fees for handing over such data upon request (Greenberg 2012). But more important is the locational data users both willingly and unwillingly generate through the use of location-based services, other mobile applications, and mobile devices themselves. As Elgan (2011) notes, locational information that can be tied to individual users "has monetary value, as well as priceless social value:" "there's money to be made from knowledge about where each of us is at any given moment… [This] data can be converted into contextual advertising revenue, used to create compelling new services or improve the value of existing products" (n.p.).

The locational data in question is not just restricted to the information users 'voluntarily' give up about themselves when they opt-in to using LBS services such as Facebook Places or Foursquare. A 2011 study of the 50 most popular applications downloaded for both iPhones and Android smartphones by the Wall Street Journal found that a huge percentage of them were collecting and transmitting locational data to third parties (Wall Street Journal 2011). Only four of the 50 most popular mobile applications were explicitly location-based:

[11] A location-based service is a Web service that integrates and exploits geographical referents (e.g., spatial coordinates) as a premise for user interaction with Web content (Schiller and Voisard 2004).

Foursquare, Grindr, Google Maps, and Yelp. However, the majority of applications transmitting highly sensitive locational information to third parties - such as the game Angry Birds, the music service Pandora, Dictionary.com, and the Bible App - are ones that have nothing to do with location and/or do not require geographic information as a functional input to the application. Of the top 50 iPhone apps analyzed, 25 of them (50%) transmitted location data – usually in the form of postal codes (e.g., ZIP) – to a third party. Of these (that disseminated location), 12 (again, 50%) did not ask for a user's permission to share this locational information with third party. Similarly, with Android applications, 21 (just over 40%) shared users' locational information with third parties; and of these, seven (33%) did not ask for a users' consent to do so. The Wall Street Journal (2011) identifies the third parties to whom this locational data is sold on to as consisting largely of "marketers that monitor app usage and create profiles of users" (n.p.). The profitability in such instances lies in these profiles, which third parties in turn sell on to product manufacturers, consultants, and marketers to enable them to fine-tune and better target their advertising. Whether location-oriented (where location is a functional input to the application), or collecting personal locational information to sell on to third parties (location is not necessary to the service itself), the monetization of location and locational information is premised on the proliferation of location-based applications and services (as well as location-enabled devices). Proliferation is secured through 'newness.'

3.5.2 Proliferation

Discourses of newness are embedded directly in the profit-oriented business model that underlies location-based services. The naturalization of these technologies is in the service of their rapid proliferation, and the profit associated with their broad-scale adoption. 'Newness' in turn is leveraged as a discursive means of ensuring that this adoption is continuous by securing a seemingly endless arsenal of 'new' LBS that are constantly brought to market. For example, for the six-month period beginning Oct 1, 2011, and ending March 21, 2012, the technology blog The Next Web covered the roll-out of 26 separate 'new' location-based services and applications (see **Table 1**).

Table 1. Newly introduced location-based applications, as reported on the blog *The Next Web*[1], (for the six-month period beginning October 2011 and ending March 2012)			
Date Introduced	**Application**	**Description**	**Location Data Source**
Mar 2012	Highlight	geosocial/'ambient social networking' application that continuously monitors a user's location and alerts them of the presence of other users with similar interests (mined from Facebook) in their vicinity (based on Foursquare check-ins); allows applications to import check-ins from each other[2]	real-time GPS of user (mobile device); check-ins from Facebook Places, Foursquare, Path, etc.
Feb 2012	WallaBee	a location-based item-collection game (where items are collected via checking-in to places)	As per Wallab.ee[3], data derived from "a range of services"
Dec 2011	Check-in Recipe	a Foursquare add-on that sends users a recipe every time they check-in at a grocery store	Foursquare venues
Dec 2011	ALF (AMEE Location Footprinter)	uses a user's Foursquare check-ins to calculate their carbon footprint	Foursquare check-ins
Dec 2011	Timehop	a service that lets users know where they were – and what they were doing – a year ago by mining their historical social media content	location data from Foursquare and/or Twitter; other content from Facebook, Twitter, and Instagram
Dec 2011	Tweetsmap	mashes up a user's Twitter followers' self-reported locations with a Google Map to let them know where their followers are from	Twitter (self-reported locations); Google Maps
Dec 2011	Schemer	a Google service that suggests new places for users to explore	Google Maps with Google+ integration
Dec 2011	TruxMap	notifies users of where food trucks are on any given day	Twitter; self-reported and/or geotagged Tweets of the food truck owners
Dec 2011	TripsQ	travel mile counter based on cumulative Foursquare check-ins	Foursquare check-ins
Dec 2011	Rentmix	a Google Maps mashup of available short-term rentals	Google Maps for base data; rental properties from other services
Dec 2011	Yipit Social	delivers electronic 'deals' (coupons) to subscribers redeemable at venues that their friends (persons in their network) have check-into on Foursquare	Foursquare check-ins
Dec 2011	Instalook	location-based discovery service for the social networking site Instagarm that lets users see photos around them, or by city	Instagram data; location data of user mobile (GPS, WiFi)

Nov 2011	App.bg	a 'local' service that mines social media sites Instagram, Foursquare, and Twitter for content generated/posted near a user's location	geolocation data of the user based on their position (GPS, WiFi); location of social media content from social media sites
Nov 2011	Magic Muggle Clock	displays Foursquare check-ins of friends (persons in a user's network) by category (restaurant, shopping, public place, etc.)	Foursquare check-ins
Nov 2011	Pee in Paris	a map of public restrooms in Paris; users may 'check-in' to these facilities	Foursquare venues
Nov 2011	Glympse (Android version)	shares a user's real-time location with persons in their network; contacts can track a user's real-time location on a map	real-time location data (GPS); Google Maps
Nov 2011	4SQooogle	visualizes Foursquare check-ins in real time near a user's location over Google Maps	Google Maps; Foursquare check-ins; GPS/WiFi/self-reported geolocation of user
Nov 2011	SkyChalk	annotation service for Google Maps that allows users to attach descriptive content to locations/places	Google Maps
Nov 2011	Auto4Sq	an automated check-in service for Foursquare that allows users to schedule regular check-ins (e.g., if they attend church at a certain time on Sunday)	Foursquare
Nov 2011	Arrivals	an aggregator service that notifies users of where their friends are checking-in in real time, akin to a flight arrivals board	Foursquare check-ins
Nov 2011	Vote Spot	a Foursquare add-on that allows users to set-up a virtual poll on any question at a Foursquare venue	Foursquare venues
Nov 2011	Sport Shadow	mines Foursquare check-ins to notify users of other users who have checked-in to the same sporting event	Foursquare check-ins
Nov 2011	City Sourced	allows users to notify their civic governments of infrastructure and/or utilities that need attending to (e.g., garbage pickup; missing potholes, etc.)	ESRI map data / ArcGIS Web
Oct 2011	Sirkel	a map-based application that allows users to contact others to randomly chat with	user-reported location; Google Maps interface displaying locations of other users around the world
Oct 2011	roadninja	tracks real-time location of users on the road and notifies them of amenities located off upcoming highway exits	GPS of user (mobile); Foursquare venues
Oct 2011	Radar	a proprietary Foursquare function that alerts users of places of interest to them when they are near their real-time position	Foursquare check-ins and venues

[1] http://thenextweb.com; blog posts written between October 1, 2012 and March 31, 2012, inclusive.

[2] (Constine 2012).
[3] (Wicks 2012).

This list presented in **Table 1** excludes other applications that were introduced during the same time frame, namely, *Girls Around Me*, a mobile geosocial application that takes a user's real-time location and notifies them of 'girls' in their vicinity, identified based on the girls' Foursquare check-ins and their Facebook profile information, including dating status, address and phone number, likes and dislikes (information that may be mined from public Facebook and Foursquare accounts; Brownlee 2012); *Picket Report*, a geodemographic service tied to a Google Maps interface that purports to help homebuyers find ideal areas to buy in where they may avoid co-habitating with "social pariahs and [undesirable] ethnic groups" (Cox 2012: n.p.); a new feature for mobiles running on the Windows mobile operating system that has been dubbed the 'Avoid Ghetto' function that, based on real-time GPS data, gives users directions that have them avoid walking or driving through high-crime areas and neighborhoods (Matyszczyk 2012); and, other 'ambient' social networking applications similar to Highlight (Kismet, Glancee, Ban.jo, Meeteor, Pearescope, GetGauss, Intro, Qrious, Mingle, and Sonar; see Worthman 2012).

Though the inventory presented in **Table 1** is by no means exhaustive, it does provide an indication of the rapid rate at which 'new' location-based services and applications are introduced to the North American market. And while each of these applications is presented and introduced as 'new,' few of them are actually novel in any meaningful sense of the word. A full 15 of the 26 applications listed in **Table 1** rely on locational information from Foursquare, typically either using Foursquare's geographical database of over two billion 'venues'[12] as base data, or mining Foursquare check-ins (user-generated geographical information) and serving up a select subset of those via the third-party application (e.g., 'Magic Muggle Clock' groups a user's friends' check-ins by category and displays them as such). In other words, the vast majority of these applications and services simply source, aggregate, filter, repackage, and/or

[12] 'Venues' is Foursquare's spatial database of places (such as commercial establishments and public places) (Ante 2012).

serve-up geographical information from existing location-based services. They offer no novelty beyond 'value-added' to extant services and their data, though in some instances the 'value' that is added is questionable (e.g., the 'Pee in Paris' application, which is a Foursquare add-on that displays public restrooms in Paris, is valuable and has a real-world use; however, the check-in functionality, which allows users to report their location at/in any one of those facilities, is less so).

The ability of third-party developers to build applications over dominant services such as Foursquare - by far the most popular geosocial application with over 20 million users having checked-in to over two billion 'venues' (Ante 2012) – is premised on the latter (e.g., Foursquare, Google Maps) releasing APIs (application programming interfaces) which allow their own applications and data streams to be 'hooked-into' from outside of the proprietary application itself. But again, what is most significant about this is that the core applications and services are not in and of themselves 'new.' The Google Maps API was released in 2005; Foursquare released its API almost immediately after the service was launched in 2009. However, through the public availability of their APIs, these services and applications are continuously being repackaged into something which, to consumers (adopters) of those technologies, *appears* to be new.

'New' applications, services, and devices seek to distinguish themselves by claiming to offer superior and/or improved connectivity over and above that extended by extant mediums, even where, as demonstrated above, the services offer little innovation or novelty but rather piggy-back on the functionalities and data of existing, dominant applications. This is particularly true of LBS like Foursquare or locational components of social media applications and services such as Facebook's ubiquitous integration of location and geotagging functionality for all aspects of its service (replacing its Places feature; Siegler 2011b). These allow users to inform persons in their network/s of *where* they are at all times (as opposed to updating their Facebook Wall with what they did last night, or Tweeting their current activity); and, they simultaneously enable users to stay continuously abreast of the real-time locations of all their friends, family, etc., with these locations visualized over a map-based interface. Each

successively introduced geoweb application portends not to innovation, but to improved *connectivity*. Increasingly, this 'connectivity,' such as that which underwrites what has been termed 'ambient social networking,' is not just about brokering social connections with friends and family, but also with *potential* friends and contacts. 'Ambient' social networking applications such as Highlight continuously ('ambiently') broadcast a user's real-time mobile location signal and both 'push' this information to other social media applications (Facebook, Foursquare, Twitter) and uses this information to notify users of persons with similar interests (based on Facebook profile data) in their vicinity (or 'ambient' surroundings). The novelty of this class of applications resides, again, in their purported capacity to better connect users to the already-connected world, and not in the social media platforms themselves. The veneer of newness is nevertheless essential to the continued proliferation of these applications and services in the service of profit.

As with the examples presented in **Table 1**, applications such as Highlight are "dependent on the plumbing that is already in place," namely Foursquare, Twitter, and Facebook (from which Highlight pulls in address book information and personal data regarding 'likes,' relationship status, career interests and prospects, etc.) (Worthman 2012: n.p.). Even the functionality of Highlight is similarly not particularly original, being premised on 'open' (i.e., public rather than private) social media profiles from which personal information can be pulled to 'match' users with potential contacts despite the serious privacy and security implications of such practices. 'Newness' is herein leveraged in the marketing and presentation of these technologies to secure their continued proliferation by artificially stimulating a need for ever-newer spatial information technologies which can successively outperform or 'out-connect' their antecedents *and* by ensuring a sizeable reserve of subjects primed to consume them.

3.6 Connectivity and the neoliberal subject

The continuous introduction of successive services, applications, and devices for geosocial networking and other LBS applications perpetuates geoweb technologies as being

always 'new' – as imminently recent phenomena. This always-newness of geoweb technologies is appropriated into regimes of neoliberal governmentality which interpellate subjects as self-enterprising individuals who self-actualize through consumption (Horning 2012; Rose 2007); in this case, the consumption, or adoption, of geoweb technologies such as geosocial applicaitons. This mode of subjectification requires a constantly-replenished supply of new products to fuel a consumption that is continuous. As digital technologies and social media in particular have become 'technologies of the self' through which individuals increasingly self-actualize as subjects (Livingstone 2008; Shao 2009), having a never-depletable arsenal of geoweb technologies that may be introduced as always new – even where they leverage existing technologies and their informational artifacts – is essential to promoting and assuring the wide and continuous adoption and use of geographic information technologies. A 'standing reserve' of subjects who self-actualize through consumption fuels, and is necessary to, the proliferation (and subsequent profitability) of these technologies.

Self-actualization through the consumption of Web-based geographic information technologies is realized through 'connectivity.' In a personally penned letter addressing the Securities and Exchange Commission submitted as part of Facebook's S-1 filing to take the company public, Mark Zuckerberg wrote that "Facebook was not originally created to be a company [; i]t was built to accomplish a social mission – to make the world more open and connected" (Zuckerberg 2012 in Johnson 2012: n.p.). The significance of Zuckerberg's statement for the purposes of this discussion lies not in the obvious obfuscation at play in his dismissal of the capitalist premises of a company claiming *not* to be a business about to launch the third-largest[13] initial public offering (IPO) in history. Rather, what is more important is his framing of the pioneering social media service as an altruistic means for 'connecting' the world, a discourse which reconfigures social goods - in this case, social connectivity and 'openness', which itself is not defined - as technology's ends.

[13] (Geron 2012).

Location is increasingly coming to funciton as a 'backbone' for social networking, serving as a basis for the interoperability of multiple applications, whereby locational content is 'pushed' across social media platforms and services (Constine 2012). But more importantly, location is seen as enabling ever greater degrees of connectivity over and above first-generation social media. This connective promise of location-based social networking may be most recently evidenced in the introduction of 'ambient' social media applications and services such as Highlight and Glancee. The integration of background locational information with personal content (likes, interests, employment qualificaitons, etc.) portends to broker instantaneous connections with strangers in real-time based on common 'interests' and the co-location (proximity) of users. Location, then, is seen as offering superior connectivity: not only can we stay informed of what our friends have been up to, but we can now stay abreast of *what* our friends, and *future* friends, are doing and *where* they are doing it – *in real time* - such that we may spontaneously 'connect' with them.

This ideology of connection is identifiably neoliberal, and may be differentially evidenced and appropriated within multiple articulations of neoliberalism (e.g., as neoliberal geopolitics; see Roberts et al. 2003). It functions as a discursive imperative which maintains that to become a fully realized subject one must self-actualize as an individual through digital media, which give individuals assurance of participation in the social sphere through being 'connected.' The normative neoliberal subject is not only self-actualizing, but also entrepreneurial, responsibilized, hyper-individualistic, and, I venture, always-already *connected* – digitally present at all times, never off-line, constantly tethered to the digital by an increasing array of personal Web-enabled mobile devices (Borsook 2000; Cooper 2007; Navarro 2007a; Read 2009; Sunder Rajan 2006). 'Newness' as a means of securing the proliferation of Web-based geographical information technologies presupposes this neoliberal subject. Social media, including *geo*social variants such as Foursquare, Path, etc., extend to subjects the promise of full personhood (in the form of the digital reification of identity) and social connection (through accumulating 'friends'), a promise that may be fulfilled through the consumption of socio-spatial media.

This discursive binding of self-actualization and connectivity is implicated in the neoliberal governmentalization of subjects who are always-already online and 'connected,' where to be 'connected' is to consume digital information technologies that self-present as necessary to establishing or fostering that very connectivity (to other individuals, to a 'global society,' etc.). The way in which the consumption of these technologies is co-articulated with self-actualization through digital connection may be evidenced in the coverage of British Prime Minister [PM] David Cameron's joining of Foursquare in the autumn of 2011. Perez (2011: n.p.), writing for the technology blog *TechCrunch*, equates connectivity with selfhood in referring to the Prime Minister's "effort to expand his digital presence and better connect with both citizens and businesses alike." The implication of this statement is twofold. By having a 'digital presence,' the PM is then able to 'connect' with both 'citizens' and 'businesses.' In 'connecting' via these technologies, the PM simultaneously fashions (actualizes) himself as a 'regular' individual not unlike the rest of the British Public. As per the Prime Minister's official blog, "[c]hecking-in helps illustrate the events the Prime Minister participates in during his day-to-day duties beyond Downing Street" (HM Government 2011). The PM is hereby not merely an elite, privately educated individual from a very affluent family who now sits at the highest echelon of political power, but is rather a fully actualized 'real person' who engages in mundane "day-to-day" activities such as 'connecting' with the *hoi polloi*, who may now discern this for themselves by following his Foursquare check-ins.

In marketing themselves to adopters, geosocial media companies directly emphasize the connective affordances and capabilities of their products. The ambient social networking application Glancee defines itself as a "mobile application that helps you discover and connect with new interesting people around you" (Glancee 2012: n.p.). Highlight is a "fun way to learn more about people nearby" (and connect with them as a result) (Math Camp, Inc. 2012: n.p.). These technologies are however also engaged first and foremost in terms of their 'connectivity' beyond their direct marketing by developers. Eldon (2012) characterizes ambient social networking applications as "enabling types of long-term connections that nothing else has yet" (n.p.). "[H]ang on to your phones, folks," he instructs (Eldon 2012), "because they're going to be

all you need to create a new and lasting network of friends" (np). Elswhere, *The Next Web*'s coverage of the Android release of the location-based chat application WhoseHere describes the service as "claim[ing] more than five million people globally [who] have used the … app to make connections with local people" (Sawers 2012: n.p.). It is the *locational* component of this service that allows for the establishment of connections that are "local" (i.e., spatially situated), "spontaneous" (serendipetous and whimsical), and made while "on-the-go" (in real -time) (Sawers 2012: n.p.). All of this is achived by simply "tapping [into] the GPS functionality on a user's smartphone" (Sawers 2012: n.p.), which is to say that connectivity is enabled by location. The application Auto4sq allows users to schedule regular check-ins ahead of time. For example, if they "[g]o to church every Sunday," they can automate that as a weekly check-in (Olanoff 2011: n.p.). Here, 'connection' as a proxy for social relations is not only reconfigured as technology's end, but becomes fully instrumentalized: the entire social relation of 'connectivity' can be machine automated.

Connectivity through the consumption of geoweb technologies offers not just a means for self-actualization, but also, the adoption and use of these technologies is presented as an 'enterprising' thing to do. Foursquare encourages users to download its newest version such that they may "[m]ake the most of where [t]hey are" (foursquare 2012: n.p.). 'Making the most' of one's location consists of "[k]eeping up with friends while [they] share and save their adventures in the real world," and receiving "personalized recommendations and deals based on where [they, their] friends, and people with their [tastes] have been" (foursquare 2012: n.p.). Foursquare's self-representation reifies neoliberal norms of subjectivity by hailing subjects as enterpring individuals that 'make the most' of their spatial position. The implication is that in order to fully maximize the condition represented by their location at any one point in time – i.e., to be enterprising – users should 'connect' through the use of Foursquare because it is through connection that they can take advantage of 'deals' (location-based advertising) and make informed, discerning consumption decisions (through receiving personalized recommendations of where to eat, shop, etc.).

