THE SHADOW SPACE OF ALLEGORICAL MACHINES: SITUATING LOCATIVE MEDIA

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A dissertation submitted to the faculty of the University of North Carolina at Chapel Hill in partial fulfillment of the requirements for the degree of Doctor of Philosophy in the Department of Communication Studies.

Chapel Hill
2013

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ABSTRACT

ALEX MONROE INGERSOLL: The Shadow Space of Allegorical Machines: Situating Allegorical Machines
(Under the direction of Ken Hillis)

This dissertation utilizes a media archaeological approach to the analysis of locative media, which are technologies that organize an experience of spatial orientation. For instance, a user can use a mobile phone to connect to a cellular network and generate a visualization of the material space in which he or she is positioned with annotated or interactive information on the screen. My critical approach to locative media is influenced by a historical constellation of orientation technologies, their contributions to the social imaginations of space, and the resulting experiences and expectations that are negotiated by the material, symbolic, and ideal.

Four case studies on the astrolabe, magnetic compass, divining rod, and digital locative media make up a broader historical arrangement of which, I argue, digital locative media are the latest manifestation. Like other media technologies such as radio or television, these spatial technologies offer a "window" onto another world while also offering (other)spaces of symbolic and cultural codes that are layered over material space. The ability to reveal these otherspaces is associated with the recurring transcendent logic of locative media as individuals are encouraged to unveil the real behind the apparent in order to become united with a hybrid (and enchanted) ecology of the virtual and real.

My locative media archaeology involves a theorization of "allegorical machines," which is a term I use to analyze the interfaced interpretation of a shadow (imagined or informational) otherspace in relation to a porous correspondence between subject and space. This theorization is an interrogation of how engineers, technological promoters, and users position allegorical machines as making the supersensible sensible through an interface with the sublime. In other words, locative media are technological attempts to make the vague intelligible by bringing what lies outside the realm of physical experience into contact with the senses. Transcending to otherspaces such as the electromagnetic spectrum or the digital network involves an inherent metaphysics of the interface, which as liaisons between bodies and spaces generate animations such as the one that is the focus of this dissertation: the sublime desire or fear of unveiling the unknown space beyond space.

If he had to, he would enter it entirely but never get lost, for he would have this Map, and in it, spread below, would lie ev'rything…

—Thomas Pynchon, Mason & Dixon.

First, my son, observe that in this world we travel through likenesses and enigmas since the spirit of truth is not of this world nor can it be seized through it. We are carried off towards the unknown…

—Nicholas of Cusa, letter to Nicolaus Albergati.

ACKNOWLEDGEMENTS

This work represents the culmination of a significant amount of time, advice, and assistance that was graciously afforded to me by numerous people. I would like to thank especially Ken Hillis as his guidance played an enormous role in my development as a scholar and as an individual. I could not have asked for a better mentor. I am grateful to Carole Blair, Tyler Curtain, Michael Palm, and Sarah Sharma for providing invaluable advice and support as this project developed over time.

I would like to thank my friends and colleagues who have directly or indirectly influenced numerous versions and incarnations of this project in seminar, conference, living, and bar rooms including Dana DeSoto, Armond Towns, David Supp-Montgomerie, Jenna Supp-Montgomerie, Chris Dahlie, Adam Rottinghaus, Brett Lyszak, Carey Hardin, J. Nikol Beckham, David Terry, Mark Robinson, Vilma Berg, Joyce Rudinsky, Lawrence Rosenfeld, Bill Balthrop, and Dennis Mumby. I would like to thank the Graduate School at The University of North Carolina at Chapel Hill and the department of Communication Studies for supporting me throughout my studies. Archival research for this dissertation was supported by the Peggy Harpold Summer Research Fellowship. Many thanks to Misty DeMars and Bruce Stephenson at the Webster Institute at the Adler Planetarium in Chicago, IL, Lucy Blaxland and Jim Bennett at the Museum of the History of Science in Oxford, U.K., and Lilla Vekerdy at the Dibner Library of the History of Science and Technology at the Smithsonian Institution in Washington D.C.

This project would have been impossible without the encouragement of my family. I am grateful for the continual love and support from my parents, Tom and Marianne Ingersoll. I am also truly appreciative of Alan and Gwenne Henricks' assistance throughout this process. Carolyn Ingersoll raised and nurtured a family that values critical inquiry and this dissertation is a result of her drive and spirit that inspired me years ago.

The love and patience of Amanda Ingersoll allowed me to navigate through a range of seemingly impassable moments. Simply saying thanks does not do justice to the sustained support that she provided me. With her, I am thrilled to explore our future that lies beyond these pages.

This dissertation is dedicated to the memory of Charles Monroe Ingersoll, Jr.

TABLE OF CONTENTS

LIST OF FIGURES

Figure

I. INTRODUCTION: TERRA INCOGNITA, OR, HERE BE DRAGONS

> How near
> We tread the confines of the spirit-world!
> How thin the veil that hides it! Who but feels
> Some time, in Night's dim silence and dead noon
> Conscious that those we deem so far are near,
> The lost are present?
> —*John Mason Neale (1863), Seatonian Poems.*

> Humanity senses this and fights against it and in order to eliminate as far as possible the ghostly element between people and to create a natural communication, the peace of souls, it has invented the railway, the motor car, the aeroplane. But it's no longer any good, these are evidently inventions being made at the moment of crashing. The opposing side is so much calmer and stronger; after the postal service it has invented the telegraph, the telephone, the radiograph. The ghosts won't starve, but we will perish.
> —*Franz Kafka (1953), Letters to Milena.*

Mobile technologies have been used in conjunction with our experiential and existential relation to space for centuries and mobile computing devices are now becoming the primary means for spatial orientation and navigation. Certain commentators have suggested that this increase in mobile communication technology in our everyday lives has contributed to a particular sense of "networked individualism" (Wellman 2002) that is supporting "new" forms of collective organization regardless of their physical proximity or mobility (Rheingold 2002). Despite arguments that significantly over-emphasize the placeless conquest of networked information and its liberation from material space, borders, and location (cf. Castells 2000), the development of mobile devices integrated with global-positioning systems (GPS) and other spatial positioning protocols has integrated features of material space within networked communication. These devices, also referred to as "locative media," are technologies that organize an experience of

spatial orientation by providing information to producers and users on networked devices about the user's geographical location. The term was first used in 2003 by Karlis Kalnins and Marc Tuters (Kalnins 2004; de Waal 2012) as a title for an international workshop for artists and researchers "interested in notions of mobile geography aiming to explore how wireless networking impacts upon notions of space time and social organization."[1] Since 2004, locative media have become objects of fascination and idealization for both artists and corporations due to their purported elimination of the barrier dividing the physical and virtual worlds.

Locative media are situated as a means to augment a user's experience in physical, material space by revealing a layer of previously hidden, networked, and geo-tagged information. This networked practice of spatial "unmasking" has become known as "augmented reality" in the sense that locative media devices are used to unveil aspects of an "ambient intelligence" within and beyond the spaces that surround us (Crang and Graham 2007). Over time, electronic technologies such as radar, sonar, GPS, radio-frequency identification (RFID), and Bluetooth have all helped to modify conceptions of space. In the face of those that argue that contemporary digital media technologies threaten to bring about an "end of geography" (cf. Smith 1997; Graham 1998; Dicken 2000), proponents of locative media suggest that we "are seeing the rise of a new, location-aware generation" (Thielmann 2010, 2). Moreover, as Nigel Thrift declares, "we are moving into a new 'a-whereness,' one in which what was called 'technology' has moved so decisively into the interstices of the active percipience of everyday life that it is

[1] Art+Communication Festival, "Locative Media," May 2003, accessed February 25, 2013, http://locative.x-i.net/.

possible to talk about a new layer of intelligence abroad in the world, a layer of intelligence which is beginning to unite living things" (2008, 166).

As the literature on new media in general and locative media in particular increasingly emphasizes the importance of physical space to digital information networks (and vice versa; cf. Mitchell 1995; Graham and Marvin 2001; de Souza e Silva and Sutko 2009; Farman 2012), much of this work has glossed over or ignored the historical complexities of the mediation of spatial orientation. In particular, this work has skirted around questions regarding how the human imagination was affected by earlier technologies of spatial orientation and navigation in terms of how space has been conceived, perceived, and lived. Nevertheless, the imagination was affected by earlier devices and in the pages that follow I offer a history of the intersection of these devices and the imagination. It is a tortuous history and I offer it as a means to better understand the current fascination with augmented reality and the desires to connect to layers of digital planes beyond material space.

The focus of this dissertation, then, concerns the persistent human relationship with spatial orientation devices that mediate the vague, unknown, incomprehensible, or supersensible as a way to expand the discussion regarding locative media in particular and spatial interfaces in general. I am interested in the articulations among the practices, representations, experiences, and affects associated with navigational media that precede and influence the digital era. In particular, I draw attention to the way that locative media have long operated as an interface between the material and the imagined. One of my

main foci is how these technologies are described and the kinds of space that are revealed through their use.

For instance, in April 2010, AT&T debuted an advertising campaign that focused on this augmented approach to mobile communication technologies. As part of this campaign, the telecommunications firm shifted away from a long-running message that had boasted about the reliability of connecting to its ubiquitous wireless network and moved towards a more metaphysical approach, asking customers to "Rethink Possible." One dominant feature of these advertisements includes a consideration of what is now "possible" and a suggestion that we can exceed such limits via locative media and augmented reality. These commercials position locative media as not only easing the anxieties of (mis)communication but as allowing us to rethink what is possible in our view of and movement through space. In the case of most "new" communication technologies, "rethinking possible" usually involves an attempt to move closer to a direct sharing of consciousness or a complete dissemination of authentic messages, both of which depend on the logic that increasingly "better wiring will eliminate the ghosts" of miscommunication (Peters 1999, 9). We are haunted by the knowledge that an ideal representation of self or world is impossible as any attempt to connect or communicate inevitably involves a degree of distortion. Franz Kafka's quote in the epigram speaks to this sense of communicative haunting as he points to the interminable efforts "to create a natural communication" by removing the "ghostly element between people."[2]

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[2] In a way, this is idealized in Claude Shannon's formulation of information theory where the quality of the signal is improved through the systematic elimination of the noise in the channel (Shannon and Weaver 1949).

As navigational technologies are increasingly incorporated into a wide variety of information and communication technologies, the distorting and deforming ghosts of (mis)communication merge with the machinations of spatial production and experience in intriguing ways. By configuring the screen with the wave of a hand, the locative media user is offered the promise of the ability to invoke whatever representation of the (often unknown or vague) physical landscape he or she so desires. This desire is often articulated in conjunction with some ideal or sublime "otherspace" such as the magnetic field or the digital network that lies just beyond reach.

As a mode of predictive technology, modern locative media have been developed to orient users in the natural environment by connecting them to an informational or imagined otherspace that transcends the sensible space that surrounds them. My consideration of this desired or feared connection to such an otherspace includes technologies that interact with spaces beyond Earth's surface—such as the tiered Ptolemaic cosmos—or with the ethereal, un-locatable physics of the electromagnetic spectrum. Like other media technologies such as radio or television, these spatial technologies offer a window onto another world while also layering otherspaces of symbolic and cultural codes over or in conjunction with material and physical space. As a result, individuals use spatial orientation technologies to determine what particular space should be encountered, which space should be avoided, and what features of the current encounter should be made in/visible (including the user her or himself, other individuals, and the space where the interaction occurs). As with other supporters and proponents of

locative media, a metaphysics of immanent transcendence[3] has become the driving logic behind AT&T's re-branded advertising campaign to encourage consumers to "Rethink Possible" by using the firm's array of mobile technologies. The technologies of spatial orientation are objects that remain within the world but direct the self towards something beyond material or direct experience.[4]

At the center of this promotional campaign, AT&T has launched a video that captures the creed of the locative media and augmented reality era. It is a mantra for the reconfiguration of boundaries (seen and unseen), spiritualized connections, and expresses a belief in the ability to visualize what is beyond space:

> Expand your boundaries of can,
> See what's on the other side of too far,
> Play the angel's advocate,
> Outsmart can't,
> Put a restriction on your limits
> And prepared to be wowed,
> Explore, try, do,
> Because before it could be done, it couldn't.
> These are indeed amazing times,
> Rethink Possible.[5]

While this mantra is used for an advertising campaign for one of the largest communication technology firms in the world, attempts to "see what's on the other side

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[3] I thank Ken Hillis for this phrase, which came from our conversations on the topic.

[4] I am interested here in the tension that is generated by a technology that remains within the boundaries of self or the world yet that also enables interactions with something that is beyond material existence or experience. This tension is elaborated in interesting ways by Neoplatonic philosophy which emphasizes the idea that God is so pure and perfect that it (or It) completely transcends all of our categories, ideas, and concepts. I go into greater detail about this tension in chapter three.

[5] AT&T, "Rethink Possible," *Youtube*, April 8, 2010, accessed February 23, 2013. http://www.youtube.com/watch?v=7EhQitYGuBk.

of too far" and "play the angel's advocate" are evident throughout the history of communication and spatial orientation technologies. In particular, this collection of maxims neatly encapsulates a continuing fascination with a strand of Neoplatonic metaphysics where the real or ideal world lies above or beyond the tangible "shadow space" of appearances. I use the term "shadow space" for a pair of related reasons. First, this is an indication of my interest in relating the Platonic myth of the shadows on the wall of the cave (and the interest in the split between appearance and reality) with the spatial imagination associated with orientation and navigation devices. This myth also underscores the restrictions of the human body for obtaining "Truth," which as embodied creatures, Platonism holds, we are only able to grasp as shadows. Second, I use this term as a way to directly interrogate the discourse associated with the history of locative media. The imagined or informational "space" that is overlaid or tied to physical space is often characterized in terms of an "otherspace" that is intended to shed light on these shadows in order to reclaim a unified sense of the real. In other words, locative media are often positioned as a conduit for access to a more truthful orientation of and in space.

Even as there is a continuing perpetuation of a gap between spirituality and technology, the dreams of technological salvation are not inherently new. The recurring appeal of a technologically-enabled spatial transcendence manifests itself in the present concerns for the visualization of information in physical space, the location of bodies and landmarks made visible or invisible with the wave of a hand or the push of a button, and the ongoing dilemma about how to deal with the threatening, unplanned, or vague encounters that may arise when one moves through space. While these concerns have slid

between the irrational and the rational, the way these anxieties and their associated techniques of amelioration have been discursively represented, defended, and (following a decline in use) marginalized underscore the cultural struggle of spatial encounters with modes of in/visibility and technologies of communication.

Spatial technologies mediate relationships between bodies and the built and natural environments and for centuries have been intimately bound up with the articulation between the imagination and the real. A wider range of spatial orientation technologies is not often considered alongside more conventional media technologies. However, these devices often operate as media of transmission (of telecommunication across various distances that link and represent disparate places such as the telegraph, telephone, or television) and affect the user situated in particular spaces in immediate and future moments. In recent years, heightened desires for digitally-enabled spatial orientation and navigation have been catered to and made popular by proponents of modern locative media devices. Additionally, the purported transcendence of space promised by locative media promoters raises interesting questions about the ongoing process by which the social imagination translates and distorts the relations among bodies and the environment. The recurring motif of spatial transcendence based on a representation of and movement between primary (material) and secondary (symbolic or imagined) layers of space can be linked to a range of spatial orientation technologies

intended to reveal, for example, terra incognita[6] or extra dimensions of unknown space. In many cases, these technologies rely on the description and attempted enactment of various forms of magical or enchanted thinking. I suggest that a sustained analysis of the historical reverberations of what I call "allegorical machines"[7] will yield a nuanced approach to the practices, affects, and experiences that are animated due to locative media.

By reviewing a selection of spatial orientation technologies from different historical eras, including their contributions to the social imaginings of space, and the resulting experiences and expectations that slide between the natural and supernatural, I highlight lines of conflict and struggle within a deeper historical constellation that is tied to contemporary locative media. One of the overarching goals of this dissertation is to identify how elements of these "new" media technologies are deeply bound to a history of spatial technologies. As Langdon Winner reminds us, "New technology… typically emerges not from flashes of disembodied information but from existing technology, by a process of gradual change to, and combination of, that existing technology" (cited in Mackenzie and Wajcman 1985, 10). My approach to technology is rooted in the relation between the materiality of the technology in question and the emanation of various imaginations that permit or restrict certain conceptions of the relations among technology,

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[6] "Terra incognita" is "unknown land" in Latin and has been used in conjunction with cartography for regions that have yet to be mapped. On the ancient map called the "Lenox Globe," (ca. 1510) an area is labeled with the description, "here be dragons" to denote a similar unknown area. I am using both phrases here to contrast the close relations between knowledge (cognita) and fantastical discourse.

[7] This is a concept that I discuss at greater length in chapter three.

self, other, and world. This is an approach that considers technology both as "the enactment of the human imagination in the world" (Romanyshyn 1989, 10) and mediating, inspiring, or framing the imagination. Our relationship with technology entails a tricky balance of utility and desire, one where the cultural imaginaries are of equal importance with the technological means.

My goal is less to provide an exhaustive analysis of locative media *per se*—a project that a general history of technology would aim to accomplish—than to use a historical positioning of locative media as a means of thinking about technology, space, and subjectivity. How do these technologies inform the desire or apprehension of the "real?" In what ways do these modes of spatial orientation and navigation produce and maintain the space or aesthetics of an "otherspace?" How do they frame the social imaginary and a sense of self and unknown space? These questions underpin my larger concern for technology's role in the tensions produced between embodied and disembodied forms of subjectivity. Certainly, proponents of spatial orientation technologies often encourage the desire to erase materiality and eliminate the physical body as they describe how individuals can orient themselves towards representations of space in such a way that their "minds know just what to do: take the information and extrapolate from it a place where they can leap, play, gambol—*without that distant province of our being, the body, dragging them down*" (Harmon 2004, 10-11; emphasis added). According to promoters and other supporters, these technologies allow an individual to break through the shadows of physical space and sense the more authentic characteristics of that space in spite of her or his body.

Through an analysis of a historical constellation of locative media, I argue that various means of spatial orientation and navigation, or allegorical practices, have paralleled and continue to parallel the development of and connection to otherspaces. These technical manifestations of a metaphysical tension between the material and a transcendent ideal are represented by a mediated interface between the subject and space. Represented space is split from the very materiality of the lived space that the human body occupies, which not only allows for these orientation technologies to become a primary site for mediating subjectivities and space but for individuals to desire or fear the secondary layers of space as well. This involves a mode of spatial orientation that "begins with geography, but it reflects a need of the conscious, self-aware organism for a kind of *transcendent* orientation" (Harmon 2004, 15; emphasis added). Locative media have long enabled an orientation practice that is premised upon a mediation of what lies beyond the knowable world of experience and phenomena. These allegorical machines involve the practice of making the supersensible sensible so as to seemingly materialize the ideal. These are technologies that mediate bodies in association with the built and natural environments in ways that raise issues related to a desire for transcendence and enchantment in conjunction with modern spatial production and media technology.

This dissertation illuminates the tension among technology, dis/embodiment, and subjectivity that is rooted in a deeper history than what has been generally offered in

discussions of contemporary technologies.[8] This contested terrain is partly an outcome of the intensifying abstractions brought on by capitalism but, in a way, has always existed due to human struggles concerning our finitude in the face of (either idealized or dreaded) concepts of infinity and the sublime, the location of meaning making, and spiritual engagements with objects and environments. The recurring desire or fear to "see what's on the other side of too far" points to the unease of our finitude and a desire to interact with some great beyond or frontier. I argue that this history is intimately involved with the spiraling relations between the spiritualization of technology and modernity's processes of rationalization and instrumentalization. This relationship is due, in part, to the development and operation of contemporary technologies and their interface with human experience that together constitute the foundations for contemporary modes of wonder and sublimity which, in turn, help mold techno-scientific knowledge and practice. Because of their complex inner-workings as well as their perceived capacities to condense time and space, locative media have come to be understood as possessing transcendent or fantastic features and can be considered in conjunction with the performative techniques of ritual action or magic. It is my view that technologies of spatial orientation and navigation contribute to ongoing struggles over space and subjectivity rooted in the contested terrain of an immanent transcendence of space and the body. This is a terrain that currently operates under the logic of a form of capitalism

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[8] See N. Katherine Hayles (1999). I contend that spatial orientation technologies directly relate to the politics of disembodied subjectivity that largely have been associated with the discourse surrounding cyberspace, cybernetics, information theory, virtual reality and posthuman or postbiological accounts of the self. My "constellational" history is an attempt to extend and potentially complicate this discourse. I discuss my approach to this constellation in chapter two.

tied to enabling and supporting the desire for "information" and under which the operations of the "spiritual" are permissible under the function of the machine and the logic of exchange.

In the following chapters I theorize and assess a constellation of orientation and navigation technologies. This includes digital locative media but also earlier orientation technologies including the armillary sphere and the astrolabe, the lodestone and the magnetic compass, and the divining or dowsing rod. I intend my design for a project on locative media to do something that is not done that often within current scholarship and popular approaches to contemporary technologies such as location-based services, ubiquitous computing, and augmented reality—a historicization of the technology.[9] This literature is predominantly rooted in a teleological media history that considers the implications of traditional media technologies and the repeated ruptures or erasure of space and time. In much of this work, however, technology and history are positioned within recurring moments of "revolution" leading to utopian visions of spatial representation and mobility (cf. Castells 2000; Gordon and de Souza e Silva 2011). I want, instead, to historicize and theorize allegorical machines in order to provide a productive extension and theoretical re-mapping of the relations among media and space, technology and modernity, and the interface. What would it mean, for example, to extend or re-map the historical constellation of technological attempts to orient individuals according to an augmented spatiality? I suggest that a deeper constellation of orientation technologies that leads to a more robust understanding of the historical realities

[9] In the following chapters, I align my work with other authors that are interested in similar historical approaches to media technology and culture.

subtending the rise of these technologies will contribute to a reflection of the relations among these juxtaposed (and often marginalized) formations in the field of media studies by emphasizing the link between metaphysics and technology. The current popularization of digital locative media by techno-prophets at AT&T, Google, and Apple underscores continuing metaphysical ideas and desires regarding the unification with fields of sublime space that are beyond direct sensation.

INTRODUCING LOCATIVE MEDIA

A brief review of the discourse surrounding contemporary technologies of spatial orientation and navigation will illustrate how the material often fuses with the ideal when the discussion focuses on devices that mediate space and culture, environment, and imagination. I am positioning a number of current technologies under the term, "locative media." These include global positioning systems (GPS), mixed-reality technologies, context-aware computing, the geospatial web, augmented reality, radio-frequency identification, and geolocation (many of these technologies I define below). The overarching goal for locative media is the ability to determine a user's or object's physical, geographical position and then provide networked information in the form of an interface that adapts according to changes in the user's geographic information. The result is a networked interaction based on the physical position of the individual who is using the device. When combined with the code of the computer, locative media encourage a range of technological, bodily, spatial, cultural, and in the context of my research, spiritual elements.

Take, for instance, the hotly promoted "app culture" in association with "smart phones" (such as Apple's iPhone or Google's Android platform). These applications provide a wide range of infotainment and are available for downloading by users who are either tethered to a computer or on the go. One of the more popular features these applications provide is the ability to use geospatial information and adapt the content of the application depending on where the user is physically located. A specific type of application that has proven popular is networked dating.

> In this new era of app-driven love, location is most important…While established online dating services like eHarmony and Match.com go to painstaking lengths to match daters based on their exhaustive surveys of likes and dislikes, this new crop of GPS-based dating apps seems fixed on two qualities in potential mates: proximity and convenience. Apps like Skout, Grindr and StreetSpark let people sort through lists of potential daters based on where they are located at any given moment. All three services list the distance between the person using the app and other member users.[10]

Both Skout and the male-only Grindr[11] have more than four million users apiece with the latter now available in 192 countries.[12] These apps allow the informational space on the screen to provide a way to reorient the user's body in relation to physical space and other users' bodies in close proximity. When one activates Grindr, "a grid of dozens of tiny succinct profiles fills the phone screen, using GPS technology to tell users how far

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[10] John D. Sutter, "With new GPS dating apps, it's love the one you're near," *CNN*, August 6, 2010, accessed February 23, 2013, http://www.cnn.com/2010/TECH/innovation/08/06/gps.dating.apps/index.html?hpt=C1.

[11] Gaydar and the use of the iPhone application, Grindr, have been used in broader discussions on queer online communities. See O'Riordan (2005) and Mowlabocus (2010).

[12] Grindr, "3 Million Guys and Counting!" *Grindr Blog*, November 3, 2011, accessed February 23, 2013, http://grindr.com/blog/C23.

away they are from each another. '17 feet away,' the message said one evening when fired up at a cafe in the Castro district—a disproportionate number of men were then seen holding their phones and looking over their shoulders."[13] By providing a digital map connected to various online profiles, the user is able to potentially "unmask" the bodies (behind the profiles) that have filled the cafe.

Use of these locative media devices and applications is intended to lift the barrier between the material world and the invisible layers of the digital network. Visualizing the network is described by proponents as providing an "augmented reality" where the meaning of material space is augmented by ephemeral information overlays. The encounter with an augmented reality environment is not meant to reduce the amount of interaction with the natural world but to allow individuals to have a more active and productive interaction with their physical environments. Proponents of technologies used to connect to this pervasive or ubiquitous computing environment believe that these connections will "augment the human intellect so that people can perform ever greater feats, extending their ability to learn, make decisions, reason, create, solve complex problems and generate innovative ideas" (Rogers 2006, 8-9). An example of this technology is the Layar mobile browser that can be installed on devices such as the iPhone. Using the camera of the device, the user can move the screen around to reveal a range of images mapped onto the physical space that is within her or his reach. These images can range from animated commercial advertisements to historical images of events that have occurred in that specific place (where the ghosts of the past are revealed

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[13] Scott James, "In the Calculations of Online Dating, Love Can Be Cruel," *The New York Times,* February 11, 2010, pg. A25A.

on the screen). “With immersive AR [Augmented Reality],” writes one reviewer, “people step into a different world.”[14]

The significant growth of locative media in the last decade has occurred in tandem with the increasing use of mobile computing devices, investments in network infrastructure, and the range of spatial positioning techniques that companies are offering. According to market research reports, revenues generated from locative media will hover around $10.2 billion by 2015,[15] locative media-enabled applications and devices will be used by over 1.5 billion users,[16] and locative advertising will account for 60 percent of the entire digital advertising market. The increase in academic, corporate, engineering, and public interest in “urban computing”[17] (Greenfield and Shepard 2007; Kindberg, Chalmers and Paulos 2007) and “urban informatics”[18] has also driven the increased demand for and use of locative and augmented media.

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[14] Maarten Lens-FitzGerald, “Tablets are great to play Immersive Augmented Reality” *Layar Blog,* September 2, 2010, accessed February 23, 2013, http://www.layar.com/blog/2010/09/02/tablets-are-great-to-play-immersive-augmented-reality/.

[15] “Location-Based Service: Market Forecast,” Pyramid Research, May 2011, accessed February 23, 2013, http://www.pyramidresearch.com/store/Report-Location-Based-Services.htm.

[16] “Mobile Location Based Services: Applications, Forecasts & Opportunities,” Juniper Research, January 3, 2010, accessed February 23, 2013, https://www.juniperresearch.com/reports/mobile_location_based_services.

[17] Urban computing is a field of study that focuses on the use of technology in public environments such as cities, parks, and suburbs.

[18] Urban informatics focuses less on the technology and more on the “study, design, and practice of urban experiences across different urban contexts that are created by new opportunities of real-time, ubiquitous technology and the augmentation that mediates the physical and digital layers of people networks and urban infrastructures” (see the *Urban Informatics Lab* run by Marcus Foth: http://www.urbaninformatics.net; accessed March 2, 2013).

Demand has also been driven by proponents who position these technologies along a continuum of what is referred to as "mixed reality." Mixed reality technologies seek to not just "augment" the user's relation to physical space but directly combine elements of the physical and the virtual worlds within the experience of the real. As opposed to situating the real and the virtual "simply as antitheses. . . it is more convenient to view them as lying at opposite ends of a continuum, which we refer to as the Reality-Virtuality (RV) continuum" (Milgram et al. 1994, 1). While on one end, objects are seen to be "real" through direct observation or "sampled and then resynthesized via some display device," on the other end "virtual" objects are "simulated" through "some sort of a description, or model, of the object" (Milgram and Kishino 1994, 1). The release of the Nintendo 3DS in 2011 represents one example of the mixed reality approach. With the cameras on the backside of this handheld gaming pad pointed towards a physical surface such as a table, digital animated characters appear on the screen as if they are interacting with the physical objects in front of the user.

Supporters of the mixed reality approach seek to combine the physical and the virtual to generate a "hybrid" environment in conjunction with locative media and augmented reality. Eric Kabisch suggests that spatial annotation software and "pervasive computing technologies can enable a merging of 'virtual' and 'mirror' worlds into what I call *hybrid ecologies*" (2008, 227). Examples of hybrid ecologies include technologies that can superimpose historical images over physical space on the screen, which allows users to interact with "ghosts" of the past. The desire to engage with a hybrid environment by way of locative media and augmented reality technologies rehabilitates

ancient magical attempts to support various engagements or "key-points" between the subject and an occulted world. For Gilbert Simondon, "In such a network of key-points, of high-places, there is a primitive indistinction regarding human reality and the reality of the objective world… they are places of contact and of mixed, mutual reality, places of exchange and of communication because they form a knot between both realities" (2011, 412-413).

One needs to remember that this attempt towards spatial overcoding (Dodge and Kitchin 2005, 2007) or haunting (Hetherington 2001) is not completely new or a uniquely technological issue. However, one of the most fundamental ways that this technology is framed (which is reflected in similar ways with nearly all technologies) is its "newness" and the ability it has to significantly alter a user's relation to space (usually for the better). Take, for instance, a recent call for submissions to a conference titled, *Transforming Audiences*:

> The rise of computers in our pockets—still called 'phones', but used more for accessing a world of online communication, information and entertainment than for making telephone calls—coincides with the growth of DIY culture and people making their own media... 'augmented reality' enables a hands-on engagement with real things to be combined with digital technologies. Social media and YouTube indicate a real change in everyday media practices.[19]

This claim of "real change" that "transforms" the relations a user has to the "world of online communication" largely ignores the longstanding human relation to technologies of spatial orientation that are built in hopes of satisfying desires to remove

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[19] "Transforming Audiences 3: Online & Mobile Media, Everyday Creativity and DIY Culture," September 2011, accessed February 23 2013, http://transformingaudiences.org.uk/.

the barriers between material space and informational or imaginative otherspaces. As Lev Manovich notes:

> [As] the overlaying of different spaces is a conceptual problem that is not connected to any particular technology, we may start to think about which architects and artists have already been working on this problem. To put it another way, the layering of dynamic and contextual data over physical space is a particular case of a general aesthetic paradigm: how to combine different spaces together. Of course, electronically augmented space is unique—since the information is personalized for every user, it can change dynamically over time, and it is delivered through an interactive multimedia interface, etc. Yet it is crucial to see this as a conceptual rather than just a technological issue (2006, 225-226).

My interest in positioning locative media within a deep historical and conceptual framework leads me to observe that the attempt to make layers of "dynamic and contextual data over physical space" involves wider issues of technology, space, and subjectivity. This is part of the reason why I am interested in juxtaposing digital locative media with other, older orientation technologies. Older devices affected the relation between the subject and space in similar ways and an analysis of the astrolabe, magnetic compass, divining rod, in conjunction with an analysis of electronic locative media provides a broader context and language to deal with the shifting struggles over the relationship between spatial imagination and devices of mediation. From the hierarchical cosmos and magnetic fields to the contemporary digital network, technological efforts to mediate the recurring forms and metaphysics of "extraterrestrial spaces" offer reminders that humanity "is towered above on all sides by monstrous externalities that breathe on it with stellar coldness and extra-human complexity" (Sloterdijk 2011, 23). A sustained analysis of these allegorical machines and their associated practices, representations,

experiences, and affects serves to productively illuminate the present, commercially-inflected, technological desires for and anxieties over networked layers of info-space.

CENTRAL CONCERNS AND CHAPTER OVERVIEW

This dissertation underscores a number of tensions among technologies of spatial orientation and cultural imaginaries. The underscoring leads to the following central questions. How do locative media help produce the space or aesthetics of an imagined or informational otherspace? How do orientation/navigation and communication media frame the imagined sense of space and how is this reflected in other cultural forms? How do these orientation technologies inform the desire or apprehension of the "real?" What are the politics of making the invisible visible and of the technological interface of the material and ideal? These questions are associated with a number of discussions within the field of media and technology studies as well as the fields of communication studies and cultural geography. These discussions revolve around technological apprehension of the "real," the linkages of the material, symbolic, and ideal with cultural imaginaries, and the consideration of spatial theory in relation to media studies.

The fundamental claim that I make in this dissertation involves the longstanding human relationship with spatial orientation devices and forms of mediation with the sublime. By analyzing a constellation of locative media, I call attention to the repeated development and use of allegorical machines, which trouble the opposition that is often set between enchantment and disenchantment, magic and science. These machines are intermediary devices between the subject and an occulted world and they serve as a

material site for contact with the immeasurable, infinite, vague, or unfathomable sublime. Technological attempts to "see what's on the other side of too far" are an acknowledgement of the unease of humanity's finitude and represent the desire to interact with various registers of the divine or fantastic. This practice of an allegorical interpretation of space is not unlike what Tzvetan Todorov identifies in his consideration of the interaction with the fantastic in the arts: a hesitation or interruption between the real and the imaginary balanced between the uncanny and the marvelous (1975). My analysis of these allegorical machines is also intended to add to the existing literature on the problems with the "conflict thesis," which involves an argument about the inherent anti-intellectual conflict between spiritualism and science (cf. Brooke 1991; Dixon, Cantor, and Pumfrey 2010). The following chapters explore, instead, how technology has operated as a site for the re-situation of spiritual belief within modernity alongside the ideology of efficiency and calculation.

In a way, these allegorical machines expand the logic of the "interface." Use of this term has increased with reference to digital technologies as it brings to mind computerized monitors, mobile media devices, touch-enabled screens, and motion-controlled systems. Alexander Galloway repositions this understanding of the interface as an object by arguing that "an interface is not something that appears before you but rather is a gateway that opens up and allows passage to some place beyond" (2012, 30). By offering promises of increased transparency or what Jay David Bolter and Richard Grusin (1999) describe as the desired immediacy of the "interfaceless" interface, this gateway always involves a process or translation. The "interface is not simple and transparent but

a ‘fertile nexus,’” continues Galloway (2012, 32). For these spatial interfaces, this nexus involves repeated affects, experiences, and practices to sense and translate for the user a hidden field of Truth or “Aletheia,” in the latter’s meaning of “the unhidden” or “the uncovered.”

This drive for transparency involves a broader set of politics of the interface that operationalize what Jacques Rancière describes as the “distribution” or “partition of the sensible.” He argues that, in general, politics involves the arranging and rearranging of the environment that humans can sense or apprehend. “The partition of the sensible is the cutting-up of the world and of world,” Rancière writes, “a partition between what is visible and what is not, of what can be heard from the inaudible” (2001, np.). Politics, then, “is about the contestation of the sensible,” or in other words, the contestation over what is “the given” (Rancière 2003, np.). With the interface in general and the locative interface in particular, the partitioned mediation of bodies or spaces becomes a key site for the politics of what is sensed, what can be articulated in response, and who even has the ability or capability to form an articulation in relation to particular properties and possibilities of space and time. These allegorical machines distribute “the visibilities of the places and abilities of the bodies in those places” in ways that are often configured as an encounter with an obscured otherspace that is out of reach (Rancière 2003, np.). As a result, my analysis of these encounters with vague or unintelligible layers of space involves an integration of the aesthetic regime of the sublime[20] into a historical analysis of spatial interfaces.

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[20] I discuss the aesthetic regime of the sublime and its relation to the vague and mysterious at greater length in the section on allegorical machines in chapter three.

Overall, this dissertation argues that the inherent metaphysics of the interface is tied to the process of mediating unknown secondary spaces or bodies. For this reason, my definition of the interface is inspired by Peter Sloterdijk's concept of "spheric liaisons" that he develops in his *Spheres* trilogy. Within this work, he analyzes the spatial relations of self, world, and wider pluralities, which he claims makes up a "history of animation relationships" (2011, 53). For Sloterdijk, "spheric liaisons are brought up in which reciprocal animations generate themselves through radical resonance; each of them demonstrates that real subjectivity consists of two or more parties" (53). His emphasis on the animation that occurs from a range of dyads points to a fundamental characteristic of the interface. As such, I define the interface as a liaison between at least two bodies or spaces which generates animations like the one that I focus on in the following chapters: the desire or fear of uncovering the space beyond space.

This dissertation reflects my interest in the collisions between the technological and the conceptual. I am interested not only in the political intervention of reading the old in conjunction with the new but the ongoing cultural struggles with media technology, space, and subjectivity. Through writing the deep history of allegorical machines, these struggles emerge from the human relations with technologies intended to operate as an interface between material and ideal space which furnishes a desire to extend subjectivity beyond a self that is purportedly distinct or buffered from the material environment. This serves to maintain various forms of Neoplatonic metaphysics, which situates the mind in association with an expansive web of resemblances, sympathetic correspondences, and final causes. As such, my historicization of the technological metaphysics of sensing "the

other side of too far" and "playing the angel's advocate" is inherently a political endeavor into the margins of technological mediation of subjects and space.

The following chapters elaborate on the themes and arguments introduced here. The structure and organization involves a methodology, literature review, findings, and conclusion but the boundaries between them are meant to be diffuse. As a result, the method or findings often operate as theory and the review of literature echoes throughout the historical findings. In chapter two, I frame an outline of what has been described as a "media archaeological" methodology. This approach considers the parallel interpenetrations between old and new media. As a method, it does not include a clear set of features and it borrows from media theory, critical and cultural studies, and film studies and extends into domains of artistic praxis. Within this chapter, I introduce how this approach to new media cultures via an examination of the neglected, unorthodox, or obscured machines and practices can lead to a productive analysis of wider media constellations.

This dissertation is comprised of two main parts. The first is a history of ideas and the second is a history of devices. Both parts engage in a literary exegesis that calls attention to the necessary interrogation of metaphysics for the field of media and technology studies. The development of a history of locative media necessitates a close explanation or interpretation of texts that calls attention to the ways in which metaphysics begins with faith in something, someone, or somewhere. Chapter three makes up the first part and is divided into five sections where I provide a theoretical framework to introduce my concept of allegorical machines. I cover a range of theoretical discussions including

the supposed disenchantment of modernity, tensions between premodern and modern forms of subjectivity, practices of allegory and interfacing the sublime and vague, articulations between media and space, and the wider terrain of supernatural, occult, or magical practice in relation to technology. These discussions help me position my consideration of allegorical machines that interface with secondary layers of otherspace. Chapters four, five, and six make up the second part of the dissertation and within this part I provide historical accounts of older orientation media technologies, starting with the astrolabe. This device was built to support a stereographic projection of the universe and was offered by scholars, nobles, and clergy as a method to comprehend and be oriented to the infinite position of the *primum mobile* (or the "first movable" sphere of the universe). It was celebrated as an instrument to decode the heavens and was both a practical and metaphysical interface for sublime encounters with the space beyond space.

Chapter five introduces the intertwined histories of the lodestone, magnetism, and the magnetic compass as a way to explore the salvific potentialities of the magnet and the cosmic utopia or horror that is positioned on the other side of the compass. The result leads to a culture of orientation and an intense interest in the celestial, transcendental, or uncanny power of the poles. Both magnetic science and metaphysics led to the supposition of a possible fourth dimension, which was considered as a ubiquitous yet vague presence of heaven or hell that surrounds us. With chapter six, I provide a historical account of a much more marginalized orientation technology: the divining rod. This is a forked twig that purportedly operates as a simple interface with a complex network of forces that are out of human reach. With a contentious history that includes

European miners, the church, and the popular imagination, the divining rod becomes a mystical platform for embodied interactions with an archetypical or universal force. This rod operates as a material link with the ephemeral presence of electromagnetic fields that flow "between the worlds."

In chapter seven, I round out my historical constellation with an analysis of contemporary locative media. I analyze the ways in which the hardware and software protocols are embraced and extended by governmental, artistic, and commercial entities to support the wider aims and desires for ubiquitous computing and a networked augmented reality. The dreams of the immediate or interfaceless interface that flow throughout the history of locative media culminate with the design for the Google Glass device, which promises ways to reveal the invisible network of information through the use of eyeglasses operating as a locative interface. The result is a reconfiguration of the ancient desires, anxieties, and techniques to "see what's on the other side of too far." Finally, in chapter eight I offer a few conclusions regarding the interface that provides "mysterious zones of interaction that mediate between different realities" (Galloway 2012, vii). I aim to offer a few suggestions regarding the political and ethical potentialities for including or defending the position of the vague or mysterious in the experience of space. In response to devices that are built upon desires to conjoin with unified fields of mixed reality, I offer an argument regarding the need for a politics that accounts for mysterious encounters of ourselves, others, and the world.

II. MEDIA, CONSTELLATIONS, AND ARCHAEOLOGY

> Magical, scientific, and technical praxis do not follow in chronological sequence… on the contrary, they combine at particular moments in time, collide with each other, provoke one another, and, in this way, maintain tension and movement within developing processes.
>
> —*Siegfried Zielinski (2006), Deep Time of the Media.*

I aim to contribute to discussion surrounding locative media by considering the protean influence of the spiritual in relation to technology and space in a way that examines the interactions of the material and the ideal. To accomplish this, I develop a non-linear historical analysis of locative media that takes shape as an overlapping and interdependent constellation. New forms of media are actively influencing our daily habits and practices but old media never leave. Analyzing media technology means engaging in the thick entanglements of past and present layered strata of media culture. In this chapter I discuss this media archeological approach in conjunction with what I describe as a constellation of allegorical machines.

My use of allegorical machines operates in association with a wider network of "cultural technologies" as a way to interlink the "formal, phenomenological, and social properties of media technologies together with the machineries of knowledge and power through which they emerge" (Berland 2009, 12). In her work on the relations among technology, space, and time, Berland underscores the importance of the relational subsections of technologies and their interconnections with material, symbolic, and imaginative dimensions of culture:

> The term *cultural technology* connects the various processes and practices that comprise culture: the materialities that produce it (radios, televisions, photographs, pianos, satellites, computers, networks, and books like this one)… the complex machineries of spatial dissemination though which their structures and materialities circulate and are put to use… and the fissures and spaces in which oppositions or alternatives are inspired and imagined (2009, 12).

My use of the term, allegorical machines, is also inspired by Winner's (1986) use of "information machines," which underscores that new media are composed of entangled assemblages of social and technical practices and apparatuses that combine the material and the ideal (see also Hillis 2009, 24). Both of these conceptual tools provide useful ways of analyzing locative media themselves, the production of spaces that they represent, and their relations with the wider spatial imagination that is often intertwined with modes of immanent transcendence. This dissertation is intended to identify and interrogate a particular assemblage of locative media where the longstanding human relationship with spatial orientation devices has articulated the relations among the material, symbolic, and imagination in specific ways.

The assembly of any history inevitably must confront the politics of what to include and exclude. To write about the methodology of this historical project is not just a way to avoid or escape these problems but to creatively engage with them. Therefore I discuss my project's methodology in order to focus on the creative and theoretical potential of certain ways of doing media history and to also consider the difficulties that face a researcher who is intending to develop such a project. My linking together of such disparate technologies is an attempt to focus on the way the instruments relate to certain features of the material, symbolic, and ideal. My work is influenced by a range of

interrelated methods that have been used to interrogate media and technology including the constellational approach, media archaeology, and media topos study. I consider each of these influences and their particular importance for my project below.

A researcher interested in constructing a media history faces a litany of questions: "Is the history of media first and foremost the history of technological methods and devices? Or is the history of media better understood as the story of modern ideas of communication? Or is it about modes and habits of perception? Or about political choices and structures? Should we be looking for a sequence of separate 'ages' with ruptures, revolutions, or paradigm shifts in between, or should we be seeing more of an evolution? A progress?" (Gitelman 2006, 1). Any attempt to articulate the range of relations between the objects themselves and the varied practices they influence and are influenced by faces a demanding challenge. Overall, it would be difficult to trace a history rooted in technological mediation without attempting to shift the focus from the technological objects themselves to the social fields where the technologies are positioned to "negotiate power, authority, representation, and knowledge" (Marvin 1988, 5). These understandings inform my analysis within this dissertation and help frame my interest in the constellational and media archaeology approaches as a way to make these historical articulations relevant and important.

I approach the historical linkages of orientation and navigational technologies in a way that considers the technological objects themselves as well as the imaginaries and subjectivities that are produced through the human relationship with these technologies. I want to re-situate the history of technologies that assist with how one navigates through

space as a way to reconsider the historical constellation of modern navigational technologies. I believe that the structure of these historical relations can contribute to a particular constellation where potentially marginalized moments of the past can illuminate contemporary techniques and experiences in ways that reveal how older practices and forms of belief are recovered and recuperated. Through this constellation, I emphasize how an analysis of metaphysics and technology is a productive way to scrutinize the articulation between political economy and human desire for meaning. For this reason, the significance of this project revolves around the ongoing production and operation of metaphysics in relation to the association with technology, subjectivity, and the environment.

The "constellational approach" is largely informed by Walter Benjamin, Theodor Adorno, Harold Innis, and Marshall McLuhan. I am inspired by John Durham Peters' description of his historiographical efforts to develop a constellational approach that is indebted to the thought of Walter Benjamin. About the observations made by Benjamin in his "Theses on the Philosophy of History," Peters observes that:

> The historian did not wait for the past to speak its fullness but was an activist who brought ages into alignment with each other... as is always true in [Benjamin's] work, the mystical sources are not wifty dreaming but have shrewd relevance to concrete concerns. The present becomes intelligible as it is aligned with a past moment with which it has a secret affinity. There is a simultaneity not only across space, but across time as well... History works not in a solely linear way but by being arranged into various constellations (1999, 3).