Similarly, ambient social networking applications are marketed not only in terms of their unparalleled connective capacities, but are presented as indispensible to self-fashioning as an enterprising individual. Writing for *TechCrunch*, a popular technology industry blog, Mike Butcher chronicled the use of ambient 'social discovery' applications such as Highlight and Glancee by technology firm recruiters at the 2012 South by Southwest (SXSW) technology and music festival to poach prospective employees (with desirable skillsets, as determined from their 'open,' i.e., publically viewable, social media profiles) from competitors. Anderson (2012) writes that for technology professionals, Highlight is the "best way to meet a VC [venture capitalist]" (n.p.). Even though these applications "are…set to expose your profile in public as a default," a practice which entails serious implications for privacy and personal security,[14] Butcher (2012) dismisses these concerns by stating that "[f]ew people are enabling 'friends of friends' only on the privacy settings," a claim which is entirely unsubstantiated and indeed false. As research carried out by Pew Research Center's Internet and American Life Project (Madden 2012) demonstrates, 58% of American adults with an active social networking profile set it to private, such that only 'friends' (those directly permitted by the owner of the profile) may view it. Only a mere 20% of adults had public profiles (accessible and viewable to anyone); and those who allowed friends-of-friends (contacts' contacts) to view their profiles accounted for 19% of adult social media users.

This representation of geosocial media hails the entrepreneurial neoliberal subject by framing the cessation over the control of one's privacy online as an enterprising behavior. The enterprising individual will disregard privacy so as to maximize their employment and/or career prospects. To enact privacy barriers and chose to not disclose one's location publically is

[14] For example, the application Girls Around Me, which notified (male) users of females in their vicinity based on publically-available (non-privacy controlled) Foursquare check-ins and cross-referenced these to women's' public Facebook profiles so as to provide users with their personal details (including relationship status, preferences in music and movies, hobbies, etc.), often unbeknownst to the women whose data was being mined and whose locations were being monitored in real-time. Foursquare suspended Girls Around Me's API access in March of 2012, denying them usage of its *Venues* database or ability to hook-into check-ins (Austin and Dowell 2012); shortly thereafter, the company behind Girls Around Me voluntarily removed the application from the Apple App store (Paul 2012).

pejoratively rendered as *un*enterprising by comparison. If a technology professional, for example, does not 'open' their social networking profiles and chose to broadcast his/her location to the world via an application such as Highlight, then any missed opportunity – such as not meeting a venture capitalist – is his/her own fault.

The way in which this discourse around the adoption of geosocial media demands an entrepreneurial, self-actualizing subject is co-articulated and consistent with the discourse of neogeography as a highly individualized practice (Turner, in Wilson and Graham 2012a). Turner (in Wilson and Graham 2012a) argues that what distinguishes 'neogeography' from the "mere collection of data and input from individuals" in user-generated practices of volunteered geographic information (VGI) is the individualistic element: the "personal interaction of individuals with spatial information in personal ways" (3 of 17). So, while discourses around non-adoption present the consumption of social media in terms of social norms that are acceptable and beneficial to the larger social group, they are in reality all about the individual. Instead of examining the implications of the translocation of social relations to the digital realm for society writ large, they enforce neoliberal norms of subjectivity which privilege and demand hyperindividualistic selves. For instance, they are part and parcel of a neoliberal matrix of subjectification that 'responsibilizes' individuals (Rose 2007): a technology professional's career fate becomes disassociated from the economic downturn and is instead reconfigured as his or her responsibility, latent in his or her decision to self-actualize as an enterprising subject by consuming geosocial applications such as Highlight.

This is part and parcel of a broader marked disdain for those who abstain from the consumption of social media. Identifiably neoliberal discourses disparage such individuals as irresponsible, un-enterprising troglodytes. In a 2009 article published in the *Washington Post*, Ian Shapira (2009) opines that such "refuseniks" and "laggards" qualify "as exotic life forms" (np.). In referring to a particular 28 year old "holdout," Shapira (2009) comments that her friends "consider her digital absence a nuisance," forced to go to the arduous lengths of emailing her invitations to events or photos they'd like to share. This discursive logic equates non-engagement with social media with *dis*engagement from society. Abstention, evidenced in a

refusal to 'connect', is pathologized as anti-social. In addition to technological fetishism and the cultural capital and social distinction gained by being an (early) adopter of digital technologies, this discursive framing stimulates social anxieties around non-adoption, further impressing upon subjects the notion that the adoption and use of social media is a normative and socially desirable behavior.

Web-based spatial information technologies simultaneously hail and impress upon neoliberal subjects the need to be always-already connected, and market themselves as the solutions for brokering that connectivity. This very connectivity is presented as the means by which subjects can self-actualize while enforcing and demanding normative neoliberal behaviors (such as entrepreneurialism). This discursive interpellation and disciplining of subjects 'primes' users to adopt geoweb technologies – i.e., it secures the proliferation and subjsequent profitability of these technologies - by extending to individuals the promise of self-actualization through connectivity. The 'newness' of Web-based spatial information technologies secures their proliferation not only by guaranteeing an undepletable reserve of 'new' technologies to be adopted, but also by ensuring the *need*, in the form of adopters, for ever-newer geoweb technologies which can out-perform (or 'out-connect') each other. Proliferation, achieved through modes of neoliberal subjectification and the always-already newness of Web-based geographic information technologies, serves the interests of profit.

3.7 Conclusion

This chapter constitutes a trenchant critique of the 'neo' heretofore missing from our collective engagements with newly emergent Web-based geographic information technologies. Geographers have been distracted by a preoccupation with disciplinary boundaries from examining the broader social implications of the framing Web-based geographic information technologies as always-already 'new' implicit in the proclamation of a 'neo'geography. 'Neogeography' is not only a rebranding of the discipline. It is a *discursive formation*, a series of

internally-consistent ways of framing Web-based geographic information technologies in ways that 'fix' or delimit how they are discussed, (re)presented, and marketed: as always-already new.

'Newness' is a discursive tactic that is operationalized to serve interests with vested stakes (profit) in their continuous, friction-free proliferation and adoption. It is leveraged as a de-politicizing device that obfuscates, and divorces social media from, the social contexts of their production so as to naturalize them; that is, to (re)present them as inevitable, necessary, and *neutral* as opposed to socially constructed and contested and thereby contentious in any way. Where Web-based social media have demonstrably deleterious social consequences such as those bound up with the erosion of privacy, which conflict with the framing of these technologies as politically neutral, the interests and social actors behind their production and dissemination make recourse to the 'newness' of these technologies as a means of rationalizing (i.e., normalizing) and absolving themselves of any responsibility for their societal effects. Simultaneously, 'newness' is used as a means of spurring the proliferation of these technologies so as to secure their profitability by ensuring an endless reserve of 'new' geographic information technologies to be adopted by users who are interpellated within these discourses as neoliberal subjects who are encouraged to self-actualize and to fulfill normative demands to act in 'enterprising' ways through the consumption of ever-newer geographic information technologies which extend the promise of full personhood through technological affordances that offer ever-superior 'connectivity.'

The "*neo* in neogeography" therefore "signals" *more* than "the potentiality of new practices" as per Wilson and Graham (2012b: 3, emphasis original). It is indicative of the ways in which the 'newness' of these technologies functions as a de-politicizing device, as a rationalization of the societal consequences of the geoweb, as a basis for proliferation and profit, and, co-articulated with the hailing of normative neoliberal subjects, as a form of neoliberal governmentality. More importantly, however, is that the leveraging of 'newness' as a discursive tactic - whether as proliferation and profit, rationalization of the social consequences of the geoweb, or proliferation and profit – has broad social implications in effecting pronounced changes in the nature of the technology-society relationships, by, for example,

normalizing certain kinds of behaviors around Web-based geographic information technologies. For example, the use of 'newness' to rationalize the societal consequences of Web-based geographic information technologies makes social data practices premised on the ceding of control over one's locational privacy not only acceptable but indeed *desirable* by projecting and representing it (foregoing locational privacy controls) as *enterprising*, i.e., as internally consistent with neoliberal subject norms.

'Newness' as rationalization further reinforces and reproduces the sense of the inevitability of these technologies effected by 'newness' as a de-politicizing device. As operationalized within Google's response to the Boring lawsuit, a logic of 'technological defeatism,' which tautologically holds that the introduction of continuously new technologies justifies and explains the proliferation *of* new(er) technologies, holds that we are 'defeated' when it comes to not only technologies but also their effects. We not only have no say or control over the introduction of technologies, which are framed as the inevitable results of linear scientific progress, but we simultaneously have no control over the social consequences of those technologies. The instillment of the sense of the inevitability of technology (and of its social consequences) serves a political purpose: it is one of the ways in which we are compelled to adopt geoweb technologies. Rather than questioning technology, we resign ourselves to its existence and assimilate it into our daily lives through practices of adoption. In consuming these technologies, we serve the interests of profit – of the businesses, speculative capital, and technological actors who accumulate capital through the continuous proliferation and use, by individuals, of these technologies.

The use of 'newness' to appeal to and demand self-actualizing, hyper-individualistic, responsible, enterprising individuals is part of a much broader matrix of neoliberal regime of subjectification which also has real-world effects by enforcing and sanctioning norms of behavior. The geoweb is, however, not only a discursive construction – it is very much a material one as well. I take up the issue of the materiality of the geoweb in the next chapter (*Chapter 4*).

CHAPTER 4

SPATIAL MEDIAS

4.1 Introduction

4.1.1 Background and historical context

At the height of what Schuurman (2000) referred to as the 'GIS wars' of the 1990s, John Pickles (1997) famously challenged members of the GIS community to take responsibility for their technologies by making explicit the ontology of their objects and epistemology of their subject(s). GIScience researchers responded by positioning GIS as a critical realist technology (Hallisey 2005; Mark 2005; Perkins 2003; Raper 2005; Schuurman 2002). In so doing, GIS researchers clarified that they understood mapping, and its outputs, in terms of practices of representation. While maps generated using GIS and other, more conventional cartographic technologies and techniques were seen as referencing real-world phenomena, these scholars ascertained that these representational artifacts were engaged always as abstractions, rather than as corresponding to any foundational 'T'ruth about the world.

This laying claim to the philosophical tenets underpinning GIS praxes did nothing, however, to stem epistemological critique of the technology by human geographers. Well into the first decade of the millennium, critics persisted in dismissing GIS as philosophically objectionable by virtue of its existence as a technology of representation (Elwood 2006; Leszczynski 2009a, 2009b). The nature of these debates, and attempts to bridge what has since been referred to as the 'qualitative-quantitative divide' have been covered extensively elsewhere (Crampton 2009a; Elwood 2006, 2009b; Elwood and Cope 2009; Kwan 2004; Lawson 1995; Leszczynski 2009a, 2009b, 2009c; Pavlovskaya 2006; Schuurman 2000, 2006). What is important about these exchanges, however, is that these epistemological critiques and philosophical positionings in response targeted and elucidated both i) how we know our *representations* (how we engage with and understand the visual artifacts and outputs that are the products of representational practices); and ii) how GIS itself constitutes an epistemology, a

specific mode of knowledge production and way of knowing the world as objectively discernible, exhaustively knowable, and 'fixed' (Brown and Knopp 2008; Dixon and Jones 1998; Hallisey 2005; Pickles 1995, 2004; Raper 2005; Schuurman 2002; Sheppard 2005).

What did not receive much attention was the *object* of these exchanges: the technology itself. While critics and GIS theorists have debated the epistemologies of representing *with* GIS, little attention has been devoted in the literature to how we 'know' – understand, frame, and engage – spatial information technologies such as GIS rather than the representations they are used to engender. Certainly, geographers have addressed the question of what GIS *is*, engaging it differentially and in various combinations as a tool; a science; a set of practices *with* the technology; the result of a series of social processes (social construction arguments); a mode of knowledge production; a system of representation; and, as a platform for cartographic communication (Chrisman 1999a, 1999b; Harvey 2000; Harvey and Chrisman 1998; Sheppard 1995, 2005; Wright et al. 1997). Save for the much-problematized definition of GIS as merely a tool, none of these attempts at engaging GIS directly address its materiality as a unique technological assemblage that makes, for example, certain kinds of practices *with* the technology possible (Leszczynski 2009c). The reason for this is that these definitional and philosophical debates occurred in an era where GIS effectively represented a 'technological singularity,' i.e., a time when GIS was the definitive technology of geography and the sole socio-technical object of critique.

GIS has unique material properties; by definition, it is constituted specifically by a database tied to a geovisual interface that enables the manipulation of associated database objects. This understanding of GIS as, at minimum, a material computing technology consisting of a database, a map interface, and some kind of computational link between the two is implicit in all of these definitions of GIS, whether it is framed as an epistemology (of knowing the world through a computing technology whose digital architectures truncate and 'fix' representation), or a set of practices *with* GIS (feminist, queer, quantitative, and other interventions). More specifically, these attempts on the part of geographers to grapple with what GIS is betray a commitment to an understanding of GIS as a *system* or *systems*: as distinctly ordered

assemblages of hardware/software objects and practices around those materialities. Together, these unique components of a GIS (database, visualization engine) work together to process particular inputs (such as proprietarily formatted spatial data) to generate certain kinds of outputs (such as a map). In other words, the unique software/hardware objects that constitute GIS function as a *system*.

4.1.2 The geoweb

Geographers' efforts to understand or conceptualize the geoweb and its significant have been hampered by a tendency to transplant concepts directly from engagements with GIS. This has primarily taken the form of situating the geoweb itself within a GIS genealogy, leading geographers to engage artifacts such as map mashups as, for example, the realization of GIS/2[15] (Miller 2006), or as an extension of qualitative GIS (Wilson 2009). Unlike the 'technological singularity' that is GIS, the geoweb, in contrast, is constituted by a multitude and diversity of informational artifacts (content) and technological devices (hardware/software). Technologies that participate in the geoweb include, but are not limited to:

- conventional Web GIS systems (GIS systems that serve data and enable some GIS functionalities over the Web);
- interactive mapping services such as Google Maps, Bing Maps, and OpenStreetMap (OSM);
- geospatial virtual environments/virtual globes such as Google Earth and NASA's World Wind;
- Spatial APIs[16] which extend interactive functionality to the client side and enable users to 'hook into' applications such as Google Maps and embed their own content into the service, in the form of a map 'mashup';
- wiki architectures that support the curation and editing of content by multiple users (for example, the user-generated content that comprises OSM);
- GPX as a standard for the exchange of geocoded (GPS) information;

[15] GIS/2 emerged at the turn of the millennium as a vision for a inclusive, participatory GIS that would be able to represent multiple spatial imaginaries, and interoperate between their encodings as well as communicate about those representation (Schroeder 1996). It was never operationalized.
[16] Application programming interfaces.

- services, such as Twitter's GeoAPI, that automatically geotag (attribute with locational coordinates) micro-blog entries with the location from which they are posted;
- geophotoblogs such as those hosted on sites such as Flickr;
- social review sites, such as Yelp, that allow users to find (and vet) services and establishments (such as hair salons, restaurants, etc.) on the basis of their location; and,
- a host of 'geosocial' applications, such as check-in services (e.g. Foursquare and Facebook Places) that allow users to connect over social networking applications based on their spatial positions by 'checking-in' to specific locations (a restaurant, their home, a park, etc.) and/or ambiently broadcasting their position over the Web.

Collectively, many of these instances are referred to as *location-based services*, which integrate and exploit geographical referents (e.g., spatial coordinates) as a premise for user interaction with content over the Web (Schiller and Voisard 2004; Spiekermann 2004). These applications and services are accessed via a wide array of Web-enabled, locationally-aware computing devices, including smartphones and other 'smart' handhelds, WiFi- and GPS-enabled cameras, tablets, and laptop and desktop computers. The sheer volume and variety of technologies and information artifacts are indicative of a need for new conceptual categories and frameworks to engage the practices, data forms, and hardware/software objects of the geoweb as these materialities do not conform to the status of a 'technological singularity' as GIS arguably does.

Moreover, geoweb devices and information artifacts do not comprise a unified system of representation or knowledge production. Nor are geoweb technologies 'systems' in the sense of ordered assemblages that are used to generate or produce unique types of outputs from specific kinds of inputs. Emergent Web-based spatial information technologies are not systems in the sense of a unique or singular means of representing the world, nor in the sense of unique sets of functions or operations (e.g., overlay, map algebra) that may be executed over certain kinds of inputs (e.g., vector map data) to produce specific outputs (such as a map). Unlike GIS, which supports database analysis and manipulation through a geovisual interface (the map), many geoweb technologies (such as OpenStreetMap or World Wind) do not support analysis or the sophisticated manipulation of data. Whereas some of these technologies are underlain by a robust geovisualization engine (e.g., Google Earth), others, such as Twitter's GeoAPI or

geotagging services are not inherently geovisual in nature. Even though geotagged tweets may be mashed-up or displayed over a Google Maps interface, the blog posts themselves are textual rather than geovisual. Elsewhere, the representational metaphor of a digital earth diverges from that of 'the map', and is associated with new affordances for interaction and navigation (for example, 'spinning' the globe rather than simply panning from one area of a map to another).

The materialities of the geoweb – by which I mean its information artifacts and technological devices, or ways in which hardware, software, and content come together – matter. They matter because they structure the kinds of interactions that become possible. For example, the engagement of emergent Web-based geographic information technologies in digital activist and civic engagement practices engenders a new knowledge politics around spatial information technologies by creating, or structuring, opportunities for leveraging new technological affordances for negotiating political claims (Elwood and Leszczynski 2012). Rather than being beholden to state-curated GIS data and seeking cartographic and thereby political legitimacy in the purported expertise vested in these datasets, civic, activist, and other organizations can generate their *own* spatial information, and themselves vet and rate the validity, accuracy, and quality of state- and corporate-authored datasets (Elwood and Leszczynski 2012). This is a function of, again, the affordances of these technologies - i.e., how and what the functional capabilities or components of technologies are perceived to be. Here, the participatory, collaborative, and public dissemination affordances of spatial media stem directly from the material nature of these technologies; specifically, the Web 2.0 architectures, framework, and programming techniques, such as APIs and wikis, that make the user-generation of geographical content possible.

The failure to engage the materialities of the geoweb, a legacy of the problems of how we engaged GIS (Leszczynski 2009a), is to erroneously abstract the phenomenon from its foundations in digital computing and the limits that this imposes upon representation, for example. This would open the door to a series of critiques flawed by virtue of their distance from the technologies themselves, as was characteristic of 1990s through early 2000s critiques of GIS proffered by human geographers (see Leszczynski 2009a, 2009b; Schuurman 2000). But

more immediately, the ubiquity of these technologies and their associated presence in and interpenetration of daily life necessitates a framework for grappling with geoweb information artifacts and devices as mediating forces. Mediation, as defined by Boyer (2007), is the "broker[ing of] the encounter of self and world" (Boyer 2007: v). Emergent Web-based geographical information technologies spatially mediate social relations in the way that spatial content and locationally-capable devices interface social connectivity. They also mediate our relationships with space and place by influencing how we experience, and build and express attachments to, particular spaces/places. For the famous media theorist Marshall McLuhan (1964), mediation is inherently material – it (mediation) speaks to the social experiences of the physical properties of technology. In other words, the ways in which we (societies) engage, promote, adopt, and most importantly use material technologies is constitutive of the field of social relations: of how we interact, and create and share meaning.

Geographers have only preliminarily begun to flesh out what is meant by 'the technical mediation of space/place.' This, I argue, is because a theory of the technical mediation of space is premised upon a systematic engagement of the nature of geoweb materialities. It involves questioning what it is about them – as devices and informational artifacts – that has engendered such a transformation in the nature of the relationship between technology and society, which is increasingly characterized by the presence of location-based technologies as mediating forces. In other words, if geographers wish to contend that new geographic information technologies *mediate* socio-spatial relations, and address how society experiences the physical properties of locational technologies, and how they structure our experiences of place/space, we first need to understand the nature of the materialities of location-based technologies.

4.1.3 Spatial media

Emergent Web-based geographic information technologies – content and hardware/software objects – are *spatial media*. Examples of spatial media include geosocial applications such as Foursquare, Twitter, and integrated mapping and photo sharing sites such

as Flickr; Web-based mapping applications, APIs and software development kits (SDKs) such as OpenStreetMap, Google Maps and Streetview, and Bing Maps and Streetside; virtual globes and geospatial virtual environments such as NASA's World Wind and Google Earth; spatial Web services such as geocoders; and, the locational functionalities and location-sensing capabilities of digital, Web-connected devices. It also includes the host of participating devices on which these applications and services run. The framing of these information artifacts and technological devices as media designates the now ubiquitous convergence of geographical information with digital, Web-based media that is characteristic of, to play on Wilson's (2012) wording, the 'locationally-aware present.'

Mine is not the first intervention to engage spatial information technologies in terms of media. Indeed, the handle "'new' spatial media" is attributable to Crampton (2009b: 91), although he does not flesh out the significance of the neologism. Sui and Goodchild (2011) productively acknowledge GIS' status as media, but they see the rise of phenomena such as location-based services to constitute a 'GIS-ification' of social and other digital media. The geoweb is *not*, however, (a) GIS. The diversity and multiplicity of its constituent technologies cannot be reduced to its status as a technological singularity. Nor are spatial media 'systems.' Their materialities break the association between the database and the geovisualization engine. Google Earth, for example, is underlain by a very powerful geovisualization engine, but it is not tied to, or underlain by, a readily accessible database of associated attribute information. As well, their material nature breaks the association between geographic information technologies and the map as output. A Bing Map StreetSide image is not a map; rather, it is a high-resolution, photorealistic, spatially referenced, and navigable image. Similarly, georeferenced tweets are VGI, and may be mashed-up with Google Maps and displayed in map form, but they are not 'map' in nature.

Elsewhere, researchers make reference to 'locative media' (Boulton 2011; Farman 2012; Firmino et al. 2011; Galloway and Ward 2006; Hemment 2006; Thielmann 2010; Varnelis and Friedberg 2008). Thielmann (2010) defines locative media as "digital media applying to real places [and] communication media bound to a location" (2). For geographers, 'location' refers to

position in physical space, reported as, for example, x,y coordinates such as longitude and latitude. The rise of the geoweb and its constitutive media, however, is salient beyond the "location sensing capabilities" of technologies (Thielmann 2010: np). While the ascendance of locational content over the Web is significant, the geoweb is not only about where things and people are geographically located, but it is fundamentally about *place*, a much deeper concept that includes embodied experiences of physical space, as well as phenomenological senses of, and attachments to, 'place.'

In the case of geosocial applications, for example, users can increasingly interact with *place* as opposed to *location*. When searching to check-in to an establishment or space on Foursquare, users search for *places*, not locations, that have been identified and stored in Foursquare's database of landmarks and venues (called, simply, 'Venues') (Dudarev n.d.). This distinction between place and location is an important one. The concept of 'location' refers to geographical position, i.e., coordinates on a Cartesian grid. 'Locative media,' then, reiterates spatial science impulses in conjuring ontologies of space as a frictionless, isotropic plane on which things are referenced and related to in terms of their precise location along a graticule. The geographic imaginaries that underly much of geosocial media, however, are richer than x,y position, extending to users more nuanced concepts of place with which to interact. As stated by blogger Artem M. Dudarev (n.d.),

> "[j]ust by looking at two numbers [coordinates] we are not able to say anything about the location. Connecting to a place makes more sense. A concept of place [is] more human [than location, even though it] is much more ambiguous than geographical coordinates"
>
> (n.p.).

My intervention around media and emergent, Web-based geographic information technologies is deeper and more robust than those offered by Crampton (2009b), Sui and Goodchild (2011), and others around locative media. 'Spatial media' is more than a neologism for describing a nascent genre of geospatial information technologies. The assertion that geoweb devices and informational artifacts both function as, and constitute, media is an epistemological claim about how these technologies should be apprehended and engaged. This

claim as to how we should 'know' our technologies is different from geographers' extant investigations of the ontological and epistemological ramifications of the geoweb.

For Warf and Sui (2010), the rise of geoweb practices such as the user-generation of locational content engender 'pluralist ontologies' constituted by the representations of the multiple and often-times conflicting realities "perceived and inhabited by different social groups" (for example, competing demarcations of urban city neighborhood boundaries in WikiMapia) (198). These pluralist ontologies confront long-problematized correspondence theories of truth associated with GIS. They are instead epistemologically consistent with "consensus and performative interpretations" revealed by the ability for "communities to construct 'truths' relative" to their own interests and spatial imaginations by using generative content-authoring platforms such as WikiMapia, Ushahidi, and Google's Map Maker (198, 203). Warf and Sui's (2010) investigation of the ontological and epistemological implications of new spatial data practices is an invaluable contribution that informs our understanding of how new spatial information technologies capture both how we know the world, and what we – as individuals and disparate groups of people – know the world to be like. However, while 'pluralist ontologies,' consensus, and performative theories of knowledge speak to epistemological shifts in terms of how we know spatial representations and practices *of* spatial representation, they again do not address how it is that we 'know,' epistemologically, our spatial information technologies in the age of the geoweb. In other words, we require a way to 'think' or engage new spatial information technologies themselves, and more specifically, their materialities.

Certainly, the geoweb is not constituted by material artifacts alone, but also by new spatial content forms, praxes, and the social contexts of their production, sharing, and use (Elwood and Leszczynski 2011). Granting emergent, Web-based geographic information technologies an epistemological status as media not only directly asserts their materiality, but also serves as a framework for grappling with the socio-spatial impacts of these technologies. In this chapter, I begin by introducing theories of media and mediation. I then proceed to establish the relevance and utility of a theory of media for framing and engaging the

materialities of emergent spatial information artifacts and devices, and elucidate the ways in which emergent Web-based geographic information technologies (information artifacts and devices) are media. I conclude by exploring the ways in which (new) spatial media are mediating forces, and suggest ways in which granting these technologies the epistemological status of media can be used to develop a theory of the technological (material) mediation of socio-spatial relations.

4.2 Media/tion

4.2.1 Media

'Media' is a broad term that assumes different meanings in multiple contexts, and is used differentially by diverse disciplines and schools of thought. Vernacularly, 'media' has long designated *mass media* or *the* media, which refers to the capitalist model of centralized content production and distribution, and the instruments – or mediums – of content dissemination (newspapers, television, etc.) (Galloway and Ward 2006; Hemment 2006; Thielmann 2010). This common meaning of media surfaced in the 18th century, when "paper was the medium of circulation [and media] emerged as a term to describe inexpensive newspapers and magazines" (Boyer 2007; Christophers 2009; Chun 2006: 3; Rajagopal 2006). This definition fully gained traction after WWII with the rise of electronic telecommunications (Chun 2006: 3). In the sense of 'mass media,' then, media are understood to be instruments, or means, of (mass) communication (Boyer 2007), as well as the institutionalized arrangements that control that communication (Boyer 2007; Castells 2009; Lievrouw 2011; McLuhan 1964). This sense of media as a channel for communication is attributable to Marshall McLuhan's theory of electronic media (e.g., broadcasters and telecommunications firms; Wu 2010). McLuhan (1964) defines media as an extension of ourselves, i.e., as prosthetics that augment human communication (and our capabilities to communicate).

If communication may be defined as "the sharing of meaning through the exchange of information" (Castells 2009: 54), then media are simultaneously the mediums – practices and

artifacts - *through* which meanings are produced, represented, instantiated, and disseminated. Media, then, is simultaneously a channel or instrument for communication as well as a 'petri dish' or site of inculturation (Barnett 2003; Crang 1998; Hall 1997). Media do not simply transmit reflections of the world, but indeed constitute "discrete moments in the production and circulation of cultural meaning" (Barnett 2003; Boyer 2007; Craine 2007: 149; Crang 1998; Hall 1997; Levinson 2001; McLuhan 1964; Rajagopal 2006). The production of media and their circulation is only one of the many 'sites' or sets of institutional practices of meaning production. As per Hall (1997), meaning is also produced at the level of the appropriation of artifacts, for instance in the way that possession of an iPhone has become a status symbol. What is unique about media, however, is that they link the production of culture to its mass dissemination: they "shape the character of social and economic exchange by virtue of what they [transmit]" (Rajagopal 2006: 279).

Thus, media are understood as both *practices* of meaning creation and sharing *and* the larger institutional arrangements, such as 'big media,' which structure the kinds of communication, i.e., inculturation, that are "[enabled] and [forbidden]" (Rajagopal 2006: 279). But central to any definition of media is its materiality: whether as technologies, instruments, or channels, media are *material*. That is to say, they have a physical instantiation, whether as informational artifacts that reside in the physical registers of computing architecture, or as technological devices that we interact with *to* produce meaning and/or transmit the objects of communication. Without a material component, there is no ground or basis for understanding media as a site of inculturation or as constitutive of social arrangements. People engage in practices *as* they design and use technologies, and social and institutional arrangements are "creat[ed] and [built] around" technological "artifacts," be they content/information or devices (Barnett 2003; Christophers 2009; Craine 2007; Hall 1997; Lievrouw 2011; Rajagopal 2006: 279). There must be some *thing* (medium) via which communication is disseminated and received, be it a newspaper, a television screen, or a digital device such as a smartphone, tablet, or computer. In the instance of recent Internet-based connective mediums such as social media, this encompasses the "hardware devices, code standards, and platforms" of communication

(Lievrouw 2011: 7), but also the informational and data artifacts that are produced, circulated, and accessed via these aforementioned devices and platforms (Lievrouw 2011; Thornham et al. 2009).

4.2.2 New media

Certainly, there are many different kinds of mediums - the visual medium, for example. The emphasis in this chapter is however specifically on *digital* media, which have been engaged in certain scholarly circles under the rubric of 'new media' (Bolter and Grusin 1999; Hansen 2004; Levinson 2009; Lievrouw 2011; Manovich 2001; Vandendorpe 2008). Manovich (2001) defines 'new media' as "the digital medium itself, its material and logical organization" – or, in other words, the "meta-medium of the digital computer" (6, 11). Chun however argues that the term 'new media' does not simply reference the digitization of existing analog data forms such as photography, video, and text, but rather denotes the rise of an "interactive medium or form of distribution as independent as the information it relay[s]" (1).

Examples of new media include social media, smartphones, blogs and micro-blogging services, social vetting and review applications, social bookmarking sites, podcasts, and wikis, but also include now well-established technologies such as file-sharing systems (e.g. peer-to-peer, or p2p), webpages, email, open-source software, as well as digital forms of audio and video. Now that many of these examples – such as file-sharing systems, hypertext, and email – are upwards of 15 to 20 years old, scholars have begun to question the salience of continuing to designate new media as 'new', particularly for younger demographics whose members never knew a time before the Internet (Gitelman 2008; Hermida 2009; Levinson 2009; Lievrouw 2011; Manovich 2001). Manovich (2001) recognized this early on at the outset of the emergence of the field of new media studies, which he helped shape. He nevertheless maintains that 'new media' is a superior signifier over 'digital media'. 'Digitality' refers, as per Manovich (2001), to the digital sampling of an analog signal or form. Many media forms, such as digital cinema, meet this definition of 'digital media.' Thus for Lunenfeld (1999), rather than speaking to the novelty of enrolled technologies or referencing their digital nature, 'new media' more so acts as a

"placeholder" for a particular historical genre of "cultural productions" (xix). Lievrouw (2011) similarly considers new media to represent a particular genre of technologies, one distinguished by unique media ecologies, assemblages of information and communication technologies (informational artifacts and devices), institutional arrangements in which they circulate, and the social contexts of their development and use.

As a distinct genre of socio-technical productions, or assemblages, new media diverge from other, earlier digital media forms, such the example of digital cinema given above. New media are unique by virtue of their modifiability, independence of content from instantiating technologies, networked nature, hybridity, interactivity, integrativity, portability, and intimacy (Lievrouw 2011). The quality of modifiability captures the way in which new media are designed to be altered by users and to find multiple instantiations across mediums (Levinson 2001; Lievrouw 2011; Manovich 2001; Thornham et al. 2009). Modification is possible because new media possess the dual characteristics of modularity, also referred to as scalability, and variability. Given the fractal nature of digits as a representational unit, they can be repeatedly dissembled and reassembled in various combinations (Lievrouw 2011). Variability describes the way in which new media content may find multiple instantiations – i.e., it can exist as many different versions (Manovich 2001). Variability is itself a function of the independence of content from any one medium (Manovich 2001). This content independence is enabled by the modularity of digital encoding. In other words, the content of new media forms can easily be moved from one device to another by virtue of having been discretized (i.e., digitized) (Levinson 2001; Lievrouw 2011; Manovich 2001; Thornham et al. 2009). As a function of variability, a YouTube video can be viewed on a Web-capable tablet, smartphone, or computer. At the same time, YouTube supports various video file types (e.g., .mov, .avi, .wmv, etc.) that have been recorded and/or created using a variety of devices. Lastly, variability means that YouTube videos can be captured (downloaded) from many devices in different formats.

It is in this way that Levinson (2009) characterizes the new media world as one in which a host of computational devices (tablets, smartphones, laptops, etc.) are "appendages and controllers of the vast array of images, text and all information stored, manipulated and

transmitted on the [W]eb" (8). Lievrouw (2011) further argues that new media furthermore enable new modes of interactivity, premised on requiring users to actually *do* something with technologies in order to make them function, as opposed to simply receiving content. By providing users with an "unprecedented degree of selectivity and reach in their choices of information and cultural resources, and their personal expressions," new media provide a "qualitatively different experience" of interaction as compared to older media forms (Lievrouw 2011: 13).

Furthermore, the networked nature of new media is significant in that it has displaced discrete media systems such as television, radio, and print (Levinson 2001). The integrativity of content forms that this displacement has enabled makes new media technologies inherently recombinant (Thornham et al. 2009). An image captured with a digital camera may not only be displayed on any number of digital devices, but may simultaneously be manipulated (deconstructed, reconstructed) in an infinite number of ways because of the addressability of its unique digital units (pixels; Hansen 2004). New media consequently "resist stabilizations or 'lockdowns' and change continuously" as a result of having been "designed and developed as continuously reorganizing, unfolding, point-to-point webs of technologies, organizations, and users – as a *network of networks*" (Lievrouw 2011: 8-9). It is the recombinant nature of new media, whereby they are always becoming 'new' by virtue of content forms and structures being continuously remixed, referenced, and/or versioned, that Lievrouw (2011) argues allows us to continue to call new media 'new' despite the currency of the informational and technological artifacts. Debates as to the 'newness' of new media aside, the capacity to disaggregate, re-combine, and reference content forms and expressions has been greatly bolstered by the ascendance of Web 2.0 interactive functionalities and participatory architectures, such as wikis, which support the *user-generation of content*. Wikipedia, for example, permits multiple users to create, edit and add content to an entry; videos posted on YouTube are another example of user-generated content.

4.2.3 Mediation

Many of these properties of new media – their modularity, variability, networked nature, hybridity, interactivity, integrativity, portability, and the independence of content from instantiating mediums – are inimical to the affordances, architectures, and frameworks of digital computing. While computation is central to any understanding of new media, however, neither computing nor digitality are synonyms for, nor do they beget, new media. In addition to being characterized by the aforementioned properties, 'new media' simultaneously signals the *effects* of digitization (Chun 2006). According to Manovich (2001), the societal effects of new media arise from the broad shift of culture to "computer-mediated forms of production, distribution, and communication" associated with the rise and adoption of attendant materialities (19). For instance, 'new media' captures the extent to which we culturally perceive objects to be interpenetrated by information patterns (Murray 2008), a perception which "finds instantiation in an array of powerful technologies" (Hayles 1999a: 69). We see this most immediately in the rise of social media as a new basis for human connection and interaction. Social media *interface* social relations – in other words, they are *mediating forces* in the technology-society relationship.

Mediation, as eloquently defined by Boyer (2007), is the "broker[ing of] the encounter of self and world" (v). What it means to say that technologies – i.e., media - broker social relations and the way in which we relate to the world around us has been differently theorized. McLuhan's (1964) 'The Medium is the Message' was an early engagement of how we experience of the affordances[17] of technology. For McLuhan, it is the medium itself – the material technology – which alters, or *mediates*, the social domain. It is the introduction of a technology such as the steam engine that is of social consequence, not individual instances of people taking the train from London to the countryside. For example, the development of machine technology altered social relations by fragmenting the labour process, and by deskilling labour

[17] Broadly, affordances are how the functional capabilities or components of technology (a technological device, an interface) are perceived. Rather than being understood as the features of (a) technology that can be directly engineered, affordances are instead what those features or components are used for.

and reducing the demand for skilled craftsmen. It is this fragmentation and deskilling of labour that is important about mechanization, *not* whether machines are used to produce "Cornflakes or Cadillacs" (McLuhan 1964: 23). The introduction of machines in the workplace changed how people understood labour (it became dehumanized), and fundamentally altered how manual labourers saw themselves (for example, as alienated from capital). The message, then, is the "change of scale or pace or pattern that it [any medium or technology] introduces into human affairs" (McLuhan 1964: 24).

But, the nature of the relationship is not unidirectional as McLuhan suggests (from technology to society), nor is society a passive receptor that simply absorbs the effects of technologies which define our culture for us. As per Lievrouw (2011), mediation is "an ongoing, mutually shaping relationship" between people and technology "that produces social and technological change." Actor-network theory alerts us to the reality that that while we (people) design and produce technologies, technologies simultaneously fashion and make us – they are active participants in the technology-society relationship (Latour 1991, 1994, 1999). We have, therefore, another definition of 'media' to be added to the aforementioned definitions of media as mass media, channel or instrument of communication, petri dish or site of incluturation, and materiality: media as a *process* (of mediation) (Silverstone 1999).

For Latour (1994), mediation is an act of translation between technologies (which he refers to as 'actants') and social (human) actors. For instance, drivers must alter their actions in navigating a speed bump; speed bumps mediate human action. Latour's theory of mediation as translation accounts for how technologies mediate the world of lived experience by necessitating that persons modify their behaviour through, for example, disruption (such as the speed bump, which disrupts the travelling speed of an approaching vehicle). But Boyer's (2007) definition reminds us that mediation is a brokering of both physical *and* social worlds. In other words, technological presences do not only involve us in unidirectional relationships with non-human actants such as speed bumps, but indeed they also mediate the field of social relations, establising, altering, and severing relationships between human actors.

In ‘Technology is society made durable,’ Latour (1991) argues that technologies are a form of ‘social glue’ that holds society together as a “durable whole” by stabilizing social relations (103). He gives the example of now-anachronistic weighted hotel keys. Before the ubiquity of magnetized cards for gaining entry to hotel rooms, keys were attached a weight intended to encourage hotel guests to leave their room keys in the lobby by making the keys too cumbersome to carry. Leaving with keys resulted in high rates of key loss thereby necessitating replacement by the hotel. The key weights mediated the relationship between hotel workers and guests. By giving guests incentive to leave their keys with reception, they prevented employees from having to intervene by pleading with or condemning hotel customers. Customers on the other hand left their keys at the hotel not because they were politely asked to do so or because they had read the sign, but because the technology – a heavy metal weight attached to their room key – prompted them to respond in a socially desirable way.

While this example of the weighted hotel room keys speaks to the ways in which technologies may broker social relations, Latour’s formulation is technologically determinist. It holds that technologies are the ontological seat of social relations; or, alternatively stated, that social relations are produced by technologies. However, while technology has non-socially reducible characteristics – such as its endurability, concreteness, malleability (Lawson 2007) – it is simultaneously a social construction. Lawson (2007) refers to this as the ‘dual nature’ of technology. As a social construction, technology is immanent to social relations: we design and enroll the technologies that simultaneously enroll us. This simultaneous ability of technologies to effect social change means that they are also transcendent to (outside of) social relations by being that force which stabilizes the social order (acts as the ‘social glue’). What is needed to understand the ways in which technologies and social actors mutually constitute, shape, reproduce, and affect one another is a balance between the reductionism of both social constructivist and technologically determinist approaches to engaging the nature of the relationship between society and technology.

Boyer (2007) effectively captures the way in which technologies function as an intermediary force. For him, media are 'medial.' The medial is that which stands between the poetic and the formal (Boyer 2007). If poetics are our creative propensities, and reflect "our awareness of our capacity to bring forth [and] change… our environments," and the formal is the external, an "attention to… things and forces [in our lives] that are not-us," then the medial is the intermediary domain (Boyer 2007: 26). This is the domain of lived social relations, such as language, which bridge the formal and the poetic (Boyer 2007). "Always," writes Boyer (2007), the medial refers to the "'in between' and thus connects very closely to the two meanings of 'medium'": 'medium' as "the middle ground," or that which "lies in between;" and 'medium' as the "means," i.e., "that which serves as the instrument of something else" (26-27).