In his "Theses on the Philosophy of History" (1940), Benjamin urges his readers to forsake historicism's "homogenous, empty time" in favor of "*Jetztzeit,*" or "time filled with the presence of now" (1969, 261). This historical linking can help illustrate a

collision of past and present where the political and cultural negotiation between centers and margins becomes a productive methodology. In *The Arcades Project* (1927-1940), Benjamin notes, "It's not that what is past casts its light on what is present, or what is present its light on what is past; rather, image is that wherein what has been comes together in a flash with the now to form a constellation" (1999, 462). For Benjamin, this is an active historical articulation that unites the past and present in a volatile, momentary flash.

For his *Arcades Project*, the "Jetztzeit" is an attempt to illuminate both an "anonymous history" and the illusionary, yet very material, "dream worlds" of consumerism and early modernity. The structure of *The Arcades Project* involves a mosaic of notes, quotes, citations, and images that can be arranged and rearranged in endless constellations. The researcher as well as the reader is pressed to consider the implications of cultural, religious, economic, and political imaginations within the material shifts of history. Posed against linear progressivism, "the concern is to find the constellation of awakening the dissolution of 'mythology' into the space of history the awakening of a not-yet-conscious knowledge of what has been" (458). For example, the French revolutions of 1789, 1830, and 1848, as well as the Paris Commune of 1870, can all be placed in a constellational articulation as distinct events in time yet remain connected by a shared subversive consciousness. The role of the critical historian, then, is "to root out every trace of 'development' from the image of history and to represent becoming… as a constellation in being" (845). In many ways, Benjamin's work is an early consideration of the effects of inter-mediation that lead to alternative ways of

understanding temporality. For Benjamin, this is expressed through figures of deterioration as opposed to a harmonious, linear succession. Importantly for my project on navigation and orientation technologies, Benjamin's consideration of the inter-mediation of time and history is not unlike what various locative media do to space as well.

In a similar way, Aby Warburg, the German art historian whose unfinished *Mnemosyne Atlas* (1924-1929) mirrors Benjamin's *Arcades Project* in various ways, suggests a nonlinear process of understanding how images and their relations repeat through time. Its title and function are linked to the German meaning of "atlas" as an album or collection. The project was borne out of Warburg's interests in telecommunication, the printing press, and rapid shifts in mobility. Photographs, reproductions of manuscripts, and visual representations from everyday life were arranged to highlight multiple thematic areas. Around 2,000 images could be clustered into various tableaus according to various relationships amongst themselves. The result is an interactive archive of European visual history (cf. Rampley 1999). Both Benjamin and Warburg emphasize constellational inter-mediation by emphasizing elements that move and shift across what we today refer to as media platforms.

Like Benjamin and Warburg, I find a similar sense of inter-mediated "flashes" in the earliest museums, the ur-collections of in the sixteenth and seventeenth centuries that were called Wunderkammers or wonder-cabinets. These cabinets of curiosity were often filled with taxidermies, animal horns, skeletons, minerals, wondrously fine or small man-made sculptures, clockwork automata, and specimens from exotic locations. In the mid-

seventeenth century, Athanasius Kircher's wunderkammer (aptly called the *Museo Kircherianum*) was one such attempt to organize a spectacular collection of signs, artifacts, and curios in order to consider their universal relationships to each other. Importantly, his museum was filled with marvelous optical and acoustic media devices contributing to a theater of the imagination that was "full of harmony, effects, illusions; it [was] calculated, dreamy, and fantastic: an ideal media world" (Zielinski 2006, 157). In the modern era, the Museum of Jurassic Technology in Los Angeles continues this experimentation with the flashes of the wondrous. "Part of the [museum's] assigned task," curator David Wilson says, "is to reintegrate people to wonder." Lawrence Weschler, after visiting this museum's wunderkammer, found himself "shimmering between wondering at (the marvels of nature) and wondering whether (any of this could possibly be true). And it's that very shimmer, the capacity for such delicious confusion, Wilson sometimes seems to suggest, that may constitute the most blessedly wonderful thing about being human" (1995, 60).

Here, the gap or intersection between premodern and modern, supernatural and natural generated by the interpenetrating constellations allows for a flash of doubt, wonder, vagueness, or possibility. In other words, a decidedly sublime encounter, a topic that I cover at greater length in the following chapter. My concern for the constellational "flash" is not only rooted in the work of Benjamin and Warburg but of Theodor Adorno, Harold Innis, and Marshall McLuhan as well. For Adorno and Benjamin, such a methodology is based on an understanding of a negative dialectic where a dialogue with marginal voices or concepts contributes to a general advance in knowledge that emerges

from the "negative" character of these moments. The rearrangement of various concepts and their relations within various "constellations" allows a historical dynamic to arise from objects whose identity exceeds the classifications that have been imposed upon them (see Adorno 1966, 52-53; 162-166). For Innis, these insights emerge from the agency of marginalized groups that were created by monopolies of communication or knowledge. To maintain a sense of openness, one must listen to or highlight the "margins" that have formed as a result of the formation of a "center" (1951).

As Peters has indicated, the arrangement of various constellations is a productive way to consider wider totalities. Innis describes a similar approach to a methodological decenteredness as a sort of "flexibility" (2007). For McLuhan, this is the development of "no point of view" (1962) while Adorno considers this decenteredness a "non-identity" (1966). This stance leads to the formation of what Adorno and Benjamin consider to be "constellations" (1969) and McLuhan "galaxies" or "mosaics" (1962). McLuhan continually engaged this approach throughout his career. He writes in the introduction to *The Gutenberg Galaxy* that his work "develops a mosaic or field approach to its problems… the galaxy or constellation of events upon which the present study concentrates is itself a mosaic of perpetually interacting forms that have undergone kaleidoscopic transformation" (1962, i). A theoretical understanding of the constellational approach also appears in Karl Mannheim's program for a new social science. Mannheim urges against the analysis of "isolated discoveries" and underscores the importance of identifying and linking "the sources in the social and intellectual life of the time from which arose the impulse to search for a dynamic logic" (Mannheim 1971, 209). As with

Adorno and Benjamin, Mannheim was influenced by Georg Lukács who argued that social factors helped develop a constellation that made a specific cultural formation possible.

The constellational approach also appears in Siegfried Giedion's work (also an influence on Benjamin, Innis, and McLuhan). Within *Mechanization Takes Command*, Giedion notes, "The writing of history has less to do with facts as such than with their relations. These relations will vary with the shifting points of view, for, like constellations of stars, they are ceaselessly in change" (1969, 1). Importantly, in a constellational or mosaic approach, a fluid relational approach seeks to contrast with the mechanistic pursuit of causation or technological "impact." These authors all present varying approaches to such modes of historical juxtaposition as an alternative to linear or progressive causality. The method is also not unlike Kenneth Burke's "perspective by incongruity." For Burke, this is an intentional mode that seeks to avoid a certain blindness by pulling a reader or viewer out of her or his conventional habits of perception (1984). I am interested in using these approaches as a way to demonstrate to other media archaeologists the value of paying closer attention to the slow movement of media as opposed to the creation or demarcation of clear stratifications (for instance, my constellation of locative media frequently overlaps and intermingles). The concern for marginal formations and their dis/articulations is also necessary to emphasize as my constellation of locative media links various objects and instruments that negotiate the interactions among the material and ideal, natural and supernatural, rational and irrational, as well as the past, present, and future.

The constellational approach exerts a significant influence on recent approaches to the development of media technology histories and has often been referred to as "media archaeology" (cf. Huhtamo and Parikka 2011; Parikka 2012). It is not just invested in uncovering lost artifacts but in exhuming events and imaginations as well. Lisa Gitelman bases her understanding of the media archaeological perspective[21] on the work of Geert Lovink who notes, "Media archaeology is first and foremost a methodology, a hermeneutic reading of the 'new' against the grain of the past, rather than a telling of the histories of technologies from past to present" (2003, 11). Gitelman considers that "the media archaeologist seeks a built-in refusal of teleology, of narrative explanations that smack structurally of the impositions of metahistory" (2006, 11).

This method of articulating links among objects, events, and imaginations allows for a way to highlight the relations between the old in the new as well as the new in the old. This is the intent of Siegfried Zielinski's *Deep Time of the Media,* in which efforts are made to understand "deep time and [discover] not just more remains, but instead neglected constellations" (2006, x). "The goal" for Zielinski largely mirrors Peters' interest in Benjamin's constellational method, where the historian attempts "to uncover dynamic moments in the media-archaeological record that abound and revel in heterogeneity and, in this way, to enter into a relationship of tension with various present-day moments, relativize them, and render them more decisive" (Zielinski 2006, 11). Media archaeology, from Zielinski's pragmatic position, involves an attempt to excavate

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[21] Such a historical approach to material artifacts does have links to the traditional archaeological discipline and has proven to be influential for the wider practice of media archaeology (cf. Witmore 2004, 2006).

concealed paths in history, which might lead to more productive paths in the future (1996).

Importantly, to interrogate media technologies from papyrus to the telegraph, typewriter, and cinema on to digital networks and code, one must emphasize their individual material natures. This is an idea that Friedrich Kittler's followers such as Wolfgang Ernst have adopted for their own work. It was in this sense that Michael Wetzel combined the approaches of Michel Foucault and Friedrich Kittler in his "preliminary considerations for an archaeology of the media," (Wetzel 1989). The media archaeologist follows a sinuous path by sifting through textual, visual, and auditory archives as well as other collections of artifacts in order to emphasize both the discursive and the material formations of culture. The result is the development of alternative or surprising ways of understanding the present through particular assemblages of the past. Indeed, Kittler identified his early approach as an "archaeology of the present" that attempted to account for the range of "data storage, transmission, and calculation in technological media" from the past leading to the present (1990, 369). These are media that, according to Kittler, offer the epistemology of how to think about "humans" in the age of technical media: not as self-governing subjects but as being increasingly subjected to capitalized processes of quantification, data gathering, and other procedures of technical media.

Numerous perspectives on media-influenced modernity have allowed researchers to approach materiality as crucial to any adequate understanding of the birth and transformation of technical communication culture. Within this field of "communication materialism," the world is not reduced to symbolic, signifying structures, or

representations, but is seen as a network of concrete, material, physical, and physiological apparatuses and their interconnections (which often condition or limit what can be uttered or signified). This brand of communication theory has a specific interest in the ongoing relation between the human and the non-human worlds of modern technical media, the influence of various media and forms of communication on space and the imagination of space, and the abstraction between material forms of communication and their associated forms of wavelengths, speeds, frequencies, or vibrations.

My constellation of locative media, then, oscillates between two approaches to media technology. One involves the more culturally oriented Anglo-American studies approach, which assumes that technology acquires its meanings from preexisting discursive contexts within which it is introduced and operates. The other involves the use of techno-hardware methods, which, to varying degrees, utilize Friedrich Kittler's blend of Michel Foucault, information theory, media history, and Marshall McLuhan's emphasis on the medium. From this second approach, Wolfgang Ernst suggests that media should be primarily researched as non-signifying channels. For him, the capability for mediation should be considered before any hermeneutic analysis of meaning as the phenomenological content of communication is too often mistaken for the essence of media. Ernst's approach to media archaeology focuses on the agency of the machine and the ways in which technical media themselves can manipulate time and space (cf. Ernst 2005). Moving between these two approaches emphasizes the complex assemblage of culture and technology.

Calling attention to the fluid negotiation between the human and the technological allows for an analysis of the articulations among communicative materialities and imaginaries. When examining the ongoing human relationship[22] with media technology, one uncovers a range of dreams, desires, and fears. Carolyn Marvin's work on the nineteenth century imbrication of the social and the technological (primarily electric communication) is an important example; she attempts to move the analysis of media and technology beyond a purely instrument-centered perspective. Marvin identifies the complex relations among the human, technological, and social because "Media are not fixed natural objects; they have no natural edges. They are constructed complexes of habits, beliefs, and procedures embedded in elaborate cultural codes of communication" (1988, 8). Due in part to the fluid linkages between "habits, beliefs, and procedures," media also "give shape to the imaginative boundaries of modern communities" (4). My approach to metaphysics and technology is indebted to this understanding of the relation between the materiality of the technology and the emanation of various imaginations. The general awe and "magic" associated with the introduction of electricity that Marvin identifies is not entirely explained by a disenchantment with the efficiency of technology and she notes that research into "media fantasies" is important, "since fantasies and dreams are important human products that define limits for

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[22] In the last couple of decades, an increasing number of studies have considered the role of technology in the realm of the everyday. For instance, Ruth Schwartz Cowan (1983) looks at the rearrangement of the domestic sphere in her analysis of housework. Lynn Spiegel (1992) considers the role television had in the real and imagined alteration of the home of the middle-class family. Anna McCarthy (2001) moves outside of the domestic space to consider the positioning of television in public spaces such as laundromats, restaurants, and airports.

imagination. Fantasies help us determine what 'consciousness' was in a particular age, what thoughts were possible, and thoughts could not be entertained yet or anymore" (7-8).

Treating media fantasies as a legitimate source of knowledge allows one to consider the discursive boundaries, capabilities, and desires associated with these technologies. Neither these fantasies nor these media are homologous with the established institutions of modernity. They have manifested in the narratives of madmen, religious visions, theories about the psyche and the body, and other recurring dreams and nightmares associated with technological modernity. Eric Kluitenberg has used the term "imaginary media" to refer to the human imagination as a site for fantastic modes of communication as well as the use of media in theories of the mind. "Imaginary media mediate impossible desires," writes Kluitenberg, a consideration which allows one to foreground the interplay of cultural fantasies, dreams, and imaginations. He continues, "As such they can be considered impossible machines. Because of their impossibility they appear to belong to the domain of pataphysics, the realm of imaginary solutions, or the study of *un*logic" (2011, 48). Importantly, these "impossible desires" are attributed to or projected onto actual media devices by engineers, politicians, the public, and other imagineers such as writers, filmmakers, and artists as ideas that are eventually "built." For this reason, there is an ongoing movement between imaginary and actual media as the media imaginaries and fantasies thread in and out of the imagined and the realized media technologies.

Though I am indebted to the authorities discussed above, in many ways, my constellation of locative media is most influenced by Erkki Huhtamo's approach to media archaeology. His efforts stem from an application of the idea of *topos*, as developed by Ernst Robert Curtius in his *European Literature and the Latin Middle Ages* (1953), to media culture and technology. The word originates from the Greek, and literally means "place." It was used to refer both common places and methods of thought. It is productive to consider how *topos* operated as an ancient locative technique as outlined by Aristotle: "For just as in a person with a trained memory, a memory of things themselves is immediately caused by the mere mention of their places (topoi), so these habits too will make a man readier in reasoning, because he has his premises classified before his mind's eye" (cited in Yates 1974, 31). The topos approach to media archaeology, therefore, emphasizes the ways in which media culture relies both on recurring commonalities as well as the moments of genuine novelty. These two aspects increasingly interrelate as the "new" is reconfigured in templates that may be hundreds of years old while the "old" may inform or guide cultural innovations. "Functioning as shells or vessels derived from the memory banks of tradition, topoi mold the meaning(s) of cultural objects," allowing for the instrumentality of media technology to be articulated with something else "through application of the 'fairy engines' of topos traditions" (Huhtamo 2011, 28).

Huhtamo's method is to not only articulate topoi, map out their trajectories, and examine the conditions of their reappearances but also to demonstrate how topoi are consistently evoked by cultural agents. These often include sales agents, politicians, writers, journalists, the general public, and artists who all use these topoi for various

reasons, from sales pitches and ideological persuasion to aesthetic and critical considerations of media culture and history. Even though the cultural agents themselves may not always recognize or accept it, the active media-archaeological or constellational "flash" brought on by these cultural agents is an essential element of the contemporary ethos. An example could include the recurring topos of someone or something breaking through the screen in order to market and champion the "newest" technology of representation. Despite being adapted to different technologies such as the cinema, television, or the computer monitor, the topos of moving through the screen repackages an ancient representational practice of illusion-making. By underscoring how the media's past lives on in the present, guiding and informing people's attitudes, desires, and fantasies in their daily lives (such as the persistent association of new electronic media with paranormal or spiritual phenomena, see Sconce 2000), the topos approach to media archaeology helps to detect novelties, innovations, and ruptures as well.

Importantly, this approach to media archaeology attempts to show how various topoi are developed, shared, and adapted by cultural agents in specific historical circumstances. This perspective is not invested in uncovering "unchanging archetypes or proto-images existing *beyond* culture" (Huhtamo 2011, 34). Some topoi emerged in antiquity and some have emerged recently, occasionally with very short lifespans. The topos approach operates from an assumption that the origins and appearances of various topoi are both created and conditioned by cultural forces. These topoi should be analyzed within a topos tradition as well as assessed for their external relations with the cultural contexts within which they serve.

These perspectives on developing a media history raise an interesting concern: the very understanding of history is inherently bound up with a wide range of media technologies as any "sense of history—of facticity in relation to the past—is inextricable from our experience of inscription, of writing, print, photography, sound recording, cinema, and now (one must wonder) digital media that save text, image, and sound… They demonstrate how new modes of inscription are complicated within the meaning and practice of history, the subjects, items, instruments, and workings of public memory" (Gitelman 2006, 21). This is the site where a constellational approach to orientation and navigational mediation becomes particularly intriguing as these technologies are not only an extension of an "industrialization of memory" (Stiegler 2009) but also serve as a means to represent particular elements of the world that remain otherwise invisible, vague, or unintelligible. In other words, these media of orientation are not just modes of inscription but also modes of connection. As Zielinksi argues, "Media are spaces of action for constructed attempts to connect what is separated" (2006, 7). Furthermore, these mediated attempts at communication at a distance are an ongoing "quest for authentic connection" (Peters 1999). In this way, the development of a deeper constellation of locative media allows for a productive analysis of how spatial production and imagination, media technology, and forms of subjectivity are entangled with one another. Fundamentally, this dissertation is meant to highlight the longstanding human relationship with spatial orientation devices and forms of mediation with the sublime or vague. The politics of this intervention are rooted in showing that the emancipatory or transcendent ideals of contemporary locative media are bound up with a much deeper

lineage. The human desire to visualize the invisible and reveal the real behind the apparent is not a new phenomenon.

The links between the constellational, archaeological, and topoi approaches all inform the methodology for my constellation of locative media. I utilize these approaches to foreground the imaginaries, desires, and fears in terms of technological use and practice across various devices. The goal of my media archaeology is to exhume and examine media and technological imaginaries across different historical and discursive settings and contexts as a way to identify various locative media topoi. I am interested in showing how nebulous the boundaries and demarcations of media and technological imaginaries actually are. The constellation I develop elucidates the interplay of the imagined and the realized in connection with the historical settings in which certain technologies emerged, achieved dominance, or were suppressed. In so doing, I trace the "network of material practices in which they are embedded," (Vesser 1989, xi) as well as the imaginaries that exceed the limits of their apparatuses and material space itself.

III. ON ALLEGORICAL MACHINES

> Thus an inquiry into our location is more productive than ever, as it examines the place that humans create in order to have somewhere they can appear as those who they are. Here, following a venerable tradition, this place bears the name "sphere". . . Because living always means building spheres, both on a small and a large scale, humans are the beings that establish globes and look out into horizons. Living in spheres means creating the dimension in which humans can be contained. Spheres are immune-systemically effective space creations for ecstatic beings that are operated upon by the outside.
>
> —*Peter Sloterdijk (2011), Spheres Volume 1: Bubbles.*

This chapter theorizes "allegorical machines" in five sections. By working through a constellation of locative media, I aim to reconfigure an "enchanted" position already proposed by industry and popular culture and to do so through an analysis of subjectivity, space, and technologies that are supposedly the outcomes of rationalism and scientific skepticism. The relevant literature opens up such issues as secularization, disenchantment, subjectivity, space, and the sublime and the following five sections provide entry-points to a broad range of themes that have been interrogated by scholars of media and technology studies. In this first section, beginning with Max Weber's account of a progressively instrumentalized materialism, I discuss the general decline of enchantment and the rise of secularization. In the sections that follow, I then consider how spatial theory has played an increasingly important role for media studies and follow on this with a consideration of the relationship between technology and enchantment. My discussion of how a discourse of enchantment is embedded within technologies of locative media offers a productive way to asses the interplay among locative media from

all eras and the complex assemblages of desire, meaning, and materiality they engage and influence. These shifting formations serve as antecedents to the rise of locative media, which operate as unacknowledged forms of re-enchantment in relation to ourselves, material space, and the world at large.

A. DISENCHANTMENT AS OUR FATE

In his address "Science as Vocation," given at the University of Munich in 1918, Max Weber declared, "The fate of our times is characterized by rationalization and intellectualization and, above all, by the 'disenchantment of the world'" (1981, 155). Weber's theory of modernity has often been linked to a gradual "disenchantment of the world" (*Entzauberung der Welt*). This mode of disenchantment is a response to the swift pace of industrial growth accompanied by rapid social change and the rise of bourgeois society in the late nineteenth and early twentieth centuries. It illustrates varying experiences of loss under modernity: loss of orientation, tradition, legitimation, unalienated labor, and shared, meaningful rituals. This loss, whether expressed in a religious or social register, prompts desires for a more complete, all-encompassing, and satisfying alternative to present social, political, or religious environments. Weber's disenchantment hypothesis also points to a close connection between modernity, science, and technology. Weber emphasizes the neutral instrumentality of modern machines and identifies how, under modernity, a general instrumentalist spirit perceives the world and its technology in terms of pure calculation and efficiency.

Weber's address was the first of two speeches he gave on the topic of "Intellectual Labor as a Profession." The series was organized by students interested in a liberal alternative to traditional student organizations and their focus on custom and honor. Within the context of the early twentieth-century German academy, Weber was asked to speak about the profession or vocation of science and he compared the merits of science as an agent of disenchantment with the promises of a radical, aesthetic politics. He focused on the abyss that separates knowledge, science, and the motor of progress from notions of meaning or a valued end. The function of knowledge and science, operating on the premise of infinite progress, he argues, is to satisfy the practical (and insatiable) needs of human beings. This is a conception of progress where science is positioned as the means to eliminate the mysteries of the world: "In science, each of us knows that what he has accomplished will be antiquated in ten, twenty, fifty years... In principle, this progress goes on *ad infinitum*" (Weber 1981, 138). This "scientific progress" represents for Weber, "a fraction, the most important fraction of the process of intellectualization which we have been undergoing for thousands of years" (138). Concurrently, the rise of scientific knowledge and the ever-increasing domination of all fields of human endeavor by intellect and reason are, for Weber, culpable for the "disenchantment of the world." However, living within a disenchanted world is a significantly conflicted experience:

> The increasing intellectualization and rationalization do *not*... indicate an increased and general knowledge of the conditions under which one lives. It means something else, namely, the knowledge or belief that if one but wished one *could* learn it at any time. Hence, it means that principally there are no mysterious incalculable forces that come into play, but rather that one can, in principle, master all things by calculation. This means that the world is disenchanted. One need no longer have recourse to magical means in order to master or implore the spirits, as did the savage, for

> whom such mysterious powers existed. Technical means and calculations perform the service. This above all is what intellectualization means (139).

Nonetheless, Weber does not contend that the world, as a whole, has become disenchanted but that, in principle, it is viewed as being calculable. This is a process that continues until everything is pulled within the calculable gaze of reason. For Weber, modern science was initially welcomed as a surrogate system of orderly value-creation, and he reminds his audience of the convictions of Francis Bacon (science as "the way to true nature") and René Descartes (as "the way to true God") (143). Although for Weber, anticipating the arguments of Thomas Kuhn, modern science is a deeply nihilistic enterprise in which any scientific "'fulfillment' raises new questions; it *asks* to be 'surpassed' and outdated" in a process that goes ad infinitum at which point "we come to inquire into the *meaning* of science" (138). He further asks, "Why does one engage in doing something that in reality never comes, and never can come, to an end?" (138). For Weber, science cannot offer truth, meaning, value or ends. Rather, in an argument that foreshadows those made by Jacques Ellul and Jürgen Habermas, "science contributes to the technology of controlling life by calculating external objects as well as man's activities" (Weber 1981, 150). Science can bring clarity to deliberations about ends or values by demonstrating what consequences are involved when particular values are espoused. However, science cannot substitute itself for those values.

Yet, Weber notes that at the peak of rationalization, we moderns have suddenly found ourselves living "as did the ancients when their world was not yet disenchanted of its gods and demons" (1981, 148). Is he arguing that modern Western society is once again enchanted as a result of disenchantment? No. Instead he argues that an earlier

unifying worldview has been irretrievably lost and fragmented into incompatible value spheres. Weber observes that "since Nietzsche, we realize that something can be beautiful, not only in spite of the aspect in which it is not good, but rather in that very aspect" (148). His vision of polytheistic re-enchantment is one of an incommensurable value-fragmentation into a plurality of alternative meta-narratives, each of which claims to answer the same questions that religion[23] seeks to answer in its own ways: "Today the routines of everyday life challenge religion. Many old gods ascend from their graves; they are disenchanted and hence take the form of impersonal forces. They strive to gain power over our lives and again they resume their eternal struggle with one another" (149).

However, these impersonal "challenges" to religion are filtered through the scientific worldview, which demands an unflinching exercise and defense of intellectual integrity in the face of any and all claims to the contrary. Science offers itself as a means to a type of knowledge that cannot be had from any other source:

> Science today is a 'vocation' organized in special disciplines in the service of self-clarification and knowledge of interrelated facts. It is not the gift of grace of seers and prophets dispensing sacred values and revelations, nor does it partake of the contemplation of sages and philosophers about the meaning of the universe. This to be sure, is the inescapable condition of our historical situation. We cannot evade it so long as we remain true to ourselves (1981, 152).

As modernity is directly shaped by scientific progress, we moderns cannot evade the specifications and repercussions of scientific rationalism if we are to remain true to ourselves and our "historical situation." Intellectual integrity requires that we reject all

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[23] See also Durkheim (2001).

claims of remarkable capacities and grace claiming to provide access to, and possession of, sacred values and revelations because such claims cannot be justified on rational, scientific grounds. Enclosed within a disenchanted era that lacks genuine prophecy, "the ultimate and most sublime values have retreated from public life into the transcendental realm of mystic life or into the brotherliness of direct and personal relations" (155). For Weber, the void produced by the absence of the binding force of religion cannot be filled by the manufactured construction of new spiritual formations created by means of academic prognostication.

When comparing the disenchanted world to the premodern, enchanted world, Weber seems to mourn the loss of meaning brought on by instrumentalized rationality that seeks to control or master the world. In pre-technological societies, the force that offset this controlling instinct was primarily spiritual. Perceiving the material world as enchanted or inspirited meant that any attempt to wrest power from this world required appeasing the spirit world that was felt to animate the visible or empirical realm. This requirement in turn limited the extent to which control over the material realm could be secured. Such a limitation endured as long as reality continued to be perceived as an autonomous order with a distinct life force against which humans labored to secure some advantage.

For Weber, it is in the modern disenchanted era where this type of engagement with the world shifts. In an enchanted world, all events in the world and the event of the world itself are infused with meaning as "all religions have demanded as a specific presupposition that the course of the world be somehow *meaningful*" (1981, 353). This

type of spiritual engagement infuses meaning into the world by positing that the empirical world does not exhaust all of reality because a part of reality exists above and beyond the empirical world. From this perspective, reality's "supra-empirical" domain is intimately related to the empirical domain and to all events taking place within it. Forms of enchanted thought presuppose a relationship between the empirical world encountered by the senses and analyzed by the intellect, and a heavenly realm that lies beyond the senses and intellect can only be accessed through spiritual or supernatural means.[24] While the events in the world may not be fully clear, comprehensible, or rationalized in their own terms, they become so when connected to the heavenly realm. From the perspective of a spiritual rationalism, this relationship between the worldly and heavenly realms renders the events of the world meaningful and significant.

On the other hand, scientific rationalism rejects all attempts to attach meaning to any particular event observed in the empirical domain, just as it rejects attaching meaning to the empirical world itself. For scientific rationalism, all the world's events and the world itself can be explained in terms of mechanistic laws of natural causality that are immanently present in the empirical domain. Weber argues that the antagonism between a meaningful cosmos and a cosmos of mechanistic causality represents the "greatest and most principled" confrontation between religious rationalism and scientific rationalism (1981, 350). This confrontation reaches it peak in modern disenchanted culture:

> The tension between religion and intellectual knowledge definitely comes to the fore wherever rational, empirical knowledge has consistently worked to the disenchantment of the world and its transformation into a

[24] This is what Weber refers to as "charismatic" forces, which afford someone with exceptional powers or qualities.

> causal mechanism. For then science encounters the claims of the ethical postulate that the world is a God-ordained, and hence somehow *meaningfully* and ethically oriented, cosmos. In principle, the empirical as well as the mathematically oriented view of the world develop refutations of every intellectual approach which in any way asks for a 'meaning' of inner-worldly occurrences (350).

The refutation or evacuation of meaning is operationalized through the calculating force of technology. With technology, the world is perceived as bereft of any animating principle that may serve as a guard against a controlling human will. From a Heideggerian perspective, a disenchanted reality is a world where what appears before us is taken as "standing reserve," a calculable resource from which humankind can extract, transform, and store energy for future use (Heidegger 1977). This reorientation in perception represents a widespread shift, for only by coming to see the world as a standing reserve could humans sanction the development of new tools for engaging such a world, namely, modern science and technology.

Out of the range of material covered by Weber's address, the phrase "the disenchantment of the world" has reverberated throughout intellectual history. This could partly be attributable to the close relation of *Entzauberung* (disenchantment) with *Entfremdung* (alienation or estrangement) where the alienation of labor, for example, estranges human beings from their own bodies and the natural world. One of the more enduring assessments contained within the disenchantment hypothesis has been that of the phenomenon of technology, which had become and would remain a passionately debated concept in critical theory and philosophy. Weber's hypothesis assembles the terms of rationalization, calculation, and mastery and presents them in a concise formulation whose arrangement is scientific knowledge. The practices of science and

technology reduce concrete reality to an abstract grid of scientific experiment. Weber's address underscores a common argument about the fundamental knowledge or belief that, in principle, there is no mystery left in the world and that, on the contrary, humans can master all problems by technical calculation. Once science, rationalization, and intellectualization had been described as means whose sole purpose was to master reality, it was easy to see this spirit epitomized in technology as its most visible instantiation. For many intellectuals, therefore, Weber identified what ailed contemporary (primarily Western) society as a whole: a loss of foundation brought on by technology and "technological" reason. He did not offer a cure since the rule of scientific knowledge was the very condition of modern life. His formulation, however, furnished the ground for similar critiques of technology that were to follow (cf. Ellul 1964; Marcuse 1964; Horkheimer and Adorno 1972; Heidegger 1977; Habermas 1984).

What is immediately striking about Weber's hypothesis is its seemingly irreversible teleology and ethnocentrism. Whereas the "savage" tried to magically "implore the spirits," the rational and "intellectualized" individual now uses technical means. Here, the unfolding of rationalization and its culmination in the complete loss of meaning in the modern world is understood as inevitable and the technical is counterposed against the magical. From religion and law to music and architecture, rationalization is tied to a historical drive towards a world in which "one can, in principle, master all things by calculation" in all areas of human life (Weber 1981, 139). Over time, the animated spirit of an enchanted or alive world has been erased or diminished by calculation and ratiocination. The practice of magic is caught in a past milieu and

rationalized technique has become the modern replacement (cf. Ellul 1964). The archetypal driving force is that of modern capitalism under which a rational mode of economic life depends on a calculable process of production and exchange. Weber's perspective that the process of rationalization pervades all aspects of contemporary life as the increase of knowledge or intellectualization, growing impersonality or objectification, and enhanced control become governing operating logics.

Importantly, Weber's work points to an understanding of the material world as rendered valueless and inanimate by science. This type of materialism is rooted in Newtonian physics which positions matter as inert and in direct contrast with an "enchanted" spirit. Yet technology as a whole cannot be tucked into a "merely machinic" role precisely because it is part of a wider articulation of the "medial poetics of existence" (Sloterdijk 2011, 80). Before I offer a reconfiguration of Weber's disenchantment hypothesis, I trace and assess arguments concerning the secularization of modernity.

B. SECULARIZATION AND SACRALIZATION IN THE IMMANENT FRAME

As many critics such as Max Weber have argued that the world has become increasingly disenchanted, others have also pointed to an associated trend of secularization. The underlying premise of most arguments regarding the secularization of modernity is that humanity has been able to adopt a non-superstitious and rationalized perspective of the world. This was the outlook shared by progressive thinkers of the nineteenth and early twentieth centuries, such as Auguste Comte and Karl Marx, even though many of these thinkers also acknowledged the continuing presence and forms of spiritual desire and forms of meaning-making that operate outside the bounds of traditional spiritual frameworks. Émile Durkheim (2001), for example, suggests in the 1912 publication of his *Elementary Forms of Religious Life* that modes of faith are not waning but taking more civil forms. Ludwig Feuerbach and Sigmund Freud extend this evolving sense of secularization identified by Durkheim towards a psychological account of religious dependency whereby humanity projects its needs and desires onto other "divine" forms. The pervasive sense, however, was that modern life had shifted towards irreligious values and institutions. As Friedrich Müller writes in 1878: "Every day, every week, every month, every quarter, the most widely read journals seem just now to vie with each other in telling us that the time for religion is past, that faith is a hallucination or an infantile disease, that the gods have at last been found out and exploded" (218).

The core of the "secularization thesis," and its effects on the modern world and self remained dominant until the 1990s. The emergence of modernity was identified as "the causal engine dragging the gods into retirement" (Stark 1999, 251). The forces of

industrialization, economic development, education, rationalization, and urbanization were understood to lead to religious decline in an unsurprising and relatively invariable way. In addition, secularization was framed as a process that occurred at the level of individual belief and practice, moving beyond institutional status and authority, and was assumed to be a global experience, despite the fact that most discussions concentrate on Western Christianity (ibid., 272).

For supporters of the secularization thesis, operating at the center of modern secularization are modes of "individualism, diversity and egalitarianism in the context of liberal democracy [which] undermine the authority of religious beliefs" (Bruce 2002, 30). Therefore, "religion diminishes in social significance, becomes increasingly privatized, and loses personal salience except where it finds work to do other than relating individuals to the supernatural" (ibid.). Steve Bruce argues that a momentous historical shift occurred during the Reformation when both individualism and rationality were on the rise. This was significant because "individualism threatened the communal basis of religious belief and behaviour, while rationality removed many of the purposes of religion and rendered many of its beliefs implausible" (1996, 230). In the West, the idea of a higher being or a metaphysical worldview becomes a matter for individual deliberation and preference as religion turns into a lifestyle choice. Religious organization itself splinters into an array of alternatives throughout the cultural sphere. Overall, the universal and overarching spiritual frame, or the "sacred canopy," has

shattered. The result is a spiritual indifference on the part of certain populations, though, such a conclusion has not been without its detractors.[25]

Charles Taylor (2007) discusses the significance of secularization in the West and offers a pointed critique of what he calls the secularized "subtraction thesis." This thesis, he argues, asserts that the mystifying veils that cloaked human experience have gradually been lifted in the West. The subtractive thesis is at the heart of Karl Marx and Friedrich Engels' description of the effect of capitalism: "All that is solid melts into air, all that is holy is profaned, and man is at last compelled to face with sober senses, his real conditions of life, and his relations with his kind" (1988, 58). Taylor's principle critique of this subtraction thesis is that it is circular. Proponents of this thesis, he observes, argue that belief is not compatible with what modern individuals recognize as the truth of the human condition. Therefore, forms of belief must be a form of mystification. However, this logic predetermines the question as to whether belief itself is valid. Supporters of the subtraction thesis usually tell a story of a teleological progression from ignorance towards perfected rational insight, an account which presumes what it sets out to prove. Taylor proposes, therefore, that we must re-situate secularization in a way that can account for the chance of an experience that has a grand depth to it, where such a moment can stand

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[25] David Martin (1978) was an early pioneer in questioning the secularization thesis. Inconvenient data includes: the increase in church membership rates in the US from the 19th century to the 21st; failure to demonstrate what church participation in Europe was actually at a "high point" from which to decline at the onset of the modern period; and the continuing self-identification of a majority of people as theists in both continents. Counter-critics assert that while there may well have been no "Golden Age" of faith and church attendance, it is still historically credible to suggest that a religious cosmology was more widespread and pervasive in pre-modern times than currently.

on its own terms. I agree with this part of his argument and discuss it at greater length in the following section.

For Taylor, the "secular age" is a move from a culture in which belief in the operation of a transcendent power "is unchallenged and indeed unproblematic, to one in which it is understood to be one option among others, and frequently not the easiest to embrace" (2007, 3). To a degree, this view resembles Weber's who believes that modernization fractured holistic systems of belief. The generation of plural spheres of belief creates a situation where none acquire definitive status. Yet, Taylor critiques Weber by attempting to identify a recurring element of fullness or an awareness of higher meaning within multiple spheres of belief. Here, Taylor positions faith as the outcome of its own motives as humans continually strive for meaning.

This striving for meaning, moreover, need not exclude faith in modernity as a means to produce new forms of meaning making. In this dissertation, I am interested in how a faith in technology has occupied a position of meaning making and how the spatial interface has been used across eras to get in contact with layers of the sublime. Individuals may need transcendent vehicles, such as locative media, but they need not acknowledge it. For Taylor, modes of belief do put human beings in touch with a transcendent power, object, or experience and he notes that even those who do not think of themselves as believers cannot deny a need for such transcendence:

> The change I want to define and trace is one which takes us from a society in which it was virtually impossible not to believe in God, to one in which faith, even for the staunchest believer, is one human possibility among others. I may find it inconceivable that I would abandon my faith, but there are others, including possibly some very close to me, whose way of living I cannot just dismiss as depraved, or blind, or unworthy, who have

> no faith (at least not in God, or the transcendent). Belief in God is no longer axiomatic. There are alternatives. And this will also likely mean that at least in certain milieux, it may be hard to sustain one's faith. There will be people who feel bound to give it up, even though they mourn its loss (3).

All beliefs "are held within a context or framework of the taken-for-granted, which usually remains tacit, and may even be as yet unacknowledged by the agent, because never formulated," writes Taylor (13). This understanding of a taken for granted "framework" of belief aligns with that of phenomenologists such as Maurice Merleau-Ponty and Heidegger. For Heidegger, this is the *Umwelt*, or "surrounding-world" of human action and it points to the idea that one's understanding as an agent prefigures a shared context of significance. Therefore, one's being-in-the-world is structured according to a shared relationship between the social and practical. For phenomenologists, the background of an individual's understanding is related not only to concepts but an entire field of embodied intentionality. This is an important divergence from the, often Neoliberal, fantasy that assumes a sort of independence from culture or history by an individual. Taylor argues, "We are in fact all acting, thinking, and feeling out of backgrounds and frameworks which we do not fully understand. To ascribe total personal responsibility to us for these is to want to leap out of the human condition" (2007, 387).

A critical component of the idea of a "background" is that it is understood historically. This background is not driven by a transcendent power or even reason but by the finite limitations of culture and time. However, such a background is still powerful within historical limits and can lead to a determination of what counts as being possible

or significant for a culture or period of time. This aligns with Heidegger's understanding of "background" as he argues that "metaphysics grounds an age, in that through a specific interpretation of what is and through a specific comprehension of truth, it gives to that age the basis upon which it is essentially formed" (1977, 115). Foucault, too, pulls from this phenomenological understanding to develop his theory of history as being significantly influenced by shifts in discursive practice (1970; 1972). Taylor's development of the concept of the "social imaginary" parallels these considerations in a number of ways. Taylor's social imaginary is the "common understanding which makes possible common practices, and a widely shared sense of legitimacy" (2007, 171-172). Therefore, a "social imaginary" points to the field of tacit beliefs and expectations told through "images, stories, legends, etc." For Taylor, the story of secularization is not simply one of shifting theories or doctrines. An individual who is either religious or secular lives a life in relation to other individuals within a field of social practice that "embodies" a tacit "image" of the common world. Since religious belief is structured within this field of social assumptions, the shift towards a secular society parallels a shift in social practice. And in this way, one can point to the shift in religious beliefs being linked to more technical formations such as the belief or faith in a digitally-networked augmented reality and the interfaces that can provide access.

However, Taylor's thesis does not take everything into account. His consideration of subjectivity in particular needs critique and I use this as an example of the inherent difficulties with the modern disenchantment hypothesis. The social field or "framework" in the late-medieval and early-modern period of the West is deeply influenced by

pluralistic religious practice. This society operates in relation to an "enchanted world" brimming over with spirits and demons where "moral forces" are thought to be everywhere embedded in the lived environment (Taylor 2007, 31-32). The metaphysical arrangement implies that religious meaning is not only "in the mind" but is also "out there." An individual could point to experiences where objects were "charged" with supernatural power (35). Because the space or environment is replete with forces that easily penetrate one's soul, an individual cannot experience his or her selfhood as ontologically distinct from its surroundings. The self is instead "vulnerable" and "porous," which in the modern era is often diagnosed as a form of schizophrenia where there is a distinct spatial disturbance between the self and the living world around it. In this cosmos, sites of transcendence and society are enmeshed together. One feels embedded within a field of personal, economic, political, and ecclesiastical influence, which undergirds a sense that society is a center for divine power. Therefore, a social bond is sacred. However, the operation of these cultural and religious positions is significantly multifarious. For instance, the celibate clergy "prays and fulfills priestly and pastoral functions for a married laity, which in turn supports the clergy. On a broader scale, monks pray for all, mendicant orders preach; others provide alms, hospitals, etc. Over time, the tension is overlaid with an equilibrium, based on a complementarity of functions" (44).

For Taylor, the gradual emergence of a secular world requires an associated disintegration of the integrated religious society and the emergence of a new social imaginary where individuals no longer conceive of themselves as embedded within a

holistic field of institutions and belief. There is also an associated change in the conception of the self, which is a key point of discussion for my constellation of allegorical machines. The older conception understands the self to be embedded within a holistic but differentiated natural, social, and sacred order, which gives way to a "disembedded" selfhood independent of its surroundings. The social imaginary envisioned a dispersal of atomistic and "calculating" individuals responsible only to themselves and contingently to those around them. This arises in the philosophy of Descartes, Locke, and Kant and becomes solidified in what Taylor argues is the "buffered self." The sense of being "buffered" is rooted in a position of self-assurance, rationalism, and economic independence that erases the self's experience of intimacy even in relation to bodily passions.

This buffered subjectivity also aligns with Norbert Elias' (1968, 256) identification of an "invisible wall" that positions objects and other individuals as being spatially distinct from one's interiorized subjectivity.[26] However, such an isolated and self-possessed model of human subjectivity does not eliminate the gains such a development offers, including the accompanying "sense of power, of capacity, of being able to order our world and ourselves" that encourages a feeling of "invulnerability" (300). Taylor writes, "Living in a disenchanted world, the buffered self is no longer. . . vulnerable to a world of spirits and forces which. . . negate the very idea of there being a secure boundary. The fears, anxieties, even terrors that belong to the porous self are behind it. This sense of self-possession, of a secure inner mental realm, is

[26] Postmodernism, broadly speaking, is in part a parallel reaction to this.

all the stronger, if in addition to disenchanting the world, we have also taken the anthropocentric turn and no longer even draw upon the power of God" (301). In such a way does the idea of an individual's dependence on a transcendent or non-human order come to be viewed as dispensable. The social "framework" or "understanding" allowed for the development of an "exclusive humanism" that did not feel the urgency for an appeal to transcendence. For Taylor, this is the foundation for the "secular age" or what he calls the "immanent frame."

However, modernity has always operated within a fractured framework. As Jane Bennett points out, the "philosophical project of naming where subjectivity begins and ends is too often bound up with fantasies of a human uniqueness in the eyes of God, of escape from materiality, or of mastery of nature; and even where it is not, it remains an aporetic or quixotic endeavor" (2010, ix). Her critique is based on Bruno Latour's (1993) argument that one of the foundational gestures of this Western modern frame has involved efforts to regulate the antinomy between human culture and nonhuman nature. In this way, he suggests that we have never been modern. Modernity is constituted through an ideology of purification where the nonhuman is disentangled from the human. However, as Latour demonstrates, modernity has always involved an ambiguous and contradictory bifurcation of nature and culture. Behind this ontological differentiation, nature and culture have often produced "mixtures between entirely new types of beings, hybrids of nature and culture" (12). The pure and buffered modern subject, then, is an incoherent and impossible goal and separatist rhetoric such as Taylor's plays a vital role

in the hybridization of nature and culture: “the modern Constitution allows the expanded proliferation of the hybrids whose existence, whose very possibility, it denies” (34).

This process of hybridization has often involved a much more permeable subjectivity than what Taylor describes. This is the case for Gilles Deleuze’s description of the subject as always being a fold of the outside (1988). For Sloterdijk, this process of permeation is the foundation upon which rests his analysis of the subject: a “system of hybrid communicating vessels, the human interior consists of paradoxical or autogenous hollow bodies that are at once tight and leaky, that must alternate between the roles of container and content, and which simultaneously have properties of inner and outer walls” (2011, 88). Positioning himself against modern notions of distinct interiority, autonomy, and freedom, Sloterdijk asks: “Does not every subjectification, then, presuppose multiple successful penetrations, formative invasions and interested devotions to life-enriching intruders?” (96). The idealized norms of modern subjectivity, from rationalized modes of thought to disenchanted relations with the material world have been consistently challenged and on a regular basis.

Beyond the dream of a buffered subjectivity, the dream of the immanent frame assumes that the shift from a premodern society to a modern disenchanted society made everyone shed their concern for transcendence and become, instead, buffered or atomistic selves. As the holistic framework began to unravel, the strands of religious and non-religious belief multiplied in dozens of competing directions. A component of this multiplicity was the shift in perspective towards belief that no single answer seemed inevitable as the social imaginary no longer supported the experience of a unified and

sacred cosmos. Nevertheless, in the immanent frame, modes of transcendence and sacralization find ways of emerging and remain a significant part of the cultural imaginary. Mircea Eliade elaborates, "To whatever degree he may have desacralized the world, the man who has made his choice in favor of a profane life never succeeds in completely doing away with religious behavior… even the most desacralized existence still preserves traces of a religious valorization of the world" (1959, 23).