Boyer holds that mediation is difficult to conceptualize, offering only suggestions of "persons[,] forces and objects beyond the certainty of what is known… experientially" (2007: 47). Mediation nevertheless serves as an effective framework for understanding and engaging socio-technical change. For Lievrouw (2011), mediation – the recursivity between practices of reconfiguration, whereby people amend and adapt technologies by actually using them, and remediation, which describes the way existing media forms and expressions are reflected in both the design and use of emergent technologies – "actually constitutes" the field of "social relations," i.e., "the creation and sharing of meaning" (4, 231). The ascendance and widespread adoption of spatial media is altering the society-technology relationship in profound ways. But before we begin to engage the ways in which emergent, Web-based geographic information technologies mediate socio-spatial relations, a discussion of the ways in which these information artifacts and technological devices constitute 'media' is warranted.

4.3 Spatial Media

4.3.1 Convergence

The rise of emergent, Web-based geographic information technologies is the latest culmination of at least three decades of an intensifying convergence of communication media

(print, audio, video, etc.) with information technologies (Lievrouw 2011). The union of telecommunications (e.g., wired and wireless telephony) with information technologies (computing and associated digital encoding, data handling and programming techniques; affordances for interaction; and hardware, software, and middleware) is not new. The incorporation of virtually all media (content and devices) into the network, and the extension of Web 2.0 affordances to media forms are, however, more recent. This process of the integration of communication media and information technologies is moreover ongoing, and since 2005, we have been witnessing and experiencing the subsequent convergence of digital, Web-based media with geographic information (Thornham et al. 2009).

The majority of mobile computing devices now have location-sensing capabilities (Wilson 2012). This is significant because it means that one can connect to, exploit, and generate or interact with geographical information from essentially any computing device that connects to the Web. Twitter's GeoAPI allows the attribution of geographical referents to a microblog post. This location is either machine-tagged based on a user's self-reported position, or the location of the device itself (position of WiFi router or GPS location of mobile device). Twitter both allows users to push these georeferenced notifications to other social media services, and also posts locational content, such as Foursquare check-ins, pushed from other applications. All of these may be geovisualized over a Google Maps mashup. Foursquare itself uses an OpenStreetMap interface for user check-ins or for viewing the locations of 'friends' (contacts) in a user's network. Photos that have been automatically geotagged using locational capabilities in smartphones and uploaded to the social photo sharing site Flickr now appear in both Bing Maps' Streetside and Google Maps' Street View applications. These services use the locational data to geo-reference the photos to existing images in either service and "[overlay] them by stretching the photo to form fit where in the world it belongs" (Cope 2009; Pendleton 2010: n.p.). Street View also sources geotagged images from the social image sharing sites Panoramio and Pandora (Catt 2010). Photos from Flickr may likewise be pushed to Mapquest using GeoRSS, a standard for including locational information with a Web feed (glenn 2009). Where photos posted to Flickr have not been auto-geotagged, users can connect to

OpenStreetMap (OSM) and tag their photos with their OSM nodes and way points (Schutzberg 2009a).

The convergence of geographic information with digital media, and the interoperability that this affords, is demonstrative of spatial media as 'media' in serveral important ways: i) spatial media as material medi*ums*; ii) spatial media as characterized by many of the definitive properties of new media, namely content independence and their networked nature; iii) media as channels of communication; iv) media as sites of inculturation; and v) media as public.

4.3.2 Spatial media as mediums

'Media' is a plural designator, and as such speaks to the diversity of technologies – georeferenced content, physical devices, geospatial services, standards for geographic information encoding, techniques for embedding geographical content across services and applciations, and software such as geosocial applications or navigational utilities – that circulate and participate in the phenomenon that we refer to as the geoweb. In other words, there are many different kinds of medi*ums* that are instances of examples of spatial media. Spatial media, then, may be defined as the technological devices and informational artefacts that comprise the geoweb. If the geoweb may be thought of as new spatial data forms (e.g. user-generated geographic content) and practices (such as the 'volunteering' of geographic information), spatial media are the material platforms, devices, and information artifacts that support, enable, and are constitutive of both the geoweb's content forms *and* data practices. Alternatively stated, they are the material channels that enable, extend, or enhance our ability to generate, share, interact with, and use geographical information online.

For example, platforms such as OpenStreetMap (OSM) may be distinguished from practices of volunteering geographic information. OSM content is crowdsourced and the initiative is therefore dependent on VGI. However, engaging the constitutive materialities of the geoweb on their own merits independent of their generative data practices, such as the lay curation of spatial data, allows for an examination of how these informational artefacts and technological devices are subsequently being used and deployed *in* practices of, for example,

activism and civic engagement (Elwood and Leszczynski 2012). The new array of emergent platforms and applications for curating and sharing geographic information over the Web engenders a new knowledge politics underwritten by the resituating of scientific expertise and new geovisual epistemologies premised on transparency that diverge from the cartographic legitimation projects of GIS-centric activist practices. While grassroots organizations, indigenous groups, and civic organizations have used geographic information in working to legitimate political claims, the emergence of new materialities (spatial media) has led to a diversification of activist practices around geographic information, and created new possibilities for *how* geographic information may be leveraged in the negotiation of those claims.

4.3.3 New spatial media

In recognizing multiple materialities, framing these technologies as 'media' divests us of a commitment to any one technological singularity. This is important given the diversity of information artefacts and technological devices that participate in this phenomenon (the geoweb). This framing moreover captures the way in which emergent, Web-based geographic information artefacts and technological devices exhibit many of the properties or characteristics of new media introduced in earlier sections. Most significantly is their networked nature and the associated independence of spatial content form any one instantiating medium. For example, geotagged photos posted to Flickr are not unique to Flickr as a platform in the same way that coverages are native to ArcGIS and must be converted to be used in any other GIS software environment. Rather, these images may be georeferenced and draped in Google Maps' Street View and Bing Maps' Streetside services. The geotags themselves may come from GPS coordinates automatically attached to the digital photo at the moment of its capture, can be self-reported by the user, and/or come from OpenStreetMap (OSM) connectivity from directly within Flickr that allows users to georeference their images using OSM map data. Similarly, check-ins from Foursquare can be pushed to Twitter, and geocoded tweets, Gowalla and Foursquare data can all be visualized over a Google Maps base-map in the

form of a Google Maps mashup. Platform independence is significant because it is that which enables multiple materialities to participate in the geoweb because they are all networked and the spatial content that they are used to curate and/or interact with is not proprietary to any one device or application/service environment. But more importantly, content-medium independence is key to an understanding of digital media as 'media machines' (Chun 2006), i.e., as platforms for altering, generating, and distributing (other) media. This is a function of the manipulability and variability of digital information, and the ability for all digital devices and environments to parse and render information stored as binary digits. In particular, the extension of Web 2.0 functionalities to the geographical domain have resulted in the proliferation of vast volumes of user-generated spatial information artifacts (media) that is accessible and may be selectively modified, reworked, and combined with other geographical and non-geographical content from any number of networked (Web-enabled) software/hardware objects. (Lievrouw 2011: 7; Thornham et al. 2009).

4.3.4 Spatial media as channels and instruments of communication

Framing examples or instances of geoweb-specific application, services, and devices as media acknowledges the ongoing convergence of location with communication technologies more generally, and with social media specifically. Social media themselves are information communication technologies whose premise is to connect individuals. Media are inherently "messaging instruments," or channels of communication (Boyer 2007: 52; McLuhan 1964). This is particularly true of geosocial applications, which may broadly be described in terms of the union of social networking and location-based services. There are several different kinds of geosocial applications. Check-in services such as Gowalla (shut down as of January 2012 after being acquired by Facebook), Foursquare, Facebook Places, loopt, whrrl, and the now defunct brightkite are premised on users reporting their presence at specific locations (their home, a restaurant, civic establishments and venues, etc.) and broadcasting this geographical information over the Web. Social review applications such as Yelp, MyTown, and Google Places allow users to rate and review businesses and establishments, and subsequently allow other

individuals to peruse these reviews on the basis of location (e.g., 'sushi in San Francisco'). And, there are also location-based blogging services such as Path and Broadcastr, and Twitter's GeoAPI permits users to have their posts automatically machine-tagged with locational referents, or to self-report the location.

In all of these instances, the objective of using geosocial applications is not simply to share geographic information. Rather, spatial content serves as a basis for *communication*. Geosocial applications are underwritten by locational services (e.g., geocoding) and/or capacities for parsing locational content to enable social connectivity – i.e., communication - on the basis of this geographical content, whether it is user-generated or machine-located. This allows users to establish connections and interact with each other on the basis of their locations. For example, check-in applications that allow users to disclose their location at a particular place are immediately premised on communication. This spatial content allows users to connect with friends and/or strangers who are either coincidentally at the same location, or by discerning where a user is so as to meet up with them at that location. The utility of these application is not latent in how well they 'represent' spatial information but rather in how well they use locational referents to broker connectivity between users; i.e., to establish communication.

4.3.5 Spatial media as sites of inculturation

Communication refers not only to the sharing of information, but indeed to the creation and "sharing of meaning *through* the exchange of information" (Castells 2009: 54; emphasis added). As digital information communication technologies become preferred mediums for cultural expression, and location is increasingly used as a basis for organizing, curating, annotating, and sharing these expressions, spatial media are demonstrably sites of inculturation. In other words, spatial media are involved in, and are vehicles of/for, the production and reproduction of cultural memes and norms. Using the Yelp application or Google Maps on a smartphone to find a sushi restaurant within a set distance of one's present location, for example, has become standard practice.

But the proliferation of these technologies has further-reaching effects in that they, and the discourses that surround their adoption and use, actively work to reconfigure social and cultural norms, such as those around locational privacy (Elwood and Leszczynski 2011) (see *Chapter 3*). The design of many geoweb applications and services running on locationally-capable mobile devices is premised on cultural apathy towards privacy. Google Street View, for example, which captures high-resolution imagery at street level and stitches them together to form a digitally navigable spatial fabric, erodes reasonable expectations that our activities in space are not being surreptitiously recorded and publically disseminated (Blumberg and Eckersley 2009; Elwood and Leszczynski 2011). Elsewhere, ambient social networking applications such as Highlight require users to 'open' up thier social networking accounts (eliminate privacy filters) and allow their mobile device to continuously broadcast their location to other users of the service. Spatial media, then, are materialities through which social and cultural norms around privacy are being actively reconfigured. This reconfiguration of locational privacy is contingent upon the unique material assemblage of the spatial medium in question. In the instance of Street View, for example, its undermining of locational privacy arises from the photo-like nature of its high-resolution imagery and the way that this stands as a "visual reproduction of a person's presence and perhaps his or her behaviors at a given location," publically disclosing people's activities in space in ways that make them appear 'caught in the act' (Elwood and Leszczynski 2011: 11).

4.3.6 The public nature of spatial media

The capacity of spatial media to be involved in a reconfiguration of social and cultural norms such as those that attend privacy arise from their public nature. Media, where understood as 'mass mediums,' are inherently public – broadly disseminated and purported publically accessible. GIS was a skilled practice and access was primarily limited to experts, requiring special software. Using new spatial media requires no such comparable skillset beyond basic digital literacy such as knowledge of how to access and navigate the Web from a

digital device with Internet connectivity.[18] Yet 'public' refers to more than access (openness to all persons) or a kind of ownership relation (public funds, for example). 'Public' also speaks to the nature of the effects of something, be it a phenomenon or physical entity. Specifically, it designates their *reach* – as affecting an entire population, community, culture, or society. What matters about the public-ness of spatial media is not the simple association of 'access' and 'democratization' that have been brandished about elsewhere (Connin 2010; Geersten 2010; Granick 2006; Meier 2011; Sui 2008), but the *effects* of their ubiquity: the technical mediation of socio-spatial relations, which I turn to in the following section.

4.4 Media, Society, Space

4.4.1 Spatial media as relations and materialities of mediation

Our daily lives - in terms of our interactions and the way we connect with others, the ways in which we access content from news to music, and even the way we identify as subjects - are increasingly mediated by digital technologies (Hayles 1999b; Levinson 2009; Manovich 2001; Robinson 2006; Sundén 2003; van Kokswijk 2007). Social media applications and services such as Facebook and Twitter, for example, mediate social relations in the sense of mediation as 'brokering' – i.e., they are mediums through which individuals establish connections and interact with others (Boyer 2007). The convergence of digital media with geographical information is not only part of a major expansion in what is considered 'media,' but is indeed constitutive of a fundamental change in the nature of the technology-society-space relationship. In other words, spatial media such as location-based services do more than simply broker social connections. They mediate socio-*spatial* relations. That is to say, spatial media fundamentally alter the ways in which we, as wired societies, experience and understand space/place by structuring and influencing those experiences and our spatial imaginaries. Moreover, encodings

[18] This is not to suggest that new spatial media render the digital divide unproblematic; issues of the digital divide persist.

of space/place themselves are enrolled in the brokering of our (social) relations with each other as well as with space/place, rendering social connectivity inherently spatial.

4.4.2 The socio-technical mediation of space

The geoweb's characteristic merging of locationally-relevant information in the form of annotations and/or recommendations regarding spaces, landmarks, businesses, etc. with Web content produces a radical conjunction, in time and space, of material and virtual experiences constitutive of 'augmented realities' (Graham and Zook 2013; Graham et al. 2012). For Graham et al. (2012), augmented reality is descriptive of the way in which Web-based and mobile spatial information technologies have become inextricably bound up with our experiences of space. Geographers have long been attuned to the ways in which code and space are mutually constitutive, and ways that software *produces* space(s) (see for example Dodge and Kitchen 2004; Graham 2005). But the general and ongoing convergence of digital media with spatial content means that code has interpenetrated space to such an extent that it ubiquitously influences, in subtle yet profound ways, our senses, experiences of, and attachments to space/place "as particular interpretations of events and locations are foregrounded or side-lined" (Graham et al. 2012: 1).

A decision about where to go for sushi, for example, is shaped by how an establishment has been vetted and/or promoted on a social review site, the establishments that are returned as results in a spatial search for sushi restaurants, and their cardinality (order in which they are listed). The augmentation of reality is moreover becoming a real-time phenomenon, in which annotations and other forms of location-based content appear superimposed overtop of a landscape as displayed or seen through a mobile device (for an example, see metaio, Inc. 2009). The most radical example of the coming augmented reality future is Google Glasses (Google, Inc. 2012), literally a pair of wearable glasses that function as a heads-up display for content (weather, restaurant reviews, geosocial networking, directions, etc.) that appears in a user's visual frame as s/he moved through the physical spatial enviornment.

Augmented reality, then, designates ways in which space/place and its encodings (geographical information) are being articulated in new ways, such as in the use of digitality to supplement our experiences of the physical world. For Manik Gupta (in Madrigal 2012), the senior product manager at Google Maps, the rapid ascendance and ubiquitous adoption of spatial media such as Google Maps is attributable to they ways in which they "bridge that gap between what we seen in the real world and [the online world]" (n.p.). As per Madrigal (2012), "[t]his is not just a theoretical concern": spatial media matter "precisely because they are the interface between the offline and online worlds" (n.p.). As such, they permit the ways in which physical and information spaces are simultaneous and co-constitutive of each other to be revealed. While all 'physical' geographies are always already information spaces (Madrigal 2012), not all of the information that we encounter in the physical spaces of our lived experience is networked (online). Spatial media permit information and digitality to futher interpenetrate our physical realities and influence and structure the way we experience space/place.

Spatial media however do more than simply 'augment' the physical spaces of our lived experience. They are also mediums through which we experience space, and build and express attachments to particular spaces/places. The geosocial application Wyst allows users to annotate geotagged posts (text and images) uploaded to the microblogging platform with emotions about the places/spaces from which they were generated (Metcalfe 2012; Wyst Digital Inc. 2011). Possible 'emotions,' which are predefined, include happiness, sadness, surprise, but also 'flirtiness' and 'drunkeness' (Metcalfe 2012; Wyst Digital Inc. 2011). A New Yorker's decision about which neighborhood to spend time in may then be mediated –influenced – by the aggregate 'mood map' of the city (Metcalfe 2012). Jennifer Kempson's 2012 interactive "Tweet Houses"[19] art installation used a series of birdhouses located along Seattle's Pike Place Market stairs that allowed the public to access (and Tweet) the Twitter streams of the Market itself, Seattle Weather, and the Washington Ferries schedule to shape users' perceptions and experiences of space. The oral history project [murmur] (http://murmurtoronto.ca/), started in

[19] http://www.jennykempson.com/projects/tweeting-bird-houses/ Accessed 27 September, 2012.

Toronto, allows individuals to share their experiences of and attachments to place(s) by recording stories and anecdotes about neighborhoods, public spaces, venues, and landmarks in their cities. Tourists and city denizens alike may then call a number from their mobile phone to listen to the story about a particular location as they encounter it.

[murmur] is an early, first-generation example of how mobile media can both capture and mediate experiences and personal senses of place/space. More recent mobile social media applications like Path (https://path.com), a 'smart journal,' allows users to automatically curate and share their spatial histories with contacts/friends in their networks. One of the ways in which users may update their Path journal is by adding descriptive tags to places. The journal also supports check-in functionality (which it can also push to Foursquare, Facebook, and Twitter), and users may enable location tracking on their device to automate the check-in process such that persons in their network are continuously notified of their location. A user's location is visualized over a Google Maps base map. Broadcastr, a new smartphone application currently in beta release, allows users to attach recorded audio diaries about a place (public space such as parks, a neighbrohood, a restaurant, etc.) and post the location to a Google Maps mashup (in the coming future, the app will also support the storage of video and images).

What becomes evident about these examples of Wyst, Path, [murmur] and Broadcastr is that in addition to spatial media mediating our senses of space/place by structuring and influencing/structuring the ways in which we experience them, they support and enable interactions with nuanced geographical encodings that reference concepts and notions of space and place. For example, while users of Broadcastr ultimately upload their information and associate it to a *location* (a Google Maps pushpin at an x,y coordinate), Broadcastr is oriented to allowing users to capture and share their experiences of, and attachments to, *place*. A user will be able to string a series of 'pushpins' together into a narrative diary about, for example, a neighborhood. The x,y locations of this geotagged content are only secondary – what is significant about them is the way in which they grant access to spatial imaginaries, experiences, and attachments to place.

Elsewhere, Flickr permits photos to be geotagged with Foursquare Venues, and, prior to its acquisition by Facebook, Gowalla Spots (Foursquare 2010). Foursquare's integration with Twitter allows check-ins to venues to be pushed as geocoded tweets to a user's Twitter account. While Twitter's GeoAPI allows coordinates (location) to be assigned to tweets, its partnership with TomTom and Localeze allows users to associate tweets with places (establishments, civic spaces, etc.) identified and stored in those databases (Laraki 2010). By virtue of their ability to capture, share, and structure our physical and emptional experiences of space, these applications and services - [murmur], Broadcastr, Path, Foursquare,Wyst, and the location-capable devices that they run on - are *spatial media*. 'Locative media' privileges an isotropic spatial ontology and reduces new materialities to their ability to determine position. Accordingly it is a concept of limited theoretical value in that it fails to capture the ways in which we think in terms of, are affected by, develop spatial imaginaries about, and build and express attachments to places/spaces in ways that involve more than simply x,y coordinates on a Euclidean grid.

4.4.3 The techno-spatial mediation of social relations

While geographers have begun to attend the ways in which spatial media, as technologies, mediate our experiences of space/place by, for example, 'augmenting' the physical world, a robust theory of the ways in which these new materialities mediate our lived experiences must equally address how encodings of space simultaneously mediate social relations. The convergence of geographic information with mobile social media is indicative of the way in which material spatial technologies (devices, services, and applications) and geographic information artifacts serve as bases for social connectivity. Geosocial media in particular allow us to interact with and express attachments to places, albeit in ways that are structured by the technology. They mediate – broker, interface - not only our physical and emotional experiences of and attachments to space/place as described in the preceding section, but indeed also mediate social relations *across* space, where encodings of space are leveraged to facilitate social interaction and connectivity.

Both the physical devices and software quite literally lie 'in between' human actors connecting to one another. This is significant in that *space*, as manifest in the form of geographical content and/or spatial encodings, is increasingly assuming the form of the medial. Encoded as locational information, spatial content acts as a medium of and for social relations. Most immediately, check-in services directly employ concepts of place/space as a premise for social interaction. Users check-in to venues, places, and public spaces and broadcast their locations to friends and/or strangers so as to encourage persons to come and physicially meet up with them, and/or to make acquitances with individuals in their spatial vicinity. Space – encoded as a user's presence at a particular place – acts as an intermediary layer of sorts for establishing connectivity and social interaction, whether digitally or in-person. It is another person's knowledge of where an individual is in space that allows them to come and find him/her at a café. Knowing where friends and contacts are at any given time gives the user a similar opportunity.