Christopher Partridge is another critic who argues that the contemporary social imaginary must be understood in terms of a combination of secularization and sacralization. In particular, he argues that the general framework of such an alternative spiritual awakening "both resources and is resourced by popular culture," or what he describes as an "occulture." Partridge references the term "occult" in order to encompass a flexibly broad range of beliefs and practices that are "sourced by Eastern spirituality, Paganism, Spiritualism, Theosophy, alternative science and medicine, popular psychology, and a range of beliefs emanating out of a general interest in the paranormal" (2005, 4). Partridge argues that "idealized, neo-Romantic, detraditionalized concepts of spiritual powers and entities are being constructed" in wider popular culture formations (129), and occultural world-views have been a significant catalyst for popular culture and that this popular culture which has, in turn, been a source of inspiration for the formation of occultural world-views (126). Importantly, these occultural views and practices extend beyond the realm of popular culture into multiple registers of everyday life. As information theorist Eugene Thacker suggests, "If we do indeed live in enlightened, technological times, we also live in a 'post-secular' era in which the themes

of religion, theology, and mysticism seep back into our world, often in obtuse ways" (2011, 11).

What is of interest to me is how the use and imagination of technology has tended to reinforce a "post-secular" framework by which modes of the religious, theological, and mystical have flowed into and throughout the world. This points to the limits of Weber's disenchantment hypothesis within which rationalism and intellectualism uphold an abstract, calculable view of the world, space and matter are inert and void of meaning, and the modern subject is bounded and buffered. The manufacturing and operation of technologies and their interface with human experience are indeed tied to scientific outcomes but they are also equally tied to spiritual modes such as wonder and the sublime. Due to their abilities to seemingly compress time and space and their bewildering and imponderable black-boxed intricacies, modern technologies have come to be understood, however implicitly, as offering transcendent or uncanny features. Encountering these features, moreover, is phenomenologically commensurate with encountering the performative techniques of ritual action or magic. This view of technology is based on a literature that has called attention to the ways in which spiritual practice and imagination are intrinsically linked to the materialities of media (cf. de Vries and Weber 2001; Engelke 2010). These materialities include more than just systems of representation. They comprise various techniques, artifacts, machines, and systematized actions and practices. I outline this literature in the final section of this chapter.

In summary, it is my argument that locative media have functioned as a site of transcendence, porous subjectivity, and sacralization at moments that cut across the

transcendent and immanent frames. I am interested in not just the "occultural" content but occult technological practices as well. In the following section, I consider locative media in terms of occult philosophy, the practice of allegory and the sublime, and the movement between the supernatural and the technological, especially communication and media technology.

C. ALLEGORICAL MACHINES AND THE VEILED OTHERSPACE

In this section, I offer an outline of Neoplatonic metaphysics in relation to technology, space, and the concept and practice of allegory. The locative media constellation that I outline in the subsequent chapters is rooted in an attempt to theorize the relation among allegory, the sublime and the vague, and technologies of space. This is illustrated by my use of the term "allegorical machines." The link between allegorical and technological practice is the axis by which technologies of orientation assist in developing a shadow (imagined or informational) otherspace in relation to the individual and material space. The function of allegory involves a fundamental practice or technique of interpretation. It is not, however, that these machines are allegories, rather, they enable the practice of allegory in relation to the spatial and technological imagination. Through a close interplay of symbols, ritual, and communicative interaction, this act of creation develops links between concrete forms and abstract ideas that generates a sense of order similar to that of an interface which "is above all the effect of a transference from interior to exterior" (Sloterdijk 2011, 56). In this way, an allegorical practice involves a mode of revealing previously unperceived or vague layers beyond the more apparent and literal plane that appears before the individual.

In Western philosophy, Plato sets the template for numerous subsequent claims, arguing that the real world lies above or beyond[27] the tangible realm of appearances. This metaphysical argument upholds the view that the sensible world is framed within a more

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[27] I want to note that my description here is spatial as opposed to temporal. Plato's consideration of the split between reality and appearance could be considered in relation to both "above or beyond" but also "before or after." However, while some components of temporality are directly tied to my analysis, it is not the focus of this project.

comprehensive reality and for this reason is less real than it appears to be. In a similar way, modern scientific materialism[28] shares with this metaphysical perspective a belief that the everyday world of appearances occludes a deeper truth. While scientific materialism is premised on the assumption that the obfuscated "real world" is an immanent reality, not a transcendent one, it shares with the metaphysical worldview a fundamental distrust of "mere" appearances and a tension between appearance and reality. The realm of appearances is positioned as a portal to a reality that can be traversed through the application of a disciplined method of inquiry, scientific or otherwise.

The Platonic theory of a split between appearance and reality was taken up in different ways by a number of followers in the 3rd century C.E. with Plotinus (205-270) being the most notable. Neoplatonism, broadly conceived, entails a metaphysical assertion of the ultimate primacy of the One and the Infinite, which is the source or origin of everything else and towards which everything strives. Plotinus claims that from the One there are a series of emanations: the first of these is Nous (or mind), then Psyche (or soul), from which Physis (or the natural world) emanates. And just as the One is the origin of this series of emanations it is also the ultimate goal, which is to be achieved in reverse order to the original emanation. This world is a shadowy image of the upper, harmonious unity. In line with this, Neoplatonists argue that matter (including the flesh of the body) is a complete negation that depends on the soul to provide it with life. The higher realms are understood to directly inform the lower realms. The Intelligible

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[28] For a more Platonic version of scientific materialism, see Thomas Nagel's *Mind and Cosmos: Why the Materialist Neo-Darwinian Conception of Nature Is Almost Certainly False* (2012).

becomes a reflection of the One, the Soul a reflection of the Intelligible, and matter a reflection of the Soul. The close inter-relations of the macrocosm and the microcosm position the Soul as being in constant struggle with the embodied self and in constant pursuit of true understanding in spite of the body. Marsilio Ficino (1433-1499 C.E.), a Neoplatonist astronomer, neatly encapsulates this view of dis/embodied subjectivity and its dependence on real/apparent space:[29]

> In the body, the soul is truly far more miserable, both because of the weakness and infirmity of the body itself and its want of all things and because of the continual anxiety of the mind; therefore, the more laborious it is for the celestial and immortal soul continually to follow its happiness, while fallen into an intemperate earthly destructible body, the more easily it obtains it when it is... free from the body (cited in Cassirer 1948, 211).

Heinrich Cornelius Agrippa (1486-1535 C.E.), the German magician, theologian, and astrologer, was greatly influenced by Ficino's Neoplatonic writings and translations. In combination with work by Giovanni Pico della Mirandola, Agrippa produced an influential set of occult philosophies. He extended Neoplatonist theories of the relation between the mind, soul, and the natural world to consider what he described as the corresponding dependencies of the elemental, celestial, and the intellectual worlds. The "natural world" makes up Agrippa's elemental world and it includes both organic and inorganic nature as well as the four classical elements of earth, fire, water, and air. Behind this world lies the celestial world, which includes the firmament, the stars, and the planetary cosmos. Further behind the celestial world lies the intellectual world, which bears the intermediary angels and demons leading to the Neoplatonic One. It is on this

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[29] For a discussion on the relation between Neoplatonic subjectivity and contemporary forms of Virtual Reality, see Hillis (1999).

primary plane to which everything in the preceding elemental and celestial worlds is linked to through abstract essences.

What is important for my consideration of locative media and the wider linkages of orientation technologies is Agrippa's expansion of this metaphysics into a wider occult philosophy. Throughout his *Three Books of Occult Philosophy*, he distinguishes between the world as it appears to us and the "occulted" or hidden parts or qualities of the world that are not readily apparent to us. His writings are primarily concerned with the means of inquiry that we can utilize to reveal the hidden essences of the world. The efforts to explain the unexplainable or sense the supersensible are dependent on the all too human efforts to reveal the hiddenness of the world: "And they are called occult qualities, because their causes lie hid, and man's intellect cannot in any way reach, and find them out… So there are in things, besides the elementary qualities which we know, other certain inbred virtues created by nature, which we admire, and are amazed at, being such as we know not, and indeed seldom or never have seen" (1993,32).

Agrippa's philosophy positions the world as occulted; the presence of the world is revealed to be known yet is always tied to the unknown. On the one side, there is the humanist world, while on the other there is the occult world. Dating back to Agrippa's usage of the term in the 1530s, "occult" is based on the latin *oculere* which means "to cover or conceal" and *occultus* which means "hidden, concealed by shadows, or secret." The practice of "uncovering" or "revealing" is linked to *revelare* which translates as "unveil" or "the opposite of—to cover or veil." From Agrippa's perspective, our relation to the world is a constant reminder of the occulted nature of the world. Or, according to

Eugene Thacker's use of Agrippa in relation to contemporary media studies, we are continually facing "a hidden world which, regardless of how much knowledge we produce about it, always retains some remainder that lies beyond the scope of our capacity to reveal its hiddenness" (2011, 53). For Thacker, a consideration of "occult philosophy" is useful not just for understanding how "the world is hidden in order that it is revealed" but because there are repeated moments when "the world simply reveals its hiddenness to us," which is an occulted practice commonly extended by media and forms of popular culture (53). Extending Agrippa and Thacker, I consider locative media as offering a practice of occult mediation. The spatial imaginaries and recurring attempts to "see what lies beyond space" that often accompany the use of locative media contemporize the dreams and practices of Neoplatonic philosophy in their desire to transcend the world's inherent vagueness or hiddenness.

For many, the influence of the Platonic tradition has supposedly receded at the hands of an Aristotelian mode of scientific materialism. However, attempts at lifting the veil on an invisible otherspace have haunted the imagination for centuries. Indeed, despite efforts to rationally identify and eliminate premodern modes of being in the world, "metaphysics do not die so easily" (Sconce 2000, 207). Where once the supernatural was a divine realm accessible only through religion or magical practice, its proportions have come to be imaginatively revealed through alternative material channels such as art, literature, films, gaming, and machines. Rooted in a perception that these channels possess "salvific properties... derived from [their] perceived ability to master and redeem human experience" (Nelson 2001, 9), the Neoplatonic "otherworld" of ideas

has expanded, and in many ways, transmogrified to the "virtual realm that exists above, outside, or beside (but curiously, never below) our own... [and becomes] timeless and immortal" (281). The attempts to navigate to or communicate with this otherworld have often mirrored the development of technology to exorcise the distorting and disfiguring "ghosts" of communication in order to reduce the threat of miscommunication (cf. Peters 1999; Sconce 2000). This is, for example, a foundational logic for the representation and mapping of space as well as the development of spatial orientation technologies.

The continuing influence of a Neoplatonic worldview of forms and ideas also survives in fantastic novels and films, though in them the supernatural "is almost universally depicted as grotesque and demonic, not benign and angelic" (Nelson 2001, viii). This malevolent image of the supernatural has its historical roots in the link between the Western idea of the soul and a persistent cultural fascination with human simulacra which can be seen in the animated and talking holy statues of the classical world and "the history of puppets, mannequins, and mummies as fictive characters and holy objects in Western culture from the Middle Ages through the twentieth century" (ix). This history is situated within a wider understanding of Neoplatonic interaction between ourselves and the space around us. Puppets, for example, stand in for the various conceptions of how our senses in the world are only *umbris idearum*, "a shadow of the larger world of ideas, that grand hidden macrocosm whose secrets we can only indirectly apprehend" (284). The projection outward of the human soul and desire onto objects such as the puppet illustrates the Neoplatonic search for a direct correspondence between the world of ideas and the "mirror" world of forms. This mode of exteriorized correspondence is made

seemingly more feasible with the electronic configuration of the virtual and forms of augmented reality. As Sloterdijk writes:

> The virtual space of cybernetic media is the modernized outside… it is made feasible in the shape of technological exteriority… Cybernetic virtuality was preceded by philosophical virtuality, admittedly, which had been founded with the Platonic exposition of the world of ideas. Classical metaphysics already cast vulgar spatial thought into a crisis, for Plato made the virtual sun known as 'good' rise over the sensual world, and it is only from this that everything that is 'real' about the three-dimensionally sensual gains being at all. The current writings about virtual space are just in time to participate in the 2,400-year anniversary of the discovery of the virtual (2011, 66-67).

This desire for Neoplatonic correspondence reverberates throughout the cultural and academic fascination with virtual reality and the internet (Hillis 1999). For instance, computer scientist David Gelernter (1991) did not envision a network of documents and files but a virtual and immersive world that he describes as the "Mirror World" where many aspects of life exist online as an extension and selective (and more productive) mirror of the physical world. It is not difficult to connect to this occulted milieu as you "can enter a Mirror World through any household computer" (15). As part of his technological prophecies and propositions regarding this Mirror World, Gelernter accurately predicts the current fascination with locative media:

> The picture you see on your display represents a real physical layout. In a City Mirror World, you see a city map of some kind. Lots of information is superimposed on the map, using words, numbers, colors, dials—the resulting display is dense with data; you are tracking thousands of different values simultaneously. You can see traffic density on the streets, delays at the airport, the physical condition of the bridges, the status of markets, the condition of the city's finances (16).

Importantly, this Mirror World is built upon a certain understanding of the network as a space that transcends our material environment. "The Mirror World isn't a mere

information service," he writes, "It's a *place*" (22). As a place within reach through a computer, it is useful "for showing you the big picture, *the whole*. Every Mirror World has the same goal, in the end: to show you the whole thing at once… [which] is available, and unescapable" (30). In terms of mobile computing, proponents of locative media such as AT&T have taken up Gerlertner's mode of mediating augmented reality, which as the following chapters show, was also a factor in the rise of earlier orientation devices from the astrolabe and magnetic compass to the divining rod.

A Neoplatonic approach to space has been illustrated by the mapping of astral spheres where planes of spiritual existence occur between earthly forms (or matter) and the divine idea (or One). This involves a view that the material plane of existence or the phenomenal world is separated from the heavenly, ideal sphere by a number of intermediary spheres or planes (firmament or ether) populated by various immaterial beings. This is the foundational logic for the astrolabe which is intended to orient its users to the primary operators of the heavens. The search for direct correspondence continues and today the astral plane has been reconfigured to conform with the dreams and desires of cyberspace (Davis 1998, 193). The relocation of the astral plane has not only consistently followed the innovations in navigation technologies but communication technologies as well. The fascination with cyberspaces as an idealized otherspace has helped form the current imagined possibility of an immanent (and technologically induced) astral plane through the use of locative and augmented media. The coupling of communication technology and varying forms of otherspaces has a history as old as the history of communication technology. For instance, during the era of the telegraph,

individuals “imagined the spirits inhabiting a series of celestial spheres emanating around the earth; others believed that the spirits, unfettered by time and space, had unlimited access to the universe as a whole” (Sconce 2000, 42).

The repeated attempts at negating space and time have long accompanied modern media as users have continually attempted to transcend the limitations of embodiment, couple the psychical and physical, signified and signifier, divine and human in order to become pure bodies of meaning. This is the pervading myth associated with the angelic metaphor of communication where the threat of miscommunication is completely erased. Peters writes, “Angels carry dispatches that are never lost or misdelivered or garbled in transit, at least not by the good angels” (1999, 75). This astral configuration continues with the development of the wireless radio and the ether[30] of information waves enveloping unknowing bodies: “The ether, a construct reminiscent of Newton’s notion of a *sensorium dei*, was a breeding ground for speculations about the ultimate unity of the physical and psychical... Henry Adams... called the ether an ‘undifferentiated substance supporting matter and mind alike’... The ether was the mother of all media that allowed light, electricity, and magnetism to work at a distance” (102).

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[30] The positioning of the amorphous field of wireless ether inevitably resembles Agrippa’s description of the *quintessence* (or *quinta essentia* or fifth essence), which is variably called the *aether.* This aether is comprised of the “Spirit of the World” and a medium was required to interact with it: “Now they conceive such a medium to be the Spirit of the World, viz. that which we call the quintessence: because it is not from the four elements, but a certain fifth thing, having its being above, and besides them. There is therefore such a kind of Spirit required to be, as it were the medium, whereby celestial souls are joined to gross bodies, and bestow upon them wonderful gifts” (Agrippa 1993, 44).

This ideal (and at times implicitly sacred) conception of an information network continues today where "the construction of networked environments and virtual spaces that knit our minds into transpersonal spaces of knowledge and experience potentially greater than the sum of their parts" (Davis 1998, 299). One does not have to look further for this desired state than to the thought of philosopher Pierre Lévy and his linking of networked environment and mind into a "collective intelligence." Lévy describes this environment as "an invisible space of understanding, knowledge, and intellectual power, within which new qualities of being and new ways of fashioning a society will flourish and mutate" (1997, xxv). This networked environment closely resembles the mechanistic cosmos of Renaissance intellectual and Neoplatonist, Giordano Bruno and his *ars memoria* in which "the astral forces that govern the outer world also operate within, and can be reproduced there to operate 'a magico-mechanical memory'" (Davis 1998, 202). Here a correspondence links mechanical techniques and magical practice, the "symbolic logic" and "the divine attributes of God," the complex movement of the cosmos and memory.

My analysis of older forms of thinking that continue to inform locative media is rooted in an attempt to theorize the relation between allegory and technologies of space, which informs my use of the term "allegorical machines." The etymology of allegory comes from a combination of *allos* and *agoreuein* ("other" and "speak openly"). *Agoreuein* also connotes open or declarative speech but is inverted by the prefix "allos." Therefore, allegory is often called an "inversion" (Fletcher 1964, 2). The practice of interpreting this "other-speak" is extended into a practice of interpreting "otherspace"

with locative media. This is the axis of interpretation by which technologies of orientation assist in developing a shadow (imagined or informational) otherspace in relation to the individual and space.

Of course, the creation of otherspaces has intrigued the human imagination for centuries. In fact, one of the most mythical otherspaces revealed by technology was the fifteenth century European "revelation" of the New World (see Marx 1964). In addition, the recurring American myth of a "new beginning" relating to the connection to some mythical frontier may actually be a variation of the primal myth outlined by Joseph Campbell: "a separation from the world, a penetration to some source of power, and life-enhancing return" (2008, 28). The term "allegorical machines" is used by Erik Davis to discuss the deeper "techgnostic" implications of alternative world creation in association with role-playing games such as Dungeon and Dragons that have since extended to the creation and use of Multi-User Virtual Environments (MUVEs).

Through a close interplay of symbols, ritual and communicative interaction, this act of creation has the ability to develop links between concrete forms and abstract ideas. How, then, does an analysis of allegorical machines such as locative media situate itself with respect to a general "disenchantment" within the "immanent frame?" In his work on allegory, Angus Fletcher notes that "A world like ours, in which theological values are doubtful, cannot hope to represent the goods of existence, whether material or spiritual, in the higher forms of metaphysics, and there is therefore a falling off in dignity in modern allegory" (1964, 363-364).

In general terms, the function of allegory is a means of communicating concepts with symbols where the symbol in question links to a secondary layer of abstracted meaning. “Allegories are based on parallels between two levels of being that correspond to each other, the one is supposed by the reader, the other literally presented” in the iconographic medium (113). In the case of allegorical fiction, the prose is usually filled with vivid and expressive textual description that undergirds an enchanted layer of secondary meaning. Fletcher writes, “for the suggestiveness and intensity of ambiguous metaphorical language allegory substitutes a sort of figurative geometry. It enables the poet, as Francis Bacon observed, to ‘measure countries in the mind’” (180). This “figurative geometry” not only supposes a projection outward of meaning but moments of interdependent correspondence that occur naturally: “Part of the function of an allegory is to make you feel that two levels of being correspond to each other in detail and indeed that there is some underlying reality, something in the nature of things, which makes this happen” (Empson 1951, 346-347).[31]

Despite the highly ordered structure of allegory, Fletcher also points out that causal connections within allegorical formations tend to be more magical than rational

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[31] An interesting distinction with symbolism can be made here. Again, Fletcher offers an interesting foundation to consider the relations between allegory and symbolist functions: “With Symbol the mind perceives the rational order of things directly, by an ‘unmediated vision,’ without any logical extrapolation from the phenomena of our material world” (18) Such an “unmediated vision” could be illustrated by works of symbolism such as Giovanni Battista Piranesi’s “Le Carzeri” (1750) which depicts a Kafka-esque take on never-ending, monumental architectural forms. As opposed to an allegorical machine that serves to make the infinite sensible through a shadow of the idea, this work of symbolism serves to stand in for that idea. In other words, this is an attempt to offer a direct vision of infinite ideas. However, the assumed control on the reader by the author through allegory is one of the reasons why it has generated a critical response when compared to symbolism.

and typically take place in the realm of the fantastic. This magical ordering is at play in the allegorical science of the Renaissance magician or the fictional worlds of science fiction and fantasy.[32] At its most basic level, allegory is "a fundamental process of encoding our speech" (Fletcher 1964, 3). For Davis, this is also at play with computer code as "computers are nothing if not hierarchies of encoded language" (1998, 213). The various levels of "code" or meaning interpenetrate within allegories, causing a direct tension between forms and ideas. Walter Benjamin's analysis of allegory offers additional insight into the relations between violent objects and concepts. In conjunction with his description of baroque allegorical poetics in *The Origin of German Tragic Drama*, Benjamin writes, "The mystical instant [*Nu*] becomes the 'now' [*Jetzt*] of contemporary actuality; the symbolic becomes distorted into the allegorical. The eternal is separated from the events of the story of salvation, and what is left is a living image open to all kinds of revision by the interpretive artist" (1996, 183). Benjamin's conception of allegory is linked to his constellational method that supports alternative ways of understanding temporality and the constellational flash. For him, allegorical practice is not a linear, organic movement but enacted through figures of ruin and decay.

In the following chapters, I argue that spatial technologies assist in the creation of an orientation for individuals to sense that everything in this world exists in a hierarchy of interdependencies and with an immutable, invisible otherworld. For proponents of locative media and augmented reality, this is the desire for technological attempts to unveil the "mixed reality" or "hybrid ecologies" (Kabisch 2008, 227). Again, this points

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[32] I discuss concepts of magic at greater length in the following section on supernatural technologies.

to significant questions regarding the relations among spatial technologies and the idealized and monetized push for a Neoplatonic transcendence or extension of mind beyond an embodied self. Indeed, the interdependencies between material space and this invisible otherworld point again to the relation of the inner psychical and outer physical realities, forming the "core of a series of tightly interwoven correspondences between the invisible transcendental level and a visible material one" (Nelson 2001, 206). For Nelson, understandings of such a merging are famously characterized by Freud as techniques of "projection" and she derives her use of the term from Freud's *Totem and Taboo*: "The projection of inner perceptions to the outside is a primitive mechanism which, for instance, also influences our sense-perceptions, so that it normally has the greatest share in shaping our outer world" (2001, 206). Nelson positions this "primitive mechanism" within a deeper historical trajectory: "Projection, in other words, is our contemporary homocentric reworking of a much older cosmo- or deocentric notion of the universe found in most pretechnological cultures as well as in earlier Western culture" (207). This is an important site for allegory, a device that for C.S. Lewis, provides "an imagined body to the immaterial" (1938, 322).

The interdependence of an outside and inside, moreover, offers a way to reframe Taylor's distinction between the "porous" and "buffered" self, and points to an interesting merging of metaphysics and technology through the practice of allegorical machines. The allegorist is able to develop an otherworld as "Allegory... signal[s] the Other" (Barney 1979, 49). In the words of J.R.R. Tolkien, a great fantasy author "makes a Secondary World which your mind can enter. Inside it, what he relates is 'true': it accords with the

laws of that world. You therefore believe it, while you are, as it were, inside" (Tolkien 1966, 37).[33] Participating in this inverted logic, Samuel Taylor Coleridge, who in 1817 authored the phrase "willing suspension of disbelief," describes this Secondary World as a spirit-world and offers a glimpse of a transcendental escape outward, developed through a visualization of an otherspace: "it is sometimes beneficial to contemplate, in thought, as in a Picture, the image of a greater and better world; lest the intellect, habituated to the trivia of daily life, may contract itself too much, and wholly sink into trifles."[34] I suggest that allegorical machines such as contemporary locative media promise a glimpse of transcendence through "a mediation between internal and external levels" (Galloway 2012, 74). This glimpse, while often positioned as a rare occurrence within this overall frame, has moved to the flow of the everyday and become seemingly "naturalized." This is partially due to the "apocalyptical escape into an infinite space and time [that tends] toward high human goals" as "allegory is serving major social and spiritual needs" (Fletcher 1964, 23).

To reiterate AT&T's motto, the relation between allegorical practice and technologies of orientation and navigation directs the range of efforts to "see what's on the other side of too far." Davis considers the function of allegory as "a rather paradoxical way of explaining concepts with symbols... allegories often take place in fantastic, almost

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[33] Tolkien, however, dismisses the specific formality of allegory as a one-to-one correspondence and instead supports the creation of secondary worlds in terms of "applicability" through the freedom of the reader as opposed to a domination of the author.

[34] From the Epigraph to *The Rime of the Ancient Mariner* (1817), which is an edited selection from Thomas Burnet's *Archaeologie Philosophicae* (1692).

psychedelic environments—a dreamland, a visionary otherworld, or a futuristic scenario where magic appears as super-science" (1998, 212). Allegory, then, is the idea that cannot be seen, whereas a symbol stands in for such an idea or concept:

> What the allegory reveals at the same time it hides, since the more visible... it is to ordinary eyes... the more accommodated it is to limited vision, and therefore the less directly representative of the secrets it would tell. Direct interpretation can only falsify the allegory, since the presupposition is that allegory is necessary as the only possible expression to those who have eyes and see not... the mysteries in question (Miller 1981, 358).

Revelation of the mysteries and secrets linked to these allegorical otherspaces is rooted in a wider effort in materializing the immaterial, "making the invisible visible, manifesting the world inside the world outside" (Nelson 2001, 203). Therefore, with the conjuration involved with locative media, an individual is linked to an operation of allegory and the externalization, recording, or projection of one's interior memory that extends a form of porous subjectivity into the surrounding material environment. This mental transcendence beyond the perceived limitations of embodiment is promised by proponents of locative media. For instance, in the initial proliferation of locative media within the net.art movement in the early 2000s, a primary goal was to use these media to connect to "pervasive imaginaries" (Tarkka 2005) developed from networked information, which has since been co-opted by corporations like AT&T. This technological exteriorization of the mind (or the "industrialization of memory," see

Stiegler 2009; and the "outering" of imagination and sensation, see McLuhan 1962)[35] can be positioned as an instance of an "amputation of memory" within networked environments as "we spiral around again to the experience of memory as a space of information, a three-dimensional realm that's 'outside' ourselves while simultaneously tucked 'inside' an exploratory space that resembles the mind" (Davis 1998, 198-199). Interestingly, long before McLuhan considered the links between amputation and mediation, Freud identified the issues at play with mnemotechnics in conjunction with Socrates' famous dictum in *Phaedrus* while ascribing a much more spiritual quality to these prosthetics than McLuhan: "Man has, as it were, become a kind of prosthetic god" (1930, 39). Like St. Augustine's memory palaces, these mnemotechnics could be considered to be a technics of spatialization and desire for porous subjectivity (cf. Yates 1974). This can also be illustrated by the history of spatial mapping, which is another history of recording technologies and the industrialization of memory (Fernández-Armesto 2006).

These forms of memory spatialization have a long relationship with forms of occult or gnostic mnemonics where the practice of projecting the mind moves between magical and technical practices. For instance, consider Giordano Bruno's incorporation of pagan elements within his system of "magic memory." The art of Bruno's magical memory was rooted in the black art of demon summoning and Renaissance demonology

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[35] McLuhan writes, "Imagination is that ratio among the perceptions and faculties which exists when they are not embedded or outered in material technologies. When so outered, each sense and faculty becomes a closed system. Prior to such outering there is entire interplay among experiences" (1962, 265). In a way, once it has been outered, or externalized, there an attempt to recombine this sense ratios in terms of an enchanted interplay of senses.

where spirits were understood as, in Ioan Couliano's words, mental "phantasms that acquire autonomous existence through a practice of visualization resembling first and foremost the Art of Memory" (cited in Nelson 2001, 193). The most significant goal of possessing and conjuring magic memory "is the formation of a religious personality, or the personality of a good magus, capable of being in magic communion with nature—the infinite comprehended in the finite" (ibid., 198). The practice of magical memory involves giving a form to a supreme Idea, the transcendent made immanent, and the infinite made finite which spiral around the magical practice of materializing the ideal. This materialization is all in an effort to conjure an ideal representation of self or world as we try to turn from the "wretchedness of our finitude" in order to grasp a small shred of transcendence (Peters 1999, 271). This transcendence, long promised by orientation technologies serving as allegorical machines, offers an opening towards the transcendence of one's mind to an external world by way of a porous subjectivity.

The technological attempts to connect with other layers of space, or even Absolute space, are tied to the ongoing human struggle with our own finitude. This struggle is reflected in the recent speculative turn in philosophy. Quentin Meillassoux, in his *After Finitude* (2010), attempts to develop a philosophical realism that can think of objects, worlds, or thoughts that exist outside the finitude of any correlationalism between the human and the world. Many philosophers, including Meillassoux, fault Kant's identification our supposed inability to think the unthought (or the ineffable) since it would continually be a contradiction. Speculative realism has been described by its supporters as offering a "rigorous exploration of the potentialities of the perceivable, the

very foundation and condition of experience" (Joy et. al. 2013, viii). Their attempts to develop a philosophical structure that would go beyond the inability to think of the absolute is paralleled in the information technology world by the practices and desires that are associated with locative media. The human struggle with allegorical machines is an ongoing drama about the inability to make sense of the absolute. The inability to comprehend the infinite in the finite. The inability to fully reveal the occulted world.

THE SUBLIME AND THE VAGUE

Many writers have considered the relations among imagination, infinitude, and technology where a vision of the "technological sublime" produces a wave of feeling that overwhelms reason before it is again reigned in (Nye 1994). This mode of affect or sense of sublime manages to animate or terrify individuals and societies through a promise of transcendence to another sense of reality. Leo Marx writes that "the rhetoric of the technological sublime" is entangled with songs of progress that swell "like froth on a tide of exuberant self-regard sweeping over all misgivings, problems, and contradictions" (1964, 207). This sense of transcendence has been associated with the telegraph, the telephone, and the radio and is related to what Corey Powell has termed a form of the "scientific sublime" where the consonance of natural law enables a "rapturous amazement." This sense of scientific sublime stands in for the gap left by forms of religion and offers "its own forms of ecstasy" (Powell 2002, 135). Jacques Derrida's account of the "religious" experiences of ecstasy and awe also points to this kind of sublimity that underscores the return of a repressed animism in conjunction with modern tele-technoscience (1998). However, this is not to say that technologies have

always been a central location for the sublime. As Marx points out, the nineteenth century was a time when the transfer of collective experiences of awe and wonder from the "metaphoric powers" of natural sources such as mountains or the wilderness to technological wonders such as electricity and the railway quickly occurred. This shift towards a "technological sublime"[36] exceeds the romantic or pastoral distinction between country and city and generates a new form of transcendent attention that is attached to ideas of progress (1964). Nye, working from Marx's discussion of the technological sublime, notes that from "Burke to Kant to later thinkers, the natural world plays a smaller and smaller role in definitions of the sublime, and the observer becomes central in defining the emotion as the mind projects its interior state onto the world" (1994, 8).

As technologies that mediate the infinitude of space, allegorical machines are devices that have long been associated with an exteriorization of the imaginative power of the sublime. It is productive, then, to consider the sublime before and after its "location" (was) shifted from natural to technological sources. In 1712, Joseph Addison used the sublime to consider elements of greatness and uncommonness, particularly in nature. This type of greatness was a "rude kind of Magnificence." "Our Imagination," Addison notes, "loves to be filled with an object, or to grasp at anything that is too big for its capacity. We are flung into a pleasing astonishment at such unbounded views, and feel a delightful stillness and amazement in the soul at the apprehension of them" (1712). Anticipating both Kant and Burke, for Addison this object could be external, a natural

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[36] See Marx (1964, 195-207) who writes that during this era, "The entire relation between man and nature is being transformed... It is the new mechanized landscape itself which may be expected to induce this state of mind" (195).

scene, or a pure abstraction of the mind. Furthermore, he emphasizes a more conflicted aspect of the sublime that often involves an admixture of pleasure and disgust: "There may, indeed, be something so terrible or offensive, that the Horror or Lothsomness of an Object may over-bear the Pleasure which results from its Greatness, Novelty, or Beauty; but still there will be such a Mixture of Delight in the very Disgust it gives us, as any of these three Qualifications are most conspicuous and prevailing" (66). Plato foreshadows this sense of unease that can arise "within" when faced with beauty and he suggests that it initiates a divine correspondence with a wider storehouse of memories hidden from everyday life:

> But he whose initiation is recent, and who has been the spectator of many glories in the *other world*, is amazed when he sees any one having a godlike face or form, which is the expression or imitation of *divine beauty*; and at first a shudder runs through him, and some 'misgiving' of a *former world* steals over him; then looking upon the face of his beloved as of a god he reverences him, and if he were not afraid of being thought a downright madman, he would sacrifice to his beloved as to the image of a god (1995, 65, emphasis added).

In 1759, Edmund Burke distinguished the sublime from beauty, with which it had previously been conceptually tightly coupled. To do so, he argued that the sublime encompassed a range of perceptions that include terror, incomprehensibility, power, privation, vastness, and infinity along with immensity, struggle, and magnificence. He described these perceptions in terms of dazzling light, drumming sounds, animal cries, bitter tastes, smells and stenches, moments of suddenness, loudness, and feelings of pain, anguish, and torment (1990, 63, 73-75). For Burke, the sublime was the raw, unstable, horrific, demented, chaotic, wild, and formless, the uncalled for and the unannounced, and, fundamentally, the ineffable and unreproducible. The sublime exhibited a power of

infinite magnitude that he associated with the abyss that was ominous, wondrous, and raucous (Lyotard 1991, 24). The passion that is prompted by the sublime is one of "astonishment" (which Burke links to its etymological root of "thunderstruck"). He writes, "astonishment is that state of the soul in which all its motions are suspended, with some degree of horror" (1990, 53-54). Pain is often involved in the sublime for Burke and, while acknowledging that pain can also be "exquisite," he opposes pain to pleasure (36). Therefore, a sublime response would not necessarily be one of pleasure but of "delight." For Burke, then, the sublime experience opens a path to transcendence by way of wonder, dread, and incredulity. The sublime emerges from "whatever is fitted in any sort to excite the ideas of pain and danger… whatever is in any sort terrible, or is conversant about terrible objects, or operates in a manner analogous to terror" (86).

The literal meaning of the word sublime is "sloping up to the lintel," or as far up as one can go against some impossible constraint. Addison suggested that this border is the capacity of the human mind and Kant expanded upon the consideration of the limit while also acknowledging that the sublime presents a greater theoretical hurdle than just a consideration of beauty. For Kant, beauty is a pleasure that is immediately sensed and associated with form, fitting relations, balance, harmony and consistency with one another. The sublime is something completely different, "it is rather in its chaos, or in its wildest and most irregular disorder and desolation, providing it gives signs of magnitude and power, that nature chiefly excites the ideas of the sublime" (1951, 84). It includes "mountain masses piled in wild disorder upon one another with their pyramids of ice, or the gloomy, raging sea" (ibid., 95). While beauty involves a play of the imagination, the

sublime pushes us to our limit and exceeds our imagination, being "as it were, an outrage on the imagination" or by doing "violence to the imagination" (ibid., 83; 1978, 91). The imagination is up against some impossible constraint, or, as Jean-François Lyotard writes, "it is a little beyond its limit—let us say, at the limit" (1991, 81).

Although, moving to the limits of the imagination requires the mind to base this understanding of a limit on previous standards. In a similar way to how astronomers can identify a black hole by the absence of light, the sublime induces the mind to sense its own cognitive incapacity. However, this requires a prior experience of comprehension. So, "the broad ocean agitated by storms," Kant argues, cannot be considered to be sublime unless one has first "stored one's mind in advance with a rich stock of ideas," so that the hesitation or apprehension of the horrifying seas generates an "intuition" of the sublime. This is "because the mind has been incited to abandon sensibility, and employ itself upon ideas involving higher finality" (1978, 92). In other words, an allegorical intuition of a secondary layer of meaning. Furthermore, "the sublime… cannot be contained in any sensuous form," as it "rather concerns ideas of reason, which, although no adequate presentation of them is possible, may be excited and called into mind by that very inadequacy itself which does admit of sensuous presentation" (92).

When faced with the infinite, the imagination is pushed to its limit and summons the rational mind, which has no response. For Kant, there is no response to that which is beyond imagination. The result is not so much a thought but more of a feeling or affect. A feeling that comes from the very confrontation with the limits of thought itself (Lyotard 1991, 72). As Lyotard notes, the aesthetic judgment of the sublime "presupposes both a

capacity to conceive of the absolute and a sensibility of the 'presence' of the absolute." The consequence, he writes, is that "the absolute is not conceived of as an Idea but only felt" (73). With respect to my study of locative media, the sublime is important precisely because it always entails the recurring allegorical practice of using technical interfaces to make the previously undefined or unknown sense of space intelligible. These interfaces, while predicated on a desire to transcend the sensible, contribute to a certain affect in the face of the sublime. This is explicit in campaigns such as AT&T's Rethink Possible and also seen in the imagineering of the technology by members of the digital art community (which I explore in more detail in the chapter seven). Locative media, as a mode of interfacing with augmented reality, represent a sublime attempt to intuit or glimpse the unthinkable.

Going up against the unfathomable opacity at the limit of comprehension might seem like an uncomfortable task but attempts to glimpse the unthinkable also involves an intricate sense of pleasure because it hints of the "absolutely great" behind and beyond. For Kant, this provides a release or a wondrous liberation from the supposed restriction. When we transcend imagination and reason is unable to comprehend, we grasp an inner perception of the "supersensible substrate" that lies at nature's foundation and the faculty of thought (1951, 94). Kant notes, "[T]he inner perception of the inadequacy of every standard to serve for the rational estimation of magnitude is a coming into accord with reason's laws, and a displeasure that makes us alive to the feeling of the supersensible side of our being, according to which it is final, and consequently a pleasure, to find every standard of sensibility falling short of the ideas of reason" (1978, 106).

Due to our relation to the supersensible, Lyotard uses the term "tautegorical" to conflate imagination and reason. The tautegorical points to "the remarkable fact that pleasure and displeasure are at once both a 'state' of the soul (or Geist) and the 'information' collected by the soul relative to its state" (Lyotard 1991, 4). Thought is able to feel "its absolute finality with a finality in itself" which offers a profound sense of release or pleasure (81). Lyotard locates this tautegorical sense in Kant, who considers "the feeling of the sublime [as] a pleasure… brought about by the feeling of a momentary check to the vital forces followed at once by a discharge all the more powerful" (Kant 1978, 91). Kant compares this sublime movement to "a vibration. . . a quickly alternating attraction toward, and repulsion from, the same object" (1951, 97). And through this movement comes a sense of release by very nearly reaching the limit of the infinitude as "the imagination… feels itself unbounded by this removal of limitations; and thus that very abstraction is a presentation of the Infinite which… expands the soul" (115). The momentary glimpse of some great beyond is all that we get but this glimpse is enough.

For Lyotard, the experience of the sublime is "the supreme 'destination' of the mind" in terms of what he describes as a "double 'yes'… imagination is justified in trying to present the unpresentable and in not being able to succeed; reason is right to demand that it make this vain effort" (1991, 25, 54-55). In these terms, the sublime's painful pleasures are as close as we can come to intimacy with what lies beyond without slipping away. In these terms, Kant follows Burke in arguing that the pain and horror which accompany the sublime must not overcome the senses. Kant writes, "we must regard ourselves as safe in order to feel this inspiriting satisfaction" (1978, 101). The

attraction and repulsion of the wondrous and the atrocious must be bounded and it follows that the bounding will vary according to the individual. What becomes important is that the sublime neither promises nor requires a spiritual "beyond" even as it can encourage us to suppose one. In this sense, this conception of what lies beyond involves an attempt to restore balance and equilibrium in the face of seemingly unhinged randomness, chaos, and unrestrained force (cf. Williams 1987). For Kant, this connection between the material and mystical worlds is encompassed by the word Geist, which "in an aesthetical sense, signifies the animating principle of the mind" (1978, 175). This animating principle, in the Lacanian sense, is linked to the continuing effects of gaps of desire when facing the real. For Slavoj Žižek, any sublime object has an "auratic" effect, which involves a surplus, a "something more than itself," an "elusive je ne sais quoi beyond positive properties" that uncovers the void of desire and reminds us that the real is essentially unrepresentable (1992, 194).

The everyday use of locative media is oriented towards an interface with the sublime: techniques are employed to interpret the ineffable or vague characteristics or objects that are positioned beyond human sense. These ineffable encounters include moments that are either too great to be articulated or too sacred to be uttered. For William James, this is a natural "extension" of life (1967, 256) and constitutes the inherent richness of experience. He suggests that not only does reality expand beyond the known, it expands beyond the knowable. "Reality, life, experience, concreteness, immediacy, use what word you will, exceeds our logic, overflows and surrounds it" (1967, 212). As a result, James defends the concept of the "vague" because any process of systemization or

intelligibility will conceal at the same time as it discloses. In the face of scientific practice, the vague is understood as an "unclassified residuum… a sort of dust-cloud of exceptional occurrences" (1983, 247). This is a function of what James considers to be a process of "focalization," which involves "the taking possession by the mind, in clear and vivid form, of one out of what seem several simultaneously possible objects or trains of thought" (1890, 403-404). Focalization is the mode of selection that occurs in relation to the formation of intelligible decisions within the unfinished continuum of consciousness and life. Not only does this process provide a certain intensity to life but it also involves a decision that cuts off future alternatives. In short, focalization depends on the creation of a fringe.

However, as is the case with the interfaces of allegorical machines, we are "fringed by a 'more'" (James 1967, 71). I want to suggest that this leads to the inherent metaphysics of the otherspace and also to extend James' defense of the vague as well. These arguments are in response to attempts to make the vague completely intelligible, which must inevitably fail. James' defense of the vague is comparable to Gabriel Marcel's defense of the "mysterious" where being or reality should not be deciphered as a problem to be solved as opposed to something to "attest to" (Marcel 1965). There is a fundamental mystery to presence in space since presence can transcend the objective physicality of being-with each other. In a way, we have come full circle back to Max Weber, who implicitly supports Gabriel Marcel's understanding of the inherent value of the mysterious through his definition of the disenchantment of modernity: "it means that

principally there are no mysterious incalculable forces that come into play, but rather that one can, in principle, master all things by calculation" (Weber 1981, 139).

Analyzing a constellation of locative media involves considering the development and use of allegorical machines to render vague or mysterious qualities intelligible. These devices are intermediaries with an occulted world and sites for contact with the immeasurable, infinite, ineffable, or unfathomable sublime. The desire to "see what's on the other side of too far" is an acknowledgement of the unease of our finitude and a desire to interact with the lintel. This practice is not unlike Tzvetan Todorov's consideration of our interaction with the fantastic in the arts: a hesitation or interruption between the real and the imaginary balanced between the uncanny and the marvelous (1975). As an interruption, the allegorical machine mediates an excess that is beyond oneself, an excess that moves between form and formlessness, finitude and infinitude, balance and chaos. The excess as an otherspace is brought to bear with our relation to physical, material space. This interruption is similar to Kant's consideration of the hesitation or apprehension of the horrifying seas that generate an "intuition" of the sublime. These locative media have long been a part of the human interaction with material life and practices as well as the imaginations that have been enmeshed with affective states of wonder, mystery, or meaningful enchantment with the world (or the worlds beyond). They exemplify a wider speculative project that is practiced by humans on a daily basis.

The history of the term, allegorical machines, is based upon the characterization of the function of allegory or the machinations of the allegorical. Fletcher summarizes

this history: as “allegory employs ‘machinery,’ it is not an engineer’s type of machinery at all. It does not use up real fuels, does not transform such fuels into real energy. Instead, it is a fantasized energy, like the fantasized power conferred on the shaman by his belief in daemons” (1964, 57-58). This is a productive framework to analyze the orientation machines themselves, the broader allegorical functions and practices, and the mediation with the sublime that these devices employ. However, in order to discuss technologies that mediate spatial relations, I outline the relevance of spatial theory for media and technology studies in the following section before concluding with a section on supernatural technology.

D. MEDIA AND SPACE

Locative media, as spatial interfaces, operationalize particular understandings of space and I am interested in outlining a number of concerns that are currently intertwined with the field of media studies and communication studies more broadly. A number of authors who have offered key arguments regarding the relations between modes of communication and spatial production have had significant influence on communication and media studies. In addition, this work on spatial theory provides an alternative critique of Weber's views on a disenchanted modernity. Since the middle of the twentieth century, authors have increasingly focused on the relations between space and communication technologies.

For instance, Henri Lefebvre's work on the production of social space, which "subsumes things produced and encompasses their interrelationships in their coexistence and simultaneity—their (relative) order and/or (relative) disorder" offered a substantive way to consider how technology is linked to the production of space (1991, 73). This consideration of simultaneous space divorces "ideal space" from "real space" by emphasizing the material production of space that also operates "on processes from which it cannot separate itself because it is a product of them" (66). Lefebvre offers a spatial triad as a way to conceptualize these links between the material production and wider social processes. This triad includes the spatial practices,[37] representations of

[37] Spatial practice is the production of spatial relations between objects and products leading to continuity and degrees of cohesion. Lefebvre writes, "In terms of social space, and of each member of a given society's relationship to that space, this cohesion implies a guaranteed level of competence and a specific level of performance" (1991, 33).

space,[38] and representational space[39] or perceived, conceived and lived space. This spatial triad has since been used by authors to consider the emphasis placed on the production of space by signification, representation, and social relations.

Shortly before Lefebvre, Harold Innis theorized the relations between forms of communication and patterns of knowledge and power. His analysis ranged from some of the earliest civilizations to the twentieth century and documented the distinction between time-biased (heavy and durable forms of communication) and space-biased media (light and mobile forms of communication). Innis argues that the different forms of communication influence the form of socio-political power. Time-biased media serve the intent of the religious authority to maintain eternal monopolies of knowledge whereas space-biased media become important means for maintaining an expansionary military empire. In his essay, *A Plea for Time*, Innis argues that contemporary industrial society is very spatially biased and neglects social values relating to traditions and communication in time. He writes that "the tragedy of modern culture has arisen as inventions in commercialism have destroyed a sense of time" (1951, 86). Inspired by Innis' work, Marshall McLuhan combined a notion of socially produced space with a number of

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[38] Lefebvre positions this as spatial representations that "are tied to the relations of production and to the 'order' which those relations impose, and hence to knowledge, to signs, codes, and to 'frontal' relations" (33). This is a "conceptualized space, the space of scientists, planners, urbanist, technocratic subdividers and social engineers, as of a certain type of artist with a scientific bent - all of whom identify what is lived and what is perceived with what is conceived" (38). This is typically considered to be "absolute" or "metrical" space.

[39] Lefebvre refers to these as spaces that are "lived" directly "through its associated images and symbols and hence the space of 'inhabitants' and 'users'" (39). Representational space emerges out of an interaction between spatial practice and representations of space.

"probes" into the technologies of spatial production (2003). McLuhan examined not only how society produces space but how technologies of space produce society. Because his concerns were "environmental," he sought to understand artistic production within these broader spatial contexts. As Innis had suggested, spatial and temporal biases were indices as much of artistic production as they were of social, political and economic structures.

The introduction of spatial theory into studies of media and communication technology quickened during the late twentieth century. Joshua Meyrowitz in *No Sense of Place* (1985) took up the "medium theory" of Innis and McLuhan and offered an influential assessment of the role of spatiality in media studies. Meyrowitz asserts, using Erving Goffman's interactionism,[40] that electronic media not only change people's perceptions of space but also contribute to the alteration of social roles and communities. Benedict Anderson's *Imagined Communities* (1983) considers how print media contribute to the production of nation states as imagined communities and spaces in early modern Europe, and David Harvey's *The Condition of Postmodernity* (1990) introduces the concept of "time-space compression" as a way to illustrate how modern media and communication technologies contribute to perceptions of a shrinking global space and blurred geographical boundaries. These theorists approach the complex relations between media and space as a way to illustrate the alternating views of mediation as reproducing

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[40] Erving Goffman develops this approach out of a symbolic interactionist tradition to examine human interaction in social settings through an analysis of the interactions, situations or environments where individuals are physically in each other's presence. These are face-to-face situations where we interact in everyday social situations, organized structures including work or school, or unusual social situations. He argues that we typically act differently in different settings. The context that we have to judge these interactions is not society at large but the specific context. Goffman suggests that life is a sort of theater in which humans play different roles based on that specific context.

as well as modifying pre-existing spatial understandings. More recently, Ken Hillis in *Digital Sensations* (1999) points to the influence of digital technologies on blurring previously discrete understandings of absolute, relational, and relative space, which are operationalized in ways that problematize a subject's relation to space. The blurred concepts of space due to technologies of mediation and representation position the idea and the realities of space at sites of continual struggle and negotiation.

Other authors also identify the influence of media on the human experience and understanding of an accelerating reality. Paul Virilio (1977; 1997) analyzes the social consequences of new media, transportation and speed. He points to altered perceptions of past, present, and future as well as space and place. Zygmunt Bauman (2000) has argued that society is moving from a solid, or heavy, to a liquid, or light, modernity. Such movement leads to wider support for forms of mobility and technological connectedness which, in turn, leads to attempts to transcend or erase modes of spatiality through the use of media technologies. The increased attention to concepts of space within media studies is reflected in works such as Anna McCarthy's *Ambient Television* (2001), where the collision of the space of media practice and flow is problematized. For McCarthy, this is accomplished through the integration and use of television in public spaces. McCarthy's co-edited volume with Nick Couldry, appropriately titled *MediaSpace* (2004), attempts to further map the outlines of a spatial theory of media. They outline "five levels" that connect geography and media analysis in their introduction:

> Level 1: studying media representations… Level 2: the study of how media images, texts and data flow across space and, in so doing, reconfigure social space… Level 3: the study of the specific spaces at either end of the media process, the space of consumption and the space of

> production… Level 4: the study of the scale-effects, or complex entanglements of scale, which result from the operation of media in space… Level 5: studying how media-caused entanglements of scale are variously experienced and understood in particular places (2004, 5-8).

These levels of analysis offered by Couldry and McCarthy all point to the increasing importance of understanding the various linkages of the material, symbolic, and imaginative aspects of communication in relation to the production of space. However, numerous authors have argued that there is a need to further distinguish between the shifting emphases within the field of media studies and the deeper historical trends of communication, technology, and space. This lack of historical detail on the part of media scholars is often exacerbated by an overvaluation of the newness of digital technology and culture. For example, it is difficult to claim that the emergence of the "networked city" as a result of digital communication technologies is a unique historical event. Nearly all urban spaces throughout history, especially modern Western cities, have been shaped by technologies that involve dynamic combinations of the material and the semiotic, or the virtual and actual (cf. Tarr and Dupuy 1988; Goodman and Chant 1999; Graham and Marvin 2001).

Lefebvre makes a similar point when looking at the history of social space and the forces of production: while "[m]ediations, and mediators, have to be taken into consideration," the forces of production "are not taking over a pre-existing, empty or neutral space, or a space determined solely by geography, climate, anthropology" (1991, 77). In addition, to claim that digital information shapes urban experience more than the physical environment does is to deny the always already complex relations between the two. Graham succinctly notes, the "hard material basis for the 'digital revolution' is

neglected but crucial… the 'information age,' or the 'network society,' is not some immaterial or anti-geographical stampede online" (2003, 139). Virilio (1977; 1997) is one theorist who argues that physical space is increasingly colonized by information technologies and that a logic of speed has forced society into a state of incessant overexposure. Castells (2000) likewise claims that physical space is being transformed into a global "space of flows" as individuals interact in real-time without having to be spatially or physically present to one another. However, accounts such as these significantly overstate the relation between technology and space because they underestimate the complexity of the social and cultural contexts within which technology and space operate and gestate.

My interest in analyzing technologies of spatial orientation and navigation is influenced by this "spatial turn" within the field of media studies in addition to work that values the historical trends of communication, technology, and space. When considering the relations of the material, symbolic, and the imaginative in conjunction with locative media, one could generate questions that cut across the five levels of geographic media analysis that Couldry and McCarthy outline. In particular, while Lefebvre distinguishes the modes of ideal and real space, technologies of spatial orientation offer interesting moments of interaction between the ideal and real.[41] If we reflect back on Max Weber's disenchantment hypothesis, we can further problematize his account if we read it against much of contemporary spatial theory. I believe this theory should be of critical

[41] In a way, contemporary locative media make it increasingly hard to distinguish between the perceived, conceived, and lived relations of space which serves particular political economic goals (Ingersoll 2011).

importance when analyzing the current fascination with locative media. In general, Weber reflected on the macro-social nature of modernity. Yet, his main historical arc that shifts from an enchanted past to a unified state of disenchantment is shared and extended by network theorists such as Castells even though it simplifies any complexities associated with social or cultural change because it ignores the possible overlaps, multiplicities, ambivalences, and reversals that occur throughout history. Attempts to demystify, disenchant, or rationalize have moved in fits and starts, especially in relation to how space has been conceptualized.

For instance, Alexandre Koyre (1957) notes that the "scientific revolution" of the seventeenth century, which supposedly initiated the argument for a disenchanted modernity, was rooted in a wider "radical spiritual revolution" where science and spatial theory were bound up with a change of world-view or metaphysical outlook. Koyre does agree that the general theoretical understanding of space "lost progressively its attributive or substantial character" as it became "the void of the atomists... the infinite, uncreated nothingness, the frame of the absence of all being; consequently also of God's" (275). However, during this progression, the Aristotelian and Copernican cosmologies faced infinite spatial expansion, despite the fact that there was no clear evidence for the legitimation of an infinite universe. Descartes and Newton could have abandoned the finite cosmos of Copernicus and Kepler on speculative philosophical grounds alone, thereby arguing for an infinite conception of space in association with an increasingly immanent God. In both the Aristotelian and early Copernican cosmos, God's throne had been positioned beyond the outermost sphere of the cosmos. In the infinite gridded

universe of Descartes and Newton, there could be no such location since every place is theoretically the same; therefore, only an immanent Deity could preserve continuing contact with his creation. As a result, a persistent tendency of seventeenth century thought is the identification of God with space or with a space-filling ether. During the seventeenth century, the previously mystical and incommunicable vision of a Neoplatonic *anima mundi* increasingly becomes a necessity of rational theology. With respect to the present work, As Margaret Wertheim suggests, such struggles continue with the current dreams and desires associated with technology: "Immortality, transcendence, omniscience... are dreams beginning to awaken in the cyber-religious imagination" (1999, 265).

A range of contemporary thought has taken into account the various micro-social processes and practices and further complicating Weber's narrative of modernity. These perspectives are productive when compared to his conception of space, which largely mirrors an "abstract" understanding of space that abides by the human mastery of the physical world. Concepts and practices of space and subjectivity, however, "reflect the societies from which they spring" (Wertheim 1999, 307). They are conditioned by the historical contingencies out of which they emerge. For this reason, I view the maintenance and propagation of the disenchantment hypothesis to be linked to a wider view of the modern world as "a place of dearth and alienation," which "ignores and then discourages affective attachment to that world" (Bennett 2001, 3). As Erich Fromm has argued, the modern alienated subject is one for whom "the world (nature, others, and he himself) remains alien. . . They stand above and against him as objects, even though they

may be objects of his own creation. Alienation is essentially experiencing the world and oneself passively, receptively, as the subject separated from the object" (1961, 44). One of the biggest issues for Weber, which numerous theorists of space have addressed, is the philosophical problem he reproduces of a Cartesian or Euclidean description of space in modernity as primarily mechanistic, lifeless, inert, and neutral. Space is the realm of "the dead, the fixed, the undialectical, the immobile" (Foucault 1980, 70). This view is endlessly replicated, in various empiricist, neoclassical, and instrumentalist conceptions of geographic relations, and denies the inescapable situatedness of knowledge. Since Weber's declaration of the "disenchantment of the world," a greater focus has been placed on the micro-social level of everyday experience and its dynamics with the wider macro-societal level.

I argue that space is a central field for the formation of social reality and is therefore grounded, relational, and lived with in association with various materials, objects, environments, practices, and imaginations. These materials and imaginations assemble and reassemble in changing configurations of power and re-articulated meanings. Space is a dynamic "product of interrelations" where embedded practices are "always in process" (Massey 2005, 10-11). This position has often been ignored by theorists due to a dominant and essentially naturalized logic of space understood as abstract or "given," a logic informed by Ptolemaic views of perspectival representation. Here, the techniques of mapping space are supported by and reflected in a detached, all-knowing, objective observer. This is an epistemological standpoint that Derek Gregory

(1994) characterizes as the "world-as-exhibition,"[42] one where the world itself is made alien to us by being overlaid with various technological, economic, and governmental abstract formalizations. This perspective, emerging during the Renaissance and gaining strength alongside modernity's march is common to various positivist conceptions of space, and confers a particular status, and thus power, to the knower as a rational, presumably male, all-knowing ego.[43] Gregory labels this position "ocularcentrism," which is well suited to the historical process of commodifying social life and space.

Any research into the fundamental exercise of power should take note of "the articulation of forms of power within spatial configurations" (Massey 2005, 93). As opposed to being a site of frictionless or disenchanted rationality, space "is always differentiated, it is always sexual or racial. . . always constituted out of circulating capital and. . . subject to the invisible boundary lines which determine inclusions and

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[42] Gregory's use of the term derives from Heidegger's "world as picture" where the "fact that the world becomes picture at all is what distinguishes the essence of the new age. The world appears as re-presentation 'for man.' In the classical age, to the contrary man is the one who is looked upon by that which is. Put simply: the gods or God used to look upon us and we had a perception that they he watched us; now we look at the world and we understand the world as that which we can see" (1977, 128-129).

[43] Gregory insists that rather than compromise some inherent "truth" dissociated from historical experience, the "world-as-exhibition" can be revealed through various postmodernist, poststructuralist, and post-colonial perspectives, as one scopic (albeit powerful) regime among many. He upholds the poststructuralist position that any standpoint is incomplete and situated, linked to a power interest and refracted through various prisms of social position. Therefore, "knowing one's place" is as much a geographical as an epistemological position. Discarding the "world-as-exhibition" opens the door to creative epistemic encounters, including feminism and subalternity, that take marginalized voices and their positionality seriously within the topographies of power.

exclusions" (Rogoff 2000, 35). Drawing on Foucault,[44] knowledge and power intersect in temporary constellations,[45] and the ways in which space is demarcated and brought into Western frames of understanding distinguish critical boundaries among identities, self and other, and strengthen particular regimes of power and knowledge.[46] Identifying this dynamic is important for my research as communication and navigation technologies contribute to the formation of spatial arrangements of power. For Harold Innis, these technologies enable the continuing production of spatially differentiated boundaries and hierarchies of power, which he describes as centers and margins (1951; 2007). Additionally, in relation to technologies of space or mobility, populations or subjectivities, whether deemed problems or healthy and productive, are directly modulated by various formations of power (cf. Packer 2008).

The process of demarcating space is particularly important as representations of space are always constructed symbolic forms (cf. Monmonier 1996) "grounded in issues

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[44] I understand Foucault's categories of inclusion and exclusion not only in relation to discourse but in terms of spatial relationships as well. This includes both the level of the imaginary and the level of the real. Foucault was interested in the physical divide of segregation and exclusion that is inscribed into physical material spaces, a distancing of the Other from the Same, and for this reason, tended to outline the terms of madness and reason, sickness and health in spatial terms. See Foucault (1973; 1977; 1980; 2007).

[45] It is interesting to highlight Foucault's early defense of a "general history": "a total description draws all phenomena around a single centre - a principle, a meaning, a spirit, a worldview, an overall shape; a general history, on the other hand, would deploy the space of a dispersion" (1977, 10). With these remarks about "spaces of dispersion," he appears to envision a spatialized ontology of the social world across which all of the events and phenomena pertinent to the substantive inquiry are "dispersed."

[46] In the preface to Jeremy Bentham's *The Panopticon*, Foucault writes win 1977, "A whole history remains to be written of *spaces*—which would at the same time be the history of *power* (both of these terms in the plural)—from the great strategies of geopolitics to the little tactics of the habitat" (1980, 149).

of positionality, in questions of who has the power and authority to subsume others into [their] hegemonic identity" (Rogoff 2000, 21). For instance, when I approach physical space, "there are no lines of latitude and longitude in nature, but by overlaying the globe with this particular. . . symbolic organization, order is imposed on spatial organization," therefore, "different maps. . . produce quite different realities" (Carey 1988, 26, 28). The fragmentation of space, then, "as well as the appearance of spatial coherence and homogeneity are social products and often an integral part of the instrumentality of political power" (Soja 1989, 126). Of course, as any architectural rendering confirms, representations of space often intersect with physical space as built forms extend these articulations of power. This is also seen in the construction of "interdictory spaces," designed to "divide, segregate and exclude" and they "have become landmarks of the *disintegration* of locally grounded, shared communal living" (Bauman 2007, 77-78). Here, the "ambient, if subliminal, fear of the unknown" is directly attached to these spaces (85).

Constellations of power are a driving force behind the propagation of space as abstract and therefore disenchanted. Moreover, naturalization of the concept of abstract space is also a wider component of the fetishization or abstraction of labor that omits the historical antagonisms within social relations of production. However, because "abstract space harbors specific contradictions," it "carries within itself the seeds of a new kind of space" (Lefebvre 1991, 52). This "new kind of space" is the emergence of or at least the possibility for a meaningful (politically reactive) "differential space." This point is key to Lefebvre's attempt at developing a radical phenomenology of space as the humanistic

basis for a critique of the denial of individuals' and communities' "right to space" that is driven by the rationale of abstract space. His "triple dialectic" is positioned as a way to highlight not only the fluidity of conceptions of space, but the illumination of potential locations for "differential space." The "perceived space" of everyday social life and commonsensical perception considers popular action and attitude but such space is often absent in the professional, and theoretical "conceived space" of cartographers, urban planners, and property speculators. Nonetheless, everyone also dwells in a "lived space" of the imagination which has been maintained, made accessible, and transformed by the arts, literature, and technologies of representation. This third space (Soja 1989) has the power to reconfigure the balance of popular "perceived space" and official "conceived space." In other words, spatial practice is shaped by representations and conceptions of space, and vice versa, an understanding that is supported by various approaches to phenomenological geography and theories of experience and space (cf. Tuan 1974, 1977; Hillis 1999). This phenomenological approach underscores a process of subject formation that is rooted in the configuration and flow of power through practices and relations with technologies and spatial environments.

The supposed triumph of abstract or disenchanted space over conceptions of space that take into account lived experience is made particularly clear in instrumentalist conceptions of space, a position made possible only if representations of the world are held to be completely detached from the world in which they reflect. Certainly, the growth of micro-electronics within and across technology-rich nations has allowed computerized networks to become dominant modes of organization around the globe (see

again the "space of flows" in Castells 2000)[47] even as it also makes possible rapid connections among individuals (illustrated by examples such as "smart mobs" in Rheingold 2002). In some ways, this is an important foundation for the modern "frame." Indeed, emphasis must be placed on the material supports that circulate people, objects, and information at various spatial ranges and speeds. These supports include not only material objects but the structured, physical routes including networks of footpaths, cycling tacks, railways, telephone lines, public roads, computers and airports (Graham and Marvin 2001).

However, any focus on these material supports must be wary of arguments that over-emphasize the conquest of information and its liberation from places, borders, and location (typified by Castells' "network society").[48] Arguments such as Castells' propagate a fetishism of uninhibited mobility, unobstructed capital, and unrestricted space. They frequently assume an "*aspatial* view of globalisation," which in a similar way to Weber's progression of disenchanted rationalism, entails an "unthinking technological determinism or. . . the inevitability of market expansion" and "comes to have almost the ineluctability of a grand narrative" (Massey 2005, 82). In contrast, working to reconnect questions of space and technology to the everyday and lived contexts within which they are produced, maintained and consumed, supports opening up

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[47] For Castells, networks "constitute the new social morphology of our societies, and the diffusion of networking logic substantially modifies the operation and outcomes in processes of production, experience, power, and culture... the network society, characterized by the pre-eminence of social morphology over social action" (2000, 469).

[48] This position often ignores subjects such as refugees or vagabonds who are unable to escape and avoid obligations as they are pushed and forced to move about, be surveilled, and sometimes made immobile (Bauman 2007).

the theoretical spatial imagination. This reconnection shifts analysis away from a purely "thinking" subject towards one that is engaged with material life and practices as well as imaginations that are often intertwined with affective states of wonder, mystery, or meaningful enchantment. In this chapter's concluding section, I consider how these affective states, in association with an allegorical machine's production of space and interface with the sublime, often slides between the natural and supernatural imagination that has long haunted interactions with media technology.

E. SUPERNATURAL TECHNOLOGY

The modern sensation of transcendence through immanence is often generated by the use of and fascination with the technological. Through various interactions with technology, glimmers of the wondrous, sublime, uncanny, and transcendent have inveigled the imagination for centuries even as this relationship with technology contradicts the rationalized, disenchanted, and more spatially abstract views associated with modernity. The modern "alienated" self remains open to discursive appeals to engage with the transcendent including technologically-inflected appeals to "see what's on the other side of too far" and "play the angel's advocate." In the moments of creation and interaction with technology, there has been a recurring impulse to transcend the limits felt to be imposed by spatiotemporal reality, an impulse which points to repeated struggles with the sense of "porous" subjectivity with the world supposedly denied by modernity. Historically, doubts regarding the authenticity of the mundane world functioned alongside a belief in an otherworldly reality that transcended yet anchored the sensible realm. Living and experiencing the world was likened to living in a Platonic shadow-world from which only partial liberation could be gained through considerable intellectual or spiritual exertion.[49] Today, the relative unease with the mundane world, whether as cause or effect, exists alongside a belief in the power of technology to reconstitute an individual's relation to the world in a manner that renders it ever more

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[49] It is interesting to consider the wider socio-cultural context in which these views re-surface. The belief in an otherworldly reality tends to have more popularity during times of intense social unrest. For instance, Plato developed his ideas during the events of the Peloponnesian War. Today, the same could be said regarding the general destabilization associated with Neoliberal economics.

amenable to human control and calculation. The efforts towards the containment and calculation of the vague serve as a foundational principle for such instrumental rationalization:

> Rationalization encompasses a variety of related processes, each of which opts for the precise, regular, constant, and reliable over the wild, spectacular, idiosyncratic, and surprising. In addition to eschewing magic as a strategy of will (i.e., 'scientizing' desire), rationalization also systematizes knowledge... instrumentalizes thinking... secularizes metaphysical concerns... and, finally, replaces traditional bonds as the basis of social order with those founded on the natural reason of men (Bennett 2001, 58).

Attempts to secularize metaphysical first principles, however, often gloss over how efforts to exchange the means for obtaining Truth from spiritual, magical, or scientific practice and belief can share common goals. One approach to the practice of magic is broadly understood as a form of noetics—a practical technique where one's thoughts have a corresponding efficacy or power in the external world. This is complemented by a view that magical practice allows one to create or manipulate various interdependencies in the natural (or supernatural) world. "For the thinkers of the early Modern Age, magic was a cipher for the art of conceiving of things and living beings as enclosed and pervaded by specific interdependencies. At all levels of being, the relationships between things—in magological terms, their binding power and bindability—take priority over their being-in-itself" (Sloterdijk 2011, 220). This Neoplatonically-inflected conception of relationality posits that we are awash with "discrete interdependencies between the things populating a highly communicative universe" (220). Magic, then, is a practice that offers the possibility for communication between the natural world and the occulted order that is separated by a veiled threshold. Moving beyond this threshold provides access to a

domain regulated by desire. This domain might be populated by primary and eternal substances or by strange and surreal beings. When the threshold between the natural world and this otherspace is lifted, however, what is "beyond" or "outside" can pass through.

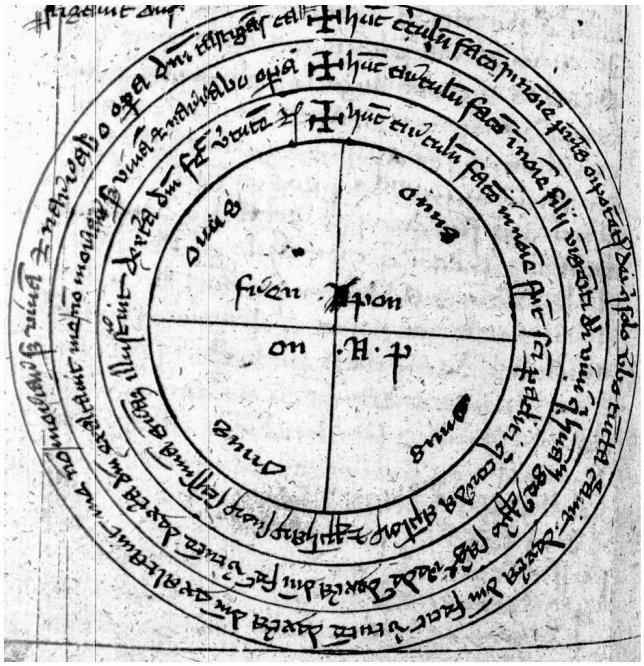

Figure 3.1 Magic circle from the 15th century grimoire, *Liber incantationum* (otherwise known as the *Munich Manual of Demonic Magic*)[50]

The magic circle reproduced above represents one particular formation of this threshold, which itself is a sort of occult media device. As Thacker writes, "the motif of the magic circle serves as a boundary between the natural and supernatural, and the possible mediations between them that are made possible by the circle itself. Hence the magic circle is not only a boundary, but also a passage, a gateway, a portal" (2011, 55). In

[50] The original is housed at the Bavarian State Library in Munich, Germany. It is also online at http://daten.digitale-sammlungen.de/~db/0003/bsb00037155/images/ (accessed March 8, 2013).

such a way, then, the threshold is akin to an interface, which is a liaison between at least two bodies or spaces. However, the interface-as-liaison itself generates a range of animations, one of which is the consistent reminder of the inherent hiddenness of the world. In relation to this particular interface, Christopher Marlowe's Faustus uses a magic circle as a way of conjuring answers in relation to hidden mysteries of the world. Faust asks, what divine forces "Make nature's hidden powers around me, / manifest?" (Marlowe 2008, 438). This occult mediation inspires Faust to consider the interconnectedness of the world as he notes, "All weaves itself into the whole, / Each living in the other's soul" (447-448).

As with science, many forms of metaphysics depend on a belief in veiled universal laws. The foundation of knowledge contributes to a performance of a scientific or magical practice that is linked to wide fields of knowledge and our hybrid relation with nature. As Erik Davis notes, "Both traditional magic and modern science are concerned with empirically understanding and manipulating natural forces and hidden universal laws" (1998, 173). In fact, there were significant contributions made by monastic orders, ancient and medieval theologians, alchemists, astrologers, magi, and others to the growth of the technical arts, including timekeeping, optics, medicine, architecture, and, especially for purposes of this dissertation, navigation and astronomy (cf. Mumford 1934; Yates 1972; White Jr. 1978). In the first book of *De Occulta Philosophia* (1533), Agrippa lays down the foundations of magical practice (or the "rationality of magic") and its formative relationship with other branches of knowledge:

> Magic is a faculty of wonderful virtue. . . containing the most profound contemplation of most secret things, together with the nature, power,

> quality, substance, and virtues thereof, as also the knowledge of whole nature, and it doth instruct us concerning the differing, and agreement of things amongst themselves, whence it produceth its wonderful effects, by uniting the virtues of things through the application of them one to the other, and to their inferior suitable subjects, joining and knitting them together thoroughly by the powers, and virtues of the superior bodies (1993, 5).

Agrippa, like most "qualified" practitioners of magic, reaffirms the belief in astrology and the principle of sky-ground dualism which is a branch of esoteric superstition that is usually under attack when modern authorities scrutinize modes of irrational belief. This dualism is exemplified in a section of the "Emerald Tablet" of Hermes Trismegistus: "What is below is like that which is above; and what is above is like that which is below: to accomplish the miracle of the one thing" (711).[51] Yet this very principle also sporadically resurfaces in modern science, and thereby allows the enchanted world to reappear in otherwise rationalized areas (whether in reference to celestial bodies or a divine creator; cf. Noble 1997). One could argue, for example, that this is the driving force behind efforts to link the theory of general relativity and quantum mechanics, where string theory is one such effort to create a unified theory of relations.

Another example is found in Niels Bohr's description of the structure of the atom, which he offers in his 1922 Nobel prize in Physics Award Address: "In this picture we at once see a striking resemblance to a planetary system, such as we have in our own solar system" (1987, 316). His colleague Max Born quickly grasped the analogy and pointed out that this concept performed "a great magic; indeed its form is rooted in the

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[51] The connection of "above" and "below" points to a close inter-relationship between various levels of reality: physical, mental, and spiritual. These levels all directly influence one another.

superstition (which is as old as the history of thought) that the destiny of men could be read from the stars" (Miller 2002, 114-115). Of course, Bohr's model of the atom went on to be modified and the similarity with the solar system disappeared, but the example reveals the ongoing linkage of scientific and pre-scientific concepts. Aleister Crowley, the influential English occultist and ceremonial magician extended Agrippa's approach with his 1929 decree that magic "includes all acts soever. Anything may serve as a Magical weapon; ...a Magical Operation... may be defined as any event in Nature which is brought to pass by Will. We must not exclude potato-growing or banking from our definition" (1991, 114, 107).

A more recent and illustrative example of the discourse surrounding scientific attempts to unlock the hidden layers of the universe is the effort to analyze the mysterious dark matter that pervades the firmament. As a *National Public Radio* pundit describes this "Shadow Universe" to his audience, "I have bad news for you. You don't matter. Not very much. Not really at all. The darkness, that's what matters. Many folks have heard of Dark Matter and Dark Energy. Most folks, however, can't tell you anything about them. They're dark. They're lurking out there" (Frank 2012). A *New York Times* article on a scientific device (the Alpha Magnetic Spectrom) that is intended to document this perplexing "matter" describes the universe in a way that would not be out of step with an enchanted or transcendent frame:

> You might think you learned in high school that the universe is made of atoms and molecules, protons and electrons, stars and galaxies, but over the last few decades astronomers have concluded—not happily—that all

> this is just a scrim overlying a much vaster shadowy realm of invisible 'dark matter' whose gravity determines the architecture of the cosmos.[52]

Interestingly, the original legitimacy of the "venerable" modern scientific traditions was based, especially during the Renaissance, on a depiction of the magician as an erudite, omniscient savant and polymath. The forms of knowledge and general questions posed by the occult master, however, quickly became subsumed in "enlightened" and "rational" scientific thought. In the seventeenth-century, scientists such as Francis Bacon, Joseph Glanvill, John Wilkens, and Isaac Newton were interested in what the Scholastics had identified as *actio in distans* (action at a distance) and positioned its explanation as a dominant problem, not only for natural philosophy and physics, but communication as well. Such a question as "How can one body influence another without palpably touching it... sets [the idea of] 'communication' on its modern course" leading to a spiritualist undercurrent that continues to flow throughout most modern communication technologies (Peters 1999, 78). Indeed, as Peters continues, the "concept of communication as we know it originates from an application of physical processes such as magnetism, convection, and gravitation to occurrences between minds. . . Francis Bacon, for instance, the founding spokesperson for modern science, thought it 'agreeable to reason, that there are at the least some light effluxions from spirit to spirit, when men are in presence one with another, as well as from body to body'" (1999, 78).

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[52] Dennis Overbye, "A Costly Quest for the Dark Heart of the Cosmos," *The New York Times*, November 17, 2010, A1.

However, the modern characterizations of enchantment, magic, and transcendence position them as inexplicable as exemplified in the "magic" of advertising or various means of commodity fetishism. Simon During's work suggests that the constitutive role of this particular brand of "secular magic" is used "to express perceptions of modern society's astonishing, unpredictable, or uncontrollable qualities" (2002, 41). Many popular technologies occupy a similar position, including Apple's iPad. In a promotional video for the mobile computer, industrial designer Jonathan Ive aligns the iPad with modes of enchantment: "You know it's true, when something exceeds your ability to understand how it works, it sort of becomes magical. And that's exactly what the iPad is." Such a statement closely resembles the third law of prediction coined by science fiction writer and inventor Arthur C. Clarke: "any sufficiently advanced technology is indistinguishable from magic" (1973, 36). Recall AT&T's "Rethink Possible" promotional campaign. The very prompt to rethink possible attempts to introduce a sense of magical thinking and a sense of sublime awe when approaching locative media in order to "see what's on the other side of too far." AT&T frames the locative media technology as a magical, awesome means to interact with individuals and spaces that exceed our understanding and sensible experience.

Elements of magical thinking, then, continue to maintain power and resonate in the contemporary cultural imaginary. This could point to a healthy struggle between modern scientific rationality and Western dreams of perfected mediation or an invisible interface (cf. Peters 1999; Sconce 2000). Indeed, as Foucault notes, the historical development of analytical economies/grids of time and space is rooted in the disciplined

construction of rationality and the elimination of "confusion" (1977, 143-145). As the techniques of supernatural or religious experience of space are marginalized by the technologies and discourses of scientific materialism, the cultural politics of spatial encounters and temporal boundaries are pressured to become thoroughly rationalized. As Maurice Perkins notes, "In appropriating the previously magical functions of prediction, modern forecasting has become a powerful means of excluding alternative interpretations of the future" (2001, 6). In a way that mirrors the "progress" of scientific techniques of forecasting, the rationalization of navigation and orientation technologies by the "predictive scientific assemblage" has in effect, moved "to eliminate the serendipity and surprise of the great outdoors" (Berland 2009, 219). The vague is put under the pressures of intelligibility.

The recurring echoes of mystical and magical practice in association with technology are not anachronisms. As Davis reminds us, "technology operates as easily in a magical universe as a rational one; indeed, from the perspective of cultural narratives and political power, technology often functions *as* magic" (1998, 172). Ioan Couliano, in his prescient study on *Eros and Magic in the Renaissance*, extends this relation of technology and magic:

> Historians have been wrong in concluding that magic disappeared with the advent of 'quantitative science.' The latter has simply substituted itself for a part of magic while extending its dreams and its goals by means of technology. Electricity, rapid transport, radio and television, the airplane, and the computer have merely carried into effect the promises first formulated by magic, resulting from the supernatural processes of the magician: to produce light, to move instantaneously from one point in space to another, to communicate with faraway regions of space, to fly through the air, and to have an infallible memory at one's disposal (1987, 104).

In the "modern" age, magic is understood as something that was or should have been replaced by a more serious use of techniques and instruments that include processes and effects empirically verified by scientific methods and reasoning. This turning away from magical practice is predicated on the divide between pre-modernity and modernity. This is an outcome of a process that Bruno Latour (1993) has described as "purification" where the construction of nature and science as categories separates things and subjects including the human and non-human worlds. The result is that the real, the discursive, and the social come to be understood as pure forms separate from one another. As locative media exemplify, however, modernity is consistently and pervasively haunted by its very efforts to disenchant the world (cf. During 2002; Meyer and Pels 2003; Styers 2004; Warner 2006).

As already discussed, one of the more influential arguments regarding the separation between the pre-technological and technological eras is illustrated by Weber's disenchantment thesis. In association with the attempts to eliminate or move beyond enchanted relations between subjects and space, this perspective aligns the technical calculability of the world with a significant loss of meaning. This consideration of loss is a dominant theme for modernity: the loss of un-alienated labor, of community, of tradition, and of an existence steeped in the deep meaning of shared ritual. The transition towards a disenchanted, technological era is illustrated by Hannah Arendt's description of the "experience of instrumentality" as part of her analysis of the function of *homo faber* (or "man the maker"). Work, in direct association with the function of instrumentality, "is the activity which corresponds to the unnaturalness of human existence… Work provides

an ‘artificial’ world of things, distinctly different from all natural surroundings” (1958, 7). The generation and instrumental configuration of this world reconfigure meaning in relation to the natural world. In this mode of activity, humanity as “*homo faber*, the toolmaker, invented tools and implements in order to erect a world. . . where everything must be of some use, that is, must lend itself as an instrument to achieve something else, meaning itself can appear only as an end, as an ‘end in itself’” (151, 154). *Homo faber,* when compared to *deus faber* (or “God the Maker”), represents a significant shift in the position of meaning-making in relation to the natural world. Indeed, as Sloterdijk writes, from “a conventional point of view, the historically established preconception that there must be an unbridgeable hierarchical divide—an ontological difference—between creator and creature” is under constant revision (2011, 39-40).

The historical origins of the *deus faber* or Demiurge as an architect of all matter are found in the writings of Plato and extend to Gnostic understandings of the Great Architect of the Universe. In Medieval and Renaissance representations of the Christian God, the deity is positioned metaphorically as an architect who “laid the foundations” (Book of Job 38:4) and “set a compass upon the face of the earth” (Proverbs 8:27). The shift from *deus faber* to *homo faber* is modernized in a different way by the influential fantasy writer J.R.R. Tolkien’s use of the term “sub-creator.” He uses the term to describe a human’s ability to craft secondary worlds that we can desire or fear and are also able to imagine so that “your mind can enter” (1966, 37). A devout Catholic, Tolkien subordinates the sub-creator’s ability to create (other) worlds or (other) spaces to the divine creator of the primary world. His reconfiguration of *homo faber* as a potential

demi-god, however, can be read as an attempt to re-enchant the relations between the self and external environments to respond, as it were, to Arendt's concerns. His defense of the human ability to develop other worlds through the act of writing is a significant shift when considering the powers and practices of world-creation. Tracing ideas of world-creation from Weber to Arendt to Tolkien demonstrates that this struggle and potential shift takes place across various registers of philosophy, culture, and everyday practice. This shift is also apparent in contemporary human interactions with modern computers which are often described as "magical" as they provide access to networked places where, in the words of Les Solomon, "every man can be a god" (Levy 1994, 190).

Modernity's leaky boundaries between *homo* and *deus faber*, however, are usually not viewed to undercut the rational world due to the intermediary of technology, as "the machine . . . is the enabling conceit that gives us, as rationalists, permission to journey to the transcendental otherworld as a fantasy experience without having to acknowledge a direct contradiction to our worldview" (Nelson 2001, 21). Indeed, to understand "the disguises of the supernatural in Western culture after the year 1700 means looking most of all at the larger idea of the machine and the mechanical" (58). These disguises have blurred the relations among modes of enchantment, forms of belief, magical thinking, and the machine following the scientific rupture of rational and irrational modes of being. Jeremy Stolow has argued for the need to "revisit and revise the very supposition that religion and technology exist as two ontologically distinct areas of experience" and that more work needs to consider, not deus ex machina, but "*Deus in Machina*" (2013, 2).

I am arguing in this chapter that technology has become a site for the re-situation of spiritual belief within modernity. Authors such as Victoria Nelson are not advocating that we "see the door in the sky, and walk through it," rather, she pushes us to reconsider why the door continually reappears in all of its manifestations as well as why the desire to turn the handle remains constant despite ceaseless pressure from onto-scientific rationalism. In terms of media technology, consider what happened after the introduction of devices that could record and reproduce sound. A widespread belief quickly arose that "they separated sounds from their sources or that sound recording allows for us to hear the voices of the dead—[these] were not and are not innocent empirical descriptions of the technologies' impact... For many of their inventors and early users, sound-reproduction technologies encapsulated a whole set of beliefs about the age in which they lived" (Sterne 2003, 8). Consider, too, the example of photography in the nineteenth century. As Gunning writes:

> If photography emerged as the material support for a new positivism, it was also experienced as an uncanny phenomenon... creating a parallel world of phantasmic doubles alongside the concrete world of the senses verified by positivism... While the process of photography could be thoroughly explained by chemical and physical operations, the cultural reception of the process frequently associated it with the occult and supernatural (1995, 42-43).

The continuing spiral of utopian and dystopian fervor underpinning the concern about communicating and connecting in the modern world, then, is rooted in a deep history of connections, conduits, and gaps. The "dualism of 'communication'—at once bridge and chasm... has simultaneously called up the dream of instantaneous access and the nightmare of the labyrinth of solitude" (Peters 1999, 5). This desire for immaculate

communication at a distance is a "quest for authentic connection" (180). Bolter and Grusin argue that this desire for the authentically "real" (they use the term "immediacy") is repeatedly projected onto media technology: "whenever one medium seems to have convinced viewers of its immediacy, other media try to appropriate that conviction" (1999, 9). This "remediated" metaphysics of a technologically-induced transparency is a set of "beliefs and practices that express themselves differently at various times among various groups" (30).

As in the ages of electricity, telegraphy, television, in the current informational age prophets promote a future of universal literacy, flourishing democracy, and world peace directly tied to the technological formation and its associated "religion of progress" (Winner 1986, 170). Belief in salvation associated with science and technology involves a "religious conviction that a widespread adoption of computers and communications systems along with easy access to electronic information will automatically produce a better world for human living" (ibid., 105). Behind such dreams is the fallacy that as media technologies "improve," so too will the very process of communication itself as if "better wiring will eliminate the ghosts" of communication (Peters 1999, 9). Peters' offers valuable historical insight into Western culture's interminable (and for Peters, ultimately doomed) dream of a world where all boundaries to successful communication magically dissolve to allow for an absolute communion among souls. Peters is less than optimistic about such possibilities yet points to the recurring efforts (and their effects) to achieve such communion:

> 'Communication'. . . is not a matter of improved wiring or freer self-disclosure but involves a permanent kink in the human condition... That

> we can never communicate like the angels is a tragic fact, but also a blessed one. . . Communication failure, again, does not mean we are lonely zombies searching for soul mates: it means we have new ways to relate and to make worlds with each other. My emphasis on the debt and dream of communication owes to the ghosts and strange eros is intended as a corrective to a truism that is still very much alive: that the expansion of means leads to the expansion of minds (29).

The attempt to realize this "dream of communication" is repeatedly materialized through technology and the beliefs and imaginations tied to it, which are often "emblematic of the human desire for transcendence, command, or creativity" (Barney 2000, 6). Most media technologies are rooted in a belief in the systematic transcendence of bodily or sensory relations with the world. For instance, the development of glass in the thirteenth century that enhanced sight, innovations in transportation technologies that led to desires to command, conquer, or eliminate space and time, technologies of media transmission and inscription throughout the nineteenth and twentieth centuries, computers and technologies of consciousness, and biomedical technologies transcending, commanding, and creating the biology of human life (and death).

If one limits an analysis of the metaphysical impulses associated solely with electronic communication technologies, one finds a deep trajectory rooted in the relation between media technology and the recurring dreams of transcendence. Sconce asks, "Why is it, after 150 years of electronic communication, we still so often ascribe mystical powers to what are ultimately very material technologies?" (2000, 6). Both Sconce (2000) and Peters (1999) point to how inventions like the phonograph, film, wireless telegraphy and the discovery of X-rays or radioactivity were not so much perceived as "disenchanting the world" than as enlarging the realm of marvelous and magical

phenomena. As Friedrich Kittler argues, "Media always already provide the appearances of specters" (1999, 12). For instance, as the use of wireless telegraphy allowed for communication at a distance, the possibility of a human being sending and receiving signals over large distances *without* an apparatus became an idea that seemed possible in the future. Such a "telegraphic imagination" closely tied to the nineteenth-century Spiritualist movement led to the formation of "'electronic elsewheres' imagined in connection with wireless, radio, and television" (Sconce 2000, 58). The inventors of the telephone continued this interest in spiritualistic séances, where they hoped that the new apparatus would help promote communication between those present and the dead.

Tom Gunning shows that the seemingly obsolescent spiritualist movement and the results of modern technology have a good deal more in common than generally acknowledged. Gunning points to David Brewster, a scientist of optics who in 1856 thought it was quite possible for the photographer "to carry us even into the realm of the supernatural" and "give a spectral appearance to one or more of the figures and to exhibit them as 'thin air' amid the sordid realities of the stereoscopic picture" (Gunning 1995, 47). Photography helped make the hidden visible: ghostly superimpositions made their appearance where the viewer would not have expected them. Behind photography's ability to develop im/materialized doubles[53] was arguably the most important illusionary

[53] A double that is translated to the realm of information; see Deleuze's (1995) consideration of the *dividual* and Mark Andrejevic's (2004) work on how this connects to productive modes of surveillance.

and spiritual medium: light.[54] As Schivelbusch notes, "The new media of the nineteenth century. . . were pure aesthetic, technical creations born of the spirit of light. . . The picture world of the new media offered endless opportunities for creating illusions,[55] belonging as it did to a different existential sphere from the reality in which the audience was sitting" (1988, 213-214).

For Peters, occult forms flow throughout the history of the human relationship with media technology: "Ghosts and angels haunt modern media, with their common ability to spirit voice, image, and word across vast distances without death or decay" (1999, 75). Such a haunted view of mediated telepresence, or "contact between people via an invisible or elusive material linkage" is at the heart of communication (103). This could even be argued to be a central function for semiotics, as Hillis writes:

> At least since Saussure's theory of signs, it has been accepted that words or linguistic signs are two-sided. They consist of a signifier (the sound if spoken) and a signified (the meaning to which the signifier refers)... The severing of material and conceptual elements, of body from idea, flowing from the need to use representational devices to transmit information across space understood as distance, inserts a difficult-to-avoid metaphysics into what it is to communicate (1999, 68).

Desire for technological transcendence is longstanding and drives early considerations of technics, mechanical arts, useful arts and mechanics. It manifests itself in the ways, for example, that an earlier technology of orientation such as the astrolabe (chapter 4) is

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[54] Ken Hillis relates the transcendent qualities of light to contemporary desires associated with virtual reality: "The transcendency of Platonic light and its withdrawal to a pure and otherworldly state—locality in transcendence—is mirrored in the contemporary virtual world" (1999, 174). His discussion of light, dazzlement, and transcendence is particularly useful here (see 172-178).

[55] For more on the important aspect of illusion in association with early photography and cinema, see Jonathan Crary (1990).

discursively framed by those writing about it when it was "new." In *The Religion of Technology*, David Noble outlines the intertwined paths of technology and religion that run from the Middle Ages to the present, asserting that "the technological enterprise. . . remains suffused with religious belief" (1997, 5). In Noble's account, this is an age-old spiritual transcendentalism now breathing through machines. Davis charts a longer period than Noble and traces the reverberations of "technomystical impulses" throughout the history of information technology, from ancient Gnosticism to the utopian fantasies attached to the internet by 1990s promoters: "technologies can serve as the vehicles for spells, ghosts and animist intuition. . . [and] can also provide launching pads for transcendence, for the disembodied flights of gnosis" (1998, 6).

As most of these authors suggest, the analysis and interrogation of the re-emergence of the spiritual within and through the machinic or technological is a worthwhile endeavor. Identifying and illustrating what Nye describes as "spiritual regeneration" (1994, xx) is a useful way to reconsider a naturalized modern framework that still permits moments of spiritual animation or enchanted relations with technology and space. It is important, however, to heed Nelson's larger argument:

> The new sensibility does not threaten a regression from rationality to superstition; rather, it allows for expansion beyond the one-sided worldview that scientism has provided us over the last three hundred years. . . Even as we see all too clearly the kitsch of much New Age religiosity and fear the rigidity of rising fundamentalism, we remain alarmingly blind to our own unconscious tendencies in this same direction. . . We forget that Western culture is equally about Platonism and Aristotelianism, idealism and empiricism, *gnosis* and *episteme*, and that for most of this culture's history one or the other has been conspicuously dominant—and dedicated to stamping the other out (2001, 288).

Philosophers of media and technology such as Bernard Stiegler have extended this position, arguing that such a reconfiguration of the modern framework would allow us to reconsider the links among technology, desire, and consumption (much in the same way that Karl Marx did in the eighteenth century). In a 2010 manifesto, Stiegler argues that "in our current epoch electronic technologies, monopolized until now by the economic powers emerging from the 20th century as psychotechnologies at the service of behavioural control, must become nootechnologies, that is, technologies of spirit, at the service of de-proletarianization and of the reconstitution of savoir-faire, savoir-vivre and theoretical knowledge."[56] In attempting to push the conception of technology towards that of "nootechnologies," or technologies of spirit, Stiegler underscores the traditional gap between the instrumental and the spiritual in the ways that technology is conceptualized. The gap, moreover, has not been ignored by modern capitalism.