The inherent way in which space is leveraged as a middle ground for digitally establishing connection becomes all the more apparent in the emergent phenomenon of 'ambient social networking.'[20] In contrast with check-in services which required users to self-report their presence at a location and then choose to broadcast it, ambient social networking applications, also known as location-based 'social discovery apps' (Butcher 2012), utilize the location-sensing capacities of mobile technologies to continuously broadcast a user's location, often beyond a user's network of friends (Cashmore 2012). These new applications are ambient in that they automatically run seamlessly in the background, with the mobile device emitting and receiving a signal that broadcasts a users' location over the Web unless manually disabled by the user (The Life Files 2012; Higgins 2012). The objective of these ambient social networking applications is to alert individuals when their friends, persons listed in their

[20] The most prominent ambient social networking application is Highlight, although other examples include Kismet, Glancee, Ban.jo, Meeteor, Pearescope, GetGauss, Intro, Qrious, Mingle, and Sonar (Wortham 2012).

contacts' networks, and even strangers with shared/similar interests are in the same geographical vicinity such that they may interact in person.

This functionality for detecting and broadcasting to friends, friends-of-friends, and strangers with shared interests is provided by i) the application knowing the position of every user in the network at all times, due to the continuous capture of mobile location signals (Wortham 2012); and ii) its unfettered access to already-mapped out social networks as represented by friendss (and their contacts) in users' social media profiles. Indeed many of these new apps require Facebook connectivity, necessitating users to log-in to their Facebook profiles to use the new applications (Constine 2012). A user's contacts, the contacts listed in their friends' profiles, and their interests then become available – if not directly uploaded – to these third-party applications, which can notify you when, for example, another user with similar interests as reported in his/her Facebook accounts walks by (Constine 2012; Wortham 2012). This is made possible not only because these apps are real-time, continuously checking-in for users in the Background, but also because Facebook's new location APIs allow them to pull and display locational data such as check-ins, geotagged blog posts, and photos that have been pushed (or updated) to Facebook from other applications such as Twitter and Foursquare (Constine 2012). Facebook now essentially functions as a "location[al] backbone": a hub for geographic content which underwrites the entire social networking universe by "power[ing] serendipitous meetups and other geo-functionality no matter which apps you and your friends use" (Constine 2012: n.p.).

Ambient social networking most directly captures the way in which geographic information (content) is independent of any one medium, be it Foursquare, Twitter, Facebook, or others. Indeed, it is the platform-independence of spatial information artifacts constitutive of the geoweb's unique and particular materialities that is driving the functionalities and social practices of geosocial networking, including social discovery applications. The locational information from a check-in to a venue on Foursquare can be pushed to Facebook and posted to a user's Timeline over a Google Maps mashup. This locational information can subsequently be used by a third-party ambient social networking application such as Highlight to alert other

users with 'similar interests' (as determined by music, literature, sports, etc. preferences defined in a user's Facebook profile) of a person's proximity to them. Spatial media such as geosocial applications and services, including ambient social networking, are mediating forces that interface relations between society and our lived environments and landspaces. Importantly, they do so on the basis of geography, which functions as a premise for both communication and for the convergence of content across social media platforms. Locational information, either user-generated in the form of deliberate check-ins to places or automatically captured from a mobile locational signal, is used as a basis for establishing physical social encounters, or, at a very minimum, it represents the possibility of such encounters and interactions. As such, the use of geosocial media enacts an understanding of space as inherently relational.

Warf and Sui (2010) argue that spatial media "offer the possibility of revisualizing space in relational and relative terms" (199). For them, relational space refers to the pluralist ontologies bound up in the *use* of spatial media to express and represent "multitudinous realities perceived and inhabited by different social groups" (Warf and Sui 2010: 198). But I suggest that spatial media give rise to an understanding of space as relational in a different sense. The result of the use of geographic information to structure and facilitate social interactions is that encodings of space are increasingly experienced and understood as the material field of social relations. For example, we see if our friends and contacts are available to socialize with us in person by appealing to any number of check-in applications to determine where they are and what kind of activity they are involved in (and if it is conducive to socializing). Space as the material domain of emotional and social life is a concept not unfamiliar to geographers. However, space as an axis of experience has not been at the forefront of social discourse, nor has it been widely recognized as an axis of knowledge acquisition (as have concepts of history, for example – Goodchild 2009a; Goodchild and Janelle 2004). Spatial media, however, constitute the field of social relations, and they do so *spatially* in that encodings of space bound up in geographical information and content online interface,

broker, and act as intermediaries in our uses of technology to connect and interact with each other in the age of 'conspicuous mobility' (Wilson 2012).

4.5 Conclusion

Attending to emergent, Web-based geographic information technologies as 'the medial' provides geographers with a preliminary starting point for engaging the geoweb's technological and informational objects and their practices as constitutive of the field of social relations. This is a possibility that emerges directly out of a theory of media as a process of (social, spatial) mediation. But beyond understanding new spatial media as forces and modes of social transaction whereby technological devices, software objects, and geographic information artefacts broker our encounters with ourselves, each other, and space, many questions remain. In the first instance, what is the conception or ontology of space that underlies or follows forth from the use of geographic information to establish ('broker') social connections? If these technologies "actualize new spaces" (Zimmermann 2007: 67), what kinds of spaces – and conceptions of space – are actualized?

Exploring the nature of the ways in which space, society, and technology intersect and are co-articulated in the assemblages of content forms, technologies, and practices that are termed 'the geoweb' requires a further consideration of the ways in which the rise of spatial media changes society's relationship to emergent (spatial information) technologies themselves. Zimmerman (2007) argues that the convergence between Web-based media and geographic information "anchors the digital, often viewed as ambling around in a placeless realm, in geographic space" (80). Indeed geographers stand to make a significant contribution by working against "'end of geography' myths" which hold that connective technologies (social media, the Web, ICTs, etc.) render space insignificant by "transcending the spatial constraints that historically limited the movement of information" and thereby "liberating people from [those constraints with all [their] confining economic and social implications" (Mosco 2004: 85, 92). Proponents of this version of the effects of Web-based and mobile ICTs in the field of sociology,

for example, herald the rise of mobile media, which can operate "from 'nowhere' and 'anywhere,'" to be a process of "delocationizing," marked by the emergence of "'a-location,'" or, the freeing of "psychological presence" and the phenomenological experience of place from "physical space" (Gumpert and Drucker 2007: 12, 16).

Rather than "[d]isplacing place" (Kleinman 2007), spatial media remind us that 'thinking' the technology-society relation necessitates that we acknowledge technology to be a socio-*spatial* phenomenon: in the case of geosocial media, for example, it is about embodied persons, physically in space, leveraging spatial encodings to connect with other individuals across space via material technological devices with affordances for parsing, curating, and interacting with spatial content. Not only is the use of (spatial information) technologies never disembodied, but indeed it is simulataneously never 'place-/space-less.' This insight is directly enabled and illuminated by the theorization of the geoweb as media. Framing geoweb technologies as *media*:

i) speaks to the multiplicity and diversity of medi*ums* that participate in the geoweb while breaking from a commitment to a GIS as a singular medium ('technological singularity');

ii) better accounts for the increasing presence of spatial information technologies in, and mediation of, everyday socio-spatial relations;

iii) captures the convergence of location with information communication technologies, and of location with media, and recognizes the premises of new spatial information technologies in communication and connectivity;

iv) addresses the 'remixability' (Manovich 2009) of content across instantiating platforms, and the independence of spatial information content from any one particular medium (such as a GIS);

v) allows us to directly draw on theories of media and mediation as a foundation for beginning to understand the socio-spatial *effects* of these technologies;

vi) designates how particular software, hardware, and information artifacts are brought together in ways that are more-than, or other-than, conventional GIS;

vii) acknowledges these technologies' public nature;

viii) situates new materialities and their attendant data practices within broader societal debates about digital technologies and the desirability of their interpenetration of daily life;

ix) belies those discourses that present new spatial media as ahistorical, necessary, natural, and inevitable; as well as those which perpetuate the notion

that new technologies herald the 'end of geography'[21] by making space – and place – irrelevant; and

x) helps us understand the ways in which the proliferation of geoweb technologies is bound up in neoliberal regimes of commerce, consumerism, and governmentality.

Engaging the geoweb as media is an epistemological claim as to the material nature of its participating technologies, and designates how particular software, hardware, and information artifacts are being brought together in ways that are other-than and more-than GIS. The ability to discern and engage the materialities of emergent, Web-based geographic information technologies as multiple, premised in communication, public, etc. are epistemological outcomes of the theoretical framing that I have herein developed. Most significantly, this framework allows us to understand spatial media as sites of inculturation. This designates them as mediums for the expression and sharing of *meaning* in the form of experiences of, senses and emotions around, and attachments to places, spaces, and others. Epistemologically claiming emergent, Web-based geographic information technologies as media, then, is also a framework for engaging and explaining the presence of these technologies in everyday life, as well as their social effects.

Directly engaging the geoweb's materialities is furthermore significant for research on emergent, Web-based geographic information technologies in that it gives us language to designate the multiplicity and diversity of forms (information, hardware, and software) engendered by the now-ubiquitous converngence of location with digital media. 'Geoweb,' though a preferred neologism of geographers, is losing salience in light of this convergence because it implies that locationally-referenced content, spatial services, and practices around these phenomena constitute a unique 'sphere' of the Web separate from the rest of the universe of networked information, devices, and subjects. 'Geoweb' suggests that the boundaries of this 'Web sphere'[22] are discrete and easily discernible. The general merging of geographical information with digital media that may now be observed in the use of spatial content to index,

[21] Vincent Mosco, 2006
[22] See methodology discussion in *Chapter 1*.

or organized the Web may be evidenced in Google accordingly terming the geographic information crowdsourcing effect the "'geoindex'" - the notion that all information may be organized, and is therefore searchable by, location (Crampton 2009b: 95). It is no longer meaningful, therefore, to refer to unique 'areas' of the Web as being geographical or spatial. Rather, it is more salient, and appropriate, to talk about spatial media, the spatial data forms that geographical content assumes, and the social practices around spatial media as well as the societal implications of their proliferation, adoption, and inerpenetration of daily life.

CHAPTER 5

CONCLUSION

5.1 Summary of Arguments

This research examines the significant transformations in the nature of the relationship between technology, space, and society that are being engendered through the rise and proliferation of a diverse range of new, Web-based geographical information technologies that have been emerging since 2005. These technologies and the practices enacted through and around them are of concern to geographers most immediately because of their spatial (locational) orientation or basis. But more importantly, these technologies and practices signal changes in the institutional arrangements that geographical information and technologies are assuming, and thereby the institutional actors that we interact with in practices of curating, sharing, and using geographical information technologies. They are redefining the ways in which we interact with each other across space. Additionally, they are also transforming the ways in which individuals experience place/space, and build and express attachments to places and spaces. The development of the geoweb accordingly presents significant challenges for both GIScience and Critical GIS as they attempt to grapple with these new technologies and their broader effects, as the material presences and practices of the geoweb cannot be defined in terms of conventional GIS.

The title of this dissertation, '*Thinking the geoweb*', refers to the intellectual project of 'thinking' – apprehending, conceptualizing, and engaging – these new digital presences, practices, and their effects. On the basis of a qualitative analysis of a conceptually-relevant sample of material thematically about the geoweb assembled from a series of Web-based sources over a three-year period (June 2009 – June 2012), I have developed a framework for theorizing the societal transformations being wrought through the geoweb on multiple, intersecting levels:

- the political-economic contexts of the geoweb's emergence that shape the forms that its technologies and practices are assuming, and that make the rise of certain kinds of technologies and practices not only possible but also desirable;

- the discourses around the 'newness' of these technologies that work to socially naturalize them, that sustain their proliferation and thereby their profitability (or the promise thereof), and that are used to justify and legitimate their (often deleterious) social effects; and,

- the materialities and material status of the geoweb's technologies (hardware/software objects and information artifacts) that structure the forms of communication and social, spatial, and technological relations the geoweb is used to foster.

These three threads of the framework emerged as central themes through a coding approach to qualitative data analysis, which comprised a central component of a grounded theory methodology for theory construction and allowed me to simultaneously organize and evaluate (analyze) my data.

The geoweb is a historical phenomenon, meaning that it has emerged within a historically-specific political economic context that may best be described as neoliberal. The neoliberal political-economic processes of welfare state restructuring, famously described by Peck and Tickell (2002) in terms of roll-back/roll-out dynamics between the state and the market, have created the 'conditions of possibility' (Foucault 1980b) for the emergence of the geoweb by opening up the 'cartographic project' to market logics. The state is 'rolling-back' by abdicating itself from serving as the authoritative producer of geographic information and the arbiter of geographical truth, actively looking to non-state actors (citizens, corporations) to supplement, augment, and in some instances even replace its role as a spatial data provider. This is creating opportunities for market actors to enter the mapping enterprise, subsuming it to corporate regimes of governance. This 'roll-out' of market logics may be evidenced in the ways in which corporate actors are harnessing of free labor of volunteer cartographers for profit; the subjection of spatial data to new regimes of private ownership and control; and, in terms of the unaccountability of these actors to their consumers that differ very much from the way in which states, in democratic societies, may be brought to account by their citizens. Neoliberal state restructuring makes practices such as the volunteering of geographical

information (Goodchild 2007) not only possible, but indeed *desirable* to non-state actors, in this instance, because these practices enrich the profitability of the market and corporate actors who rely on these practices of crowdsourcing as a form of free labor, for example.

The profits of these non-state actors are not being sustained through these identified imperatives of technoscientific capitalism (Sunder Rajan 2006) alone, but also through discursive formations around the 'newness' of these technologies. These 'discourses of neogeography' leverage newness as a depoliticizing device that seeks to strip these technologies of political content so as to socially naturalize them by representing them as politically and socially neutral and as the inevitable outcomes of technological progress. The interests served by the naturalization of these technologies are the interests of capital that seek to profit from newly emergent location-based services and applications. They leverage the 'newness' of these technologies by discursively representing them as always-already new, thereby presenting consumers of these technologies with a never-depleting arsenal of 'new' applications and services that may be consumed (installed on a range of location-capable devices). As an examination of a selection of these applications and services reveals, however, the newness of these technologies is a purely discursive construction. The overwhelming majority of applications and services which present themselves as 'new' are built atop of and designed to exploit the locational affordances and spatial databases of dominant market actors in the arena of geosocial and other location-based services more generally (Foursquare, Facebook, and Twitter). Elsewhere, the corporate and market actors with vested interests in realizing the profitability of geoweb technologies (through encouraging their sustained consumption) make recourse to the newness of these technologies as a means of legitimating and justifying the societal effects of these technologies while simultaneously disavowing themselves of responsibility for these effects. Rather than assuming any culpability for any of the socially deleterious implications of geoweb phenomena, the interests of capital situate any such effects in the 'newness' of participating technologies. This discursive tactic is underwritten by a logic which holds that because these technologies are so new, their effects cannot be anticipated and therefore mitigated in any way.

The geoweb is not only a discursive construction, but also very much a material one. Based on an examination of the material characteristics of geoweb hardware/software objects and information artifacts, the geoweb's technologies must be accorded a material status as *media*. For example, the emergence of these technologies out of the convergence of location with digital, Web-based media, as well as their premises in communication and their public nature reveal the geoweb's devices and informational artifacts to possess many of the traits distinctive of media. *Spatial media* is an epistemological claim about how the geoweb's materialities should be engaged: as media not only in the sense of mass channels of communication, but also as sites of inculturation. As per the famous media theorist Marshall McLuhan (1964), the ways in which we adopt, market, interact with, and use technologies – in this case, spatial media – are constitutive of the field of social relations. In other words, our (social) experiences of the physical properties of Web-based spatial information technologies constitute the ways in which we interact with both place/space *and* with each other, *and* they constitute the ways in which we build and express attachments to places and spaces. Epistemologically engaging the geoweb's information artifacts and technological devices as *media*, therefore, opens the possibility for geographers to build a theory of socio-spatio-technical *mediation*. *Mediation* not only accounts for the very material presences of these technologies in our daily lives and their interpenetration of our material social and spatial practices and experiences, but also helps us as scholars to understand and theorize the changing nature of the ways in which society, space, and technology intersect and are being articulated in new and unprecedented ways.

The epistemological approach to the geoweb's technologies in which they are granted a material status as *media* not only provides us with an epistemological strategy for comprehensively engaging the diversity of the geoweb's materialities, but it also helps us as scholars understand how these technologies are actively brokering our relationships with space and with each other. Understanding the geoweb as simultaneously a *discursive* construction as well as a material one highlights the ways in which dominant representations and practices around the 'newness' of these technologies work to effect particular kinds of changes in the

world and to secure particular interests, such as the interests of capital. Incidentally, the interests of profit are the interests of the market actors who, enabled by neoliberal political-economic relations, are actively subsuming the cartographic enterprise to corporate regimes of governance.

5.2 Significance of this research

This research constitutes the first empirically-grounded effort at theorizing the geoweb and its societal significance in the emerging area of geoweb research. It pushes the research agenda forward by moving beyond an enumeration of constituent objects, and anticipatory interventions that speculate on the implications of geoweb impacts through studying individual applications (e.g., Ushahidi, an open-source online information compilation and geovisualization platform) or specific kinds of applications and services (e.g., crisis mapping). Though presented as a conceptual framework for theorizing the geoweb, the three threads or themes advanced herein are more than 'propositions' for 'thinking' the geoweb. They are three areas of key transformations – discursive, material, and political economic – that are producing and sustaining the phenomenon that we call the geoweb, and in which its key societal effects are being realized.

Going forward, this framework has the potential to guide a broad range of geographers' critical engagements with the geoweb in ways similar to how Critical GIS provided a conceptual and critical approach for engaging conventional GIS. The enduring contribution of Critical GIS is that, as per Sarah Elwood (2009a: 257), it necessitates that as scholars, we contend with the reality that spatial information technologies are more than just the physical 'box': they are social constructions, social and political practices, forms of representation, and "ways of knowing and making knowledge." This intervention offers to similarly inform other scholars' work on the geoweb. It enables geoweb researchers a framework around which to structure their own analysis of the potential arenas of impact for a particular geoweb applications or a particular dimension of the geoweb phenomenon.

For example, the changes to the social norms around locational privacy being advanced by and through the geoweb emanate from the material nature of the technologies and practices in question: for example, the hyper-realistic scopic regimes of geoweb services such as Google Street View and Twitter's data retention practices for geocoded microblog posts. Understanding the ways in which the rise of the geoweb is reconstituting social norms around privacy is contingent upon not only examining but also directly addressing the material nature of the geoweb's constitutive objects. The effectiveness of these technologies in rewriting the social contract around privacy is, for instance, partially attributable to their public nature and accessibility. Elsewhere, the materialities of the geoweb's technologies structure the kinds of practices *with* and *through* these technologies that become possible. For example, the ways in which activists and civic engagement groups can leverage and mobilize emergent Web-based spatial information technologies to negotiate and legitimate their political claims is delimited by the affordances of these technologies (see Elwood and Leszczynski 2012).

Considering the way in which the geoweb is simultaneously a *discursive* formation is important in similar ways. Scholars wishing to grapple with the privacy implications of the geoweb, for example, must contend with the ways in which eroding effects of these technologies are intimately bound up with discursive constructions regarding the *a priori* 'death of privacy' which create the dual perceptions that privacy has either already been irrevocably negated and/or that it is no longer a desirable social good. Both of these discursive tactics serve to render the privacy-eroding effects of these technologies, and thereby the technologies themselves, inevitable and acceptable.

Grappling with and theorizing the material, discursive, and historical (political-economic) dimensions of the geoweb is, in other words, indispensible to not only understanding the nature of the societal effects and implications of its technologies and practices, but also to being able to *explain them*. As the above examples around locational privacy illustrate, an attempt to *explain* why – and how – the phenomenon of the geoweb is associated with a reconfiguration of societal privacy norms necessitates that scholars explain the articulation of particular discourses and specific material phenomena in that

reconfiguration. Engaging the geoweb as historical, discursive, and material is important to contending with the forms that the geoweb's technologies, practices, and effects have assumed to date and are continuing to assume.