I position my work alongside such authors who are working towards an analysis of the deep histories of media technologies and their relationship to human desires for metaphysical insight, illumination, transcendence, and escape. This mode of analysis engages productively with theories of and interactions with contemporary or "new" media technologies. In terms of digital locative media, the reverberations of the kind of techno-metaphysics discussed in this chapter continue in the AT&T "Rethink Possible" campaign. The campaign positions the user as a (potentially divine) magician-creator hybrid, which deflects attention away from the political economy of the telecommunications giant. The user of locative media is often positioned as endowed

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[56] Bernard Stiegler, "Manifesto 2010," *Ars Industrialis*, October 5, 2010, accessed February 23, 2013, http://arsindustrialis.org/manifesto-2010.

with ahistoric powers of "sub-creation" (Tolkien 1966). These technologies, then, are offered by capital as a way to create and sense these secondary worlds or otherspaces that operate just outside the grasp of the non-user. These otherspaces have a longstanding influence on the human, as Sloterdijk writes: "The body of humanity seeks to create a new immune constitution in an electronic medial skin. Because the old all-encompassing and containing structure, the heavenly *continens* firmament, is irretrievably lost, that which is no longer contained, the former *contentum*, must now create its own satisfaction on artificial continents under artificial skies and domes" (2011, 25).

The decision, therefore, by AT&T to feature the song "Pure Imagination" in another "Rethink Possible" advertisement[57] is an interesting choice. In the ad, paper cutouts move throughout the streets of a city as if by magic. A flying saucer zaps an animated piece of walking toast, a dragon swims in the streets, a bus chases a three-eyed alien, and a twenty story robot moves between skyscrapers while a narrator asks, "Remember when you were five and anything was possible? Happy fifth birthday again." The camera pans to the roof of a skyscraper and focuses on a man in a suit who seems to have something in his lap. No device is shown but an illuminated aura begins to emanate from his head and face, which fudges the question as to whether this is a reflection of the light of the digital display or some celestial or divine light that infuses his very being from within due to his possession of the technology. This paean to augmented reality is reinforced by the voice of Gene Wilder singing as the character of Willy Wonka, the eccentric owner of an enchanted chocolate factory whose god-like presence hovers over

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[57] AT&T, "Rethink Possible Birthday," *Youtube*, September 26, 2010, accessed February 23, 2013, http://youtu.be/nZMZoy3rrlM.

the divine world of his creation. “Come with me, and you’ll be, in a world of pure imagination. Take a look, and you’ll see, into your imagination. We’ll begin, with a spin, traveling in the world of my creation. What we’ll see, will defy explanation. If you want to view paradise, simply look around and view it.”

The AT&T campaign positions the mobile technology user as a divine creator endowed with a magical technique that can visualize a transcendent otherspace. Access to meaning, then, becomes situated in the augmented reality the technology accesses and the desire for this access is the operative logic that the telecommunications company presumes to satisfy. In addition, the user/creator is asked to revisit and rekindle a moment of childhood wonder and enchantment that recalls a “childhood sense of the world as filled with all sorts of animate beings. . . It draws attention to an efficacy of objects in excess of the human meanings, designs, or purposes they express or serve” (Bennett 2010, 20). The locative media user becomes a magical sub-creator who deals with an augmented reality that intermixes itself and relations of mind, matter and enchantment. As Davis notes, “Magic is technology’s unconscious, its own arational spell. Our modern technological world is not nature, but augmented nature, super-nature, and the more intensely we probe its mutant edge of mind and matter, the more our disenchanted productions will find themselves wrestling with the rhetoric of the supernatural” (1998, 38). The movement through lived/representational space by way of representations of space exemplifies a powerful negotiation among the material, symbolic, and imaginative. The push for these specific modes of enchantment and the pervasive connection between

metaphysics and technology is fueled both by the attachment of meaning to objects and nature by the forces of industry and the ongoing human desire for meaning.

As technologies that organize an experience of spatial orientation, locative media and augmented reality are positioned by advocates as offering access to a transcendent otherspace. Attempts at developing and then connecting to fully automated, user-produced "spaces" relate to a more radical agenda in which individual desire gets coupled with the view of and mobility through networked data-space and physical space to achieve perpetual satisfaction. To "look around and view paradise" one has to engage with a technique to alter one's "sense ratios or patterns of perception" (McLuhan 2003, 31). Here, heightened concern with "what I need" also points towards a utopian future of individually customized worlds, where a multiplicity of individual spaces overlap and co-exist even as they may remain invisible. We can then understand the politics of the interface, from the astrolabe and magnetic compass to the divining rod and digital locative media, as involving a "partition of the sensible," which "is about the contestation of the sensible," or in other words, the contestation over what is "the given" (Rancière 2003, np.).

This politics is explicit in Marcos Novak's use of the partisan term "liquid architecture." "Liquid architecture makes liquid cities, cities that change at the shift of a value, where visitors with different backgrounds see different landmarks, where neighbourhoods vary with ideas held in common, and evolve as the ideas mature or dissolve" (1991, 250-51). This liquid approach often privileges the informational layers where the subject's body is an impediment to the flexibility of the mind and the computer.

Subjectivity, then, is conceived as needing to be relocated to "transcendent spaces" in spite of the physical body which somehow must remain "behind." While supporters of living in a "world of pure imagination" argue that locative media allow users to flexibly make "the invisible visible," they are also making a political choice influenced by Neoliberal economics and postmodern forms of thought where "the flip side of 'show me everything I want to know about the world' is 'don't show me anything I don't want to know.'"[58]

LIAISONS BETWEEN THE HUMAN AND THE WORLD

The mediation between subject and world via locative media serves as a material site for contact with the immeasurable, infinite, or unfathomable sublime and as a way to make the vague intelligible. The repetition of technological efforts to uncover metaphysical first principles (analyzed in the following chapters in the form of the astrolabe, magnetic compass, divining rod, and digital locative media) is premised on a movement towards a reclamation of a unity that exists in a magical universe. In *On the Mode of Existence of Technical Objects* (2011) Gilbert Simondon identifies the ideal of magical unityand the modern interest in reclaiming it as a force that drives modern technological development. He develops a conception of magic that moves beyond a consideration of superstitious techniques, which "are faded vestiges of magical thinking" (413) and suggests that forms of magic involve an "affective, representative, and voluntary" practice that "supports an

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[58] Jamais Cascio, "Making the Visible Invisible," *Open the Future*, August 18, 2008, accessed February 23, 2013, http://openthefuture.com/2008/08/making_the_visible_invisible.html.

ascent or an exploration" of the relations between the human subject and the world. This "ascent gives it the character of a place that is more fully developed, elaborate, and non-abstract, a place where this exchange between the world and man occur" (414). This point of exchange is precisely where the allegorical interpretation of space occurs.

Acts of magic serve to support a form of contact within a unified, mutual reality: "magical unity is the vital relational link between man and world, defining a universe at once subjective and objective prior to any distinction between object and subject, and consequently also prior to any emergence of the separate object" (411). Within this magical unity there are both privileged places and moments that are part of a reticulated whole. Simondon continues, this "magical universe is made up of the network of places providing access to every domain of reality: it consists of thresholds, summits, boundaries, and crossing points that are connected to one another by their singularity and their exceptional nature" (414). These thresholds are comparable to a spatial interface or what I consider to be a liaison between at least two bodies or spaces. For Simondon, these interfaces are magical "key-points" that modulate the relationship between humans and their world. For in "the totality constituted by man and the world there emerges as the primary structure a network of privileged sites that make possible the insertion of human effort, and through which exchanges between man and the world are carried out" (413). Technology inherits and now instantiates this dream of magical human-world relationality even as it accompanies the buffered distinction between the modern human subject and the world.

In the chapters that follow, I trace an archaeology of the material attempts to overcome this modern buffer. This "ascent" involves a tension that is introduced by a desire for a porous subjectivity that is the dominant mode of structuring a reticulated magical unity. Proponents of digital locative media, while recalling and reassembling magical modes of relating subject to world, promote a networked metaphysics within which encounters with an originary sublime are offered by way of allegorical machines. This interface involves a partition of the sensible, where the intelligibility of the ineffable or vague becomes a significant driving force (Rancière 2001). Magical key-points take up residence in various technological configurations, which offer promises of orientation to a range of unifications with what has been partitioned: the hierarchical spheres of the Ptolemaic cosmos, magnetic fields of force, electromagnetic flows of universal power, and the ubiquitous digital network. In the following four chapters I take the astrolabe, magnetic compass, divining rod, and digital locative media as individual examples of locative media that make up a wider constellation of allegorical machines. These are machines that operate as a practice of intelligibility for the ineffable presence that lies beyond the fringe of space and being.

IV. MEDIACION OF THE FIRMAMENT: ON ASTROLABES

> What is beyond?
> —*Giordano Bruno (1584), On the Infinite Universe and Worlds.*

This and the following three chapters represent different technological points within a wider constellation of locative media. While chapters are organized according to a rough chronology, the case studies they feature often overlap and many of the older technologies I discuss are still used today. The histories I offer function as a form of literary exegesis by focusing on the recurring articulations between orientation technologies and metaphysics. This serves to illuminate the shared and repeated practices, representations, experiences, and affects of allegorical machines while also offering unique particularities generated out of distinct moments in time. Overall, these histories revolve around technological apprehension of the "real" and a longstanding human relationship with spatial orientation devices and forms of mediation with the sublime and the vague. Beginning with an analysis of the astrolabe, I focus on the development and use of allegorical machines and I call attention to how the contemporary techno-cultural environment sustains and extends older beliefs and practices attached to the older technologies I assess. To accomplish this, I approach these orientation instruments from a media archaeological approach and I construct historical stories that illustrate the various tensions and overlaps between the technological and the metaphysical. These are

historical narratives about humans, their spiritual machines, and the anxieties and desires of what lies beyond space.

As intermediaries with an occulted world, allegorical machines are material sites for contact with the immeasurable, infinite, or unfathomable sublime. Indeed, technological attempts to "see what's on the other side of too far" are an acknowledgement of a widespread Western unease with humanity's finitude and they represent, therefore, the desire to interact with various registers of the divine or fantastic. In this chapter I introduce the astrolabe as a way to begin my discussion of the links between spatial interfaces and the mediation of first principles of being and space. To make these claims, I identify how the device functions and how it has been historically conceived and positioned. I first analyze how the astrolabe expands the principles and practices of the armillary sphere, which is a device that represents the spherical framework of the celestial sphere. Ancient Greek philosophers flattened the armillary sphere into a planispheric projection with the astrolabe and developed the mathematical model of stereographic projection, which offered an early method to comprehend (and be oriented according to) the infinite. I then discuss how Arabic scientists and religious figures used the device in more sacred contexts after finalizing its design. Finally, given the re-introduction of the astrolabe into Western European culture during the Middle Ages, I analyze how it became the primary instrument for decoding the heavens and linking the heavenly with the terrestrial. To summarize one of its famous proponents, Geoffrey Chaucer, the astrolabe augments reality through a "mediacion of the firmament." The astrolabe, an early allegorical machine, was both a practical and

metaphysical instrument that offered users sublime encounters with the "space beyond space."

ACCESSING THE *PRIMUM MOBILE*

I have chosen to analyze the development, use, and imaginations associated with the astrolabe due to its widespread influence on astronomy, astrology, navigation, and the arts. This device relies on an ancient practice of celestial navigation extending back to Ptolemy (90-168 CE.), intended to orient the user in space, and is an early crystallization of the imaginative depths associated in our time with digital locative media. As allegorical machines, astrolabes extended yet constrained a range of beliefs and fears related to techniques of spatial mediation. Users of the astrolabe joined terrestrial and extra-terrestrial space within "an imaginary sphere of infinite radius called the celestial sphere. This sphere [had] its center at the earth's center" (Dutton 1934, 123).

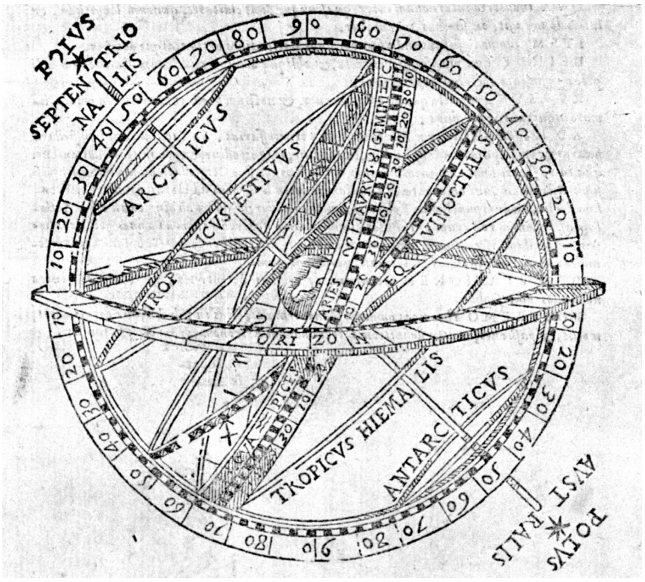

Figure 4.1 A medieval celestial sphere from Clavius' commentary on Sacrobosco's *De Sphaera* (1611)

Humans projected this imaginary celestial sphere from earth upon the sky, and its celestial equator is on the same plane as the earth's, just as its imaginary poles are extensions of the earth's poles. Likewise, the celestial poles stood for the intersections of the axis of the earth, which extended to meet the limits of the celestial sphere. In turn, the imaginative work of unveiling what lies beyond space (e.g., the poles, the ether, the firmament, the heavens) required a practice of mediating one's spatial orientation with this instrument. In particular, the astrolabe provided an orientation in space based on the infinite points of the poles and the rigid structure of the hierarchical cosmos.

I am especially interested in how the use of this locational device depends upon what is directly visible to the human eye and assists in forming an understanding of space as a closed system of celestial "boundaries" or levels. The astrolabe is commonly aligned with a medieval Christian cosmology where "beyond" the stars and "outside" physical space constituted the heavenly Empyrean of God. Ancient cosmological theories of space valued a sense of rigid order in the universe and this device allowed for an imposition of this order onto an unruly Cosmos. Such an imposition offered individuals a platform for metaphysical belief yet it also produced anxiety. The astrolabe also formalized the Platonic reduction of "celestial motions to a system of interlocking uniform circular ones which would 'save' the phenomena by revealing the permanent stability of the real behind the seeming irregularity of the apparent" (Koyré 1957, 16). The primacy of a transcendent, immaterial realm presided over by a divine spirit, however, gradually transmogrifies into a modern materialist realm where science holds the keys to the depths of the universe. This configuration of the spatial device unmasking the "real" that is

beyond the "apparent" is echoed in the development and use of the magnetic compass, the divining rod, and digital locative media.

From antiquity to the Renaissance, the astrolabe was one of the most important and widely used astronomical instruments and contemporaneously combined a practical mode of spatial orientation with forms of metaphysical mediation. It was also one of the most sophisticated scientific instruments of its era and can be considered to be one of the first mobile, analogue computers. Its primary purpose is to locate objects in the sky and use them as bearings to determine one's time or location. Fundamentally, the device "imitates the motion of the heavens. The stars may be imagined to be on a celestial sphere, and their daily rotation may be represented by the rotation of this sphere" (Lorch 2005, 1). This handheld, usually brass, instrument is essentially a movable sky chart that works on principles still used by navigators today. The device's name, coming from the Greek, literally means "star-catcher" or "star-thief," a name that positions *homo faber* as being uniquely equipped to thieve the depths of the heavens from *deus faber*. Since it is a planispheric projection of the sky's sphere—that is, it projects what we perceive as spherical onto a flat plane—the instrument is technically referred to as the "plane astrolabe." The device itself has been adapted in various ways, including the mariner's astrolabe, which was designed for the determination of latitude on a moving vessel on water.

The astrolabe's planispheric projection underscores its close relation to another device: the armillary sphere. The astrolabe, however, which uses discs to point to the spherical heavens, differs from the armillary sphere in that the latter is a spherical model

of celestial space that "revealed how the universe worked" for its users (Brown 2010, 121). The name of this second device comes from the Latin *armilla* (circle or bracelet) since it has a skeleton made of graduated metal circles linking the poles and representing the equator, ecliptic, meridians, and parallels. Usually a ball representing the earth, or later, the sun, is placed in its center.

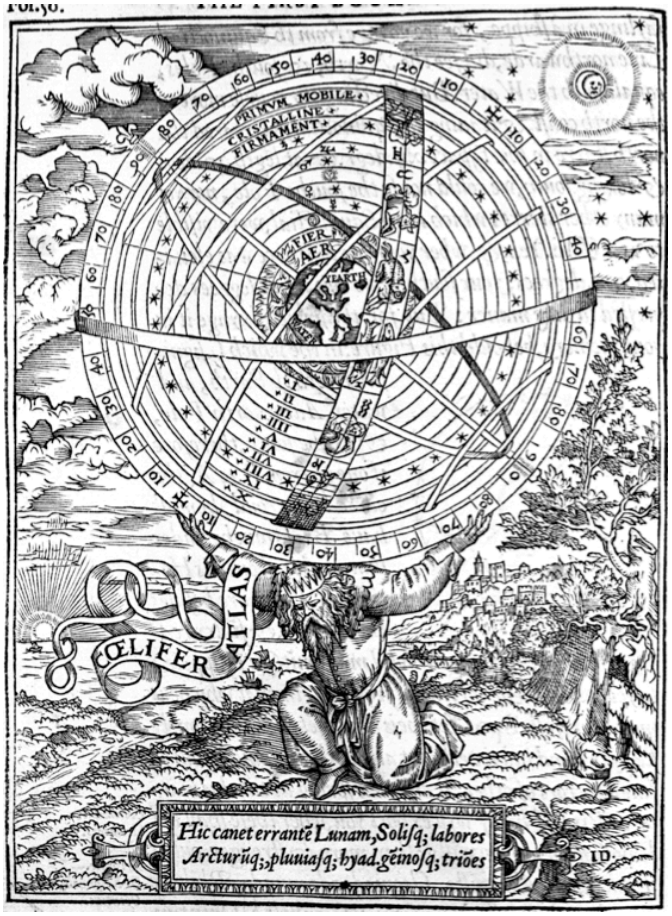

Figure 4.2 Atlas bearing an armillary sphere from William Cunningham, *The Cosmographical Glasse* (1559)

Before the European invention of telescope in the seventeenth century, the armillary sphere was the prime instrument by which astronomers determined celestial positions. Advances in the instrument's design were made by Tycho Brahe (1546-1601

CE.) whose elaborate armillary spheres merging into astrolabes are depicted in his *Astronomiae Instauratae Mechanica* (1598). Armillary spheres were among the first complex mechanical devices used by astronomers. For this reason, Renaissance scientists and public figures often had their portraits painted showing them with one hand on the armillary sphere, a strategy which suggests how long cultural and political status has been tied to technological advance.

As a device that represents the rotation of three-dimensional celestial space in two-dimensions, the astrolabe is directly tied to the armillary sphere. In fact, the creation of the astrolabe is described in a popular myth regarding an accidental destruction of the sphere. According to an Arabic folktale (Brown 2010, 133), Ptolemy the Greek astronomer was traveling on a donkey while carrying an armillary sphere in his hand. The device slipped from his grasp and tumbled underneath one of the donkey's hooves which flattened the device. Even though it is unlikely that this led to the invention of the astrolabe, the folktale does point to the combined mathematical and mythical basis for the astrolabe's development.

The astrolabe was constructed to simulate the rotation of the celestial sphere by turning a map of the stars over coordinate lines linked to the observer's visible horizon (Neugebauer 1949). The motion of the celestial spheres beyond the observer's grasp, then, could be partitioned, categorized, and measured. In practice, the problem of finding one's precise location was virtually identical with that of finding the exact locations of points in the celestial sphere such as, for example, the position of the Sun's ecliptic longitude (its place in the zodiac). Someone using as astrolabe could locate such points in

relation to the coordinates determined by the meridian and horizon and could establish the observer's local time and positioning. The astrolabe, moreover, was a metaphysical instrument, and, therefore, an astrolabist was not simply determining time or spatial orientation—the individual's place in the cosmos was being unveiled and one's body was the point of reference. Furthermore, this was a device that offered a porous connection between the subject and the Absolute. The astrolabe was offered as a machine that allowed for an individual to mediate the *primum mobile* or the "first movable" layer of the celestial sphere that directed each sphere of life within it.

This outermost sphere was understood to have its own intellect or "nous," which was a cosmic equivalent to a perfected human mind. The *primum mobile* has since gone by many names: Plotinus' "World Soul," Ralph Waldo Emerson's "Over-Soul" (2009), Teilhard de Chardin's theological description of a "noosphere" (1959), Kevin Kelly's "Hive Mind" (1994), and Pierre Lèvy's networked environment as "the infinite discourse of collective intellects" (1997, 183). In a way that is similar to attempts by proponents of digital locative media to unveil and experience "pervasive imaginaries" (Tarkka 2005, 4) that constitute a networked "layer of intelligence which is beginning to unite living things" (Thrift 2008, 166), the astrolabe is an ancient foray into a similar technological exteriorization of mind. Here, the field of the Absolute within the *primum mobile* represents a desire to mediate with a primary mode of mind, a mediation which will be reconfigured over time with other allegorical machines. As the astrolabe was implemented in various ways, it was not understood just as a mechanical depiction of the

motion of the observable universe, but also as a way to better understand the grand artificer of creation and get closer to the *musica universalis*.

At its most basic level, the astrolabe incorporates a number of discs and slides as a way to measure a plane representation of the rotating celestial sphere as seen over a representation of some observer's horizon and identifiable coordinates on the horizon [figure 4.3]. With this form of locative media, the altitude of the sun or a star above the horizon can be calculated to reveal its azimuth. This is accomplished by comparing the observable sky with the position of a star, the Sun, the Moon, or some planet that is inscribed on one of a number of flat planes or discs on the astrolabe. The first disc is an openwork star map or a chart of star projections commonly referred to as the rete. On the rete, the positions of the most luminous stars are identified by named pointers (many of which are intricately crafted as starbursts or winding arrows), and the sun, moon, and planets can be located on the ecliptic circle, which is also inscribed on the open rings of the disc. The center pivot and pin of the rete marks the position of the North Pole.

The astrolabe's operator of this locative device can revolve the rete against his or her horizon, which is represented on another plate commonly referred to as the tympan.[59] If the altitude of the Sun or a star is measured, the instrument may be set to parallel the position of the heavens by putting the representation of the star on a particular circle engraved on the device (and selected for that particular altitude). The tympan, which is crafted for a specific latitude, identifies the primary phenomena in relation to the observer: the horizon, the zenith, the meridian, the lines of equal altitude (otherwise

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[59] In architecture, tympanums are recessed semi-circular or triangular monumental sculptures that adorn the top of a doorway or portal and often contain religious imagery.

known as almucantars), and the azimuths, or direction lines. Many tympans also show the Great Houses used by astrologers. As opposed to the rete which rotates above it, the tympan is fixed to the main body of the instrument, known as the mater, to prevent it from rotating. The mater, which literally means “mother” or “womb,” is hollowed out to hold the rete along with several tympans, each one representing a different latitude. The outer rim of the mater is known as the limb and is divided into twenty-four equal hours. This hourly scale, in conjunction with the position of the heavenly bodies, provides the observer with enough information to solve the problems of determining time.

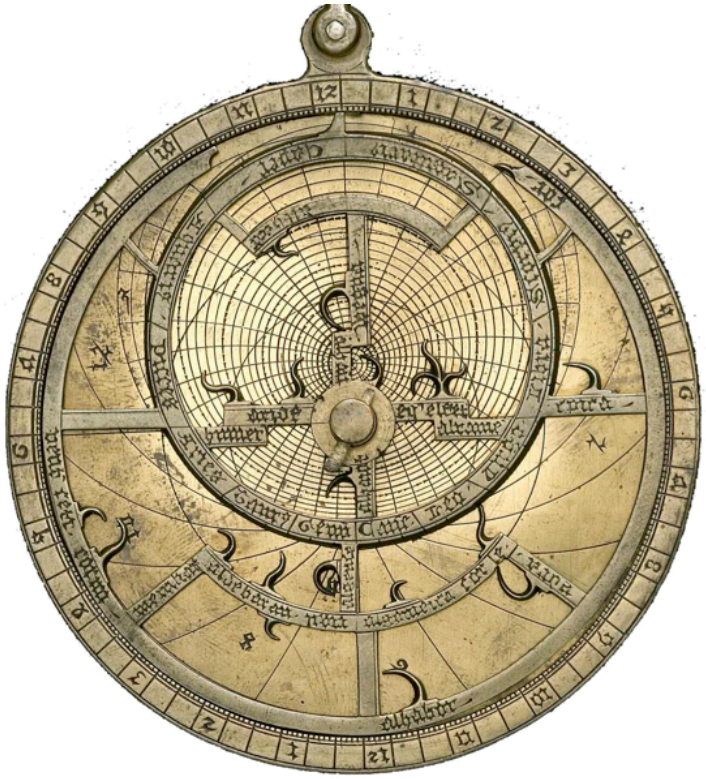

Figure 4.3 A brass astrolabe by Jean Fusoris (ca. 1400)

A ring and shackle are attached to the top of the mater so that the instrument can hang vertically when used for measuring the altitudes of objects above the horizon. All

observations are then checked against the back of the astrolabe, where the outer rim is divided into degrees and an alidade, or sighting bar, which can be pivoted at the center. The alidade is equipped with pinhole sights and contains an opposing pin (which is often in the shape of a horse that is inspired by the Greek myth of Pegasus) that holds all of the pieces together. Centered on the backplate of most astrolabes are two circular calendars. Along the outside is one showing the zodiac, within which a civil calendar is inscribed. The two circular scales are arranged in this way so that the position of the sun within the zodiac can be found opposite the date inscribed within the civil calendar. Below this calendar is a shadow square or an altitude scale. This involves the use of a geometrical square as a way to measure heights and distances by simulating the ratio between a gnomon and its shadow.[60] Throughout the early literature on astrolabes, the shadow square is a key component in illustrations showing how the device can be used to determine, for example, the distance between unreachable places, the height of towers above an observer, and the depth of wells deep underground.

A MIRROR OF THE UNIVERSE

The astrolabe, as an orientation device, can be traced back to 150 B.C.E. in the Hellenistic world (Evans 1998). The Greek astronomer Hipparchus (190-120 B.C.E.) is

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[60] Illustrations that were developed as a result of the instruction and use of the shadow square regularly show the geometry of the *umbra recta*, or "straight shadow," and the *umbra versa*, or "turned shadow." The *umbra recta* simulates the shadow cast on the horizontal plane by a vertical gnomon when the Sun's ray is inclined between 0° and 45°. The *umbra versa* simulates the shadow cast on the vertical plane by a horizontal gnomon when the Sun's ray is inclined between 45° and 90°. To each value of the *umbra recta* corresponds a value of the *umbra versa*. When the ray is inclined by 45°, the two shadows are equal (*umbra media*).

often cited as one of its primary innovators and he was attempting to develop an "instrument that measures the altitude of stars and planets above the horizon" (Krebs and Krebs 2003, 56). The initial research and development of the device is closely associated with mathematical attempts to resolve the problem of mapping a sphere onto a plane. Hipparchus, by applying a range of geometric proofs, was the first to develop a solution to the problem of showing the curved hemispheres of the earth on a flat surface. Hipparchus had hoped that geography as a whole could become more precise through the extended development and use of these projections. At the time, the Greeks did know how to make fairly good measurements of latitude with the gnomon—the part of the sundial that casts a shadow (gnomon literally means "that which reveals")—but very few such latitudinal observations had, in fact, been made. To help in determining latitude in association with spherical visualization, Hipparchus invented a basic version of the astrolabe. His invention incorporated a circular dial partitioned into 360 segments,[61] and included a rotating arm fixed at the dial's center. This device was developed based on his calculations for what has since been described as "stereographic projection," which he achieved by laying a flat piece of parchment tangental to the earth and then extending the latitude and longitude lines from a point opposite the point of tangency. The resulting star projection was eventually formalized as the astrolabe's rete.

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[61] One may divide the dial this way or that and in fact even the mathematical tools that the astrolabe embodies could be seen to have about them an element of arbitrariness and convention. For as Nicole Oresme pointed out in the later fourteenth century, a celestial circle or any circle at all need not have been divided into 360 degrees; it could have been divided, if one had wished, into 480 degrees or any other number. It is all a matter of preference and arithmetic. In short, the cultural conventions relating degrees to hours, already quite firm, have been literally inscribed onto the face of the astrolabe.

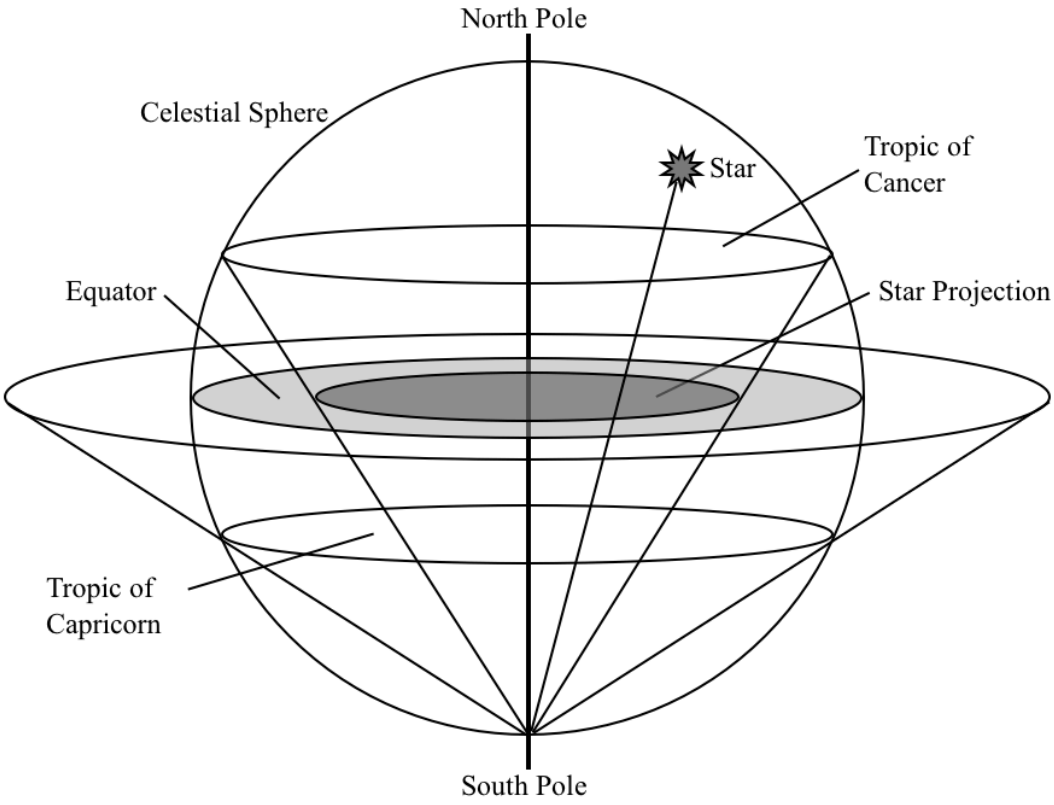

Figure 4.4 A diagram of stereographic projection

The link between stereographic projection and the astrolabe is a fundamental starting point for my analysis of allegorical machines. Beginning with a close reading of the principles of stereographic projection is important as this mathematical method conceptualizes an imagined infinite spatial position which is materialized in technologies such as the astrolabe (and becomes reconfigured in devices such as the magnetic compass). With stereographic projection, lines always run tangentially to the poles and yet never intersect the plane or other parallel lines on the sphere. These lines of orientation direct the subject to the poles, which are points of an intersection that never comes and never will. In the mathematic description of stereographic projection, the hemispheres are referred to as "complex planes" and the points that represent the poles

are considered to be the corresponding "points at infinity" or "ideal points" (James and James 1992, 336). In this conceptualization, the poles are without any specific point of intersection and instead, symbolize the position of the "infinitude." In terms of what this projective function actually represents, the poles become an imagined position continually pointing towards boundlessness or the beyond. As a result, the astrolabe is taken up in various cultural contexts due to its ability to indicate the ultimate position of the sublime.

The use of stereographic projection in association with locative media is crucial when considering the links among allegorical machines as a whole. Measuring and imagining space beyond one's field of senses parallels how the astrolabe is used as an instrument of mediation between the observer and terrestrial and celestial space. With the astrolabe, the poles stand in for the point furthest from one's mind and farthest from one's body. This is a recurring motif with the locative media I describe in following chapters. In relation to the astrolabe in particular, this sense of an imagined infinitude is tied to an instrument that is historically in tension between a rigidly closed cosmology of celestial boundaries and a cosmology of the infinite expanse of the universe. The orientation according to the infinite, developed during an era dominated by a finite hierarchical cosmology, points directly to the recurring metaphysical anxieties and desires that develop with instruments such as the magnetic compass, the divining rod, and digital locative media. This constellation of allegorical machines underscores the recurrence of a Neoplatonic interaction between bodies and space where our senses in the world are only *umbris idearum*, "a shadow of the larger world of ideas, that grand hidden macrocosm

whose secrets we can only indirectly apprehend" (Nelson 2001, 284). In cases such as the astrolabe, then, the cosmos was apprehended by means of an interface with the sublime.

Knowledge of the astrolabe spread from Greek, Arabic, and Roman sources as inventors improved the instrument's capability to determine one's time and space based on stereographic projection. The South Pole was chosen as the standard center of the projection for the northern hemisphere, the North Pole as the center of the projection for the southern pole, and the plane that runs through the celestial equator was the plane of reference (see figure 4.4). Thus, an individual looking towards the South Pole in the northern hemisphere could identify on this plane the apparent location of any star in the sky. This is the principal reason for using this form of projection as it allows for the replication of the angles between the observer and the objects in the sky. The angle between any of the stars within the celestial sphere will be identical to the angle between the projection of these stars onto the plane. Any circle on the celestial sphere will also be represented as a circle on the plane. As a way to compress the celestial sphere into a two-dimensional plane representation, the astrolabe contains a flattened map of the heavens in which the divine space among the astral bodies is nevertheless maintained. In other words, the heavens are at the operator's fingertips.

The measurement of terrestrial time and space from the Greeks to the Renaissance was often achieved according to the rotation of the celestial sphere. This is the sphere in which all subjective, terrestrial, and celestial positions are located and understood in relation to the *primum mobile*, or "first movable." In this cosmology, the movement of the *primum mobile* directly causes movement within the lower spheres by transferring

angular momentum to these secondary inner spheres. In other words, heavenly bodies swirl around the earth and directly influence the movement below. These bodies are composed of the quintessence, a pure and eternal substance of the mind, or nous, where modes of perfection prefigure and structure the universe. A total of ten spheres move between the heavens and the Earth, including the moon, Mercury, Venus, the Sun, Mars, Jupiter, and Saturn. A sphere of fixed stars, or the firmament, constitutes the eighth layer. The ninth sphere is sometimes described as "crystalline" in nature and supposedly accounts for the reference in Genesis 1:7: "And God made the firmament, and divided the waters which were under the firmament from the waters which were above the firmament: and it was so" (Genesis 1:7, King James version).

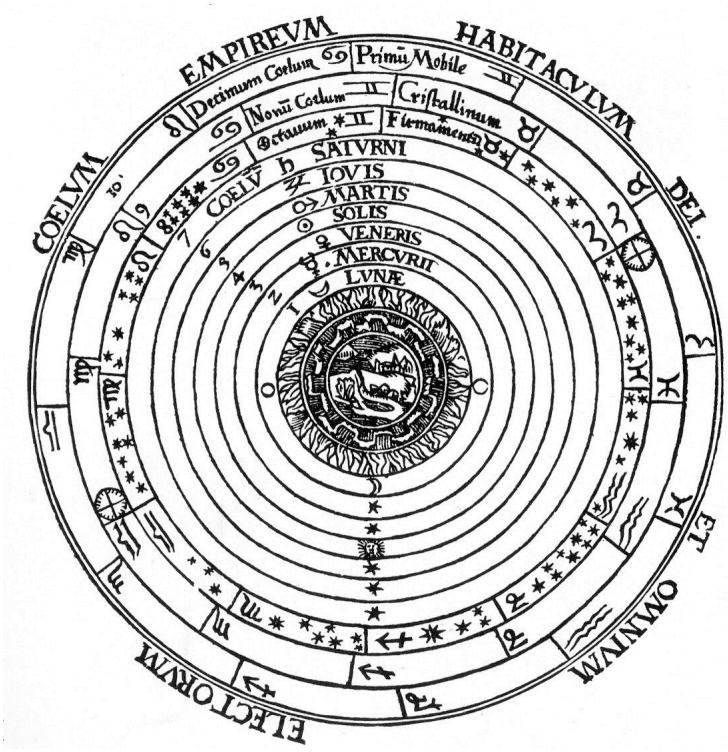

Figure 4.5 The Ptolemaic cosmological system

It is the *primum mobile* that makes up the tenth layer, which separates the unfathomable empyrean space and time from the levels below. C.S. Lewis, who considers the enduring influence of the architecture of the Ptolemaic universe in his modern fantasy novels, explains that beyond the sphere of fixed stars, "there is a sphere called the First Movable or *Primum Mobile*. This, since it carries no luminous body, gives no evidence of itself to our senses; its existence was inferred to account for the motion of all the others. And beyond the *Primum Mobile* what?" (1964, 96). This system was actually based on Ptolemy's observation of the increasing lengths of apparent revolution of the various celestial bodies around the earth.[62] Of course, there are a number of variances from the Ptolemaic model. For instance, in his account of the myth of Er, Plato notes in *The Republic* that there are eight spheres of the visible cosmos (ordered differently than Ptolemy's) that fit together into one another like a nest of bowls. Another variant order was adapted from Hermes Trismegistus, which has since been described as the "Egyptian order."[63]

Ptolemy dealt with the operation of stereographic and planispheric projection in his *Planisphaerium* (ca. 160 C.E.) and he refers to a horoscopic apparatus that resembles an astrolabe at the end of this work. This specific device, however, did not have a number of the elements that have come to make up what we now consider to be the astrolabe, but did feature a rete that pivoted overtop a plate with coordinates pulled from celestial

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[62] 29 days for the Moon, 339 days for Mercury, 348 days for Venus, 365 days for the Sun, 2 years for Mars, 12 years for Jupiter, and 30 years for Saturn.

[63] The "Egyptian order" moves from the Earth, to the Moon, Sun, Mercury, Venus, Mars, Jupiter, Saturn, and then the firmament.

space. Another early description of the device is found in the treatise of John Philoponus (ca. 530 CE.), which, after a description of the astrolabe, detailed its uses. Philoponus not only describes how "it is possible to know… how far the sun, or any other star, has been raised from the setting or from the rising horizon" but provides commentary on the direct correspondence between the inscriptions on the astrolabe and the Great Houses or Zones in the heavens (1932, 62). Following the astrolabe's wide adoption, the French instrument maker Jean Fusoris (1365-1436 CE.) writes that its use was fundamental "to know… the four principal houses of the sky" (1412, II 2).

It was during this time that astrologers recognized twelve astrologically significant segments of sky called "houses" and considered the astrolabe to be essential in determining their location. Of the four principal ones, the most important was the ascendant house, which Fusoris describes as beginning at the degree ascending on the East horizon. Importantly, being able to identify the four main houses instead of only one is a significant step toward casting a horoscope. As explained by Theodore Meliteniote (1320-1393 C.E.), when one sets the rete or the star chart on the astrolabe, the four "centers" or "kentra" on which the principal houses are based are located automatically (Meliteniote 1990, 223).[64] Once the instrument is set, Meliteniote notes, it will have the identical positioning as the universe because the instrument is constructed as a mirror representation of the universe (or, as is noted in the treatise of Jacques Focard in 1556 [figure 4.6], it is the *miroir du monde*). Positioning the astrolabe thusly brings to mind how the internet was imagined in the late twentieth century. In particular, David

[64] The centers are the ascendant and its opposite and the "culmination" or mid-sky and its opposite.

Gelernter's dream of a networked and immersive "Mirror World" where you can enter "through any household computer" (1991, 15) can be read as an attempt to complete the project initially developed with the astrolabe as a corresponding mirror of the universe.

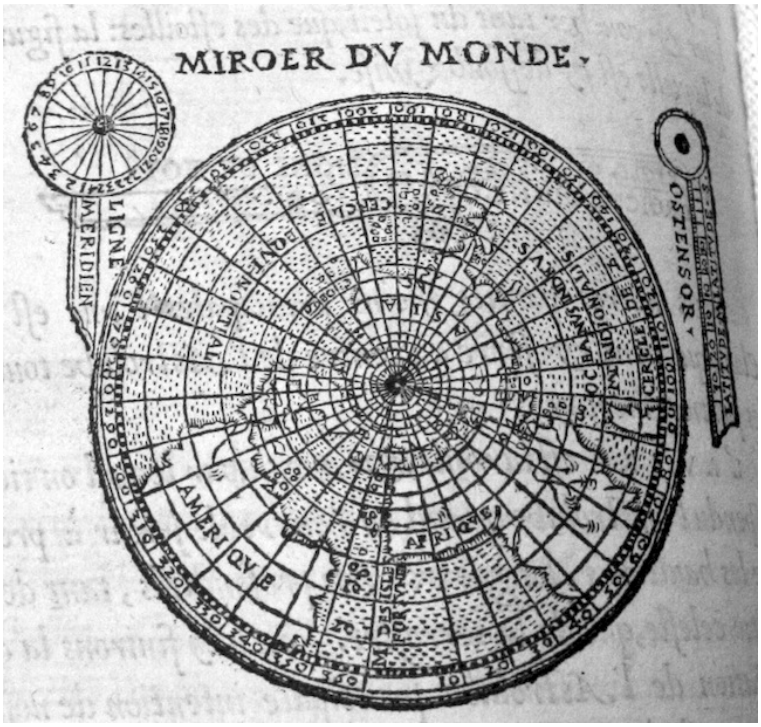

Figure 4.6 From Jacques Focard's *Paraphrase de l'astrolabe* (1556)

PRAYER TOWARDS QIBLA

Following the decline of the Greek city-states (ca. 600 CE.), Arabic scholars and inventors became the principal theorists of astronomical and astrological thought and had a significant influence on the continued development and refinement of the astrolabe. The device itself was highly valued in Islamic communities as it allowed for orienting oneself in the direction of Mecca in order to pray as well as to correctly orient mosques in space. Certainly, "the instrument was an essential part of the ritual trappings of the mosque; it

was a sacred object kept apart from the gaze of the impious. It is therefore sometimes difficult to acquire one of these astrolabes if its owner happens to be a practicing Moslem" (Guye and Michel 1971, 224). Spherical trigonometry and algebra were developed alongside the astrolabe's increased use and the device was vastly improved to support not only astronomy, surveying, and navigation, but to reinforce faith and ritual as well.

Astronomers at the local mosque, or "muwaqqit," would use an astrolabe to ascertain the times of the five daily prayers, or Salah (Fajr before sunrise, Zuhr at noon, Asr in the afternoon, Maghrib after the sun sets, and Isha at dusk). Numerous mosque astronomers promoted astrolabes and adapted many devices to function in association with astrolabes and fulfill various demands (Mayer 1956, 40-41, 61). A variety of tympans determined the altitude of the sun as part of identifying the time of prayer and did so in association with annual inscriptions on the back of mashriqi instruments. Prayer lines were also inscribed on the front of maghribi discs to aid in directing one's prayer (Gibbs and Saliba 1984, 31-33, 38-39). Such technical aids helped devotees direct their required prayers towards the direction of Mecca. Mashriqi astrolabes, then, typically included inscriptions that represented the azimuth of the direction for important cities and these were used in determining the direction of Mecca from the altitude of the sun. "Qibla" is the Arabic term denoting the direction of Mecca, or to be precise, the direction of the Ka'ba, the most important sanctuary of Islam, situated near the center of the great mosque in Mecca. Muslims around the world direct their religious practice to this

sanctuary and astrolabes came to stand in as the means by which one could unveil qibla and develop a direct connection with it through prayer.

Religious practice in the twenty-first century has reconfigured this medieval valuation of locative media in conjunction with mobile phones and networked communication technologies. For example, the location-based software provider Foursquare, which currently has over 20 million users,[65] is a popular locative tool for religious spatial orientation and ritual. With the software enabled, users can "check in" at particular locations and these locational data points can be revealed to users who are connected to that account. This has become important for "ordained ministry leaders, who use LBS [location-based services] to make visible the range of their ministry practice and to alert community members that they're available for conversation at a nearby coffee shop or brewpub." Elizabeth Drescher notes that digital locative media will be a significant component for digital ministry: "As the reality of part-time, bi-vocational, and otherwise extra-congregational lay and ordained ministry continues to grow, believers and seekers shaped by digital culture increasingly expect mobile accessibility to *everything*" (emphasis in original).[66] This type of ubiquitous spatial accessibility and networked ritual runs throughout the histories of allegorical machines.

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[65] Sarah Kessler, "Foursquare Tops 20 Million Users," *Mashable*, April 16, 2013, accessed February 26, 2013, http://mashable.com/2012/04/16/foursquare-20-million/.

[66] Elizabeth Drescher, "Five Social Media Trends that are Reshaping Religion," *Religion Dispatches*, December 15, 2011, accessed February 26, 2013, http://www.religiondispatches.org/archive/culture/5463/five_social_media_trends_that_are_reshaping_religion_/.

Persian astrolabes were highly valued, kept in small sacks, and regarded by the general public as precious gems (Chardin 1735, 168). These instruments included geographical indices inscribed directly onto their surfaces, which listed the latitudes, longitudes, and other geographic information relating to orientation to Mecca and other cities. These geographic indices commonly included the inhirāf, the qibla's azimuth, or jihat, the direction of the qibla's azimuth in terms of the four cardinal points. On the majority of Arabic astrolabes, the spatial orientation of Mecca and Medina was the most prominent feature (Gibbs and Saliba 1984, 26-33). By the seventeenth century, the face of Persian astrolabes was commonly inscribed either with the word "kurst," meaning "throne," or contained a longer quote from the Qu'ran's "Verse of the Throne": "His throne is extended over the heavens and the earth."[67] The device itself was the object of devout ritual and these inscriptions were befitting for an instrument filled with sacred purpose. On an astrolabe built in 1124, later modified for the last Safavid Shah of Iran, Sultan Husain (ca. 1668-1726 C.E.), and currently housed in The British Museum, an inscription across its back offers the following dedication: "May the Almighty God extend the shadow of his equity over the heads of mortals so long as night and day shall endure; this Astrolabe, complete (Tamm) in form, was finished in Sha'ban 1124." On the outer rim of the astrolabe, another inscription notes that this astrolabe is "the mirror representing the whole universe."[68]

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[67] 256th verse of the 2nd Surah of the Qu'ran.

[68] This astrolabe is currently housed at the Museum of the History of Science in Oxford, U.K.

Evidence of use of the instrument for the determination of metaphysical forms is found throughout the popular imagination and the astrolabe's use in this way demonstrates that the combination of astronomy and astrology that was not yet divided by Western science following Newton. Consider the story of Barber's astrolabe[69] in *One Thousand and One Nights*:

> The barber put his hand in his bag and produced an astrolabe with seven plates, inlaid with silver. He took it and went to the middle of the house (i.e., the courtyard). He raised its upper part to the rays of the sun and looked at it for a while. Then he said: "Sir, know that there has passed from this day of ours, namely Friday, the eighteenth of Ṣa far of the year six hundred thirty-five of the Hijra, and seven thousand three hundred twenty of the Alexander Era; the ascendent on this day of ours is, according to computation, from Mars eight degrees and six minutes; the lord of the ascendent happens to be Mercury; and it is in one-third of the astrolabe; and Mars is with it in the ascendent; and it enters with it in its sextile (aspect). It indicates that it is (a) good (moment) for cutting hair, and that also indicates that you want to be in contact with someone, but this is inauspicious and the situation in this case is hopeless (Mahdi 1984, 335).

The astrolabe, from its development in Greek antiquity through its Arabic expansion, evolved into a device of ever greater accuracy and precision but from the thirteenth through the fifteenth centuries, its design became fairly stable. In a way, the device had reached a seeming pinnacle of technical refinement that left little need for change. From this point forward, treatises on the astrolabe predominately underscore a set of common operations by the astrolabist. This begins with the determination of the Sun's ecliptic longitude from a calendar scale on the back of the instrument. One can then use the astrolabe's alidade to measure the Sun's altitude above the horizon. The astrolabe is then rearranged to accurately represent the celestial sphere and the coordinates of one's

[69] The story occurs on the 144th night.

horizon so that the Sun's longitude coincides with that of its altitude. Following this arrangement, the astrolabist can read off the "ascendant" (or the degree of the zodiac on the eastern horizon), from which an astrological horoscope can be established. From this point forward, the astrolabe furnished the basic data for its two principal uses: orientation and metaphysics.

EUROPEAN REINTRODUCTION

As the knowledge and influence of the astrolabe and its ability to mediate the *primum mobile* spread westward, so too did the fantastic imaginations attending it. In *Mandeville's Travels*, written in the fourteenth century, mystical savants and scientists reportedly had the device close at hand at Kublai Khān's table:

> At the side of the Emperor's table sit many philosophers that have proved to be wise men in many diverse sciences, as Astronomy, Necromancy, Geomancy, Pyromancy, Idromancy, of augury, and of many other sciences. Each have before them astrolabes of gold, some have before them the brain pan of a dead man, some have vessels of gold full of gravel or sand, some have vessels of gold full of burning coal, have vessels of gold full of water, or of wine, or of oil, and some have clocks of gold, notably and richly made. There are many other manner of instruments after their sciences (Coleman 2006, 218-219).

Mandeville's Travels was a popular work of the time but is both fairly unreliable and covers topics that merged implausible myths with fact, a common practice in writings from this era. While it may underscore the distorted Western imagination of the East as opposed to what actually happened when the author (or authors) encountered Khān's advisors, *Mandeville's Travels* also may provide a practical illustration of the popular perceptions of philosophers, mystics, and astrologers who serve the royal courts in the West. The work also pointed to the relation between the astrolabe and the popular rise of

travel literature that described a diverse world of wonder and whetted the public appetite for curiosities.

The astrolabe was reintroduced to Europe in the early twelfth century and from the Renaissance to the mid-seventeenth century its powerful modes of mediation made it an instrument of universal potential. To highlight just a selection of the lengthy title of John Blagrave's treatise, *The Mathematical Jewel* (1585), "The use of which Jewel is so aboundant and ample that it leadeth any man practising thereon, the direct pathway (from the first steppe to the last) through the whole Artes of Astronomy, Cosmography, Topography, Navigation, Longitudes of Regions, Dyalling, Spherical Triangles, Setting figures, and briefly of whatsoever concerneth the Globe or Sphere." The orientation device also began to be used outside the practice of astronomy and navigation. This "marvelously delightful" instrument, to use a description by Jacob Köbel, was "not only very practical and even necessary for astrologers, doctors, geographers, and others cultivating the arts and sciences, but also truly advantageous for mechanics [and] certain artisans" (1535).

Like their Arabic counterparts, European astrolabes were celebrated as "mathematical jewels" (Blagrave 1585) and were crucial for interpreting the cosmological clockwork for a range of professions. Or, to use the title of Robert Tanner's treatise (1587), the astrolabe is "A Mirror for Mathematiques: A Golden Gem for Geometricians: a Sure Safety for Saylers, and an Auncient Antiquary for Astronomers and Astrologians." Astrolabes were honored artifacts in the cabinets of aristocrats and adorned the spectacular libraries of noblemen like Jean, Duc de Berry (ca. 1340-1416; cf.

Impey and MacGregor 1985). Of the astrolabes housed in contemporary collections, most have been well maintained due to their early inclusion in the libraries and curiosity cabinets of affluent nobles. These instruments were often highly sought after as a way to affirm their owner's knowledge, support of the arts, and increase reputation.

Images of the device began to appear in universities and cathedrals, such as Giovanni Pisano's depiction of an astrolabe on a pulpit in the Duomo of Pisa in the early fourteenth century. Astrolabes were taken up by European royalty and the locative medium came to be celebrated for its association with science, magic, and cultural prestige. Michael Scot actively discussed astronomy when traveling with Frederick II, the Holy Roman Emperor (1194-1250), and offered his astrolabe in an attempt to predict the outcome of military campaigns (Thorndike 1965, 32). Charles V of France (1337-1380) directed the development of the first astrolabe treatise in the vernacular by Pèlerin de Prusse in 1362 and the King personally owned over a dozen elaborate versions of the device (Turner 1985, 32, 34). In 1514, a miniaturized version of the instrument in the form of a ring was invented by Bonet de Lattes, a rabbi who became a doctor and astrologer to Pope Alexander VI in 1498 and later served Pope Leo X. The development for such a ring might be rooted in the desire to have the heavens literally on hand (Steinschneider 1857, 187).

Astrolabes were celebrated in the court of Elizabeth I of England (1533-1603). Prince Henry was an active supporter of the instrument and carried a small, four-inch pocket astrolabe (Gunther 1932, 484-485). John Dee (1527-1608), a philosopher, diviner, and astrologer to Elizabeth I, brought his eclectic training in mathematics, astronomy,

astrology, magic, and Hermetic philosophy to bear in consulting with the Queen regarding her astrolabes. As a student of Belgian cosmographer and astrolabe-maker Gemma Frisius and a devotee of Marsilio Ficino's brand of Neoplatonism, Dee actively used both the armillary sphere and the astrolabe as part of his search for a transcendent understanding of the primary divine forms, or what Dee described as the "pure verities" that undergird the visible world (Dee 1570). Dee's influence extended beyond royalty and influenced generations of scholars and technicians seeking to construct technologies that visualize the invisible. Most recently, this can be seen with technology blogger Jamais Cascio, who in 2008 noted that locative augmented reality will not only actualize Dee's dreams of visualizing the primary entanglements of what Cascio describes as the networked "metaverse" but also afford the locative media user the power to do the inverse: "I suspect that augmented reality is most likely to be widespread soon; moreover, when it hits, it's going to have a surprisingly big impact. Not just in terms of 'making the invisible visible'—showing us flows and information that we otherwise wouldn't recognize—but also in terms of the opposite: making the visible *invisible*."[70]

Between the fourteenth and mid-seventeenth centuries, the astrolabe moved beyond the the royal court to become a powerful object of fascination in European

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[70] Jamais Cascio, "Making the Visible Invisible," *Open the Future*, August 18, 2008, accessed February 23, 2013, http://openthefuture.com/2008/08/making_the_visible_invisible.html.

popular culture for making the invisible visible.[71] Requests for such technologically-aided foresight and prediction became common and typically occurred at the intersection of astronomy, astrology, and general knowledge of unknown or vague frontiers and the seas. Use of the astrolabe expanded across Europe in association with a greater desire and demand for technological mobility that was also due, in part, to the associated fear of getting lost. At the time, this fear was enmeshed with layers of supernatural dread. This perception of one's orientation in relation to the natural world was often threatened by the infection of the mind by unknown evils stalking in spaces felt to operate beyond human perception. This is nicely illustrated by *The Travels of Marco Polo* (ca. 1300), where a traveler could be "lured from the path by demon-spirits… For this reason bands of travelers make a point of keeping very close together. Before they go to sleep they set up a sign pointing in the direction in which they have to travel. And round the necks of all the beasts they fasten little bells, so that by listening to the sound they may prevent them from straying off the path" (Latham 1972, 85). As is the case with other allegorical machines such as the magnetic compass and the divining rod, this perceived anxiety of spatial disconnection is eased by supporters of these allegorical machines. Such is the case with Verizon's recent attempts to encourage the contemporary locative media user to

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[71] Jean Fusoris (1365-1436 C.E.) started selling metal (as opposed to wood) astrolabes in his shop in Paris in the fifteenth century, which helped to increase the knowledge and use of the instrument. Shortly thereafter, Rabbi Abraham Zacuto (1450-1515 C.E.), a professor of astronomy and astrology at the University of Salamanca, started selling astrolabes throughout Western Europe and began serving John II and Manuel I of Portugal due to his knowledge of the device. Preceding Vasco de Gama's departure in 1496, Manuel I, the King of Portugal, not only requested that Zacuto train sailors to use his astrolabe, astronomical tables, and charts, but also that he offer a forecast for the outcome of their expeditions as well (cf. Metzger and Metzger 1982).

use its digital networks to "not be afraid of dead zones"[72] or spaces where he or she might become disconnected from the digital network.

BEYOND THE SEA

The evolution of the astrolabe into a nautical instrument was largely developed out of the western European fear of maritime disorientation coupled to the dream of revealing what lay beyond the horizon—a dream influenced by the amalgamation of European economics and forms of belief, ranging from land ownership, trade, and mobility, to the imagination and configuration of myth-making. As a result, various texts and instruments from the early sixteenth century reveal how the device was becoming reconfigured for everyday spatial orientation practices. In his 1513 treatise, Johann Stöffler explained how explorers could use the astrolabe to find their location if they ventured into an unknown section of the ocean or deep into the wilds (2:33). John Blagrave, in 1585, instructed sailors how to use the device to help guide a ship through darkness by following the angles of the stars (62). By the late sixteenth century, the mariner's astrolabe was widely accepted as a nautical orientation instrument and appeared on the frontispiece to Anthony Ashley's influential book on the subject, *The Mariner's Mirrour of Navigation* (1588). As the astrolabe increasingly played a part in naval explorations, it also fed into wider cultural fantasies due to its power to unveil occulted fields of space. For instance, on the title page of Lucas Wagenaer's *Spieghel der Zeevaerdt,* two seafarers are surrounded by sixteenth century navigation instruments, including armillary spheres, astrolabes, and

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[72] "Verizon Dead Zones," *Youtube*, September 8, 2008, accessed February 26, 2013, http://www.youtube.com/watch?v=2QrlEYNfODI.

magnetic compasses. “One of the seamen, dressed in a long cloak and pointed hat looks more like a bearded Merlin engaged in cabalistic incantations surrounded by his instruments of magic, summoning monsters from the deep,” which were submerged in the water surrounding the seamen (Gurney 2004, 23-24).

Determining longitude with an astrolabe was possible by determining the difference in longitude between two geographic points. However, the only way that astrolabists understood how to accomplish this was by comparing the initial time of a lunar eclipse at each location (Stöffler 1513, 2:31), making such longitudinal measurements fairly unlikely. Determining latitude was a bit easier because noting the altitude of a feature in the sky as it crossed the meridian was something that could be achieved at any point on land or sea (2:30). Because of the increasing need to make such calculations, some astrolabes included a tympan inscribed with a world map in stereographic projection in addition to a tympan of the celestial sphere (Turner and Dekker 1993). The development and refinement of components like these transformed the astrolabe from a more purely astronomical instrument to an instrument of exploration.[73]

The capability to determine latitude with an astrolabe made it increasingly appealing to sea navigators during the late Middle Ages and the early Renaissance.[74]

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[73] John of Sacro Bosco (ca. 1230-1255) pointed out that if a person equipped with an astrolabe observed the pole star from two locations that were separated by 1° along a meridian, he could determine the circumference of the earth. The observations were used to mark the endpoints of an arc of 1°. The length of this arc was multiplied by 360 in order to compute the circumference (de Sacro Bosco 1949, 85, 122-123).

[74] See the use of an astrolabe made by a priest who returned to Norway in 1364 after a voyage to the “northern islands” (Skelton, Marston, and Painter 1965, 180).

Using a traditional astrolabe would have been fairly burdensome because the rocking of the ship and wind resistance offered by the thick, metal plate would have interfered with the ability to take a measurement. In the fifteenth century, therefore, these instruments were modified by having all nonessential parts removed, leaving only a heavy bronze disc, graduated limb and a pivotable alidade, or sighting bar (Stimson 1988). The result was what would come to be called the "mariner's astrolabe" made deliberately heavy so that its inertia would help stabilize it on the deck of a ship. In addition, most mariners' astrolabes were cast in the form of a spoked wheel to minimize the winds effect. However, use of the device remained difficult as is evident in Columbus' journal describing his first voyage: "On February 3, 1493, the North Star appeared very high, as it does off Cape St. Vincent. The Admiral was unable to take the altitude either with the astrolabe… because the rolling caused by the waves prevented it" (Gunther 1927, 139).

As a result of evolution in the design of astrolabes built specifically for mariners, the astrolabe was reborn as a nautical tool and increasingly utilized by sailors who were taught to sail according to the altitude of the pole star or "run down the latitude" (Taylor 1957; Grant 1974; Waters 1978, 1980).[75] These sailors could measure the altitude of Polaris and, so long as they were sailing due east or west, could get back to their original

[75] In sailing by the altitude of the pole star, seamen used the height of Polaris above the horizon as a measure of their vessel's change in the north-south position. Once Europeans ventured south of the equator (in 1471), it became impractical to sight Polaris. For mariners near the equator, Polaris appeared too close to the horizon; for those in southern waters, Polaris was below the horizon. The technique of altitude sailing was then refined into the method of "running down the latitude." According to this method, sailors measured the altitude of either the sun or pole star in order to determine their latitude. Based on this, they sailed north or south until they reached the latitude of their destination and then ran east or west along that parallel until they sighted land.

destination if Polaris was at the same altitude angle as when they left. However, the lofty hopes attached to the instrument often outweighed its actual abilities, which were often impeded by lack of stability on the deck of the ship or obscured skies. For this reason, the device became more of a symbol of the imaginaries of exploration and distant, hidden frontiers.

Figure 4.7 Painting of Noah's Ark, attributed to Miskin (India, 1590)

The mariner's astrolabe, then, is usually represented visually like the one that appears onboard an Indian ship in a painting from the late sixteenth century [figure 4.7]. The watercolor, attributed to Miskin, shows a multi-level ship filled with terrestrial animals and surrounded by sea monsters (one sailor is being helped from being thrown overboard). The sailor at the front of the ship uses an astrolabe and seems to play the part of Noah, guiding the animals and the others occupants across the terrors of the sea.

The use of the astrolabe on nautical vessels can be traced back to Dom Henrique, or Prince Henry the Navigator (1394-1460). Despite his "title," Henry was not so much a navigator as a benefactor for the new maritime navigators. Instead of just collecting astrolabes and armillary spheres like many of his contemporaries, he was more a patron saint of European exploration. He established a school of navigation at Sagres, Portugal, where the best navigators and astronomers were said to have trained. The Portuguese used sophisticated astronomical observation and developed advanced navigational methods at this school that were precursive techniques for modern navigation. Henry, though, stood out in the European imagination as "the beau ideal of romance: an Arthurian figure, surrounded by Merlineque cosmographers and adventurous knights and squires, riding the waves on missions of knightly and Christian virtue, doing battle with swart paynims, discovering exotic islands, braving supernatural terrors in Seas of Darkness, and fighting for the faith" (Fernández-Armesto 2006, 130). His motives to endorse, equip, and enable explorations to reveal what lay beyond the seas were rooted in his "faith in his own horoscope" (Soares 1978, 45). The astrolabe, for Henry, was more than just a tool for orientation, it allowed him to keep track of the dominant influences of

this astrological signs, Mars and Saturn, with Mars being the seventh house "of secrets and ambitions" (45). The direct influence of the heavens predestined Henry to make "great and noble conquests and to uncover secrets previously hidden from men" (ibid.).

This allegorical machine, as an interface that synthesized magical and practical techniques, has recently been recast in the form of digital locative media. What Prince Henry did for the astrolabe, "secular prophets"[76] such as Steve Jobs have done for digital locative devices. A locative application such as Star Walk for iPad, for instance, lets users hold the iPad up to the heavens to directly visualize previously hidden astrological forces above their heads. In such a way do iPad enabled experiences continue and extend the sublime imaginations encouraged by use of devices like the astrolabe into the everyday practices of the twenty-first century. Here we see how allegorical machines across time point to the continuing historical arc of the links between reality and its very construction. For Bruno Latour, it is through this repeated process of construction and the associated disavowal of such construction that the "real" world of science and technology aligns with the "illusionary" world of transcendent and magical powers (2010).

ABSOLUTE ORIENTATION

While astrolabes were increasingly being used for sea navigation, their uses were also becoming more widespread on *terra firma*, especially their metaphysical uses. As early as the twelfth century, the astrolabe was a popular symbol of astronomical learning and was

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[76] Andy Crouch, "Steve Jobs: The Secular Prophet," *The Wall Street Journal*, October 8, 2011, accessed February 26, 2013, http://online.wsj.com/article/SB10001424052970203476804576615403028127550.html.

made popular through its depiction in cathedral sculpture and miniature reproductions (Poulle 1954). It was popularized in the coming centuries as its image was reproduced in manuscripts, drawn on vellum. It was also glued to wood, which allowed it to be used by more of the general population (cf. Gunther 1932).[77] With more portable versions being developed in the late Middle Ages and the Renaissance, it was much more likely the device would be used in everyday settings. Vellum and wood astrolabes were often part of the wider educational system during this time, suggesting their widespread usefulness and comparative ease of use.

At around the same time, treatises on the astrolabe began to shift from Latin towards vernacular languages and these more accessible treatises were instrumental in instructing a range of audiences in how to use and think about the astrolabe and the possibilities of mediating the concealed layers of the universe. As the device became more affordable, individuals became more inventive in the way it was used. The assumption seems to be, as Pèlerin de Prusse makes explicit in his treatise in 1362, that after one has mastered a few fundamental techniques, one can find or freely invent others. Many of these served no useful purpose but were, as Chaucer writes, "for a maner curiosite" (1870) or for Jean Fusoris, good for users "by way of recreation and play" (1412).[78] Overall, though, the astrolabe was a fundamental way for individuals to "search out the truth" (Batting 1558, prop. 45).

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[77] Astrolabe makers such as Georg Hartmann, Johannes Krabbe, Egnatio Danti, Willem Janszoon Blaeu, Philippe Danfrie, Jean Moreau, Henry Sutton, John Prujean, and Nicolas Bion.

[78] From the Old French "par maniere d'aucune recreacion et eulx esbatre."

A commonly prescribed use for the astrolabe was based on the idea that the study of celestial order had important ethical value for the overall ordering of one's self or soul. This philosophy was first put forward by Ptolemy, in the first book of the Almagest:

> even in chance matters we not lose sight of our inquiry into beautiful, well-ordered structure… If anyone should grasp in its pure simplicity the first cause of the first motion of the heavens, he would consider it a god, invisible and unmoved… And we were induced to cultivate as far as possible the whole of this theoretical discipline and especially the part that contemplates the divine and the heavenly. For this alone is concerned with the inquiry into things that are 'always such'… And surely mathematical knowledge would render men clear-sighted in the nobility of their actions and character because of the uniformity, orderliness, symmetry, and modesty it contemplates in the divine. It makes those who pursue it lovers of this divine beauty, and it habituates and, as it were, naturally disposes them to a like structure of soul… Now we ourselves are striving unremittingly to increase this love for the study of the 'always such' (Heiberg 1903, 5-7).

Over time, the astrolabe becomes the means by which the correspondence between the ordering of the heavens and the ordering of the soul is made. It was an interface that supported a porous subjectivity with the hidden universe beyond one's senses. Positioning the astrolabe as a machine that allows for a direct link with the heavens resurfaces in other texts on the device such as Christine de Pizan's early-fifteenth-century biography of Charles V, where she describes his devotion to the study of the heavens through the use of the astrolabe as well as his continued encouragement of this line of study by his successors (1940, 17). During the same time, Jean Fusoris' treatise suggests that an exalted individual would be wise to study the astrolabe due to its appeal to the spiritual order of one's mind and soul as opposed to one's body, which is weighted down by "ordure and putrefaction" (1412).

An astrolabe built out of wood, paper, and vellum by M. Laurentius Schreckenfuchs in 1567 is fairly standard for its blend of astronomical measurements and astrological houses. Both the front and back are made of a thin manuscript overlaying a wood disc. The winds are noted in Italian, a civil calendar is included, and the zodiacal signs are interspersed across the stereographic projection of the heavens. On the back of this particular instrument is a six-line Latin inscription within the shadow square that reminds the user: "The stars [are] a daily power and it aids the entire human race. They [the stars] dispose men towards [observing events pertaining to] calendar days, both profane and sacred."[79] The astrolabe was more than a celestial coordinate finder, it was a metaphysical device that provided a way to order the lives of its users. As an intermediary with the occulted firmament, this locative medium fused the sacred and the worldly as a way for the human to interface the sublime.

Indeed, as astrolabes were used by a greater portion of European society, their astrological use began to supersede their astronomical use. In the seventeenth-century, John Aubrey remarked that every schoolboy should have a proper astrolabe "to teach him to erect a Scheme presently [i.e., cast a horoscope]: wch will much delight & incourage them" (in Turner 1973, 65). Use of the astrolabe was generally understood to lie somewhere between the heavenly and the impious. For instance, on a wood astrolabe built by Philippe Danfrie in 1578 (updated in 1584) and then reissued by Jehan Moreau in 1622, both sides are filled with allegorical symbols set below an angelic female figure on the front and a satyr peering over the shadow square on the back. As a result of their

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[79] This astrolabe is currently housed at the Adler Planetarium in Chicago, Illinois.

capability to allow operators to cast horoscopes, astrolabes were used in an increasing range of functions including the designation of the nativity of an infant, where and when to situate building foundations, and as a means to discover the identity of criminals (Thorndike 1953, 259; Thomas 1971). Beginning in the Middle Ages, astrology became an essential tool for medical care and astrolabes were considered important for their use in conjunction with bleeding and medications but for prayer as well (Stöffler 1513).

In a manner similar to how the practices of digital locative media are negotiated in a cultural engagement with the navigational software and hardware, the astrolabe was an enduring object of fascination from the Middle Ages to the Renaissance. Of the many inventors and supporters of the astrolabe, Chaucer might have had the most influence popularizing the device in western Europe. Chaucer continually emphasized his wide-ranging interests in astronomy and alchemy, both of which were shaped by and illustrated the popular imagination of the time. Chaucer's *Treatise on the Astrolabe* (1391), the first manuscript on the astrolabe written in English,[80] is addressed to a ten-year-old boy. Of course, this may be a function of Chaucer writing about the instrument for a wider audience as a whole, including courtly personages, without seeming uncourtly or condescending. As he writes in his prologue, he speaks not only to the young, "Lyte Lowis" but also to "every discret persone that redith or herith this litel tretis." Regardless,

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[80] Chaucer notes in the preface to his *Treatise* that he is "but a lewd compilator," or an uneducated compiler, of previously published work and, to be sure, it has since been established that this work was either based on a popular Latin text that was attributed to a ninth-century work by Māshā'allāh or an eleventh-century Latin compilation by Ibn al-Saffar. Therefore, one could consider this treatise to be more of an extended translation, which does not lessen its impact for English readers who were first coming into contact with the device (Kunitzsch 1981).

later astrolabe treatises differ greatly from earlier ones written for monastic or royal use. These later treatises were authored for more general audiences and emphasized that the astrolabe was useful in ways that often exceeded the strict astronomical uses that were prescribed by their creators.

Certainly, Chaucer's work introduces the astrolabe to a greater section of the public than ever before. The treatise itself, while outlining the traditional uses of the astrolabe to determine one's location according to one's position in relation to "the daily motion of the heavenly vault," also pushes the reader to consider how the instrument is used as a way to mediate the heavens. For Chaucer, the astrolabe offers a means for augmenting the skies or "eke[81] by mediacion of thyne eye to… the sterres by night" (1870, 25). Positioned as a Chaucerian media interface, the astrolabe does not just allow for observation of the heavens but also serves as a supplementation or "mediacion" of the firmament. His use of the astrolabe is also an important feature in many of his other works in that he uses to structure space and time as to indicate how his characters engage in metaphysical struggles (North 1988). In *The Canterbury Tales*, Chaucer gave the Oxford student, Nicholas, an astrolabe with which to practice his astrological art. In the section entitled *The Knight's Tale*, Nicholas is affected by a number of comic forces (specifically Saturn) due to his inability to properly use the instrument "blindly," without regard for the "sighte above."

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[81] Consulting the Middle English Dictionary offered by the University of Michigan, "eke" stands for "an increase, addition, enhancement; an added tract of land [quot.: c1465]; (b) to (on) eke(n, teke(n, in addition, over and above; (c) to eke, to eke this or that, therteke, in addition to this (that), moreover, also." Accessed February 23, 2013, http://quod.lib.umich.edu/m/med/.

Beyond individual characters directly engaging with the astrolabe, Chaucer sought to structure all of the *Tales* within a cosmic perspective dependent upon use of the device.[82] Throughout the work, temporal and spatial details as well as the order of the tales themselves are often directly influenced by the shifting positions of celestial space, all of which are described with exacting precision according to particular locations. For example, in *The Franklin's Tale*, the characters of Palamon, Emelye, and Arcite, each pray for assistance at specific times from their respective gods in a sequencing that is determined by the spatial positioning of the Ptolemaic spheres. Chaucer includes astronomical and astrological references in more than a third of his Tales, however, these occurrences serve more as time and space markers for the pilgrimage itself as pilgrims journey from Southwark to the shrine of Saint Thomas Becket at Canterbury Cathedral. For Chaucer, understanding the ordering of the firmament through a "mediacion" of the heavens allows for the astrolabe to unveil the influence of the firmament on those below. As is also the case with desires associated with the magnetic compass, divining rod, and digital locative media, desire to mediate an intelligible empyrean space is a driving force for the astrolabe's use and imagination. About six hundred years after Chaucer, the iPad becomes the allegorical machine *du jour* where the "heavens suddenly make sense"[83] as a user holds the device up to the skies to visualize astrological and astronomical bodies swirling above.

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[82] See "The Canon's Yeoman's Tale" for a good example.

[83] Bob Tedeschi, "When You Wish Upon a Star, Now You Can Call It by Name," *The New York Times*, April 29, 2010, B8.

Though increasingly used for astrological purposes, the astrolabe was also operationalized in various Judeo-Christian contexts as well. In the late Middle Ages, biblical exegesis scholars debated the origins and uses of an assortment of obscure divinatory devices, some of which they thought could be early astrolabes (Gandz 1970).[84] One of these was the Urim and Thummim, a mysterious device for obtaining oracles and for determining God's will. The astrolabe was supposedly referred to by the breastplate of a high priest's vestment, which was inlaid with twelve precious stones engraved with the names of the twelve tribes of Israel. Although rare in appearance,[85] one instance in which the astrolabe appears is when Joshua receives answers from God by means of the Urim through the high priest Eleazar, which leads to Joshua's succession of Moses as leader over Israel.[86] Abraham ibn Ezra (1089-1164 AD), a distinguished poet, philosopher, mathematician, astronomer, and biblical commentator who was also prominent for his treatises on the astrolabe, suggested that this "breastplate of decision"[87] was a direct reference to an astrolabe and indicative of its roots in heavenly mediation (Gandz 1970).

In the twenty-first century, digital locative media have inherited these metaphysical desires as the information network is positioned as the "technological substitute for the Christian space of Heaven" (Wertheim 1999, 16). Other authors point to the wide range of spiritual practices and ritual actions involved with the mediation of the

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[84] See Genesis 31:19, Exodus 28:30, and Numbers 22:7.

[85] See Exodus 28:30, Leviticus 8:8, Numbers 27:21, Deuteronomy 33:8, Joshua 7:14-18, 1 Samuel 14:37-45, and 2 Samuel 21:1.

[86] See Numbers 27:21.

[87] The concept evokes "the Tablets of Destiny" in Babylonian mythology—the symbol of supreme authority that lay on the breast of the chief god.

network potentially leading to "another, unheard-of dimension of spirituality" (Žižek 2001, 53). For the astrolabe and digital locative media alike, the practice of technological orientation and navigation involves an inherent metaphysics of interfacing with the sublime via the intelligibility of the vague. This spiritual mediation is utilized by AT&T as part of its "Rethink Possible" advertising campaign where the locative media user is encouraged to enact forms of a spiritualized dissemination of the Word. In the company's advertisement, "Convert the Nonbelievers," a locative media user transmits his networked message as he stands on the edge of the roof of a skyscraper and looks down on his followers below who receive his message.[88] For a brief moment, he embodies the figure of an angel (or perhaps a demon) as the concrete wings of a gargoyle are visually superimposed onto his shoulders. Here, digital locative media recall the angelic mediation once offered by the astrolabe, and extended by the magnetic compass and divining rod, as "angels have been the epitome of perfect communication, a model of how we would talk if we had had no obstructions" (Peters 1999, 76). The interfaceless interface made real.

In the Middle Ages, many members of the Church thought that, while the astrolabe was more than a purely scientific instrument, its use of the could not be contained to applications that would be condoned by holy documents. "Theologians could not ignore its proximity to astrology" notes Gerhard Dohrn-van Rossum, "they considered it a tool of the devil and frequently also evidence of unseemly theoretical curiosity" (1996, 79). The fear was that this unseemly curiosity would lead to the

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[88] AT&T, "Rethink Possible: Great Expectations," *Youtube*, August 29, 2010, accessed February 26, 2013, http://www.youtube.com/watch?v=ixnGnen5-SE.

astrolabe's use in more supernatural affairs. In one such case, a cleric had used the astrolabe magically, "not with the intention of calling up the devil" but to "find goods of the Church that had been stolen. Zeal and simplicity had driven him to do this," so he was ordered to do penance for the "most grievous sin" (Peters 1978, 99).

Despite the Church's position against using the astrolabe for magical practice, the device does have a history of being used for orientation with the otherworldly and the darker, divinatory arts. Whether these cases were popularized as a mode of caution and discipline against non-ecclesistical ways of being or the device was actually used in conjunction with acts of magical conjuration, they speak to the imaginative power of the astrolabe. One such example comes from Michael Scot (1175-1232 C.E.), the medieval astrologer, mathematician, priest, and translator. Scot was a proponent of what we would now consider to be "natural magic"—the power of words, numbers, and the influence of the stars. He was well-versed in the darker realms of magic, which involved the invocation of demons. In his *Liber particularis* (written in the middle of the thirteenth century), Scot writes that the astrolabe was a vital instrument for invoking evil spirits despite the Roman Church condemning this practice. Furthermore, he believed that the use of the astrolabe in conjunction with knowledge of astronomy was essential for necromancy since there were specific times and places for summoning demons (Thorndike 1965, 93-94).

Scot also noted that Gerbert d'Aurillac (946-1003 C.E.), credited with reintroducing the armillary sphere into Europe after its disappearance at the end of the Greco-Roman era, not only "was the best necromancer (*optimus nigromanticus*) in

France, whom the demons of the air readily obeyed in all that he required of them by day and night," he also "borrowed the astrolabe, conjured the demons and made them explain it fully to him, and wrote down: (1) how it was made; (2) what it was good for; and (3) how anyone should work it" (Thorndike 1965, 93-94). And in 999 C.E., Gerbert supposedly repudiated his past communications with demons and sorcery to become Pope Sylvester II. However, the underlying assumptions of using the astrolabe as an interface with invisible demons and spirits ignited the popular imagination for centuries thereafter. By the dawn of the eighteenth century, astrolabes were largely considered to be instruments primarily used to communicate with the dead or evil spirits. Cheap pamphlets, broadsides, and chapbooks featured rudimentary woodcuts of scenes such as Dr. Faustus and the devil inside of a magic circle with an astrolabe (Marlowe 2008).

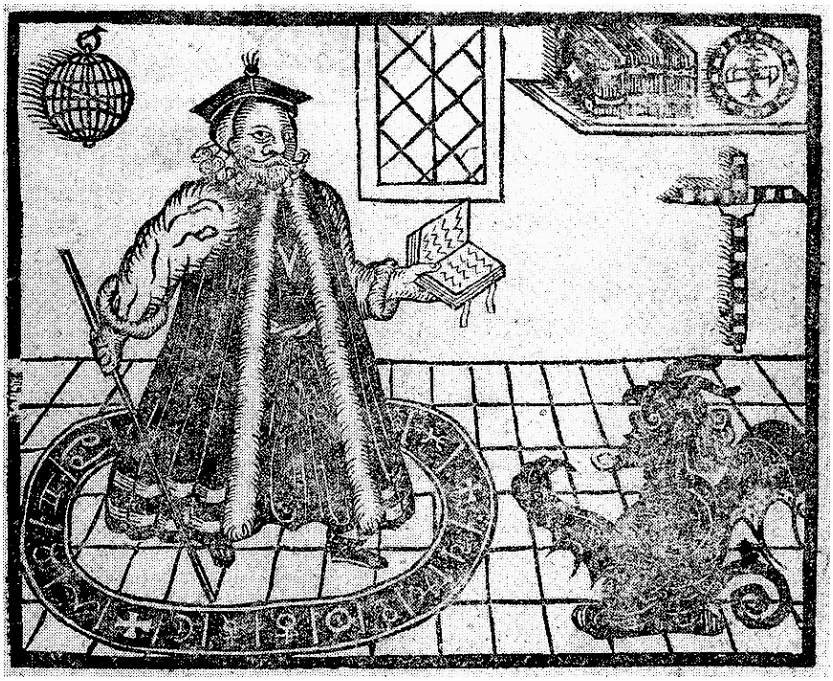

Figure 4.8 Woodcut from *The Tragicall History of the Life and Death of Dr. Faustus* (1620)

The use of the astrolabe as a means of occult mediation meant that an individual was not using the device as a conduit to understand ordered beauty but instead access the disordered and unbounded chaos that is just beyond reach. The fear of astrolabe misuse was intensified by a general anxiety of moving beyond the bounded Ptolemaic model and towards a more infinite spatial expanse of the universe. Of course, the astrolabe was developed during an era where the conceptions of the infinite were understood to be contemptible because such a concept was unintelligible, indefinite, and lacked the harmony and beauty of the cosmos. Yet for thinkers such as Nicholas de Cusa (1401-1464), this problematic introduced a new opening to consider the infinite since any attempt to conceptualize it was always a process of making certain portions of it comprehensible. For de Cusa, this is what occurs when space is conceptualized, which leads to *homo faber* reclaiming something of a divine subjectivity: "He thinks Him to relate to the world in an anterior way, as he the cosmographer relates to the map, and from the relation of the map to the true world, the cosmographer speculates within himself like the Creator of the world, by contemplating in his mind the truth of an image, the signified in the sign" (Watts 1982, 214). This contemplation is aided by the belief "that man can talk about what he does not know—God and nature—only by talking about what he does know—the world of his own experience and fabrication" (26). In other words, a divinely inflected "distribution of the sensible" (Rancière 2004). de Cusa's conceptualization reveals how these allegorical machines operate as intermediaries with an occulted world and serve as a material practice for sensory contact with the

immeasurable, infinite, vague, or unfathomable sublime. A glimpse of the Absolute is offered as a result of locative mediation.

In addition, with his general appreciation of what he described as "learned ignorance" in the fifteenth century, de Cusa opens the door to a world where a bewildering sense of change, relativism, and a human grasp of the seemingly Absolute add some degree of tension to the Greek view of an ideal, unchanging, and abstract reality that lies beyond our reach. It was not until the seventeenth and eighteenth centuries that a form of a mathematics that accounted for the dynamics of change took shape as a result of Isaac Newton and Gottfried Leibniz's development of calculus. However, de Cusa's work during this era underscores the increasing tension between technologies of spatial orientation and the process of making the infinite finite. Indeed, as astronomers moved away from a conception of the universe as a closed, finite system, "the citizens of the Modern Age inevitably found themselves in a new situation that not only shattered the illusion of their home's central position in space, but also deprived them of the comforting notion that the earth is enclosed by spherical forms like warming heavenly mantles" (Sloterdijk 2011, 23). A spherical form was reconfigured in conjunction with other allegorical machines.

The limitless expanses that were so attractive to some brought about a kind of agoraphobia in others. The French mathematician and Christian philosopher Blaise Pascal (1623-1662) admitted, "The eternal silence of these infinite spaces frightens me" (2008, 57). By the year 1600, this anxiety was readily apparent as Giordano Bruno, an Italian Dominican philosopher and astronomer who contemplated the shifts between the finite

and infinite on multiple scales, was charged with heresy and burned alive for his views. His pantheist perspective dislocated the transcendent *primum mobile* and repositioned it in more immanent terms. While adhering to a Hermetic belief that humanity is part of a spiritual journey that leads to unification with the Divine, Bruno argued that the Divine was everywhere as the center of the infinite universe was in no particular place. While interested in astronomical instruments and mapping devices and their relation to understanding the world and the heavens, he eagerly positioned the astrolabe as a device that offers a restrictive way of perceiving space and the ultimate prime mover, God:

> Make then your forecasts, my lords Astrologers, with your slavish physicians, by means of those astrolabes with which you seek to discern the fantastic nine moving spheres; in these you finally imprison your own minds, so that you appear to me but as parrots in a cage, while I watch you dancing up and down, turning and hopping within those circles. We know that the Supreme Ruler cannot have a seat so narrow, so miserable a throne, so straight a tribunal, so scanty a court, so small and feeble a simulacrum that a phantasm can bring to birth, a dream shatter, a delusion restore, a chimera disperse, a calamity diminish, a misdeed abolish and a thought renew it again, so that indeed with a puff of air it were brimful and with a single gulp it were emptied (1584, 17).

Despite the significant threats to the dominant cosmology of the time, Bruno was executed in 1600 due to his Hermetic view of the immanent multiplicity of the manifestations of the Divine (Yates 1964). In a way, though, the tension between a hierarchical and an infinite cosmos foreshadowed the general demise of the astrolabe and the shifting imagination, desires, and fears about what lies beyond space. Bruno continues:

> On the contrary we recognize a noble image, a marvellous conception, a supreme figure, an exalted shadow, an infinite representation of the represented infinity, a spectacle worthy of the excellence and supremacy of Him who transcendeth understanding, comprehension or grasp. Thus is

> the excellence of God magnified and the greatness of his kingdom made manifest; he is glorified not in one, but in countless suns; not in a single earth, a single world, but in a thousand thousand, I say in an infinity of worlds (1584, 17).

With a design built upon the mathematically-inflected function of locating the infinite in stereographic projection, its ability to orient one's self according to the *primum mobile*, and the ideals of mediation with fields beyond space, the astrolabe operated as an early allegorical machine that synthesized the technological and the metaphysical. By framing an imagined sense of space through an articulation of the material, symbolic, and ideal, the transcendent was made increasingly immanent. However, this shift in the conception of Divine space brought with it a greater concern for the immanent mysteries of nature. As other philosophers and astronomers began to lend support to Bruno's writings (often implicitly), general use of the astrolabe began to diminish. As a result, forms of navigation and orientation began to change as well. Instead of being directed to the distant heavenly sphere, forces of magnetism now seemed to flow throughout space and the technologies that could tap into this force quickly animated the imagination. In the following chapter, I describe how the practice and metaphysics of spatial mediation continued with the magnetic compass, which was built upon the elusive spectrum of magnetism and the then strange capacities of the lodestone. Much like the astrolabe and digital locative media, the range of desires and anxieties that are generated in association with attempts to interface the supersensible points to the recurring struggle that "mortals are captured through an inaccessible transcendent order" (Sloterdijk 2011, 79).

V. ATTRACTION TOWARDS FIELDS OF FORCE: ON MAGNETIC COMPASSES

> This very cogitation carries with it I don't know what secret, hidden horror; indeed one finds oneself wandering in this immensity, to which are denied limits and center and therefore all determinate places… It is not good for the wanderer to stray in that infinity.
> —*Johannes Kepler (1604), On the New Star in Ophiuchus' Foot.*

The glorification of a transcendent field of information depends on a general idealization of the network form. "Network science's reliance on universality, ubiquity, and a mathematical model suggests that it really is a *metaphysics of networks,*" write Galloway and Thacker (2007, 118). The dream of the ubiquitous network involves repeated attempts to interface with "a universal pattern that exists above and beyond the particulars of any given network" (118). Analyzing this dream is the task of digital locative media, and involves the practice of visualizing the occulted network that is layered over material space. Interfacing with a universal pattern, however, is a practice that extends back to instruments such as the astrolabe and continues with the later adoption of the magnetic compass as the dominant means for orientation.

In this chapter I explore how the metaphysics of networks is tied to a deeper history of magnetism. As use of the astrolabe faded in the seventeenth century, other devices began to affect the imagination in ways to how it once had done. In terms of navigation and orientation, none of these were quite as widespread or as influential as the magnetic compass. For a term that has also come to mean attraction, seductiveness, charm, charisma, or magic, "magnetism" has long haunted the human imagination. The

range of technologies from the lodestone to the magnetic compass have been used to indicate its influence reveal the persistent negotiation among the practices, representations, experiences, and affects related to the mediation of veiled magnetic fields.

I begin with a history of the early links between magnetism and directionality. After a coalition of alchemists, astrologers, scholars, magicians, and scientists revealed that this mysterious force of attraction was consistently drawing towards specific directions, the object of its orientation emerged as a place conceived as powerful and therefore as carrying a range of salvific properties. This mystery of attraction continued with the proliferation of the modern magnetic compass, which led to a wider cultural negotiation over the logic of orientation and the evils of disorientation and how this magnetic metaphysics might be incorporated into the political economics of trade and exploration. I conclude by discussing how representations of this negotiation found their way into the romantic horror stories of the nineteenth century and contributed to the emerging dreams and anxieties regarding a supposed fourth dimension of space. The balance between cosmic utopia and horror is predicated on an understanding of the magnetic compass that is related not only to its instrumental or machinic qualities, but also as an allegorical machine that could afford users the power to mediate and unveil the ethereal magnetic field. This mode of unveiling what lies beyond space continues today in many of the ways that we engage with digital locative media, which indicate that digital networks today enjoy a status once attached to the the astrolabist's celestial domes and the fields of magnetic force made visible by the magnetized needle.

As an orientation device, the magnetic compass was unique at the time of its introduction in that it positioned the subject in relation to magnetic fields and distant poles and thereby offered a means for navigation in the absence of direct perception of physical space or celestial bodies in the skies. Before the compass (or the astrolabe) was used, ancient navigators relied primarily on water currents, winds, and the shape and depth of the bottom of the sea. Awareness and appreciation for the winds and water currents were of critical importance for ancient mariners since currents tend to follow known seasonal patterns. Mariners also relied on their observation of the migratory habits of birds and particular sea animals. These migration patterns provided clues to the mariner about a ship's current location. The introduction of the magnetic compass was significant, therefore, in that it allowed for the insertion of a conceptual division between the subject and his or her immediate environment. Not only did the compass offer a separation from the physical environment, it offered a way to discern the invisible magnetic currents that flow throughout space. As a locative device, moreover, the compass was not only a highly celebrated technological and scientific instrument of navigation, it also became a powerful metaphor in poetry and was associated with mystical investigations and divinations due to the age-old fascination with magnetism. Furthermore, the lodestone (a naturally magnetized piece of magnetite), because of its puzzling ability to exert force at a distance on metallic objects, was believed to possess mysterious, supernatural properties.

As a result of magnetism's puzzling ability, reference to the use of magnets for navigation and the various imaginations associated with the Earth's poles are found in a

substantial amount of folklore. Perhaps this is related to the fact that the term "pole" began as an astronomical term, "first as the entire axis of the celestial sphere, then as the two fixed points in the celestial sphere around which the stars seemed to revolve. By the sixteenth century, pole signified the two points at which the earth's axis met the celestial sphere" (Nelson 2001, 145). The magnetic compass and lodestone have long been associated with orienting the subject according to the celestial, transcendental, or uncanny. This was because use of the word "pole," shifting from its medieval Latin usage of "polaris" as "heavenly" or the Greek "polos" as a "pivot, axis, or sky," was extended to each of the two opposite points on the surface of the magnet. The mystical notion of the poles as either Hell or Eden is found in works such as Plato's *Republic*, Aristotle's *Metaphysics*, John Milton's *Paradise Lost*, Samuel Taylor Coleridge's *Rime of the Ancient Mariner*, Mary Shelley's *Frankenstein*, Edgar Allen Poe's *Narrative of Arthur Gordon Pym*, H.P. Lovecraft's *At the Mountains of Madness*, and Thomas Pynchon's *V*. The development and use of the magnetic compass and lodestone have a deep history rooted in an orientation of the subject according to the celestial, transcendental, or uncanny space beyond comprehension. As Victoria Nelson explains:

> The term pole was also extended to each of the two opposite points on the surface of the magnet, which aligns itself north-south. The magnetic poles of the earth are these two points in the North and South Poles, respectively, where the compass needle takes a vertical position. The magnet was a crucial tool for mariners in finding their way (*lodestone*, the old word for magnet, means literally 'way-stone'). Thus the Poles, in both their 'true' and 'magnetic' manifestations, are orienting points. In microcosmic terms, this means they are the orienting loci of the psyche, but by the same token they are also the least known, the farthest from consciousness, the point (inherent in the notion of polarity) where the transcendent and celestial spheres have special access to the human sphere (2001, 145).