This research is furthermore a methodological intervention that works to substantiate Web-based presences and technologies as well as digital content as legitimate sources of evidence; specifically, as evidence of social relations and changed or newly emergent social norms. This diverges significantly from earlier 'ages' of Internet study (Wellman 2011). Initially, researchers relied on conventional methods to studying the Internet, such as interviews, surveys, participant observation and other ethnographic methodologies to discern who was 'online' and to learn more about 'online cultures' (Wellman 2011). These approaches to research about the Internet were more recently superseded by attempts to bring the Internet into disciplinary concerns and research areas – for example, examining the ways in which issues of the digital divide play into, intersect with, and inform the broader study of social inequality (Wellman 2011). However, the material presences of and discourses around digital media do not just inform or shed new perspectives on the nature of social relations, they are actively reconfiguring social norms in ways that reflect their own interests and, as argued in this dissertation, ensure their social naturalization and propagation. For example, scholars have attended to the ways in which Facebook has sought to engineer social relations, engendering new forms of social interaction and connectivity as well as stimulating changes in social attitudes about privacy (Dash 2012; Bosker 2011; Johnson 2012; MacKinnon 2012). As sites of incluturation, Web-based resources (mediums, content, etc.) are deserving of attention as sources of edivence, the direct examination of which has much to reveal about social, technical, and as this dissertation maintains, *spatial* relations. As such, this research contributes to the development of Internet research methodologies more broadly beyond the geoweb alone. Furthermore, the ways in which this framework expands beyond GIS-centric theorizing opens the door to powering new interdisciplinary engagements. For example, it creates opportunities for engaging with rich digital humanities scholarship on new spatial technologies and practices, such as research in the areas of mobilities, the mediation of space/place, and big (spatial) data.

5.3 Directions for future research

This work raises many questions that provoke and require further research. In the first instance, this dissertation suggests media/tion as an approach to developing a theory of the dual *socio-technical mediation of space* and the *spatio-technical mediation of social relations*, but these forms of mediation remain to be empirically examined and theoretically fleshed out. A related question concerns the ways in which spatial media function as 'sites of inculturation.' If spatial media are subject to the definition of media as vectors of cultural transmission, what is the nature of this inculturation?

Secondly, but equally importantly, the ways in which the marketing around and promotion of spatial media, namely geosocial applications, interpellate the users of these technologies as normative neoliberal subjects who self-actualize through being always-already connected remains under-theorized in this dissertation. Theorizing the ways in which these technologies are bound up in neoliberal regimes of *governmentality* as well as governance as advanced in this work requires empirical ethnographic research *with* the users of these technologies in order to begin to answer questions about how subjects feel compelled (or not compelled) to adopt and use location-based services, and to use them in particular ways. These questions inform my next research project, which will investigate the difference that gender makes in the adoption and use of geosocial applications and services. Whereas survey data indicates that women are overwhelmingly more concerned with the privacy eroding consequences of these technologies than are men, they have recently begun leading men as users of these technologies. The next phase of research will accordingly investigate this apparent conflict between privacy and the adoption and use of geosocial media.

And third, geographers have yet to address the ways in which the geoweb is bound up in the subjectification of populations who are *not* active consumers, users, or contributors of Web-based geographic information and location-based services and applications but are caught in the Web nevertheless, often without their consent and knowledge. Accordingly, a theorization of geoweb subjectivities beyond the 'prosumer' is needed.

APPENDIX 1

LIST OF BLOGS AND NEWS FEEDS

- All Points Blog
- AnyGeo – GIS, Maps, Mobile and Social Location Technology
- Augmented Planet
- Community Mashup
- Digital Earth Blog
- edparsons.com
- Exploring Local
- GeoBloggers
- The Geo Factor
- geoMusings
- Geospatial Talk
- geothought
- Google Earth Blog
- Google LatLong
- The GIS Institute
- got geoint?
- Garry's Bloggage
- High Earth Orbit
- Geoweb Guru
- iRevolution
- indiemaps.com
- James Fee GIS Blog
- Marc Prioleau
- The Map Room

- Ogle Earth
- NiJeL | Community Impact Through Mapping
- Law & Disorder <<Ars Technica>>
- The Economist: Telecommunications
- The Economist: Science and Technology
- The Economist: The internet
- OpenGeoData
- RealityPrime
- Techmeme
- Slashgeo.org
- Spatial Law and Policy
- Spatial Sustain
- Spatially Adjusted
- The Next Web – Location
- Very Spatial
- Threat Level <<Wired.com>>
- GigaOM
- BBC News – Technology
- guardian.co.uk – Technology
- New York Times – Internet
- ArsTechnica
- TechCrunch
- Pew Internet

BIBLIOGRAPHY

Aday S and Livingston S (2009) NGOs as intelligence agencies: The empowerment of transnational advocacy networks and the media by commercial remote sensing in the case of the Iranian nuclear remote program. *Geoforum* 40(4): 514-522.

Allen A and Warden P (2011). Got an iPhone or 3G iPad? Apple is recording your moves. *O'Reilly Radar* (20 April). Available from: <http://radar.oreilly.com/2011/04/apple-location-tracking.html>. [31 May 2012].

Anderson D (2012) Best New Way To Meet A VC: Drive Down Sand Hill With HighLight. *Startup Grind* (26 February). Available from: <http://startupgrind.com/2012/02/best-new-way-to-meet-a-vc-drive-down-sand-hill-with-highlight/>. [19 June 2012].

Ante SE (2012) Foursquare Joins the Coupon Craze. *The Wall Street Journal* (08 May). Available from: <http://online.wsj.com/article/SB10001424052702303630404577392393241695440.html>. [09 May 2012].

Apple Inc. (2012) Apple Q&A on Location Data. *Apple Press Info* (27 April). Available from: <http://www.apple.com/pr/library/2011/04/27Apple-Q-A-on-Location-Data.html>. [27 April 2011].

Arthur C (2011) iPhone keeps record of everywhere you go. *The Guardian* (20 April). Available from: <http://www.guardian.co.uk/technology/2011/apr/20/iphone-tracking-prompts-privacy-fears>. [25 April 2011].

Austin S and Dowell A (2012) 'Girls Around Me' Developer Defends App After Foursquare Dismissal. *Digits | The Wall Street Journal* (31 March). Available from: <http://blogs.wsj.com/digits/2012/03/31/girls-around-me-developer-defends-app-after-Foursquare-dismissal/>. [03 April 2012].

Atkinson D (2010) Google maps master plan halted by Ordnance Survey. *The Daily Mail* (24 October). Available from <http://www.dailymail.co.uk/money/article-1323119/Google-maps-master-plan-halted-Ordnance-Survey.html>. [25 October 2010].

Babbie E (2008) The Basics of Social Research. Belmont, CA: Thomson Wadsworth.

Ball M (2009a) China Cracks Down on Mapping and Surveying. *Spatial Sustain* (16 March). Available from: <http://vector1media.com/spatialsustain/china-cracks-down-on-mapping-and-surveying.html>. [19 December 2009].

Ball M (2009b) Google's Missteps Help the Geo Industry. *Spatial Sustain* (27 October). Available from: <http://vector1media.com/spatialsustain/googles-map-missteps-point-to-importance-of-trusted-data.html>. [28 October 2009].

Barnett C (2003) Culture and Democracy: Media, Space and Representation. Edinburgh: Edinburgh University Press.

Barthes R (1999) Myth Today. In: Evans J and Hall S (eds) Visual Culture: The Reader. London, Thousand Oaks, New Delhi: SAGE in association with The Open University. pp 51-58.

Barr A (2012) Insight: Morgan Stanley cut Facebook estimates just before IPO. *Reuters* (22 May). Available from: <http://www.reuters.com/article/2012/05/22/us-facebook-forecasts-idUSBRE84L06920120522>. [23 May 2012].

Batty P (2009a) Google Maps data correction - a strange semi-update. *geothought* (25 October). Available from: <http://geothought.blogspot.com/2009/10/google-maps-data-correction-strange.html>. [04 November 2009].

Batty P (2009b) Google shakes up the geospatial data industry. *geothought* (07 October). Available from: <http://geothought.blogspot.com/2009/10/google-shakes-up-geospatial-data.html>. [08 October 2009].

Batty P (2009c) The Geospatial Revolution. Paper presented at *AGI GeoCommunity '09*, Stratford Upon Avon, UK, 23 September 2009. Available from: <http://www.slideshare.net/pmbatty/the-geospatial-revolution-agi-geocommunity-keynote>. [27 March 2012].

BBC News (2009) Switzerland takes Google to court. *BBC* (13 November). Available from: <http://news.bbc.co.uk/2/hi/business/8358908.stm>. [13 November 2009].

Blamont J (2008) We the people: Consequences of the revolution in the management of space applications. *Space Policy* 24(1): 13-21.

Blumberg AJ and Eckersley P (2009) On Locational Privacy, and How to Avoid Losing it Forever. *Electronic Frontier Foundation*. Available from: <http://www.eff.org/wp/locational-privacy>. [30 June 2010].

Boal IA (2007) Globe Talk: The Cartographic Logic of Late Capitalism. *History Workshop Journal* 64(1): 341-346.

Bolter JD and Grusin RA (1999) Remediation: Understanding new media. Cambridge, MA: MIT Press.

Borsook P (2000) Cyberselfish: a critical romp through the terribly libertarian culture of high tech. New York: Public Affairs.

Bosker B (2011) Facebook's Randi Zuckerberg: Anonymity Online "Has To Go Away." *The Huffington Post* (27 July). Available from: <http://www.huffingtonpost.com/2011/07/27/randi-zuckerberg-anonymity-online_n_910892.html>. [02 August 2011].

Boulton A (2011) Landscape and the place of locative media. Paper presented at the *Annual Meeting of the Association of American Geographers Annual Meeting*, Seattle, WA, 15 April 2011.

Boyd D (2006) A Blogger's Blog: Exploring the Definition of a Medium. *Reconstruction* 6(4): no pagination.

Boyer D (2007) Understanding Media: A Popular Philosophy. Chicago: Prickly Paradigm Press.

Bradley T (2009) Google Street View Battle Highlights Privacy Challenge. *San Francisco Chronicle* (16 November). Available from: <http://www.sfgate.com/cgi-bin/article.cgi?f=/g/a/2009/11/16/ urnidgns002570F3005978D80025766E005191D6. DTL>. [19 November 2009].

Bratton BH (2009) On Geoscapes and the Google Caliphate: Reflections on the Mumbai Attacks. *Theory, Culture & Society* 26(7-8): 329-342.

Brian M (2011) Steve Jobs breaks silence on iOS location issue, says "we don't track anyone". *The Next Web | Apple* (25 April). Available from: <http://thenextweb.com/apple/2011/04/25/ steve-jobs-breaks-silence-on-ios-location-issue-says-we-dont-track-anyone/>. [25 April 2011].

Brown M and Knopp L (2008) Queering the Map: The Productive Tensions of Colliding Epistemologies. *Annals of the Association of American Geographers* 98(1): 40-58.

Brownlee J (2012) This Creepy App Isn't Just Stalking Women Without Their Knowledge, It's A Wake-Up Call About Facebook Privacy. *Cult of Mac* (30 March). Available from: <http://www.cultofmac.com/157641/this-creepy-app-isnt-just-stalking-women-without-their-knowledge-its-a-wake-up-call-about-facebook-privacy/>. [03 April 2012].

Brügger N (2011) Web Archiving - Between Past, Present, and Future. In: Consalvo M and Ess C (eds) The Handbook of Internet Studies. Malden, MA; Oxford, UK: Wiley-Blackwell. pp 24-42.

Brustein J (2010) Tag-along marketing. *The New York Times* (06 November). Available from: <http://www.nytimes.com/2010/11/07/weekinreview/07brustein.html?_r=2&scp=1&sq=location+technology&st=nyt>. [08 November 2010].

Budhathoki NR, Bruce BC and Nedovic-Budic Z (2008) Reconceptualizing the role of the user of spatial data infrastructure. *GeoJournal* 72(3-4): 149-160.

Butcher M (2012) Social Discovery Apps Like Highlight Are A Recruiter's Wet Dream At SXSW. *TechCrunch* (12 March). Available from: <http://techcrunch.com/2012/03/12/social-discovery-apps-like-highlight-are-a-recruiters-wet-dream-at-sxsw/>. [12 May 2012].

Butler J (1997) Excitable Speech: A Politics of the Performative. New York: Routledge.

Capper S (2009) Google faces court action over Street View. *swissinfo.ch* (16 November). Available from: <http://www.swissinfo.ch/eng/front/Google_faces_court_action_over_Street_View.html?siteSect=105&sid=11489632&ty=st>. [16 November 2009].

Carr A (2010) How Google Maps Led to An Accidental Invasion. *Fast Company* (04 November). Available from: <http://www.fastcompany.com/1700270/google-maps-trumps-bing-causes-invasion-in-south-america>. [09 November 2010].

Cashmore P (2012) The scariest tech trend of 2012? *CNN.com* (06 March). Available from: <http://www.cnn.com/2012/03/01/tech/mobile/tech-trends-sxsw-cashmore/ index.html>. [09 March 2012].

Castells M (2009) Communication Power. New York: Oxford University Press.

Catt D (2010) Flickr Photos now in Street View. *geobloggers* (08 February). Available from: <http://geobloggers.com/2010/02/08/flickr-photos-now-in-street-view/>. [16 June 2010].

Chatfield T (2012) The decaying web and our disappearing history. *BBC Future* (28 September). Available from: <http://www.bbc.com/future/story/20120927-the-decaying-web>. [01 October 2012].

Chen BX (2011) iPhone Tracks Your Every Move, and There's a Map for That. *Gadget Lab | Wired.com* (20 April). Available from: <http://www.wired.com/gadgetlab/2011/04/iphone-tracks/>. [31 May 2012].

Chen BX and Isaac M (2011) Why You Should Care About the iPhone Location-Tracking Issue. *Gadget Lab | Wired.com* (22 April). Available from: <http://www.wired.com/gadgetlab/2011/04/iphone-location/>. [01 June 2012].

Cheng J (2010) More privacy headaches for Facebook: gay users outed to advertisers. *Law & Disorder | Ars Technica* (21 October). Available from: <http://arstechnica.com/tech-policy/news/2010/10/more-privacy-headaches-for-facebook-gay-users-outed-to-advertisers.ars?utm_source=rss&utm_medium =rss&utm_campaign=rss>. [21 October 2010].

Chrisman N (1999a) A transformational approach to GIS operations. *International Journal of Geographical Information Science* 13(7): 617-637.

Chrisman N (1999b) What does GIS mean? *Transactions in GIS* 3(2): 175-186.

Christophers B (2009) Envisioning Media Power: On Capital and Geographies of Capitalism Lanham, MD; Plymouth, UK: Lexington Books.

Chun WHK (2006) Introduction: Did Somebody Say New Media? In: Chun WHK and Keenan T (eds) New Media, Old Media: A History and Theory Reader. New York, London: Routledge. pp 1-9.

Connin S (2010) What Happened to Neogeography? *Techne | National Institute for Technology in Liberal Education* (15 March). Available from: <http://blogs.nitle.org/2010/03/15/what-happened-to-neogeography>. [27 March 2012].

Constine J (2012) Facebook Becomes Location Backbone That Lets Apps Import Checkins From Each Other. *TechCrunch* (07 March). Available from: <http://techcrunch.com/2012/03/07/facebook-becomes-location-backbone-that-lets-apps-import-checkins-from-each-other/>. [10 March 2012].

Cooper M (2007) Life as Surplus: Biotechnology and Capitalism in the Neoliberal Era Seattle: University of Washington Press.

Cope AS (2009) "That's maybe a bit too dorky, even for us." *Code: Flickr Developer Blog* (28 September). Available from: <http://code.flickr.com/blog/2009/09/28/thats-maybe-a-bit-too-dorky-even-for-us/>. [28 September 2009].

Cope M (2010) Coding Transcripts and Diaries. In: Clifford N, French S and Valentine G (eds) Key Methods in Geography. 2nd ed. London; Thousand Oaks, CA: SAGE. pp 440-452.

Cox S (2012) Picket Report Will Pick Out Social Pariahs And Ethnic Groups While Finding You the Perfect Neighborhood. *Curbed Detroit* (26 April). Available from: <http://detroit.curbed.com/archives/2012/04/picket-report-will-pick-out-social-pariahs-and-ethnic-groups-while-finding-you-the-perfect-neighborh.php>. [27 April 2012].

Craine J (2007) The Medium Has a New Message: Media and Critical Geography. *ACME* 6(2): 147-152.

Crampton J (2008a) Mapping without a net: neogeography in the 21st Century. Paper presented as part of *Virtual Seminars in GI Science and Technology*, Joint Worldwide Universities Network, RGS (with IBG) Quantitative Methods Research Group & UCGIS, 08 October 2008.

Crampton J (2008b) What Are the Implications of Maps 2.0? *GeoWorld* 21(1): 14-18.

Crampton JW (2009a) Being Ontological. *Environment and Planning D: Society and Space* 27(4).

Crampton JW (2009b) Cartography: maps 2.0. *Progress in Human Geography* 33(1): 91-100.

Crampton JW (2009c) Cartography: performative, participatory, political. *Progress in Human Geography* 33(6): 840-848.

Crampton JW (2010) Cartographic calculations of territory. *Progress in Human Geography* 35(1): 92-103.

Crang M (1998) Cultural Geography. London; New York: Routledge.

Dash A (2012) Facebook is gaslighting the web. We can fix it. *Anil Dash* (21 November). Available from: <http://dashes.com/anil/2011/11/facebook-is-gaslighting-the-web.html>. [05 November 2012].

Dixon DP and Jones JP III (1998) My dinner with Derrida, *or* spatial analysis and poststructuralism do lunch. *Environment and Planning A* 30(2): 247-260.

Dobson M (2009) Google's Nav-O-Matic Finally Arrives. *Exploring Local* (25 October). Available from: <http://blog.telemapics.com/?p=192>. [05 November 2009].

Dodge M and Kitchen R (2004) Flying through code/space: the real virtuality of air travel. *Environment and Planning A* 36(2): 195-211.

Dodge M and Perkins C (2009) Editorial: The 'view from nowhere'? Spatial politics and cultural significance of high-resolution satellite imagery. *Geoforum* 40(4): 497-501.

Doel M (2010) Analysing Cultural Texts. In: Clifford N, French S and Valentine G (eds) Key Methods in Geography, 2nd ed. London; Thousand Oaks, CA; New Delhi; Singapore: SAGE. pp 485-496.

Dollins B (2009) What Is This "GIS" Of Which You Speak? *geoMusings* (27 October). Available from: <http://blog.geomusings.com/2009/10/27/what-is-this-gis-of-which-you-speak/>. [08 May 2012].

Dudarev AM (n.d.) Geoconnect, not Geocode. *Artem M. Dudarev*. Available from: <http://dudarev.com/writings/geoconnect-not-geocode.html>. [29 February 2012].

Eckert J (2010) Tropes 2.0: Mobilization in OpenStreetMap. Unpublished MA Thesis, University of Washington, Seattle, WA.

Edney MH (2009) The Irony of Imperial Mapping. In: Ackerman JR (ed) The Imperial Map. Chicago and London: The University of Chicago Press. pp 11-45.

Eisnor D and Wilson J (2006) What is neogeography anyway? *Platial News and Neogeography* (27 May). Available from <http://platial.typepad.com/news/2006/05/what_is_neogeog.html>. [27 March 2012].

Eldon E (2012) Foursquare And Glancee Are Cool, But Here's Why I'm So Excited About Using Highlight At SXSW. *TechCrunch* (03 March). Available from: <http://techcrunch.com/2012/03/03/myhighlight/>. [19 June 2010].

Elgan M (2011) Who owns your location? *Computerworld* (30 April). Available from: <http://www.computerworld.com/s/article/9216304/Who_owns_your_location_?taxonomyId=77>. [02 May 2011].

Elwood S (2006) Critical Issues in Participatory GIS: Deconstructions, Reconstructions, and New Research Directions. *Transactions in GIS* 10(5): 693-708.

Elwood S (2008a) Volunteered geographic information: future research directions motivated by critical, participatory, and feminist GIS. *GeoJournal* 72(3-4): 173-183.

Elwood S (2008b) Volunteered geographic information: key questions, concepts and methods to guide emerging research and practice. *GeoJournal* 72(3-4): 133-135.

Elwood S (2009) Geographic Information Science: new geovisualization technologies - emerging questions and linkages with GIScience research. *Progress in Human Geography* 33(2): 256-263.

Elwood S (2010) Geographic information science: emerging research on the societal implications of the geospatial web. *Progress in Human Geography* 34(3): 349-357.

Elwood S and Cope M (2009) Introduction: Qualitative GIS: Forging mixed methods through representations, analytical innovations, and conceptual engagements. In: Cope M and Elwood S (eds) Qualitative GIS. Thousand Oaks, CA: SAGE. pp 1-12.

Elwood S, Goodchild MF and Sui DZ (2011) Researching Volutneered Geographic Information: Spatial Data, Geographic Research, and New Social Practice. *Annals of the Association of American Geographers* 102(3): 571-590.

Elwood S and Leszczynski A (2011) Privacy, Reconsidered: New Representations, Data Practices, and the Geoweb. *Geoforum* 42(1): 6-15.

Elwood S and Leszczynski A (2012) New Spatial Media, New Knowledge Politics. *Transactions of the Institute of British Geographers*: Forthcoming.

Farman J (2010) Mapping the digital empire: Google Earth and the process of postmodern cartography. *New Media & Society* 12(6): 869-898.

Farman J (2012) Mobile interface theory: embodied space and locative media. New York: Routledge.

Fee J (2010) What Steve Coast's Move to Bing Really Means. *James Fee GIS Blog* (23 November). Available from: <http://www.spatiallyadjusted.com/2010/11/23/what-steve-coasts-move-to-bing-really-means/>. [03 December 2010].

Firmino RJ, Duarte F and Ultramari C (2011) ICTs for mobile and ubiquitous urban infrasctructures: surveillance, locative media, and global networks. Hershey, PA: Information Science Reference.

Flanagin AJ and Metzger MJ (2008) The credibility of volunteered geographic information. *GeoJournal* 72(3-4): 137-148.

Foot K (2006) Web Sphere Analysis and Cybercultural Studies. In: Silver D and Massanari A (eds) Critical Cyberculture Studies. New York: New York University Press. pp 88–96.

Foucalt M (1972) The Archaeology of Knowledge. New York: Pantheon Books.

Foucault M (1980a) Questions on Geography. In: Gordon C (ed) Power/Knowledge: Selected Interviews and Other Writings. New York: Pantheon Books. pp 63-77.

Foucault M (1980b) Truth and Power. In: Gordon C (ed) Power/Knowledge: Selected Interviews and Other Writings. New York: Pantheon Books. pp 51-75.

Foucault M (1990 [1976]) The History of Sexuality, Volume 1. New York: Vintage Books.

Foucault M (1995 [1977]) Discipline and Punish: The Birth of the Prison. New York: Vintage Books.

Foucault M (2008) The Birth of Biopolitics: Lectures at the Collège de France, 1978-79. New York: Palgrave Macmillan.

Fougner J (2011) Introducing Deals. *The Facebook Blog* (31 January). Available from: <http://www.facebook.com/blog/blog.php?post=446183422130>. [22 May 2012].

Foursquare (2010) Tag your Flickr photos with Foursquare venues. *About foursqaure*. Available from: <http://aboutfoursquare.com/tag-your-flickr-photos-with-foursquare-venues/>. [03 March 2012].

Foursquare (2012) *foursquare*. Available from: <https://foursquare.com/about/new> [21 June 2012].

Fried I (2011) Apple Breaks its Silence on Location-gate, Plans to Ship White iPhone on Thursday. *All Things D* (27 April). Available from: <http://allthingsd.com/20110427/apple-breaks-its-silence-on-location-gate-plans-to-ship-white-iphone-on-thursday/>. [01 June 2012].

Fuchs C (2011) The Contemporary World Wide Web: Social medium or new space of accummulation. In: Winseck D and Jin DY (eds) The Political Economies of Media: The Transformation of the Global Media Industries. London: Bloomsbury Academic. pp 201-220.

Galloway A and Ward M (2006) Locative Media As Socialising and Spatializing Practice: Learning from Archaeology. *Leonardo Electronic Almanac* 14(3).

Garfield B and Gladstone B (2012) Life in Facebookistan. *On The Media*. Radio broadcast, 26 October. Transcript available from: <http://www.onthemedia.org/2012/oct/26/ life-facebookistan/transcript/>. [05 November 2012].

Geens S (2010) About Costa Rica, Nicaragua, their mutual border, and Google. *Ogle Earth* (17 November). Available from: <http://ogleearth.com/2010/11/about-costa-rica-nicaragua-their-border-and-google/?utm_source=feedburner&utm_medium=feed&utm_campaign=Feed%3A+ ogleearth+%28Ogle+Earth%29&utm_content=Google+Feedfetcher>. [18 November 2010].

Geersten M (2010) Democracy, Data and Collaboration: Trends to Watch in GIS & Beyond. Paper presented at *Geoweb 2010*, Vancouver, BC, Canada, 28-30 July 2010.

Geron T (2012) Facebook Prices Third-Largest IPO Ever, Valued at $104 Billion. *Forbes.com* (17 May). Available from: <http://www.forbes.com/sites/tomiogeron/2012/05/17/facebook-prices-ipo-at-38-per-share>. [11 November 2012].

Gitelman L (2008) Always Already New: Media, History, and The Data of Culture. Cambridge, MA: MIT Press.

Glancee 2012. *Glancee*. Available from: <http://www.glancee.com/>. [31 March 2012].

Glaser BG and Strauss AA (1967) The Discovery of Grounded Theory. New York: Aldine Publishing Company.

glenn (2009) Map your Flickr or Brightkite Photos on Mapquest using GeoRSS. *AnyGeo* (16 October). Available from: <http://blog.gisuser.com/?p=5327>. [16 October 2009].

Goodchild M (2007) Citizens as sensors: the world of volunteered geography. *GeoJournal* 69(4): 211-221.

Goodchild MF (2009a) Formalizing Place in Geographic Information Systems. Paper presented at *Conference on Place, Health and Equity,* University of Washington, Seattle, WA, 08 May 2009.

Goodchild, MF (2009b) GeoJournal Plenary Lecture: Citizens as Censors: The World of Volunteered Geography. Paper presented at the *Annual Meeting of the American Association of Geographers*, Las Vegas, NV, 24 March 2009.

Goodchild MF, Fu P and Rich P (2007) Sharing Geographic Information: An Assessment of the Geospatial One-Stop. *Annals of the Association of American Geographers* 97(2): 250-266.

Goodchild MF and Janelle D (2004) Thinking spatially in the social sciences. In: Goodchild MF and Janelle DG (eds) Spatially Integrated Social Science. New York: Oxford University Press. pp 3-22.

Google, Inc. (2012) *Google unveils Google Glass Explorer Edition at I/O*. Available from: <http://www.youtube.com/watch?v=OLn0cSZfl6c>. [29 August 2012].

Gordon E (2007) Mapping Digital Networks From Cyberspace to Google. *Information, Communication and Society* 10(6): 885-901.

Graham M (2011) Time Machines and Virtual Portals: The Spatialities of the Digital Divide. *Progress in Development Studies* 11(3): 211-227.

Graham M and Zook M (2013) Augmented realities and uneven geogrpahies: exploring the geo-linguistic contours of the web. *Environment and Planning A*: Forthcoming.

Graham M, Zook M and Boulton A (2012) Augmented reality in urban places: contested content and the duplicity of code. *Transactions of the Institute of British Geographers*: Forthcoming.

Graham SDN (2005) Software-sorted geographies. *Progress in Human Geography* 29(5): 562-580.

Granick J (2006) Saving Democracy With Web 2.0. *Wired.com* (25 October). Available from: <http://www.wired.com/software/webservices/commentary/circuitcourt/2006/10/72001>. [14 February 2010].

Greenberg A (2012) Phone Tracking Big Business For Cell Companies. *All Things Considered*. Radio broadcast, 05 April. NPR.

Gumpert G and Drucker SJ (2007) Mobile communication in the twenty-first century or "Everybody, everywhere, at any time". In: Kleinman S (ed) Displacing place: mobile communication in the twenty-first century. New York: Peter Lang. pp 7-20.

Guptill SC (2007) GIScience, the NSDI, and GeoWikis. *Cartography and Geographic Information Science* 34(2): 165-166.

Haklay M 2008 What's so new about neogeography? Paper presented as part of *Virtual Seminars in GI Science and Technololgy*, Joint Worldwide Universities Network, RGS (with IBG) Quantitative Methods Research Group & UCGIS, 22 October 2008.

Haklay M (2010) How good is OpenStreetMap information? A comparative study of OpenStreetMap and Ordnance Survey datasets for London and the rest of England. *Environment and Planning B* 37(4): 682-703.

Haklay M, Singleton A and Parker C (2008) Web mapping 2.0: the Neogeography of the GeoWeb. *Geography Compass* 2(6): 2011-2039.

Hall S (1997) Introduction. In: Hall S (ed) Representation: Cultural Representations and Signifying Practices. London; Thousand Oaks, CA; New Delhi: SAGE in association with The Open University. pp 1-11.

Hallisey EJ (2005) Cartographic Visualization: An Assessment and Epistemological Review. *Professional Geographer* 57(3): 350-364.

Hannah MG (2000) Governmentality and mastery of territory in nineteenth-century America. Cambridge, New York: Cambridge University Press.

Hansen MNB (2004) New Philosophy for New Media. Cambridge, MA: The MIT Press.

Haraway DJ (1997) ModestWitness@SecondMillennium.FemaleManMeetsOncoMouse: feminism and technoscience. New York: Routledge.

Harvey D (1990) The Condition of Postmodernity. Cambridge, MA; Oxford: Blackwell.

Harvey D (2005) A brief history of neoliberalism. Oxford; New York: Oxford University Press.

Harvey F (2000) The social construction of geographic information systems. *International Journal of Geographic Information Science* 14(8): 711-713.

Harvey F (2007) Commentary: Just another private-public partnership? Possible constraints on scientific information in virtual map browsers. *Environment and Planning B: Planning and Design* 34(5): 761-764.

Harvery F (2013) To Volunteer or to Contribute Locational Information? Towards Truth in Labeling for Crowdsourced Geographic Information. In: Sui DZ, Elwood S and Goodchild MF (eds). Dordrecht, New York: Springer. pp 31-42.

Harvey F and Chrisman N (1998) Boundary objects and the social construction of GIS technology. *Environment and Planning A* 30(9): 1683-1694.

Hayles NK (1999a) The Condition of Virtuality. In: Lunenfeld P (ed) The Digital Dialectic: New Essays on New Media. Cambridge, MA; London: The MIT Press. pp 69-94.

Hayles NK (1999b) How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics. Chicago: University of Chicago Press.

Hemment D (2006) Locative Media. *Leonardo Electronic Almanac* 14(3): no pagination.

Hermida A (2009) Why new media is a generational term. *Reportr.net* (11 February). Available from: <http://www.reportr.net/2009/02/12/why-new-media-is-a-generational-term/>. [01 February 2012].

Heussner KM (2011) Michigan Police Use Cellphone 'Data Extraction Devices;' ACLU Objects. *ABC News* (21 April). Available from: <http://abcnews.go.com/Technology/michigan-police-cellphone-data-extraction-devices-aclu-objects/story?id=13428178>. [03 June 2012].

Hickey M (2011) ACLU wants to know how Michigan cops use 'data extraction devices'. *CNet News* (19 April). Available from: <http://news.cnet.com/8301-17938_105-20055431-1.html>. [03 June 2012].

Higgins P (2012) Highlighting a Privacy Problem: Apps Need to Respect User Rights From the Start. *Electronic Fronteir Foundation* (08 March). Available from: <https://www.eff.org/deeplinks/2012/03/highlighting-privacy-problems-apps-need-respect-user-rights-start>. [09 March 2012].

HM Government (2011) More digital communication from the Prime Minister: PM joins Foursquare and LinkedIn. *Number 10* (13 October). Available from: <http://www.number10.gov.uk/news/prime-minister-david-cameron-joins-Foursquare-and-linkedin/>. [21 June 2012].

Horning R (2012) Notes on the “data self.” *Marginal Utility | The New Inquiry* (02 February). Available from: <http://thenewinquiry.com/blogs/marginal-utility/dumb-bullshit/>. [02 May 2012].

Holmes B (2006) Counter cartographies. In: Abrams J and Hall P (eds) Else/where: mapping new cartographies of networks and territories. Minneapolis: University of Minnesota Design Institute. pp 20-25.

Hurwitz J (2012) Can Facebook "Monetize Eyeballs?" *The Management Blog | Businessweek.com* (23 May). Available from: <http://www.businessweek.com/articles/2012-05-23/can-facebook-monetize-eyeballs>. [23 May 2012].

Jardin X (2005) Using Google Earth to process Katrina flood damage data (30 August 2005). *Boing Boing*. Available from: <http://www.boingboing.net/2005/08/30/using-google-earth-t.html>. [13 March 2009].

Jeffries A (2010). Bing Adds Open Street Map. *ReadWriteWeb* (02 August). Available from: <http://www.readwriteweb.com/archives/bing_adds_open_street_map.php>. [16 August 2010].

Jensen KB (2011) New Media, Old Methods - Internet Methodologies and the Online/Offline Divide. In: Consalvo M and Ess C (eds) The Handbook of Internet Studies. Malden, MA; Oxford, UK: Wiley-Blackwell. pp 43-58.

Jessop B (1990) State theory: putting the Capitalist state in its place. University Park, PA: Pennsylvania State University Press.

Johnson S (2012) Can Anything Take Down the Facebook Juggernaut? *Wired.com* (16 May). Available from: <http://www.wired.com/epicenter/2012/05/mf_facebook/all/1>. [29 May, 2012].

Kingsbury P and Jones JP III (2009) Walter Benjamin's Dionysian Adventures on Google Earth. *Geoforum* 40(4): 502-513.

Kirk J (2009) Swiss Contend Google Doesn't Blur Street View Enough. *PC World* (13 November). Available from: <http://www.pcworld.com/article/182150/swiss_contend_google_doesnt_blur_street_view_enough.html>. [19 November 2009].

Kleinman S (2007) Displacing Place: Mobile Communication In The Twenty-First Century. New York: Peter Lang.

Knigge L and Cope M (2006) Grounded visualization: integrating the analysis of qualitative and quantitative data through grounded theory and visualization. *Environment and Planning A* 38(11): 2021-2037.

Kwan M-P (2004) Beyond Difference: From Canonical Geography to Hybrid Geographies. *Annals of the Association of American Geographers* 94(4): 756-763.

Laraki O (2010) Twitter Places: More Context For Your Tweets. *Twitter Blog* (14 June). Available from: <http://blog.twitter.com/2010/06/twitter-places-more-context-for-your.html>. [03 March 2012].

Larner W (2000) Neo-liberalism: policy, ideology, governmentality. In: de Marieke G (ed) International political economy and poststructural politics. New York: Plagrave Macmillan. pp 5-25.

Latour B (1991) Technology is Society Made Durable. In: Law J (ed) A Sociology of Monsters: Essays on Power, Technology & Domination. London: Routledge, 103-132.

Latour B (1994) On Technical Mediation - Philosophy, Sociology, Genealogy. *Common Knowledge* 3(1): 29-64.

Latour B (1999) On recalling ANT. In: Law J and Hassard J (eds) Actor Network Theory and After. Malden, MA: Blackwell Publishing. pp 15-25.

Lawson C (2007) Technology, technological determinism and the transformational model of social activity. In: Lawson C, Latsis J and Martins N (eds) Contributions to Social Ontology. New York: Routledge. pp 32-49.

Lawson V (1995) The Politics of Difference: Examining the Quantitative/Qualitative Dualism in Post-Structuralist Feminist Research. *The Professional Geographer* 47(4): 449-457.

Leaver T (2006) The Blogging of Everyday Life. *Reconstruction* 6(4): no pagination

Lee D (2012) Foursquare and Amex join forces in UK to offer discounts. *BBC News* (30 May). Available from: <http://www.bbc.com/news/technology-18259306>. [01 June 2012].

Lee M (2010) A Political Economic Critique of Google Maps and Google Earth. *Information, Communication & Society* 13(6): 909-928.

Leszczynski A (2009a) Poststructuralism and GIS: Is there a 'disconnect'? *Environment and Planning D: Society and Space* 27(4): 581-602.

Leszczynski A (2009b) Quantitative limits to qualitative engagements: GIS, its critics, and the philosophical divide. *The Professional Geographer* 61(3): 350-365.

Leszczynski A (2009c) Rematerializing GIScience. *Environment and Planning D: Society and Space* 27(4): 609-615.

Leszczynski A (2012) Situating the geoweb in political economy. *Progress in Human Geography* 36(1): 72-89.

Levinson P (2001) Digital McLuhan: A Guide to the Information Millennium. London; New York: Routledge.

Levinson P (2009) New New Media. Boston: Allyn & Bacon.

Levy A (2012) Facebook's IPO Headache. *Weekday*. Radio broadcast, 23 May. KUOW.

Lievrouw LA (2011) Alternative and Activist New Media. Malden, MA: Polity Press.

Lin W (2012) Situating Performative Neogeography: Tracing, Mapping, and Performing 'Everyone's East Lake'. *Environment and Planning A*: Forthcoming.

Livingstone S (2008) Taking risky opportunities in youthful content creation: teenagers' use of social networking sites for intimacy, privacy and self-expression. *New Media & Society* 10(3): 393-411.

Lunenfeld P (1999) Screen Grabs: The Digital Dialectic and New Media. In: Lunenfeld P (ed) The Digital Dialectic: New Essays on New Media. Cambridge, MA; London: The MIT Press. pp xiv-xxi.

Macdonnell D (1986) Theories of Discourse: An Introduction. New York: Blackwell.

MacKinnon R (2012) Ruling Facebookistan. *Foreign Policy* (14 June). Available from: <http://www.foreignpolicy.com/articles/2012/06/13/governing_facebookistan>. [05 November 2012].

Madden M (2012) *Privacy management on social media sites*. Washington, D. C.: Pew Research Center's Internet and American Life Project.

Madrigal A (2012) How Google Builds Its Maps—and What It Means for the Future of Everything. *The Atlantic* (06 September). Available from: <http://www.theatlantic.com/technology/ archive/2012/09/how-google-builds-its-maps-and-what-it-means-for-the-future-of-everything/261913/#.UEpP-FmX1rE.twitter>. [08 September 2012].

Malik O (2005) Web 2.0, Community & the Commerce Conundrum. *GigaOM* (18 October). Available from: <http://gigaom.com/2005/10/18/web-20-the-community-the-commerce-conundrum/>. [18 May 2010].

Mann G (2010) Money: The Exception. Paper presented to the Department of Geography, University of Washington, Seattle, WA, 30 April 2010.

Manovich L (2001) The Language of New Media. Cambridge, MA; London: MIT Press.

Manovich L (2009) Remixability. In: Koepnick L and McGlothlin E (eds) After the Digital Divide? German Aesthetic Theory in the Age of New Media. Rochester, NY: Camden House. pp 43-51.

Mark DM (2005) Spatial representation: a cognitive view. In: Longley PA, Goodchild MF, Maguire DJ and Rhind DW (eds) Geographical Information Systems: Principles, Techniques, Management and Applications. 2nd (abridged) ed. New York: John Wiley & Sons. pp 81-89.

Math Camp, Inc. (2012) *Highlight*. Available from: <http://highlig.ht/>. [21 June 2012].

Matyszczyk C (2012) The joy of Microsoft's 'avoid ghetto' GPS patent. *Cnet News* (07 January). Available from: <http://news.cnet.com/8301-17852_3-57354445-71/the-joy-of-microsofts-avoid-ghetto-gps-patent/>. [21 May 2012].

McLuhan M (1964) Understsanding Media: The Extensions of Man. New York: The New American Library.

Meier PP (2011) Do 'Liberation Technologies' Change the Balance of Power Between Repressive States and Civil Society? Unpublished PhD dissertation, The Fletcher School of Law and Diplomacy, Tufts University, Medford, MA.

metaio, Inc. (2009) Mobile technologies and location-aware social networking. The Location Based Service LBS Zone (18 September). Available from: <http://www.lbszone.com/ content/view/5392/2/>. [22 September 2009].