My account of the compass is not meant to be exhaustive. Rather, I survey its association with the cultural imagination of space and trace the intertwined histories of the lodestone, magnetism, and the magnetic compass. Taken together, these histories reveal a dynamic relationship among these devices and their intersections with the human imagination of space. As an allegorical machine, the compass is an intermediary with the immeasurable, infinite, or unfathomable sublime. Its influence on digital locative media is reflected in the persistence of network metaphysics and the recurring transcendent desires to develop a porous interface with the "space beyond space."

SYMPATHY OF THE LODESTONE

"Many learned men write that Nature is hiding four things," noted a Dutch navigator in 1659, specifically, "the movement of the heavens, the movement of the Earth, the movements of the heart, and the movement of the magnet" (Anhaltin 1659, 49). The power of magnetism has been wrapped in wonder and mystery for thousands of years. While its capacity to attract, repel, and magnetize had long been acknowledged and experimented with, the general understanding of magnetic force remained an ongoing dilemma until the late nineteenth century. Indeed, how does one imagine a magnetic field? Such a field has various effects that can be accounted for but it cannot be seen or touched by anyone coming into contact with it. Magnetism, while surrounding and moving throughout us, can only be sensed through indirect means. This invisible marvel raised a wide array of questions. Is the strength of its attraction and repulsion the same everywhere? Does it remain stable or does it adjust over time? Why does the magnetic

field have its strange contours? And how would one transmute an invisible force into a sensible field? As individuals began to formulate responses to these questions, the various technological modes of revealing these magnetic fields were also made to enter into close alliances with forms and practices of spirituality.

Indeed, before there was the mystery of the magnetic compass, there was the mystery of magnetism and magnetized iron ore. A lodestone (or loadstone where "load" means "to lead or attract") is a blackish-gray magnetite or oxide of iron (Fe_3O_4) originally found in outcrops of stone on the surface of the earth. Not only does this rock attract iron but it can magnetize it after which iron can point to the relative orientation of the poles. A small fragment of lodestone, if rubbed against an iron needle, will transfer to the needle its magnetic characteristics and, if the needle is suspended at its middle by a thread, it will align itself north and south. In other words, rubbing a piece of iron with a lodestone will produce a compass needle. The mythical origin of the lodestone is described by Pliny the Elder (23-79 C.E.), who tells of a shepherd named Magnes who was the first to observe its mysterious properties: "As for the name *Magnes* that it has, it took it from the first inventor and discoverer thereof, who found it upon the mountain Ida. He was a neatherd who, as he watched his beasts, observed as he went up and down the mountain side, both the nails in his shoes and the iron tip of his staff adhering to the stone" (Still 1946, 5).

Explanations regarding these mysterious magnetic forces follow an intriguing history. In classical Greece, there does not seem to be a description of the magnet's opposing polarity or of a magnetized iron needle's tendency to orient towards the poles

(Blackman 1983, 319). Instead, Greek philosophers developed two mutually exclusive, metaphysical principles to account for magnetism. The first suggested that there was an invisible "effluvium" that emanates from the "pores" of the lodestone. Empedocles (490-430 B.C.E.) was one of the pioneers of this approach and developed a universal theory of change based on elemental effluvia. He thought that while the air usually impedes the pores of all objects, the lodestone was able to remove particles of air from the pores of iron so that different effluvia coming from the lodestone's and the iron's pores were drawn to each other (Roller 1959, 17-18). This magnetic principle was extended and refined by Plato and Plutarch, who associated the pores of the lodestone with the operations of final causes. Their association was predicated on their mutual belief that all animate and inanimate objects are purposive and have an internal force that is always attempting to reach a state of perfection (Still 1946, 11). With the lodestone and iron, this perfect state constituted an ideal union formed the basis of and an early understanding that the magnet pulled towards a transcendent plane.

The rival metaphysical doctrine was rooted in a principle of magnetic "sympathy," theorized to come from a powerful "similitude" between objects. This principle is referenced by Pliny the Elder and Galen of Pergamon (129-199 C.E.), who contend that magnetism is a "living force" of mutual cohesion and movement. After the fall of the Roman Empire, Scholasticism extended this approach by arguing that magnetization is representative of divine control and is permeated with the Holy Spirit. This doctrine argued that the "quality" of the magnetic force would cause the iron to enable its own self-motion in the direction of the lodestone due to an occult attraction

(Smith 1992, 62-63). This kind of attraction was understood as a form of sympathy, as in sympathetic attraction and this concern for sympathy was extended into forms of Neoplatonic magic by philosophers such as Iamblichus[89] (250-330 C.E.). The extension is made possible because of the widespread understanding that the living world is "One Soul" bound together by invisible forces of sympathy. Plotinus (205-270 C.E.) claimed that these magical forces were manifestations of divine love where "the action of any distant member [is] transmitted to its distant fellow. Where all is a living thing summing to a unity there is nothing so remote in point of place as not to be near by virtue of a nature which makes of the one living being a sympathetic organism" (1956, 316).

These metaphysical doctrines inform the early negotiation with a supersensible field under divine control that surrounds us. Metaphysically-inflected ideas about magnetism continue to mutate alongside the development of the magnetic compass and they also influence the rise of locative media given that the digital networks are understood by many (and hyped by capital and some academics alike) as the "infinite discourse of collective intellects" (Lévy 1997, 183). In such a way are networks today implicitly positioned as the supreme Idea. Just as the magnetic compass allowed the human subject to unveil magnetic principles, digital locative media allow the digital network to be visualized overtop material space. With allegorical machines, the magical practice of sympathetic correspondences is extended into an everyday interaction where the practices of reading secondary spaces articulate the material to the ideal.

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[89] Iamblichus, in his *On the Mysteries of Egypt*, writes, "it is the performance of mysterious acts which surpass all understanding, duly executed in honour of the gods, and the power of unutterable symbols, intelligible to the gods alone, that effects the theurgic union" (Gregory 1991, 217).

It is unclear when, exactly, magnetism was first associated with spatial orientation. However, the development of one of the more famous representations of magnetism, the wind rose, reveals an early synthesis of magnetism, directionality, and divination. The traditional, sixteen-point wind rose used for navigation [figure 5.1] originated in Mediterranean divination cults that flourished from the sixth to the fourth centuries B.C.E. The wind rose is usually considered to be based on the division of the horizon into twelve equal sections divided according to the traditional wind system (the Rose of Winds). However, there was a shift away from the twelvefold to a sixteen-point wind rose, which is featured on the magnetic compasses used by navigators from the end of the thirteenth century onward.

Figure 5.1 A sixteen-point compass rose from John Davis, *The Seaman's Secrets* (1607)

This shift away from indicating the orientation of the wind was based on an interest in indicating the direction of magical and divine positions in space and is outlined by a

number of authors (cf. Kreutz 1973; Motzo 1947) who trace this history back to the pre-Italian Etruscan civilization. Etruscan civilization, suffused with orphic cults and mystical traditions, flourished from the ninth century through the first century B.C.E. after which it was absorbed into the Roman Empire. By using augurs to divine prophesies regarding natural events, the Etruscans created a directional system to discern the spatial origins of these phenomena. This system was also used by their priests to conjure up visual tricks and was also believed to hold the key for certain magical powers.[90] Other earlier cultures strongly suffused with mystical beliefs, such as the Samothrace culture (ca. sixth century B.C.E.) used rings made of lodestone to determine the spatial position of city elders.[91] The use of such rings functioned as a positioning system and anticipates contemporary global positioning systems (GPS).

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[90] Bacchisio Motzo (1947) argues that the abrupt change from a twelve-point wind rose to the sixteen-point directional system is directly tied to the ancient Etruscan divination methods and experiments with magnetism. According to Motzo, Etruscan magnetic divination and its links to spatial orientation eventually led to the development of the modern magnetic compass. Motzo bases his analysis on the Etruscan chandelier artifact that dates from between the fifth and fourth centuries B.C.E. In the center of the bronze chandelier is a female gorgon creature surrounded by sixteen individuals that alternate between male satyrs and female sirens. Sixteen horned busts of mythological creatures adorn the side of the chandelier facing the ceiling, which is filled with oil and lit for illumination. When looking at the chandelier from below, one can view the horizon in sixteen equal divisions, which is the same arrangement that modern navigators use.

[91] On the island of Samothrace in the Aegean Sea, a large marble wheel with sixteen divisions, called the *Arsinoeion*, has been recovered and is thought to have been used for divination. The Samothrace culture used lodestones for divination where lodestone rings that were given to the general population were used to draw them to a larger lodestone in the form of a key kept by city elders. The Samothrace culture as a whole is better known for its ties to the Argonauts and other mythological sailors which, along with the Etruscans, provide evidence for the mystical origins of the magnetic compass. As the device began to take its modern form in the late thirteenth century, it adopted the sixteen-point wind rose design (McCredie 1992, 46).

The Chinese knew of the lodestone and its magnetic properties well before their European counterparts. The Iron Age began in China around 800 B.C.E. and iron needles were soon used in a range of applications. The Chinese quickly noticed that the lodestone had the power to attract these needles. Chinese authors contend that experiments with the magnetic wonder led them to the creation of the magnetic compass by the first century C.E. Ancient Chinese literature does have numerous descriptions[92] of metal ladles and spoons that mysteriously rotated to face south. These ladles were chiseled out of lodestone and pointed south when put on a smooth plate that represented the earth and was used for spiritual mediation. The plates were designed to mirror the Big Dipper, or the "Seven Stars of the Northern Dipper," and were, in effect, one of the earliest functioning compasses. In *Meng Chi Pi Tan*, written by Shen Kuo in 1088, we find:

> Magicians rub the point of a needle with the lodestone; then it is able to point to the south. But it always inclines slightly to the east, and does not point directly to the south. It may be made to float on the surface of water, but it is then rather unsteady. It may be balanced on the fingernail, or on the rim of a cup… It is best to suspend it by a single cocoon fibre of new silk attached to the center of the needle by a piece of wax. Then, hanging in a windless place, it will always point to the south (Needham and Ronan 1986, 9-10).

Sometimes, the needle was in the shape of an animal and was used as a tool for divining. It often took the shape of a fish that floated on water and would point in a direction that answered a question for the user. Or it was the nodding head of a turtle that would indicate a propitious direction. Users of this early version of the compass

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[92] See for instance the book *Lun Hêng*, written in 83 C.E. by Wang Ch'ung, or much later, *Wu Tsung Yao*, written in 1040 C.E. by Tsêng Kung-Liang.

understood it as a means to mediate with a divine force that was acting at a distance from a space that was out of reach.

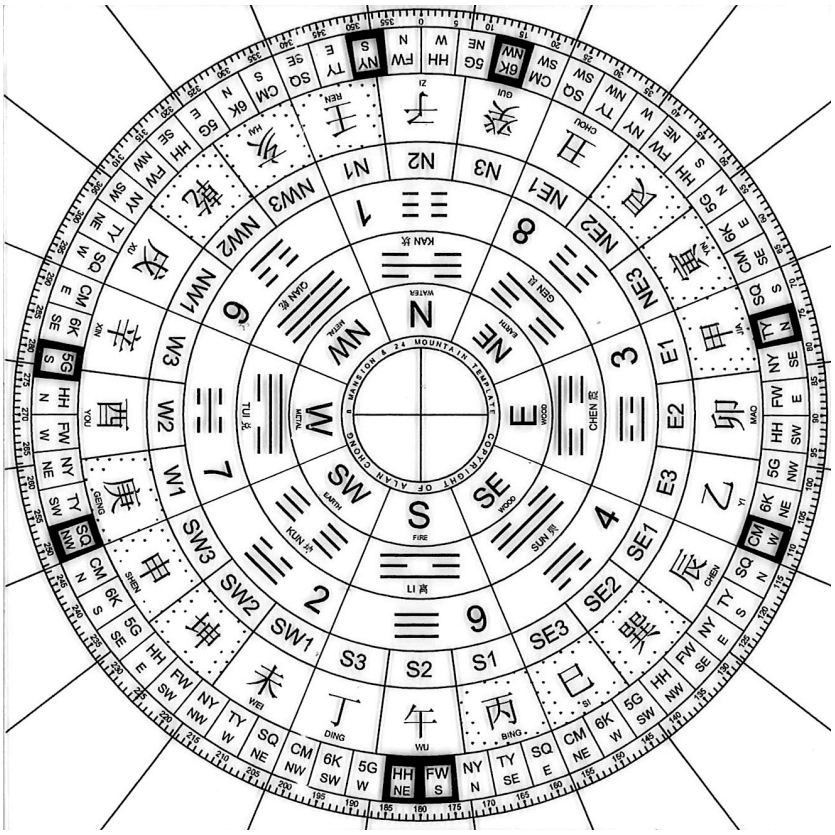

Figure 5.2 Diagram of Chinese magnetic compass or luopan used for the determination of feng shui

This manifestation of magical power, often in animistic form, provided information about the nature of the earth, especially its subterranean features. The compass also was an important instrument for the practice of feng shui, a system of geomancy that takes into account such factors as the subject's spatial orientation as well as the orientations of natural features and built structures in order to improve the transmission of positive life force or Qi. Magnets often took the form of a luopan or luo pan [figure 5.2], and featured dials representing the 24 directions of heaven and earth. Like the astrolabe, the luopan

was developed as a mirror of the cosmos and served as a means of divination. There is evidence that the Chinese understood that the magnet could serve as an orientation device though it was never used intensively for this purpose. Instead, much like the divining rod (chapter 5) and forms of digital locative media, the Chinese used the lodestone to engage with an augmented reality—as an interface with sublime forces that exceed our direct comprehension. Today, the conjuration of networked forces such as Google, for instance, enable similar dreams of instantaneous transmissions of positive life force and mappings of the cosmos.

TOWARDS A MAGNETIC PHILOSOPHY

In Europe, the magnetic compass gained prominence during the twelfth century as a way to determine the direction of the winds. It operated in association with the wind rose and offered a way for sailors to "have faith" in their instruments (Taylor 1957). The compass quickly became an object of fascination and wonder for its seemingly reliable indication of directionality even in the face of environmental obstructions such as clouds or darkness. The instrument is mentioned in the twelfth century in the writings of the English Augustinian monk, Alexander Neckam (1157-1217 C.E.). His book, *De Naturis Rerum* (1187 C.E.), filled with fantastic legends and folk tales, contains a very early description of the magnetic compass:

> The sailors, moreover, as they sail over the sea, when in cloudy weather they can no longer profit by the light of the sun, or when the world is wrapped up in the darkness of the shades of night, and they are ignorant to what point of the compass their ship's course is directed, they touch the magnet with a needle. This then whirls round in a circle until, when its motion ceases, its point looks direct to the north (in Runcorn 1958, 19).

Neckam was intrigued by the magnetized needle and he was also terrified of the sea, believing that no one should sail forth except under extreme necessity (Taylor 1957, 96). Interestingly enough, his work offers few hints as to where or how he might have learned about the magnetic compass. The traditional narrative often credits the town of Almalfi as the pioneering European navigators to use the magnetic compass and Neckam's description is often thought to have been based on his personal use of an Italian nautical compass (cf. Gurney 2004). Neckham's work, though, was also responsible for extending the Greek doctrine of similitude and dissimilitude into medieval spatial thought. Neckham's principal innovation was to have combined the principles of opposing polarity and spatial orientation. By connecting magnetic "sympathy" and similitude with the power of northern orientation, Neckam directly connected the magnetized needle with the operations of the cosmos at large. This generated new terrain for discussion as to where this invisible polarity could be located as it imposed its will on magnetic compasses all over earth.

However, a number of barriers impeded developing this line of inquiry. At the time, the ocean served as the ultimate limit point and was a catalyst for the imagination. The ocean was a space where literary tales of fantasy and horror took place and these stories often overshadowed the real experience of sailors and navigators. The Moroccan cartographer and court geographer to Roger II of Sicily, Muhammad Al-Idrisi (1099-1161 C.E.), illustrated the long historical convention that many subsequent writers followed regarding the unthinkable properties of the space that exceeds the senses. "No one knows," Al-Idrisi wrote, "what lies beyond the sea… because of the hardships which

impede navigation: the depth of the darkness, the height of the waves, the frequency of tempests, the multiplicity of monsters and the violence of the winds… No navigator dare cross it or penetrate the open sea" (Varela 1984, 205). Recall AT&T's advertising campaign to "Rethink Possible." The company's efforts to encourage users of mobile navigation technology to "play the angel's advocate" in order to "see what's on the other side of too far" operates within a history of knowing the unknowable by reframing the limits of possibility. The mediation of "what lies beyond," then, involves a practice of interfacing the sublime by very nearly reaching the limit of our knowledge. Both the magnetic compass and digital locative media are offered by their respective advocates as a way to rethink what is possible and to enrich the soul. As Kant notes, "the imagination… feels itself unbounded by this removal of limitations; and thus that very abstraction is a presentation of the Infinite which… expands the soul" (1951, 115).

Because navigators could use the compass to potentially decode the veiled mysteries of the seas, it became an enchanted object that seemed to point towards some unchanging, eternal position. Writing between 1203 and 1208, Guiot de Provins pondered the orientation towards the infinite that the magnetic compass offered sailors:

> O that the Holy Father were unchanging, like the star that never moves! This is the star that the sailors watch whenever they can, for by it they keep course. They call it the Tramontane, and while all the other stars wheel round, this stands fixed and motionless. By the virtue of the magnet-stone they practice an art which cannot lie… There is never any doubt about it, it will never deceive. When the sea is dark and misty, so that neither star nor Moon can be seen, they put a light beside the needle, and then they know their way. Its point is towards the Star, so that the sailor knows how to steer. It is an art that never fails (cited inTaylor 1957, 95-96).

Roger Bacon, the thirteenth century English philosopher and scientist who gained a rather notorious reputation as an alchemical magician and was imprisoned by the Church, is another early proponent of the orientational capabilities of the compass. While the fascinating powers of magnetism had been known for eons, Bacon was one of the first to consider the directive properties of magnetism after it was incorporated into a locational device.[93] Shortly following publication of his findings, it became common practice to create maps with north positioned at the top. When a map was laid on the ground so that its directionality corresponded with the directions of the magnetic compass, it (and therefore the human subject as well) was said to be "oriented."

Due to the possibility that the magnetic needle could offer reliable orientation, Jacques de Vitry, a church Bishop in Acre, Israel, wrote in 1218 that it could be useful for navigating towards an eternal position in the skies, much like the astrolabe: "An iron needle, after it has made contact with the magnet stone, always turns towards the North Star, which stands motionless while the rest revolve, being as it were the axis of the firmament" (cited in Taylor 1957, 94-95). Vitry further notes that the magnet stone was not only crucial for orientation but also offered a form of protection against invisible forces of witchcraft, madness, poison, and insomnia. Despite his argument that the device

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[93] Bacon was intrigued by the power of attraction that it exhibited and how it functioned even through a buffer of water. He was curious that while one end of the magnet draws iron to itself, the opposing end will "make [iron] flee like a lamb from a wolf" (cited in Taylor 1957, 93). Bacon conducted a series of experiments on magnetism and noticed that when a needle pushed through a straw left to float on a tub of water while a magnetized stone was held beneath the surface, the needle quickly dove into the water to seek it out. Furthermore, if the magnetized stone was positioned above the water, the needle stood straight up and leapt after it. Bacon was puzzled that after taking the magnetized stone away, the needle turned and stopped with its point in a northerly direction.

could be used as a talisman for resisting magical fields of force, many others believed the opposite and thought that the compass was actively involved in conducting various magical operations. Brunetto Latini, the Italian philosopher and statesman concedes in 1260 that the compass might be useful to mariners at some point in the future, but that "no master mariner dares to use it lest he should fall under the supposition of being a magician; nor would even the sailors venture themselves out to sea under his command if he took with him an instrument which carries so great an appearance of being constructed under the influence of some evil spirit" (cited in Still 1946, 56). Use of the compass to reveal magnetism's obscured forces, then, occupied a contested position between trust and mistrust.

However, within a few decades of 1280, the world experienced a dramatic rise in trade, and with it, increased prosperity for maritime trading powers such as Venice, Spain, and Britain. This shift in geopolitics and economics relied heavily on increased use of the magnetic compass for navigational purposes. The compass was popular because it was the first instrument that allowed navigators at sea and on land to determine their direction quickly and accurately at any time of the day, night, or season and under almost any weather conditions. Even though more individuals had faith in the device, others remained puzzled, fascinated, and in awe of its powers and the invisible influences at play. The magnetized needle, mysteriously moved by an unseen force to point to the

North Star, became a metaphor that animated the imaginations of authors and artists for centuries.[94]

In 1300, the year generally considered to mark the inauguration of the compass as a reliable instrument for navigation, Dante Alighieri (1265-1321 C.E.) descended into the Inferno he describes in his *Divine Comedy*. Dante, "having lost his way in gloomy forest," found his own "compass"—Virgil—who guided him through the Inferno, then Purgatory, and finally to an ascent past the heights of the universe towards Paradise. In *Paradiso*, Dante overhears the song of souls. They remind him of the melodies of the sirens, who lured sailors to be shipwrecked at the edge of rocky islands. Dante hears the benevolent voice of Saint Bonaventure, which makes him turn in its direction, quite literally, like a compass needle: "Then from the heart of one of the new lights / There came a voice, and as I turned toward it, / I seemed a needle turning to the polestar."[95] Dante uses the image of the magnetic needle to describe the soul's attraction to righteousness and eternal love. For Dante, the compass points towards paradise and this metaphor will persist as way to conceive of one's orientation towards Truth (see, for instance, Kant's use of the moral compass). The relationship between the compass and the orientation of magnetic fields is paralleled today in the use of digital devices to access the "paradise" of networked cyberspace (Stenger 1992). Here, Truth is found in aggregates of "big data" and made searchable by Google, Apple, and AT&T.

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[94] For instance, in 1294, the Italian poet Leonardo Dati wrote a long poem called *La Sfera* (The Sphere). Dati included the verses: "With a compass to the star directed / Of magnet toward the north / Come exactly where the prow points."

[95] Canto 12, 28-30.

During the medieval era, the needle appeared to always turn towards the North Star and was thought to do so because of a mysterious, "mystic sympathy" (an argument that continued well into the nineteenth century; cf. Scott 1829). Ancient Greek theories of sympathy were revived and extended to argue for a primary "similitude" between the magnet and an eternal position in the firmament. The importance of the North Star in wider cultural contexts was due not only to the fact that it never moved in the sky, (the Stella Maris or Star of the Sea) but also because it was also the Star of Mary and a recurring symbol of hope. This association dates back to St. Jerome and a tenth-century hymn that invokes the Virgin: "Hail, the Star of the Sea / Blessed Mother of God / Ever the Virgin, / Happy is the Gate to Heaven."[96] Neckam relates to Mary as the Rose of Delights and Glory of Womanhood, and proceeds to name her the Star of the Sea and Queen of the Poles. "Behold the Pole Star!" he exclaims, "the apex of the north, shining out on high. The sailor at night directs his course by it, for it stands motionless at the fixed hinge of the turning sky—and Mary is like the Pole Star" (Taylor 1957, 100). Indeed, the compass was felt to offer a way to mediate the Virgin Mary herself.

However, as European use of the compass continued expanded, an increasing range of considerations arose regarding just where the compass was directing its subjects. As part of this process, the position of the pole began to move down from the heavens to somewhere on earth. In 1269, Petrus Peregrinus' "round magnet" (what was popularly described at the time as a magnetic "terrella" or "little Earth") contributed to his argument that every position of the magnet had a direct correspondence in the heavens.

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[96] "Ave maris stella / Dei Mater alma / Atque semper Virgo, / Felix coeli porta."

This belief led to the idea that magnetic poles themselves were an immanent link to the celestial poles. To develop this argument, Peregrinus hung his round magnet in a frame so that it could freely rotate about its magnetic axis, which was oriented in parallel to the "celestial rotation axis." The force that moved the lodestone, he theorized, had to be in the heavens and must be the invisible celestial pole. For that reason, he thought that it was located precisely in the area above the North Pole, which was marked by a point around which Polaris, the North Star, completes its nightly circular motion. Due to the magnetic sympathy (in a Neoplatonic fashion) between the round magnet and the heavens that directed the magnet to follow the celestial sphere in its daily revolution around the Earth, Peregrinus suggested that the magnet could be considered to operate as an infallible, universal clock. The influence of his magnetic philosophy continued well into the sixteenth century. In 1525, Antonio Pigafetta (1491-1534 C.E.), who circumnavigated the globe with Magellan, wrote a treatise on navigation in which he offered the following rationale for choosing the celestial pole as the primary point of orientation: "The reason of this tendency is because the lodestone does not find in the heavens any other spot in repose except the pole, and on that account directs itself toward it" (cited in de Morais e Sousa 1924, 167). The sympathetic influence continued to reinforce use of the magnetic compass as a device that could unveil the hidden space of heaven.

In 1545, Martin Cortés (1510-1582 C.E.), shifted general opinion regarding the actual position of the dipoles when he published the widely used navigation manual *Arte de Navigar*. In this work, Cortés stated that because the magnetic pole does not align precisely with the celestial pole and because the crystalline ninth sphere of the cosmos,

the primum mobile, eternally revolves, the unwavering origin of the magnetic force must be positioned outside the farthest heaven. In so arguing, he placed the magnetic pole on the level of the gods, with the magnetic compass allowing for the mediation of the *primum mobile*. This logic has since been applied to the use of digital technologies, which have the capacity to mediate the "new Jerusalem… the weightless palace" that "comes down out of heaven itself" (Benedict 1992, 14). In other words, the digital network.

By 1600, the uses of magnetism and magnetic orientation had greatly expanded. In the same year, William Gilbert published his *De Magnete, Magneticisque Corporibus, et de Magno Magnete Tellure*, or, *On the Magnet and Magnetic Bodies, and on the Great Magnet Earth*. With this scientific work, Gilbert not only established the modern usage of the terms "electricity," "electrical force," "electrical attraction," and "magnetic pole," he reported an insight that would change the way the world would think about magnetism: that the earth itself was magnetic. In addition, he combined this view with Giordano Bruno's unpopular and potentially dangerous conception of an infinite universe. One of Gilbert's primary arguments posited that the rotation of the celestial spheres was an absurdity and that, instead, the stars were in variable distances within the aether as opposed to being locked into a sphere.

With respect to Gilbert's enduring influence on the wider constellation of locative media, what is fascinating is how the idea of an infinite universe informed his "Magnetical Philosophy." Following a range of magnetic experiments, Gilbert was convinced that the force of the magnet operated due to the animistic work of its own soul:

"The magnetic force is animate, or imitates a soul; in many respects it surpasses the human soul while it is united to an organic body" (1893, 308). Gilbert's magnetic "organic body" is a repackaging of Plotinus' "World Soul" and foreshadows Emerson's "Over-Soul" (2009), de Chardin's "noosphere" (1959), and Kelly's networked "Hive Mind" (1994). His insights into this unified organic body directed him to develop a theory of the fundamental and eternal connection between magnetism and the transcendent heavens. He posited that provided the earth was magnetic and the influence of magnetism reached deep into the space surrounding the magnetized body, an interdependence between the earth's magnetism and that of the heavens must exist. His theory was based on his speculations, subsequently proved correct, that a lodestone is magnetically aligned with the earth's own magnetic iron core. For Gilbert, this was due to a lodestone lying underground in the earth for so long, thereby forming its magnetization from the planet itself. The earth, he reasoned, must have received its magnetization directly from the heavens.

While his refinement of magnetic philosophy led him to argue against geocentrism, Gilbert's views remained suffused with belief in the sacred potentiality of magnetic forces. Magnetism was the soul of the earth itself and the earth existed as an immaculately spherical lodestone. His theory of the earth's rotation reads at times like a mystical exegesis and it is clear that his cosmology still stands at the feet of the gods. "What Gilbert meant by 'magnetism,'" notes J.A. Bennett, "was the expression of spiritual influences whose animating presence was felt throughout Nature" (1980, 165).

This directed Gilbert to describe the earth's magnetic properties in ways that considered it as an immanent metaphysical force:

> By the wonderful wisdom of the Creator, therefore, forces were implanted in the earth, forces primarily animate, to the end the globe might, with steadfastness, take direction, and that the poles might be opposite, so that on them, as at the extremities of an axis, the movement of diurnal rotation might be performed. Now the steadfastness of the poles is controlled by the primary soul (1958, 328).

Gilbert's theories greatly influenced the scientific climate for centuries to come. "By adding magnetic motions and magnetic souls to the forces impelling and ordering the heavens," writes Martha Baldwin, "Gilbert significantly enlarged the field of astronomical enquiry and debate in the seventeenth century" (1985, 155). His Magnetical Philosophy provided the ground for Newton's conception of gravity and Galileo and Kepler relied on his account to articulate their understandings of heavenly motion. Kepler himself credits Gilbert for offering a foundation for his astronomical work: Kepler had "placed a celestial rooftop upon the magnetical philosophy of Gilbert, who himself has built the terrestrial foundation" (Bennett 1981, 156). While the magnet shifted the position of the fantasized pole away from the heavens to the earth, the magnet and its conceived sacred animism still served as a means of orientation towards a sublime limit point. As Christopher Smart writes in the 1760s, "For the Life of God is in the Loadstone, and there is a magnet, which pointeth due EAST… For due East is the way to Paradise, which man knoweth not by reason of his fall."[97]

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[97] *Jubilate Agno* (Latin, "Rejoice in the Lamb") was written between 1759 and 1763, during Smart's confinement for insanity at St. Luke's Hospital in Bethnal Green, London.

By this time, global exploration was becoming an adventurous ideal replete with romantic legends as science equipped explorers and navigators with increasingly precise methods of direction finding and route recording. Many of these fanciful voyages, though, were also outcomes of the pressures of geopolitics and motives for exploration that greatly encouraged aggrandizement by the navigators. Since exploration was a capital-intensive business that returned profits infrequently, explorers tended to inflate their accounts as a way to receive prolonged financial and political support. This was especially true when the potential discoveries could be exploitable and the pursuit of fantastical dreamlands borne out of the allure of apocryphal voyages continues to this day, as exemplified in the everyday practices of digital orientation and navigation, where consumers are encouraged to "rethink possible" in order to be "prepared to be wowed" with the revelations of the digital sublime (Mosco 2004). For AT&T, the fantastical voyage made possible by digital locative media combines an array of spiritual practices and imaginations with the materialities of media and the labor of mediation. This is due, in part, to the promises that the "electronic gates of the silicon chip have become, in a sense, a metaphysical gateway, for our modems transport us… into an entirely 'other' realm" (Wertheim 1999, 226).

In the eighteenth and nineteenth centuries, tales of voyages guided by the compass often involved speculations that enticed explorers toward ambiguous destinations that did not exist or mirabilia only imaginatively inscribed on maps. The search for various forms of paradise was generated in part by the supposedly reliable orientation of the compass, which only folded back onto itself to further feed the fantasy.

This ignited the public imagination and increased demand for stories of dreamworlds that purportedly lay beyond the horizon. Such stories, in turn, led to an increase in a genre of travel literature that slid between the real and the imagined in ways that predated science fiction. This form of literature "existed to depict a world of wonder, not reduce it to easily classifiable facts. Exploration, unfolding an ever more diverse world, whetted public appetite for curiosities" (Fernández-Armesto 2006, 253). The genre as a whole was so popular that it famously inspired Jonathan Swift's 1721 travel satire, *Gulliver's Travels*. By the nineteenth century, moreover, the romantic rediscovery of the beauty of sublime nature and the public's interest in the wonders of the picturesque were inspired in part by the grandeurs of the spaces that these explorers had described.

It is also worth noting the enduring myths of a beckoning and open-water passage to the North Pole. A mythical creature, the Golden Old Woman of the Ob, lured adventurers to the northern regions of Siberia and the myth is illustrated on one of the most important sixteenth century maps of Russia. However, not all of these stories pointed towards an out-of-reach utopia. Many myths of "seas of darkness" and "boiling oceans" worked against the human ambition of discovery and even places such as the Red Sea developed evil reputations among sailors. The Arab navigator and cartographer, Ahmad ibn Mājid, warned in the late fifteenth century that the Red Sea contained "many hidden places and things" and in 1541 the Portuguese naval officer, Joao de Castro, thought that "this sea presents more hazards to navigation than the whole of the great ocean'" (Fernández-Armesto 2006, 212). The world that that we inhabit, which was disproportionately covered by ocean, "seemed to defy every principle of order and

symmetry, such as rational minds expected from a divine creator" (291). This plagued the human imagination as the limits of the Atlantic came to recede and revealed the "new world" of the Americas. Meanwhile, the Pacific stretched between the rumored sea passage to the North Pole and the "unknown continent" of Terra Australis or what the Spanish described as "La Australia del Espíritu Santo" ("the southern land of the Holy Spirit").

French philosopher Pierre Louis Maupertuis (1698-1759 C.E.) contributed to this fascination with an unknown continent, far out of reach, when in 1752 he wrote: "Everyone knows that in the southern hemisphere there is an unknown space where there may be situated a new part of the world greater than any of the other four… Nowhere else on the globe is there a space as vast as this, but rather than being totally occupied by a continuous sea, there is much more probability that one will find there land" (cited in Fernández-Armesto 2006, 291). It was the immensity of earth's and its oceans' sublime power that inspired Maupertuis's work, which would convince much of the public that the rock on which we live is an oblate spheroid that flattens at its poles. Though early in his career he made successful contributions to evolutionary theory, mathematics, and mechanics, Maupertuis became disillusioned by science and moved towards mysticism. His mystical leanings play out as if his attempt to interface the sublime drove him to mental collapse or, perhaps, be at peace with never encountering the space behind the ever-receding horizon. "You cannot chase God in the immensity of the heavens," he writes, "or the depths of the oceans or the chasms of the Earth. Maybe it is not yet time to understand the world systematically—time only to behold it and be amazed" (cited in

Fernández-Armesto 2006, 285). Maupertuis would finally speculate that the world we perceive is an illusion, our mind "alone in the universe" in conjunction with God who serves as the only source of existence.

THE HORROR OF DEVIATION

Many of the fantastic and wondrous formations noted above were tied to the wider political economy of nautical exploration because for hundreds of years, the magnetic compass had not always produced precise results. During Columbus' expedition, perplexing discrepancies emerged between the magnetic and geographic north poles. Columbus was one of the first explorers to mention that the compass' needle does not always point north and that its directionality varies according to one's longitudinal position. As other explorers would discover, the magnetic compass points to the magnetic and not the geographic north pole. The difference between these poles came to be known as the magnetic variation or declination. Following the discovery of this variation, the calculation of declination assumed primary importance for navigators and is always taken into account when setting a course.

Following the colonial voyages of the fifteenth and sixteenth centuries, it was widely believed that longitude could be identified by solving the problem of magnetic declination. In 1700, the British Astronomer Edmund Haley made a long ocean voyage for the sole purpose of plotting magnetic variation on a map. His use of lines to represent fields of magnetic variation resulted in the creation of the first isarithmic map produced.[98]

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[98] Also known as contour maps that depict changing variables such as elevation or precipitation.

Through its production, Haley showed that the variation was not the same for each longitude. As scientists would later discover, this is due to the compass being guided by the localized characteristics of a magnetic field that is generated by a swirling mass of liquid iron in the outer core. Earth's magnetic field, then, does not resemble a simple bar magnet at the planetary scale, though it does produce strong dipolar effects.

However, the story of determining these magnetic irregularities reveals a deeper trauma related to the threat posed by magnetic deviation to the Truth of the magnetic compass. Throughout the eighteenth and nineteenth centuries, the magnetic needle was considered to be held hostage to a range of hidden forces with magnetic deviation arguably considered the most anomalous and unpredictable. Samuel Metcalf, in his book on terrestrial magnetism (1833), quotes Admiral Samuel Barrington who states that as late as 1754, sailors remained terrified of the North Pole's magnetic power. Barrington tells of the crew of a Greenland whaling ship that wanted to push through icebergs toward the North Pole but had to turn around, not because crew members feared the ice and extreme cold, but because they feared their ship would be torn to pieces by temperamental magnetic forces. Barrington notes, "if they should be able to proceed so far, the ship would fall to pieces, as the pole would draw all the ironwork out of her" (cited in Still 1946, 58). The compass, then, did not always reveal a space of paradise. It also pointed towards the dark depths of magnetic fields that are out of our reach. The compass offered an interface with multiple facets of the sublime where the transcendence also comes in the form of dread and incredulity.

Of course, numerous shipwrecks happened during the mid-nineteenth century due to the warping effects of magnetic deviation and induction. Francis Beaufort, head of the hydrographic department for the United Kingdom's Royal Navy, presented a report in which he pointed out "many instances of HM Ships having been endangered and their services delayed through the badness of their Steering Compasses" (cited in Gurney 2004, 195). It was a state of affairs that had become "so notorious that it is a matter of surprise that the more serious mischief has not been the result." Beaufort proposed that a committee be struck to find an appropriate remedy for "an evil so pregnant with mischief" (195). Efforts to develop a more functional compass also occurred in tandem with the expanding political economy of rail and telegraph networks. Through their coordinated use of these networks, shipowners could communicate with their business associates and coordinate the movement of their ships in distant geographic areas. The increasing volume of world shipping, particularly British freight, required reliable compasses to battle with the demon of magnetic deviation and the mischievous evils of the compass.

Cultural anxiety relating to these wicked magnetic fields coupled with moments of disconnection also spilled over to the arts. In Edgar Allan Poe's work, the compass is a technology that stands in for various forms of terror. In *The Unparalleled Adventure of One Hans Pfaall* (1835), he describes a manuscript that he found that purportedly discovers that details the nineteen-day journey by Hans Pfaall on his voyage from Earth to the moon by balloon. Poe published the episodic work in the *Southern Literary Messenger* and intended it to be a public hoax. One of its moments of dread concerns

Pfaall's description of the unintelligible "points of the compass" that would lead one to "inextricable confusion" (2006, 212). In *Eleonora* (1842), the narrator admits that many have "called me mad" and describes this madness as a descent into eternity without assistance from a compass: "In their gray visions [the mad] obtain glimpses of eternity, and thrill, in awaking, to find that they have been upon the verge of the great secret… They penetrate, however, rudderless or compassless, into the vast ocean of the 'light ineffable'" (424). And in his only novel, *The Narrative of Arthur Gordon Pym of Nantucket* (1838), Poe begins with Pym describing the horrifying moment of sailing on his boat without the device: "It is hardly possible to conceive the extremity of my terror… A storm was evidently gathering behind us; we had neither compass nor provisions" (879). In his final voyage, Pym acquires a compass as he makes his way to the ultimate terrestrial space beyond space: the mysterious South Pole. It is at the limits of the earth where the story suddenly ends (with Pym presumably dying) as he encounters the presence of "a shrouded human figure" dressed in white (1018). Some authors have interpreted the ending as the ultimate completion of Pym's spiritual journey—he had reached the magnetic pole and encountered God (see Peoples 1998, 68). For Poe, using the compass to finally reach what lies beyond space meant an uncanny engagement with the Absolute.

Along with the anxiety and terror associated with simply using the compass, Poe underscores the cultural perturbation about the space or object that is the source of its orientation. As the compass deviates from the geographic north pole, many individuals were curious about where, exactly, the magnetic compass was directing its users. Not

only are the geomagnetic poles imaginary points in a mathematical description but conceptions of the poles as hallowed places seem to exist in various places at various times. Therefore, many authors mulled over the location of these faraway, "all-powerful" points of attraction. Throughout the nineteenth century, a popular cosmological interpretation equated the magnetic poles with the celestial poles and considered the magnet to be a powerful technology in uncovering the precise spatial position of God:

> The magnet's potent spell attracts the ore,
> Whose strong affinity obeys its power;
> Possess'd, diffus'd, its laws inpress'd extracts;
> The needle points where'er its power directs…
> To God Omnipotent! whose gracious word,
> Created all!—and saw that all was good! (Bryan 2011, 143).

Alternatively, the magnetic poles also stood for the terror that was furthest from one's mind and the magnetic compass was the means by which these terrors were to be held at bay or invaded the mind. Mary Shelley's *Frankenstein; or, the Modern Prometheus* (1818) is framed by a series of correspondences from Captain Robert Walton to his sister, Margaret Walton Saville. Walton is sailing to the North Pole in hopes of generating notoriety to save his writing career: "I try in vain to be persuaded that the pole is the seat of frost and desolation; it ever presents itself to my imagination as the region of beauty and delight… we may be wafted to a land surpassing in wonders and in beauty every region hitherto discovered on the habitable globe" (1995, 11). Despite his "evil forebodings," he is inspired, not only by previous voyages to the north Pacific Ocean, but by his hope of discovering "the wondrous power which attracts the needle" (12). When he reaches the North Pole, Walton encounters Victor Frankenstein, the scientist who created the famed monster. Following Frankenstein's death, Walton does not describe an

encounter with the "beauty and delight" of the pole but how the monster tracks them down only to escape from their ship, "borne away by the waves and lost in darkness and distance" (183). Shelley shatters Walton's dreamlike image of the North Pole as the "country of eternal light" by unleashing a monster in the depths of darkness.

This tendency to understand allegorical machines as offering an opening into fields of horror extends to contemporary digital media that, at times, can offer "visions of hell" (Sherman and Judkins 1992). Take, for instance, "Riot! 1831," the locative "mediascape" designed in the Hewlett-Packard (HP) computer research labs. Users are given a computer with a built-in global-positioning system (GPS) and a pair of headphones, which provide them with immersive sounds to create an experience "as if you were walking through an invisible riot" in Bristol, England (Reid et. al. 2005a, 290). The game is based on the actual riots that occurred in that city over 170 years ago. Participants use digital locative media to unveil this history by "eavesdropping on a magic parallel world" (290). The authors describe this encounter as a "magic moment" that "occurs at those points of unexpected connection between physical and virtual worlds" (291). With "Riot! 1831," however, the HP researchers note that the experience of connecting into this other world brings about moments of fear or discomfort for participants. They describe this connection to the invisible network as involving a "synaesthetic confusion. . . caused when you do not know whether a sound is real or part of the mediascape." This confusion induces the unsettling sense that beyond space "is more disturbing and weird" (291). Participants experience a sense of horror when

invisible bullets and panicked screams swirl around their heads as the locative media uncover terrors from the past.

With the magnetic compass, the sense of not knowing what lies at the poles led many to believe that they were irrelevant. Perhaps, it was floated, a colossal piece of magnetized iron was located somewhere in the Arctic that exerted a powerful planetary influence. Indeed, by the second-half of the sixteenth century, the imagined seat of magnetic power had shifted away from the heavenly poles. In its place, a rock, island, or a remote mountain made of the purest lodestone was supposedly the master of all magnetic compasses. Yet, as with the historical curiosity with magnetism, the roots of this particular legend go back thousands of years. As early as the second century C.E., Claudius Ptolemy described the position of magnetic mountains on what he called the "Manioles" islands, now considered to be Borneo (Benjamin 1898, 97). These islands supposedly exerted such a powerful magnetic attraction that iron nails would be pulled straight out of the ships sailing close by, thereby never to return.[99]

A more famous variation of this myth filtered throughout Arabian folklore for centuries: a single magnetic mountain rising from the sea lured passing ships to their doom by pulling out all its iron nails out at a distance, crushing the hull, and drowning everyone on board. This violent image appears in the *Book of the Thousand Nights and a Night* and was similarly conveyed by Arabian geographers. The story follows a ship entering strange waters. A man onboard reports "something looming in the distance, sometimes black and sometimes white" (Hale 1888, 91). This comes as ominous news for

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[99] Ptolemy pointed to this as a reason why the local population relied upon wooden vessels, as their iron-free boats would not be vulnerable.

the captain has a premonition of his ships' inevitable fate. To the Prince on the ship, he says:

> Tomorrow we shall arrive at a mountain of black stone called lodestone; the current is now bearing us violently toward it, and the ships will fall in pieces, and every nail in them will fly to the mountain and adhere to it. On that mountain is such a quantity of iron as no man knoweth but God, whose name be exalted; for from times of old great numbers of ships have been destroyed by the influence of that mountain… On the following morning we drew near to the mountain; the current carried us toward it with violence, and when the ships were almost close to it, they fell asunder and all the nails and everything else that was iron flew from them toward the loadstone (92).

By the twelfth century, the myth had reached northwest Europe and been incorporated into several epic sagas and legendary voyages (see, for instance, John Maundevile, Gudrun, Ogier the Dane, St. Brandan, and Ernst von Schwaben). A few of these variations shifted the theme only slightly to a castle made of lodestone on the island or to a completely submerged magnetic rock that imperiled the ships. Most variations did not clearly identify the location of this dreaded peril, however, waters to the north of Europe were common (Still 1946, 58; Jonkers 2003). By the thirteenth century, Bartholomew Anglicus, otherwise known as Bartholomew the Englishman, claimed that "there are mountains of such stones and they attract and dissolve ships made of iron" (cited in Cerf and Navasky 1984). Such an account was unlikely to calm the nerves of seamen who increasingly relied on forms of magnetism to guide them across the seas into areas of the unknown. The Italian Poet, Guido Guinicelli, suggested that these mountains lay just north of the Alps and were positioned under the Polestar, which was emitting a "hidden virtue… to turn the quivering needle to the Bear" (Benjamin 1898, 155). Of course, it was during this period that individuals held to the opinion that the

Polestar itself was magnetic. Many other Italian texts, therefore, considered the mythical mountain to operate as an earthbound conduit of the star's magnetic force and to circulate its northerly power throughout the world (Smith 1992, 52).

The Oxford friar and mathematician, Nicholas of Linna, allegedly presented an account of his Arctic exploration in 1364 in which he reported that at the exact geographic position of the North Pole "stood a huge black magnetic rock, towards which venturesome ships would be hurried by four indrawing seas rushing between four great islands. And they could never return against the current but would be lost" (Taylor 1957, 155). This narrative strengthened belief that the origin of magnetic attraction was to be found in the Earth's polar regions. Similar examples of a shift toward actualizing the magnetic north are found throughout contemporary cartographical representations and commonly featured a magnetic mountain or island. A 1508 edition of Ptolemy's *Geography* includes a *mappa mundi* that shows the magnetic pole as a mountain emerging from the sea north of Greenland. This myth was also merged with the story of Hy-Brazail, a phantom island that inhabitants of the west coast of Ireland claimed could be both visible *and* invisible to the eye. Hy-Brazail was identified in a Catalan atlas map published in 1367 and its illustration was later transcribed to all "new and revised" maps appearing thereafter. In 1636, a manuscript on the history of Ireland attributes the discovery of the island to Captain Rich "who saw its harbour, but could never reach it" (Still 1946, 58). The mysterious island continued to appear on maps as "Brazil Rock" and was noted on British Admiralty charts published as late as 1850.