Metcalfe J (2012) A Map of New York City's Moods. *The Atlantic* (07 September). Available from: < http://www.theatlanticcities.com/neighborhoods/2012/09/map-new-york-citys-moods/3196/>. [08 September 2012].

Miller CC (2006) A Beast in the Field: The Google Maps Mashup as GIS/2. *Cartographica* 41(3): 187-199.

Mills S (1997) Discourse. New York: Routledge.

Mitchell T (2002) Rule of Experts: Egypt, Techno-Politics, Modernity. Berkeley; Los Angeles: University of California Press.

Mosco V (2004) The digital sublime: myth, power, and cyberspace. Cambridge, MA: MIT Press.

Murray S (2008) Cybernated Aesthetics: Lee Bull and the Body Transfigured. *Performing Arts Journal* 30(89): 38-65.

Navarro V (2007a) Neoliberalism as a Class Ideology; Or, the Political Couases of the Growth of Inequalities. In: Navarro V (ed) Neoliberalism, Globalization and Inequalities: Consequences for Health and Quality of Life. Amityville, NY: Baywood Publishing Company. pp 9-23.

Navarro V (2007b) Neoliberalism, Globalization, and Inequalities: Consequences for Health and Quality of Life. Amityville, NY: Baywood Publishing Company.

Newitz A (2006) Where 2.0 Gives the World Meaning. *Wired.com* (16 June). Available from: <http://www.wired.com/science/discoveries/news/2006/ 06/71170>. [25 October 2007].

Nourbakhsh I, Sargent R, Wright A, Cramer K, McClendon B and Jones M (2006) Mapping disaster zones. *Nature* 439(7078): 787-788.

O'Grady JD and Morgenstern D (2011) Apple finally responds to Locationgate, but is it enough? *ZDNet.com* (27 April). Available from: <http://www.zdnet.com/blog/apple/ apple-finally-responds-to-locationgate-but-is-it-enough/10026>. [31 May 2012].

Olanoff D (2011) Regular? Automate your Foursquare check-ins with Auto4Sq. *The Next Web* (21 November). Available from: <http://thenextweb.com/apps/2011/11/14/are-you-a-regular-automate-your-foursquare-check-ins-with-auto4sq/>. [19 November 2011].

O'Reilly T (2005) What Is Web 2.0. *The O'Reilly Network* (30 September). Available from: <http://www.oreillynet.com/pub/a/oreilly/tim/news/2005/09/30/what-is-web-20.html>. [25 September 2007].

O'Reilly Media, Inc. (2011) *Where 2.0 Conference 2011*. Available from: <http://whereconf.com/ where2011>. [21 May 2012].

Parks L (2006) Satellite and Cyber Visualities: Analyzing 'digital' earth. In: Nirzeoff N (ed) The Visual Culture Reader. 2nd (reprinted) ed. London; New York: Routledge. pp 279-292.

Parks L (2009) Digging into Google Earth: An analysis of "Crisis in Darfur". *Geoforum* 40(4): 535-545.

Paul I (2009) Google Street Views Faces Privacy Critics in Japan and Greece. *Today @ PC World* (13 May). Available from: <http://www.pcworld.com/article/164810/google_street_views _faces_ privacy_critics_in_japan_and_greece.html>. [19 November 2009].

Paul I (2012) Girls Around Me App Voluntarily Pulled After Privacy Backlash. *Today @PCWorld* (02 April). Available from: <http://www.pcworld.com/article/252996/girls_around_me_ app_voluntarily_pulled_after_privacy_backlash.html>. [03 April 2012].

Pavlovskaya M (2006) Theorizing with GIS: A tool for critical geographies? *Environment and Planning A* 38(11): 2003-2020.

Peak K (2012) Foursquare looking to coupons, verify fee to monetize. *Vator News* (09 May). Available from: <http://vator.tv/news/2012-05-09-Foursquare-looking-to-coupons-verify-fee-to-monetize>. [23 May 2012].

Peck J (2004) Geography and public policy: constructions of neoliberalism. *Progress in Human Geography* 28(3): 392-405.

Peck J and Tickell A (2002) Neolibralising Space. *Antipode* 34(3): 380-404.

Pendleton C (2010) New Bing Maps Application: Streetside Photos. *Bing Maps* (11 February). Available from: <http://www.bing.com/community/site_blogs/b/maps/archive/2010/02/11/new-bing-maps-application-streetside-photos.aspx>. [01 March 2012].

Perez JC (2009) Judge Dismisses Google Street View Case. *PC World* (19 February). Available from: <http://www.pcworld.com/article/159740/judge_dismisses_google_street_view_case.html?tk=rel_news>. [19 November].

Perez S (2011) U.K. PM David Cameron Joins Foursquare and LinkedIn. *TechCrunh* (17 October). Available from: <http://techcrunch.com/2011/10/17/u-k-pm-david-cameron-joins-Foursquare-and-linkedin/>. [21 June 2012].

Perkins C (2003) Cartography: mapping theory. *Progress in Human Geography* 27(3): 341-351.

Perkins C and Dodge M (2009) Satellite imagery and the spectacle of secret spaces. *Geoforum* 40(4): 546-560.

Petrishen B (2010) Town Meeting: Members reject recommended capital projects. *The Winchester Star* (09 November). Available from: <http://www.wickedlocal.com/winchester/news/ x115985312/TOWN-MEETING-Members-reject-recommended-capital-projects>. [17 November 2010].

Pickles J (1995) Representations in an Electronic Age: Geography, GIS, and Democracy. In: Pickles J (ed) Ground Truth: The Social Implications of Geographic Information Systems. New York; London: The Guilford Press. pp 1-30.

Pickles J (1997) Tool or Science? GIS, Technoscience, and the Theoretical Turn. *Annals of the Association of American Geographers* 87(2): 363-372.

Pickles J (2004) A History of Spaces: Cartographic reason, mapping and the geo-coded world. New York: Routledge.

Pritchard E (2009). Mr. Wells called it Canton, Google calls it Colesville. *CantonRep.com* (26 October). Available from: <http://www.cantonrep.com/communities/canton/ x23524235/Mr-Wells-called-it-Canton-Google-calls-it-Colesville>. [09 November 2009].

Rajagopal A (2006) Imperceptible Perceptions in Our Technological Modernity. In: Chun WHK and Keenan T (eds) New Media, Old Media: A History and Theory Reader. New York; London: Routledge, 277-286.

Raper JF (2005) Spatial representation: the scientist's perspective. In: Longley PA, Goodchild MF, Maguire DJ and Rhind DW (eds) Geographical Information Systems: Principles, Techniques, Management and Applications. 2nd (abridged) ed. New York: John Wiley & Sons. pp 61-70.

Read J (2009) A Genealogy of Homo-Economicus: Neoliberalism and the Production of Subjectivity. *Foucault Studies* 6(25-36.

Roberts S, Secor A and Sparke M (2003) Neoliberal Geopolitics. *Antipode* 35(5): 886-897.

Robinson W (2006) Catching the Waves: Considering Cybercuture, Technoculture, and Electronic Consumption. In: Silver D and Massanari A (eds) Critical Cyberculture Studies. New York: New York University Press. pp 55-67.

Rodrigues J (2009) Google Street View's headaches around the world. *The Guardian* (29 November). Available from: <http://www.guardian.co.uk/technology/2009/nov/29/google-street-view>. [02 December 2009].

Rose NS (1999) Powers of freedom: reframing political thought. Cambridge, United Kingdom; New York: Cambridge University Press.

Rose NS (2007) Politics of life itself: biomedicine, power, and subjectivity in the twenty-first century. Princeton: Princeton University Press.

Sakr S (2011) Location-based services still have to win over business. *BBC Mobile* (26 April). Available from: <http://www.bbc.co.uk/news/business-13158901>. [26 April 2011].

Sawers P (2012) WhosHere Finally Lands on Android. *The Next Web* (07 June). Available from: <http://thenextweb.com/apps/2012/06/07/location-based-chat-app-whoshere-finally-lands-on-android/>. [21 June 2012].

Scharl A and Tochtermann K (2007) The geospatial web: how geobrowsers, social software and the Web 2.0 are shaping the network society. London: Springer.

Schiller J and Voisard A (2004) Introduction. In: Schiller J and Voisard A (eds) Location-Based Services. San Francisco: Morgan Kauffman. pp 1-4.

Schroeder P (1996) Criteria for the Design of a GIS/2. Paper presented at the *NCGIA Specialist Meeting: Empowerment, Marginalization and Public Participation GIS,* Santa Barbara, CA.

Schuurman N (2000) Trouble in the heartland: GIS and its critics in the 1990s. *Progress in Human Geography* 24(4): 569-590.

Schuurman N (2002) Reconciling Social Constructivism and Realism in GIS. *ACME* 1(1): 73-90.

Schuurman N (2006) Why formalization matters: critical GIS and ontology research. *Annals of the Association of American Geographers* 96(4): 726-739.

Scott JC (1998) Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed. New Haven; London: Yale University Press.

Schmidt S (2009) Privacy not protected on Google Street View, MPs told. *The National Post* (22 October). Available from: <http://www.nationalpost.com/news/story.html?id=2133506>. [20 November 2009].

Schutzberg A (2009a) Flickr Connects to OSM. *All Points Blog* (29 September). Available from: <http://apb.directionsmag.com/archives/6551-Flickr-Connects-to-OSM.html>. [29 September 2009].

Schutzberg A (2009b) Google Resets its Data Providers. *All Points Blog* (07 October). Available from: <http://apb.directionsmag.com/archives/6584-Google-Resets-its-Data-Providers.html>. [08 October 2009].

Schutzberg A (2010) "Neogeography" Deleted from Wikipedia. *All Points Blog* (25 October). Available from: <http://apb.directionsmag.com/archives/8852-Neogeography-Deleted-from-Wikipedia.html>. [25 October 2010].

Schutzberg A (2011) Time to Rebrand GIS? *All Points Blog* (03 January). Available from: <http://apb. directionsmag.com/archives/9190-Time-to-Rebrand-GIS.html>. [06 January 2011].

Shao G (2009) Understading the appeal of user-generated media: a uses and gratification perspective. *Internet Research* 19(1): 7-25.

Shapira I (2009) In a Generation That Friends and Tweets, They Don't. *The Washington Post* (15 October). Available from: <http://www.washingtonpost.com/wp-dyn/content/article/2009/10/14/AR2009101403961.html>. [16 October 2009].

Shaw R (2010) Google gets data for free, B.C. gets a bill. *The Vancouver Sun* (13 July). Available from: <http://www.vancouversun.com/technology/Google+gets+data+free+gets+bill/3270020/story.html>. [14 July 2010].

Sheppard E (1995) GIS and Society: Towards a Research Agenda. *Cartography and Geographic Information Science* 22(1): 5-16.

Sheppard E (2005) Knowledge Production Through Critical GIS: Genealogy and Prospects. *Cartographica* 40(4): 5-21.

Siddique H (2009) Greece's dim view of Street View. *The Guardian* (12 May). Available from: <http://www.guardian.co.uk/technology/2009/may/12/google-street-view-greece-privacy>. [02 December 2009].

Sieber R (2004) Rewiring for a GIS/2. *Cartographica* 39(1): 25-39.

Sieber R (2009) Neogeographers meet Paleogeographers. Panel session held at the *Association of American Geographers Annual Meeting*, Las Vegas, NV, 24 March 2009.

Siegler M (2009) Google Doubles Its Cartographers As Maps Continues To Go Wiki-Style. *TechCrunch* (19 August). Available from: <http://www.techcrunch.com/2009/08/19/google-doubles-its-cartographers-as-maps-continues-to-go-wiki-style/>. [27 August 2009].

Siegler MG (2011a) Lost In The iPhone Location FUD. *TechCrunch* (27 April). Available from: <http://techcrunch.com/2011/04/27/apple-iphone-location/>. [01 May 2012].

Siegler MG (2011b) One Year Later, Facebook Killing Off Places …To Put Location Everywhere. *TechCrunch* (23 August). Available from: <http://techcrunch.com/2011/08/23/facebook-location-tagging/>. [19 June 2012].

Silverstone R (1999) Why study the media? Thousand Oaks, CA: SAGE.

Singh JP (2002) Introduction: Information technologies and the changing scope of global power and governance. In: Rosenau JN and Singh JP (eds) Information Technologies and Global

Politics: The Changing Scope of Power and Governance. Albany, NY: State University of New York Press. pp 1-38.

Sparke M (2006) Political geography: Political geographies of globalization (2) - governance. *Progress in Human Geography* 30(2): 1-16.

Spiekermann S (2004) General Aspects of Location-Based Services. In: Schiller J and Voisard A (eds) Location-Based Services. San Francisco: Morgan Kauffman. pp 9-26.

Staeheli LA and Lawson V (1995) Feminism, Praxis and Human Geography. *Geographical Analysis* 27(4): 321-338.

Stratton A (2009) Ordnance Survey maps to go free online. *The Guardian* (17 November). Available from: <http://www.guardian.co.uk/technology/2009/nov/17/ordnance-survey-maps-online>. [17 November 2009].

Strauss AL (1987) Qualitative Analysis for Social Scientists. Cambridge, UK; New York: Cambridge University Press.

Sui D and Goodchild M (2011) The convergence of GIS and social media: challenges for GIScience. *International Journal of Geographic Information Science* 25(11): 1737-1738.

Sui DZ (2008) The wikification of GIS and its consequences: Or Angelina Jolie's new tattoo and the future of GIS. *Computers, environment and urban systems* 32(1): 1-5.

Sundén J (2003) Material Virtualities: Approaching Online Textual Embodiment. New York: Peter Lang.

Sunder Rajan K (2006) Biocapital: the constitution of postgenomic life. Durham: Duke University Press.

Tapscott D and Williams AD (2006) Wikinomics: how mass collaboration changes everything. New York: Portfolio.

Terranova T (2004) Network culture: politics for the information age. London; Ann Arbor, MI: Pluto Press.

The Economist (2010) Location-based services on mobile phones: Follow me. *The Economist* 394(8672): 85.

The Life Files (2012) New Trend Alert: Ambient Social Networking. *The Life Files* (01 March). Available from: <http://www.thelifefiles.com/2012/03/01/new-trend-alert-ambient-social-networking/>. [11 March 2012].

The Smoking Gun (2008a) Couple Sues Google Over "Street View". *The Smoking Gun* (04 April). Available from: <http://www.thesmokinggun.com/archive/years/2008/0404081google1.html>. [02 December 2009].

The Smoking Gun (2008b) Google: "Complete Privacy Does Not Exist". *The Smoking Gun* (30 July). Available from: <http://www.thesmokinggun.com/archive/years/2008/0730081google1.html>. [02 December 2009].

The Wall Street Journal (2011) What They Know – Mobile. Available from: <http://blogs.wsj.com/wtk-mobile/>. [Accessed March 09, 2011].

Thielmann T (2010) Locative Media and Mediated Localities: An Introduction to Media Geography. *aether* 5A: 1-17

Thornham S, Bassett C and Marris P (2009) New Technologies, New Media? In: Thornham S, Bassett C and Marris P (eds) Media Studies: A Reader. 3rd ed. New York: New York University Press. pp 791-795.

Timmer J (2009) EU seeks Street View picture purge. *Ars Technica* (26 February). Available from: <http://arstechnica.com/web/news/2010/02/eu-seeks-street-view-picture-purge.ars>. [01 March 2010].

Treves R (2007) Google Earth Design: Steve Chilton Interview. *Google Earth Design* (07 August). Available from: <http://googleearthdesign.blogspot.com/2007/08/steve-chilton-interview.html>. [27 March 2012].

Tulloch DD (2008) Is VGI participation? From vernal pools to video games. *GeoJournal* 72(3-4): 161-171.

Turner A (2006) Introduction to Neogeography. Sebastopol, CA: O'Reilly.

Turner A (2009) How Neogeography Killed GIS. Paper presented at *AGI GeoCommunity '09*, Stratford Upon Avon, UK, 23 September 2009. Available from: <http://www.slideshare.net/ajturner/how-neogeography-killed-gis>. [27 March 2012].

van Kokswijk J (2007) Digital Ego: Social and Legal Aspects of Virtual Identity. Chicago: Eburon.

Vandendorpe C (2008) Reading on Screen: The New Media Sphere. In: Schreibman S and Siemens R (eds) A Companion to Digital Literary Study. Oxford: Blackwell. pp 203-215.

Varnelis K and Friedberg A (2008) Place: A networking of public space. In: Varnelis K (ed) Networked publics. Cambridge, MA: MIT Press. pp 15-42.

Warden P (2011) *iPhone Tracker*. Available from: <http://petewarden.github.com/iPhoneTracker/>. [20 April 2011].

Warf B and Sui D (2010) From GIS to neogeography: ontological implications and theories of truth. *Annals of GIS* 16(4): 197-209.

Wellman B (2011) Studying the Internet Through the Ages. In: Consalvo M and Ess C (eds) The Handbook of Internet Studies. Malden, MA; Oxford, UK: Wiley-Blackwell. pp 17-23.

Wicks S (2012) Thoughts on Places. *WallaBee Blog* (08 March). Available from: <http://wallab.ee/blog/2012/03/08/thoughts-on-places/>. [18 May 2012].

Williams J (2009) Google Japan fights concerns about Street View. *Examiner.com* (04 September). Available from: <http://www.examiner.com/x-16352-Japan-Headlines-Examiner~y2009m9d4-Google-Japan-fights-concerns-about-Street-View>. [10 September 2009].

Wilson MW (2009) Towards a Genealogy of Qualitative GIS. In: Cope M and Elwood S (eds) Qualitative GIS. Thousand Oaks, CA: SAGE. pp 156-170.

Wilson MW (2012) Location-based services, conspicuous mobility, and the location-aware future. *Geoforum* 43(6): 1266-1275.

Wilson MW and Graham M (2012a) Neogeography and volunteered geographic information: A conversation with Michael Goodchild and Andrew Turner. *Environment and Planning A*: Forthcoming.

Wilson MW and Graham M (2012b) Situating Neogeography. *Environment and Planning A*: Forthcoming.

Wong TSK (2009) Google Street View a privacy worry. *The Tornoto Star* (10 October). Available from: <http://www.thestar.com/special/article/713806--google-street-view-a-privacy-worry>. [11 November 2009].

Worthman J (2012) New Apps Connect to Friends Nearby. *The New York Times* (08 March). Available from: <http://www.nytimes.com/2012/03/09/technology/new-apps-connect-to-friends-nearby.html>. [11 March 2012].

Wright D, Goodchild MF and Proctor JD (1997) GIS: Tool or Science? Demystifying the Persistent Ambiguity of GIS as "Tool" versus "Science". *Annals of the Association of American Geographers* 87(2): 346-362.

Wu T (2010) The Master Switch: The Rise and Fall of Information Empires. New York: Alfred A. Knopf.

Wyst Digital Inc. (2011) *Wyst*. Available from: <http://wyst.it/>. [18 September 2012].

Yarbrough L and Easson G (2005) Eye of the Storm: Google Earth Assists Katrina Response and Recovery. *GeoWorld* 18(11): 24-27.

Zimmermann PR (2007) Public Domains: Engaging Iraq Through Experimental Digitalities. *Framework* 4(2): 66-83.

Zittrain J (2008) The Future of the Internet - And How to Stop It. New Haven: Yale University Press.

Zafra A (2009) Google Street View in Japan Faces Various Complaints. *Search Engine Journal* (06 September). Available from: <http://www.searchenginejournal.com/google-street-view-in-japan-faces-various-complaints/13048/>. [10 September 2009].

Zmuda N (2010) Check-in Apps' Next Stop: Your Supermarket Aisles. *Ad Age Digital* (15 November). Available from: <http://adage.com/article/digital/food-marketers-tyson-pepsi-social-check-apps/147100/>. [22 May 2012].

Zook MA and Graham M (2007a) The creative reconstruction of the Internet: Google and the privatization of cyberspace and DigiPlace. *Geoforum* 38(6): 1322-1343.

Zook MA and Graham M (2007b) Mapping DigiPlace: geocoded Internet data and the representation of place. *Environment and Planning B: Planning and Design* 34(3): 466-482.