This recurring myth indicates a strange allure that surrounds the twin ideas of enigmatic islands or rocks capable of regulating humanity's fate and the spatial technologies used to reveal their presence. In the acclaimed television series *Lost,* the mysterious magnetic island again resurfaces in the popular imagination. The series revolves around passengers who survive an airplane crash on a Pacific island. Survivors come to realize that the island exhibits mysterious magnetic phenomena. Early in the first season, the character Sayid is unable to determine geographic directions and reveals to the rest of the group that a magnetic compass cannot read the position of true magnetic north. During the final season, the evil "Man in Black" describes how, due to magnetic irregularities, early settlers on the island had dug wells in search of the Truth: "Oh, they weren't looking for water. They were looking for answers. A long time ago places like the one we're standing at right now made compass needles spin. And the people holding the compasses needed to know why."

Throughout the series, anyone attempting to navigate to or from the island either cannot find it or escape from it resulting in disorientation and death and led many to believe that the island never remains in one place. It was subsequently revealed that the island's magnetic force was the primary reason why the plane was pulled from the sky. In such a way is Hy-Brazail reborn in the twenty-first century so that it is able to block various forms of digital locative media used for navigation and communication with those beyond its shore. In addition, the island is discovered to operate as a physical site where humans are suspended in the bardo, an actualization of the Buddhist concept of being in a transitional or liminal state. However, the island of *Lost* occupied a liminal

zone between life and death and reclaimed the ancient notion of the magnetic pole as the axis between the sphere of the earth and the celestial sphere. To access this spiritual place, castaways had to rely on finely tuned GPS mobile phones and digital compasses. And, as the title implies, their search for orientation was directly tied to their recurring sense of disorientation.

THE FOURTH DIMENSION

From the mid to late nineteenth century, geomagnetism was increasingly rationalized, the compass' use as a means for navigation became fairly commonplace, and the anxieties of magnetic deviation began to subside. However, the theoretical and public desire to encounter the magnetic point of origin shifted focus due to increasing fascination with electromagnetism and its invisible fields of force, and the possibility for technologies that could offer orientation towards and access to what was popularly described as the fourth dimension of space. Before outlining the influences on these desires, I will describe how the science of magnetic fields shifted from the nineteenth into the twentieth century. Much of this was due to Michael Faraday's (1791-1867) experimental approach to magnetism and the research that followed the 1821 publication of "On Some New Electro-Magnetical Motions and on the Theory of Magnetism." By using electricity to make a metal wire rotate around a magnet, Faraday took an important step toward the creation of the modern industrialized world, which depends on the use of electrical generators and motors. His article described this circular rotation in terms of "lines of force" that develop around magnets or electrical current-carrying wires. In what would come to be known as Faraday's Law, a magnet moving though a conducting coil

generates an electrical field, which then drives a current in the coil. From his perspective on these "lines of force," he developed a broader conception of magnetic fields. This insight emerged while studying patterns made by iron filaments sprinkled on pieces of paper and laid atop various combinations of magnets. As a result, Faraday identified a field around a magnet in which the presence of magnetism was manifest. His cultural influence is referenced, like the recurring legend of the magnetic island, by *Lost*, which features an Oxford physicist named Dr. Daniel Faraday who studies (and eventually perishes in) the extra-dimensions of space-time.

Faraday's conception of these "fields" was revolutionary and led to the development of other original concepts which have come to form the basis of modern physics. His "lines of force" would replace the mysterious effluvia, effluences, imponderable fluids, and other invisible emanations that earlier physicists had considered. These fields could exist in the imagination without the presence of the iron filings, which seemed to reveal the hidden fields through our bodily senses. Concerning the tenuous physical existence of his "lines of force," Faraday writes, "I still hold the opinion with some hesitation; with as much, indeed, as accompanies any conclusion I endeavored to draw respecting points in the very depths of science, as, for instance, regarding one, two, or no electric fluids; or the real nature of a ray of light, or the nature of attraction, even that of gravity itself, or the general nature of matter" (1852, 79). Although he thought he could see "filed lines" when iron filings were sprinkled over magnets, those lines were actually imagined. Nevertheless, this figment would prove a powerful concept for imagining the nature of magnetism.

James Clerk Maxwell (1831-1879) translated Faraday's concepts into mathematical language and his lines or fields of force came to replace the hypotheses of earlier physicists and magicians that involved "action at a distance" between particles of matter. In the *Apologia* (1873) of his *Treatise on Electricity and Magnetism*, Maxwell writes:

> I was aware that there was supposed to be a difference between Faraday's way of conceiving phenomena and that of the mathematician's. So that neither he nor they were satisfied with each other's language… As I proceeded with the study of Faraday, I perceived that his method of conceiving the phenomena was also a mathematical one, though not exhibited in the conventional form of mathematical symbols… For instance, Faraday, in his mind's eye, saw lines of force traversing all space where the mathematicians saw centers of force attracting at a distance. Faraday saw a medium where they saw nothing but distance. Faraday sought the seat of the phenomena in real actions going on in the medium (1904, ix).

Maxwell eventually described an idea[100] that became known as Maxwell's correction to Ampére's Law and, when combined with a number of principles from Faraday, outlined a wider theory of electromagnetic waves. In terms of media theory, what is particularly interesting is the relation of this field theory to wider electromagnetic phenomena from radio, television, radar, electrical power generation, industrial use of electricity, computers, and astronomical equipment used to detect electromagnetic waves in space. These technologies and the imaginations that attend to them are all linked to the lodestone's curious power of attraction that causes particles of iron to move and adhere to its surface.

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[100] Maxwell hypothesized that electromagnetic waves travel at the velocity of light, an idea that Heinrich Hertz later proved in 1888. In the same way that a modulating magnetic field generates an electric field, a modulating electric field generates a magnetic field.

Maxwell came to represent the lines of force of a gravitational field by straight lines radiating from the center of a spherical body of attraction. He assumed that the "closeness together" or the density of such imaginary lines was a measure of force acting upon a small external body. He later understood that gravitational force decreases directly with the square of the distance. He extended his hypothesis to consider the effects of a long straight magnet isolated in space. Maxwell concluded that the lines of force of the magnetic field would radiate from the poles just as the lines of force of the gravitational field radiate from Earth. The result was the theoretical unification of electricity, magnetism, and optics known as electromagnetic theory, which fundamentally demonstrates that light, magnetism, and electricity are all manifestations of the same electromagnetic field.

During the same period, the German mathematician Bernhard Riemann (1826-1866) revolutionized mathematics with his attempt to theorize the geometry of complex planes. In equations that expanded and reinterpreted many of the principles upon which stereographic projection is based. Riemann sought to introduce points of infinity to finite, complex algebraic curves, known as complex projective lines. This non-Euclidean geometry became known as a Riemann sphere,[101] which posited "the existence of a higher-dimensional manifold" (Beichler 2007, 527). In other words, an extra plane of space, the fourth dimension, lies outside our sensory perception. The English mathematician and philosopher, William Kingdon Clifford (1845-1879), combined the

[101] This "posited that an n-dimensional space would be embedded in an $n+l$-dimensional manifold, which implies that the physical reality of our three-dimensional space (where $n= 3$) requires the existence of a higher-dimensional manifold" (Beichler 2007: 527).

ideas of Maxwell and Riemann to suggest that theories of electromagnetism imply the existence of a fourth dimension as the projective lines running from the pole of the sphere entail a direct correspondence to infinity. Clifford argues "that what we sense as matter is nothing more than three-dimensional space curved in a fourth dimension and what we conceive as matter in motion is no more than variations in that curvature." In addition, his "geometrical model of space is normally regarded as a precursor to Einstein's model of space-time curvature in the general theory of relativity" (Beichler 2007, 528).

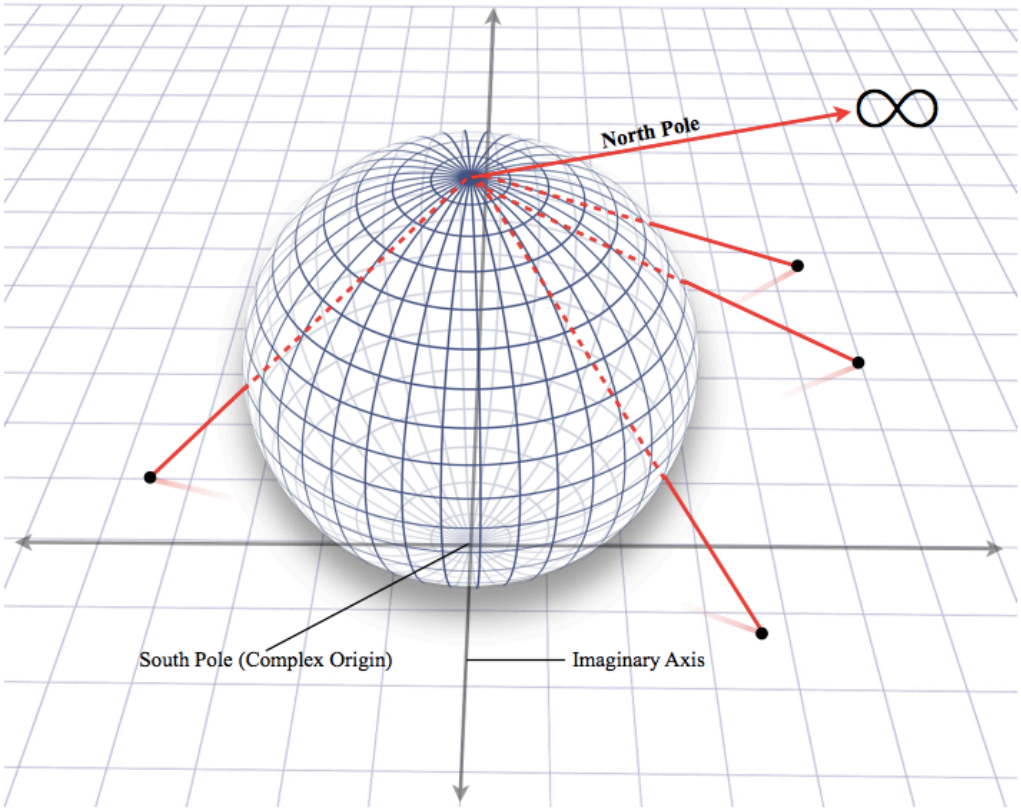

Figure 5.3 A diagram of a Riemann sphere

Before Einstein shifted the analysis of the fourth dimension to concepts of time, the nineteenth century imagination was awash with the concept of "hyperspace" and, as noted above, speculation about technologically mediating a fourth dimension of space.

Echoes of this are heard in contemporary literature on digital locative media where the barriers between virtual and physical dimensions are eliminated to form "hybrid ecologies" (Kabisch 2008, 227). Speculation about extra dimensionality developed out of the deeper analytics involved with these high mathematical contexts, yet was reflected in unique ways throughout the cultural imagination (including literature, music, and art). As art historian Linda Dalrymple Henderson writes, in the late nineteenth century, "the 'fourth dimension' gave rise to the entire idealist and even mystical philosophical systems" (1983, xix). By the year 1900, "the fourth dimension had become almost a house-hold word... Ranging from an ideal Platonic or Kantian reality—or even Heaven—to the answer to all the problems puzzling contemporary science, the fourth dimension could be all things to all people" (1983, 43). Stories such as *Flatland: A Romance of Many Dimensions* (1884) by Edwin Abbott, *The Canterville Ghost* (1887) by Oscar Wilde, *The Time Machine* (1895) by H.G. Wells (and others including "The Wonderful Visit," "The Plattner Story," and "The Remarkable Case of Davidson's Eyes"), and *Voyage to the Country of the Fourth Dimension* (1912) by Gaston de Pawlowski all engage with the idea of spatial multidimensionality. Space suddenly becomes unbounded as orienting oneself according to magnetic fields of force introduced a range of complications for the traditional magnetic compass.

The imagination of multidimensionality, of course, was not always an idealist projection and a number of such imaginations recall Agrippa's occult philosophy by which the presence of the world is known and yet always tied to the unknown or the occult (Thacker (2011) extends this to contemporary media studies). For H.P. Lovecraft,

extra-dimensional and cosmic horrors are the primary force that threatens to consume his fictional universe set in and around Arkham, Massachusetts. Lovecraft's fiction expressed horror at the thought of opening oneself to "terrifying vistas of reality" linked to "the awesome grandeur of the cosmic cycle" (2005, 167). The characteristics of monsters that seemingly erupt from beyond space exceed description: "one may properly say that it could not be vividly visualized by anyone whose ideas of aspect and contour are too closely bound up with the life-forms of this planet and of the three known dimensions" (389). In Lovecraft's *The Shadow Over Innsmouth* (1936), the narrator takes pains to be sure that the "points of the compass were clear to me," yet is consumed by "a blind horror beyond all rational proportion" (2005, 636-637).

In *At the Mountains of Madness* (1936), explorers use the magnetic compass to discover the convoluted structure of an alien city buried near the South Pole. The city's constitution was so grotesque that orientation according to the North Pole was useless. Explorers attempted to make their "dim way through the labyrinth with the aid of map and compass—traversing rooms and corridors in every stage of ruin or preservation, clambering down again, encountering choked doorways and piles of debris, hastening now and then along finely preserved and uncannily immaculate stretches, taking false leads and retracing our way" (2005, 558). At the story's end, the narrator cites Poe's *Arthur Gordon Pym* and instead of discovering a "shrouded human figure," the surviving explorers go insane after encountering a more horrifying figure of the Absolute, "Yog-Sothoth… the original, the eternal, the undying" (586). In *The Colour Out of Space* (1927), Lovecraft suggests that these extra-dimensional fields involve magnetic

phenomena. A meteorite fell from the sky in a remote farm community and "upon heating before the spectroscope it displayed shining bands unlike any known colours of the normal spectrum" and was found to have magnetic properties (2005, 344). After splitting it open and then trying to dispose of it, the "colour out of space" kills everyone in town and turns everything into a "greyish dust" (367).

For Lovecraft, mediating the fourth dimension with an allegorical machine involves facing a noumenal horror. In his personal letters, Lovecraft tells readers that facing this horror means coming to terms with the inherent hiddenness and inhuman characteristics of the world (or worlds beyond): "but when we cross the line to the boundless and hideous unknown—the shadow-haunted *Outside*—we must remember to leave our humanity and terrestrialism at the threshold" (1968, 150). The practice of mediating a secondary layer of space positions the interface as a hesitation or interruption between the real and the imaginary balanced between the uncanny and the marvelous. The space beyond space not only could involve God at the celestial or magnetic pole, it could, for example, be the monstrous Cthulhu whose ambivalent cosmic forces creep just beyond comprehension. From the astrolabe and magnetic compass to digital locative media, a Platonic secondary space is reconfigured and repackaged. From the cosmological spheres of the universe to the magnetic fields of force and the digital network, a range of recurring desires and anxieties are invoked regarding attempts to mediate "what's on the other side of too far."

The intertwined histories of magnetism, lodestones, and magnetic compasses spiral around concerns for orientation and navigation according to fields of force that, for

much of the time, exceeded the perceived limits of possibility. The use of the magnetic compass offered a way to move through space by allowing the subject to be directed by magnetic flows that were separate from the sensible environment. In addition, the fascination with magnetic fields and the associated speculations of extra-dimensional layers of space continued to transform throughout the twentieth century. Because of these factors, the history of the magnetic compass can be closely aligned with the divining rod, an even more imaginative device that relies on revealing the physical feedback of invisible electromagnetic fields. In the following chapter, I explore how the persistent negotiations among the locative media practices, representations, experiences, and affects extend to this much more paranormal media technology.

VI. DIVINING WHAT LIES BEYOND SPACE: ON DIVINING RODS

> They tell us something strange and odd,
> About a certain magic rod...
> As ready was the wand of Sid,
> To bend where golden mines were hid;
> In Scottish hills found precious ore,
> Where none e'er look'd for it before...
> —*Jonathan Swift (1710), Virtues of Sid Hamlet the Magician's Rod.*

In this chapter I move away from more established orientation technologies and focus on a more marginalized device: the divining rod. As a locative technology that is often just a branch cut from a tree, it has a deep history tied to elemental, mythical, and spiritual orientation. As a form of locative media use of the divining rod has often been contested and I do not offer a determination as to whether or not the claims of its supporters are accurate. As with the devices I outlined in previous chapters, I am, instead, interested in the neglected and alternative imaginations tied to these devices for what they reveal about the interface made to serve as a process that melds technological and spiritual practices in order to make the sublime intelligible. The divining rod is important to consider when identifying the recurring metaphysics that long haunt the desires and fears of mediating the space beyond space. In many ways, the divining rod is an allegorical machine in near-idealized form.

As part of the enduring "metaphysics of networks" at play with digital locative media (Galloway and Thacker 2007: 118), the practices of interpreting secondary spaces underscore the desires to move beyond the barrier between terrestrial and extraterrestrial

spaces. In this chapter I begin with a brief outline of the assorted operations of the divining rod before discussing its historical connections to European miners, the church, and the general population. Because the device often was positioned as an allegorical machine that might offer an opportunity to touch the space beyond space, I conclude with an extended analysis of its function as a platform for embodied interactions with the electromagnetic spectrum. As an interface with this "universal force," the divining rod expands the desire to reveal a potential fourth dimension of space—a desire that some see realized via the mediation of the digital network.

SEEING WITHOUT EYES

Divining (also referred to as dowsing, water witching, and Radiésthesia), as the term indicates, is a specific form of divination reliant on the use of a forked stick, rod, or pendulum to locate underground water. As a practice, then, it foretells the future by recourse to various natural or psychological techniques. A practitioner of the divining rod is typically referred to as a dowser, or one "who discovers springs" (Mager 1931: 13). The literature on divining indicates that an underground spring typically represents the ultimate frontier as the "spring is the final limit of the subterranean journey accomplished by a drop of water" (ibid., 13). Harvey Howells (1979) writes that the act of dowsing is often wrapped in the "art of mysticism" and "that the power came from the gods. The very name 'divining rod' implies association with a supreme being or beings" (11). Indeed, the technique has often been considered as linked to a "supernatural" power and possibly influenced by "dealings with the Evil One" (Raymond 1883: 419). For hundreds, possibly thousands of years, divining rods have been used for a wide range of purposes:

> They claimed also inspired power with which to cure all sorts of diseases, intuitive knowledge of lost or stolen goods, and ability to discover the hidden treasures of the earth, as well as the more convenient talent of transmuting ordinary substances into the precious metals... The instrument of their miraculous powers was a cleft stick, or *rod*, something of the form of an inverted Y. And when this talisman was firmly grasped in either hand by its two points, it was believed to indicate the proper course to be pursued, or point out some substances of medicinal utility, or fix the locality of some valuable mine—whichever of these the agent was pleased to wish (Anderson 1984, 67).

The divining rod also has been used "to find lost landmarks and reestablish property boundaries... to analyze personal character... to insure immunity against ill fortune when preserved as a fetish... to determine the direction of cardinal points." One of its more notorious uses was "to detect criminals" (Ellis 1917: 8). A popular legend associated with the moral use of the divining rod dates to 1692 when a dowser named Jacques Aymar led authorities to suspects who supposedly had murdered the wife of a wine-grower (Vogt and Hyman 1959). The story begins with Aymar's routine trip in search of water when he suddenly felt the rod turn towards the ground, which led him to believe he was standing on a substantial underground well as had repeatedly happened before. Upon digging up the spot, he discovered the severed head of a woman. He went to her house and directed the rod towards everyone in residence. The rod only moved when directed towards her widower. Seeing this, the man fled the house and his guilt was supposedly established. Aymar subsequently experienced both fame and notoriety for his ability to use the rod forensically. He claimed that using the rod allowed him to discern an unusual "'matiére meurtriere,' 'murderous matter,' given off by a murderer." (Barrett 1926, 31).

Although diviners claim that various instruments can be used, the classic method is to employ a forked stick. However, not just any forked stick will suffice as

determination of the specific type of wood as well as the means to acquire the wood is a meticulous ritual. Here is an abbreviated description of what is entailed:

> They should be of special wood: the magical hazel with its reputed power against all enchantments, the rowan with its protection against evil of all kinds, the sacred mistletoe—especially useful in finding treasure—or the magic birch or lucky willow with their powers to repel enchantment. As it was cut (if possible from a tree which had had seven shoots in the year), whatever wood was chosen, the Holy Trinity was involved and the twig had to be torn from the tree with one quick motion (Underwood 1980: 19-20).

Asked how the forked twig is able to locate and navigate, some diviners reply that the twigs themselves are "thirsty for water," while others argue that the twig serves as a medium between the body and electrical or magnetic fields of force flowing throughout the natural environment. Still others claim that the divining rod connects them to an invisible "network on the surface of the earth" described as "earth force" which is "an essential part of the mechanism by which life comes into being and, in fact, to be the 'Great Arranger': the balancing principle which keeps all nature in equilibrium" (Underwood 1980: 61-62). Many diviners further assert that it is necessary for the operator to "have faith" in the operation, as faith rewards the operator with "supernormal perceptive power—seeing as it were without eyes... perception at a distance" (57). Indeed, the "miracle of dowsing" is purported to allow the operator to sense "what lies beyond space" (Howells 1979: 13). This practice of interpreting space invokes other allegorical machines such as the astrolabe, the magnetic compass, and digital locative media as all have been positioned as having the ability to help actualize the desire to "see what's on the other side of too far." In the case of the latter, using locative media to create an augmented reality is premised on a digital imagination that

provides access to the hidden reality of the world or the "implicate order" of information that forms the eternal truth behind all surface appearances (Heelas 1996, 27).

Accessing this hidden reality with the divining rod involves a mysterious and oftentimes aggressive ritual:

> Jeff Green seems like a man in a trance. His head is bent forward, and his eyes are focused upon the junction of the two forks of the peach limb that he holds in his hands. He clutches one fork of the branch in each hand in such a way that the junction points almost straight up in the air. For the past half-hour he has been pacing back and forth over Frank Brown's pasture. Suddenly, the peach limb quivers, and, as Jess moves forward a few paces, it twists in his hands and points downward with such violence that the bark peels off. Jeff looks up and smiles at Frank Brown. "Dig here," he says, "and you'll find the water you need" (Vogt and Hyman 1959, 2).

Using the divining rod as a universal location device was popular until the 1701 European Inquisition when a decree was issued against its use in the "moral world." Not only did this ban its use for locating criminals but also for identifying various boundaries and settling lawsuits, as such uses were deemed to be based in "mischievous superstition and scandal" (Barrett 1926, 32). Superstitious use of the divining rod, however, never fully subsided and it was again soon in use to hunt ghosts and reveal traces of haunted presences caught between the visible and invisible.[102]

A DIVINE ROD

References to divining are mostly absent from Greek and Roman manuscripts, though there were various indications of the use of a divine rod (Latin: *virgula divina*) as well as

[102] One recent account is noted by Underwood: "One evening, Robert believed he located the exact position of the haunting entity in the kitchen with the help of his divining rods, and he put his rods on one side and boldly addressed the 'ghost'" (1980, 187).

stories that emphasized powers associated with the staff of Hermes (Tromp 1949). In these, Hermes is consistently carries a rod or wand, named Caduceus, entwined with two serpents, which were animals intended to guard mines from various forms of intrusion. As a device widely used by miners in the sixteenth century, Hermes's rod was assumed to be a divining rod. For the messenger of the gods who moved between mortals and the divine, a divining rod would have certainly helped. Caduceus was later carried by the messenger, Iris, who used the staff to travel at the speed of the wind from the heavens to the underworld. In Roman mythology, the staff was held by Mercury who was not only the messenger of the gods but the guide of the dead and protector of merchants.

The divining rod, then, has a long history rooted in its purported ability to mediate with the gods and its ability to contribute to prophetic acts. Stories about tree limbs imbued with a form of power can be traced back to various divine trees that people the mythological imagination. There is the prophetic power of Apollo's laurel at Delphi as well as the famous ash tree, Yggdrasil, which binds the entire world of the ancient Norse legends. There is also the shrine at Dodona in Northwest Greece. According to Herodotus, this shrine consists of oak trees whose whispering leaves are the oldest Hellenic oracle:

> They say that two black doves flew from Thebes to Egypt, and came one of them to Libya and the other to their land. And this latter settled upon an oak-tree and spoke with human voice, saying that it was necessary that a prophetic seat of Zeus should be established in that place; and they supposed that that was of the gods which was announced to them, and made one accordingly (2008, 32).

The ancient myth of the divine tree resurfaces as the Tree of Souls in James Cameron's *Avatar* (2009) where the Tree of Souls is the central source of spiritual power

for the oppressed people called the Na'vi. Charles Francis Keary argues that various historical foundations leads one to assume that "the divining-rod has inherited its qualities from the divining tree" leading to its ability to pick up on energies stemming from an originary life source (1882: 62). In addition to the Greek and Norse references to various divining rods, other writers note how Mediterranean idols were often seen holding forked rods which were seen as reinforcing their power and authority (Vogt and Hyman 1959). And the German folklorist, Franz Felix Adalbert Kuhn (1812-1881), claimed that the shape of the forked rod itself was a universal feature that connected the object with an original divine fire or light (Barrett 1926, 1). Much like the conception that the magnetic compass has sympathy with the divine power of the poles, the divining rod was conceived as inexorably pulled toward an invisible source of primary power.

Water dowsers typically refer to Moses as the first dowser, and base their reference on a passage from Exodus 17:5: "Behold, I will stand before thee there upon the rock in Horeb; and thou shalt smite the rock, and there shall come water out of it, that the people may drink." Despite its supposed Biblical era use, in 1518 Martin Luther included the use of the rod in his list of acts that break the first commandment due to the rod's potential connection with occult sources (Vogt and Hyman 1959, 15). While the apparent use of the divining rod in the Christian Testaments might not offer conclusive examples of its use, the locative device does appear in key moments of religious revelation in denominations such as the Church of Jesus Christ of Latter-day Saints. One moment in particular occurred during a revelation for the founder and prophet of the Mormon Church, Joseph Smith Jr., when he was given to understand that the "Second

Elder" of the church, Oliver Cowdery, should use a divining rod to learn the "mysteries of God." In the 1833 Book of Commandments (7:3) is written, "for you have another gift, which is the gift of working with the rod: behold it has told you things: behold there is no other power save God, that can cause this rod of nature, to work in your hands, for it is the work of God; and therefore whatsoever you shall ask me to tell you by that means, that will I grant unto to you, that you shall know."

The basis for such a strong inclusion of the divining rod in Mormonism's religious texts would seem to be associated with Joseph Smith Jr.'s use of the divining rod as he moved across the U.S. in search of treasure: "He [Joseph Smith] also believed that there was a vast amount of money buried somewhere in the country; that it would some day be found: that he himself had spent both time and money searching for it, with divining rods, but had not succeeded in finding any, though sure that he eventually would" (Kirkham 1967: 384). It is interesting to note, though, that the Mormon Church's own history reveals an uneasy relation to the rod, as it troubled the distinction between magic and religion. In an 1841 bishop's court ruling, cleric Benjamin Hoyt was charged with "accusing certain persons of being witches or wizards and endeavoring to cure such as he said was bewitched, by art, and meddling with those things unlawfully" (Anderson 1984: 48). The Church punished Hoyt because he used the rod for "fortune telling, magic, black art, etc., for it was not of God" (48). Its High Council disciplined Hoyt for using the divining rod for occult ends: "The decision of the court is that Brother Hoyt cease to call certain characters witches or wizards, and that he cease to work with the rod he calls a divining rod, and that he cease to burn a board or boards to heal the sick by art" (48).

The divining rod's potential relations with the occult extend back to the first printed demonstration of the practice, which appeared in a 1556 foundational book on ores and mining, *De Re Metallica*, published by the German founder of geology, Georgius Agricola (1494-1555). He describes how miners search for mineral veins, using a technique that closely resembles water dowsing. "[T]he application of the inchanted or divining rod to metallick matters took its rise from magicians and the impure fountains of inchantment" (1950, 27).

Figure 6.1 "Divining Rod for Finding Metals," woodcut from Georgius Agricola's *De Re Metallica* (1556)

Agricola's description of dowsing is linked to the mining districts of the Harz Mountains in Germany which are often considered the birthplace of modern dowsing. German miners were exported into England during the reign of Queen Elizabeth (1558-1603) and brought the practice of the divining rod with them. This contributed to the first direct discussion of the divining rod in English in Robert Fludd's 1638 *Philosophia Moysaica*. Fludd "revives the use of the rod as an illustration of the innate affinity between things vegetable and things mineral" (Barrett 1926: 11). The divining rod, then, was the scientific and metaphysical means by which the originary interdependencies could be revealed.

For many practitioners, the rod was a way to interact with the mysterious magnetic fields that flowed throughout the environment. Gabriel Plattes, an English agricultural and science writer, illustrates how he trimmed a forked branch from a hazel tree and used it to guide him up and down the side of a mountain. "Before Noone [Noon]," he writes, "it guided mee to the Orifice of a lead mine." The hazel rod was attracted to particular areas because it was "of Kin to the Load-stone, drawing Iron to it by a secret vertue, inbred by nature, and not by any conjuration as some have fondly imagined" (1639, 11). For many dowsers, then, the divining rod served as a more discerning form of magnetic compass.

During the seventeenth century, the divining rod enjoyed extensive user in locating underground water sources. This practice was popularized by the mining engineer and mineralogist Martine Bertereau, also known as the Baroness de Beausoleil. The baroness and her husband, Jean de Chastelet, were tasked with finding and

developing mines for the French government. Following the publication of *La Veritable Declaration des Mines de France in 1630*, she published *La Restitution de Pluton* in 1640 in which she advocated using the rod for locating underground water sources. However, soon after its publication, the couple was imprisoned on charges of sorcery and she passed away around 1645.

By the end of the seventeenth century, the practice of dowsing spread geographically alongside European exploration and colonization. The spread provides a fascinating nexus between the supposed "rational" colonial project and techniques of domination that oscillate between scientific "rationalism" and supernatural "irrationalism." For example, the struggle over use of divining rods in Namibia in the late 1890s and early 1900s reveals that "the 'civilising mission' was not always confined to strictly rational models" and points to a wide-ranging "non-rational epistemological imperialism" that was involved (van Sittert 2004: 915). For Otto Krautwurst, "colonial and imperial expansion involved not only the export of rationality, but local European forms of non-rationality—sometimes coded as irrationality—as well; that the colonial Self-Same not only encounter 'external' Others of its own construction, but also... brought 'internal' Others of its own construction into the colonies" (cited in van Sittert 2004: 915).

The introduction of this "magical" technique by the German colonial power reveals that the use of divining rods was far from being "some quaint anachronistic shadow quietly fading away as Enlightenment comes to brighten the few remaining dark corners of 'superstition' in Western and Westernising social forms" (ibid., 915). During

the same period, native farmers in South Africa were skeptical of imported British geological boring practices because "Nobody can see underground" (926). The British, then, seeming to recognize the power of their own "irrational" divining practice, introduced the divining rod to South African farmers as a way to increase political and economic influence in the colony. This admixture of knowledge, belief, science and magic underscores the longstanding interplay of metaphysics, economics, and materialism that has pervaded the practices of spatial orientation.

The use of divining to sense what lies beyond the space of the visible quickly spread throughout the popular imagination. In the seventeenth and eighteenth centuries, use of the rod evolved from solely discovering underground springs towards finding universal location. As Jean Nicholas writes in 1693, "The rod turns over a hidden object of any nature" (Mager 1931: 125). In 1691, John Locke, in an analysis of financial interest rates, mentions dowsing as a method for discovering valuable treasure: "the Deusing-rod or Virgila [sic] Divina able to discover Mines of Gold and Silver" (1691). Abraham Cowley, a leading English poet of the seventeenth century, describes a similar scene in his poem, "To Mr. Hobs" (1656):

> We break up *Tombs* with *Sacrilegious hands*;
> Old *Rubbish* we remove;
> To walk in *Ruines*, like vain *Ghosts*, we love,
> And with fond *Divining Wands*
> We search among the *Dead*
> For Treasures Buried,
> Whilst still the Liberal Earth does hold
> So many *Virgin Mines of undiscover'd Gold* (lines 41-48).

Throughout its history, the divining rod has been counterposed against more "rational" methods of direction finding and object discovery. In 1658, dowsing was

analyzed in an academic thesis by Jacobus Klein. His primary concern was to determine whether the vibrations and movements of the *Virgula mercurialis* were due to an occult force. After consulting with twenty-three experts and practitioners, Klein concluded that the rod does in fact move but that its movement is not entirely due to an occult force (1658, 37). In most cases the device vibrated due to intentional fraud and deception by the dowser who typically shook and moved it at will. However, in a smaller number of cases, these movements were found due to a pact with the devil (16). Samuel Sheppard, in his *Epigrams theological, philosophical, and romantick* (1651), sums up the popular understanding of the divining rod at the time:

> Some Sorcerers do boast they have a Rod,
> Gather'd with Vowes and Sacrifice,
> And (borne about) will strangely nod
> To hidden treasure, where it lies:
> Mankind is (sure) that Rod Divine,
> For to the wealthiest (ever) they encline (VI. i.).

According to Father Pierre Lebrun of the French Oratory (1661-1729), since the divining rod can locate various objects hidden to the sensorium, it does so due to an all-knowing intelligent force. If not under human control then it must be controlled by the devil. In 1689, after the use of the divining rod was adopted by parishioners, Father Lebrun sought the advice of Father Nicolas Malebranche in order to make a determination regarding its use. Malebranche replied that if the divining rod actually works, it is only due to the devil's actions. Guided by these arguments when he wrote *Histoire critique des pratiques superstitieuses* in 1701, Lebrun concluded that the motivations of the rod were uncertain. He was convinced that the rod was an instrument

that the devil used for deceit and was largely in favor of abolishing its use “by every means” and “for all time” (Mager 1931: 2).

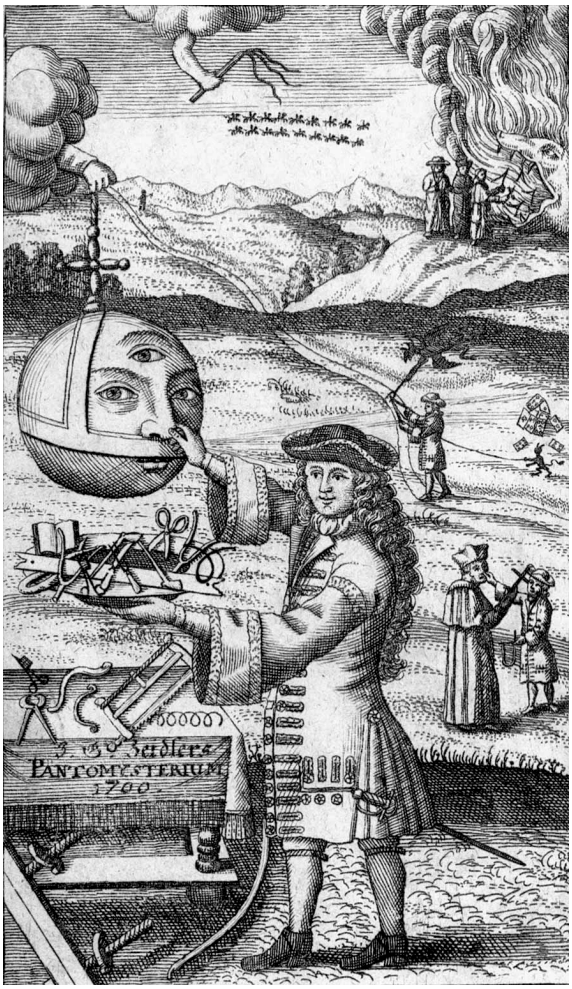

Figure 6.2 Illustration from Johan G. Zeidler’s *Pantomysterium* (1700)

Published in 1700, a work by Johann G. Zeidler, *Pantomysterium,* featured a series of denunciations of dowsing. An elaborate illustration features various kinds of dowsing rods supposedly used for divining. The artist includes the popular forked wooden rods as well as more humorous specimens: candle-snuffers, a pair of scissors, table utensils, two pipes held at an angle, an open book, a bucket handle, an ordinary forked rod fixed to the ends of two magnets, two bare hands, and a knackwurst sausage.

In the foreground, the dowser tweaks the nose of a globe with three eyes and "the widest nose" (as is explained in an illustrative stanza), which symbolically represents Halle, Germany, or "God's city." Above the dowser we see a hint of punishment from the heavens as a whip extends from the skies and is followed by a plague of locusts. Opposing this message from God is a Leviathan spewing a fiery mess of dowsing rods into the faces of three priests unable to stop the flow of forked twigs. A small demon stands below both the Leviathan and a tumbling house of cards as it pulls the strings to alter the dowser's path of direction. Another priest also in the foreground attempts to place a cross on the forehead of a young dowser who returns the favor by tweaking the nose of the priest. In this illustration we can see how the divining rod was viewed by the Church as an instrument of chaos.

PLATONIC RADIOLOGY

Despite ongoing Church pressure, the divining rod continued to offer alluring possibilities for contact with the immeasurable, infinite, vague, and the unfathomable sublime. As a liaison with fields beyond space, this spatial interface generated substantial

interest due to its simple design. In the United States,[103] a few publications on water dowsing were published prior to 1800 and most, if not all, describe the contested position of those who use the forked twig to see "beyond space" (Howells 1979). In England, Thomas De Quincey described how dowsing was becoming a popular means of location finding. In his essay on *Modern Superstitions* (1840), he casts doubt on the whole practice: "the experimental evidence of a real practical skill in these men, and the enlarged compass of speculation in these days, have led many enlightened people to a… suspension of judgement, on the reality of this somewhat mysterious art" (434). Nevertheless, De Quincey also notes that the instruments and their users are always in high demand because "nobody sinks wells without their advice" (221). Experimental testing of the divining rod through various experimental testing became the new challenge. Nicolas Jadelot, a Professor of Medicine in Nancy, France, oversaw one of these experiments and noted that dowsers successfully located underground water sources before a crowd of witnesses that included physicians and lawyers.

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[103] The first American academic paper on the subject was published in the *American Journal of Science* in 1821 by Reverend Ralph Emerson entitled "On the Divining Rod, with Reference to the Use of It in Exploring for Springs of Water." Emerson reported on the use of divining rods for locating underground water in the states of New York and New Hampshire, and concluded that he was "totally skeptical of their efficacy, till convinced by my own senses." In 1826, the *American Journal of Science* published an article titled simply "The Divining Rod" and contrary to Emerson, the anonymous author concluded that the "pretensions of diviners are worthless." In 1917, the U.S. Geological Survey published *The Divining Rod: A History of Water Witching* by Arthur J. Ellis. In an introduction to the paper, O.E. Meinzer related that the U.S. Geological Survey received a large number of inquiries each year on the subject of water dowsing, as well as persistent demands that it be made a subject of investigation. Meinzer explains that the paper was written "merely to furnish a reply to the numerous inquiries that are continually being received from all parts of the country."

Jadelot's experiment, which extended over two months, was primarily conducted to verify the accounts of the famous dowser, Barthelmy Bleton. However, the experiments also linked the locative device with the wider electrical imagination. Dr. Pierre Thouvenel, in his *Mémoire physique et mêdicinal* (1781), describes the process of these experiments with Bleton:

> When he had followed the course of an underground spring—sometimes for more than a quarter of a mile, across mountains, rock, or forests and indicated on the way numerous sub-divisions of the same spring—I made him return. He then re-conducted me himself, though still blindfolded… Sometimes in order to try and deceive him, if his senses were concerned, I placed false marks as if to indicate a spring… Nevertheless, he was never led astray and always rectified such errors. In fine I tried all sorts of ways to deceive him, and I can testify that in more than six hundred trials, I did not succeed in doing so one single time (cited in Barrett 1926: 36).

Additional experiments regarding the use of the divining rod became public spectacles as nearly five hundred bystanders gathered at repeated events to watch Bleton demonstrate the power of the divining rod. Members of the crowd included ministers of state, magistrates, scientists, clergy, and journalists for the *Journal de Paris,* who on May 13, 1782, described the months of proceedings: "To the present time, and to our knowledge, Bleton has followed more than fifteen thousand *torses* of the conduits, without his having committed a single error and without having found, among more than six thousand persons, a single responsible witness who has made a well-founded objection. He has been submitted to the most rigorous tests that incredulity, even prejudice, could suggest, and they have only resulted in more light, more conviction and more astonishment" (ibid., 41-42).

This communal spectacle was more than an elaborate game of truth and treachery and Bleton often exhibited prolonged breakdowns and tremors. His performance was closer to an embodied glossolalia as his body seemed to succumb to the earth's power and to open itself to the fields of energy supposedly radiating from below. In the words of one witness:

> The presence of water made him experience a feeling of oppression in the region of the diaphragm. At the same time trembling and a general feeling of chill took possession of him. His legs staggered, the tensions of his wrists stiffened, causing convulsive movements. His pulse gradually failed. These convulsive spasms persisted, in varying degree, as long as he remained vertically over the subterranean stream, but suddenly disappeared directly he placed himself on one side of it. At least they became weaker, for they did not cease entirely until he had gone a distance from the water, and that distance, according to Bleton, represented the depth of the spring (cited in Mager 1931, 31-32).

Determining the validity of dowsing was one thing but attempting to explain the manic convulsions of Bleton was another. One witness, Dr. Pierre Thouvenel, hypothesized what he had witnessed. In 1783, he was commissioned by Louis XVI to report on the mineral and medicinal waters of France and he obtained permission to use the services of a dowser to find fresh mineral springs. In his report, Thouvenel speculated that Bleton had tapped into a source of "electric effluvia" that move from the earth's subterranean streams and that caused his body to react the way that it did (cited in Mager 1931: 1). Based on his observations of the strength and reactions of Bleton's sensations, Thouvenel argued that the dowser was interacting with electrical currents that flowed from east to west. Thouvenel's speculative discussion predates the modern analysis of electrical currents and the operation of earth currents was not fully analyzed until experiments made in 1849 by an English telegraph official named William Henry Barlow.

Monitoring the electrical currents running through the telegraph lines, Barlow noted that there were moments of spontaneous interference by natural currents (Barlow 1849). Thouvenel's consideration of the divining rod's ability to reveal electrical currents inspired others to consider the curious art of dowsing. As a result, the device continued to make inroads into European culture and became entangled with the wide-ranging fascination with the "electrical sublime" associated with more well known technologies of the time (cf. Carey and Quirk1989).

For Vicomte Henry de France, the possibility that objects had inherent electrical properties that could be detected by a simple instrument was something of an obsession. Inspired by Faraday's postulation of electrical fields of force, de France sought a method to interact with these properties. By the early twentieth century, he had developed a systematic theory of electrical orientation and force—the "method of fields"—and combined it with a wider theory of navigation and orientation. His perspective was influenced by Baron Pierre Bigot de Morogues who wrote extensively on chemistry and mineralogy in the nineteenth century. According to de Morogues, all metals, mineral deposits, and subterranean waters are shrouded in electrical spheres and, due to an obscure mechanism, the operator of the divining rod feels the effect of colliding with and penetrating through these spheres. Therefore, de Morogues theorized that when the divining rod moves, it must be indicating the presence of an electrical field and any objects that surround this field. Since "all bodies are surrounded by electric spheres," they "exert an incessant reciprocal action on one another" (cited in Mager 1931: 134). In this way, one sees how the divining rod comes to be understood as a quintessential

"spheric liaison" (Sloterdijk 2011) where the rod-as-spatial-interface generates an animating relation between the body and the electrical currents that are beyond direct sensation.

"As spheres are the original product of human coexistence… these atmospheric-symbolic places for humans are dependent on constant renewal," writes Sloterdijk (2011: 46). The shattered *primum mobile* was renewed in the form of universal correspondences held together by electrical currents. "The method of Fields goes back to the seventeenth century. . . [the] first objects of study should be those known to possess electric, magnetic or calorific properties, such as rubbed glass or ebonite, magnets, stoves, then a fissure in the ground water-bearing or otherwise, ore, plants, the human body, finally anything at all" (de France 1948: 14). These universal electric properties, however, extend to every object which "is surrounded by a 'field'—that is to say, a space in which its influence is felt. Every field is characterised by its vertical and horizontal dimensions, as well as by its 'direction', as shown by a beam of radiation acting at an angle to the meridian which is peculiar to the object" (ibid., 14).

For de France, the ability to interact with invisible electrical fields is precisely the reason why the divining rod works as an orientation device. This mode of orientation is reconfigured by digital technologies, which promoters suggest now allow humans to become conscious of resonating "morphogenetic fields" made up of hidden informational patterns (Rushkoff 1994: x). Much like the divining rod allowed the diviner to sense a fundamental electrical "earth force" emerging from a "Great Arranger" (Underwood 1980: 61-62), some cyber futurists suggest that digital technologies help to form the

"global brain… [the] final stage of the development of 'Gaia,' the living being that is the Earth, for which humans serve as the neurons" (Rushkoff 1994: x).

de France collaborated with Abbe Bouly, who in 1930 developed the concept of *Radiesthésie* in an effort to better understand how to use the divining rod to interact with these hidden fields. Together they founded *L'Association des Amis de la Radiesthésie* at around the same time. *Radiesthésie* means "sensation of radiation" or "radiation perception" and de France and Bouly expanded its meaning to include detection of a range of other physical effects that remain invisible to the senses. Their attempts to directly perceive radiation recalls practices of Platonic radiology where the idea of causation is understood as a result of radiation and refers back to Plato's "hypercosmic sun" that resides in the *primum mobile* (Sloterdijk 2011, 119). Platonic radiology was refined by Marsilio Ficino as his erotic theory of enchantment contributed to various Platonic magological theories of fascination, influence, enchantment, and disenchantment (ibid., 224).[104] With the divining rod as their primary instrument, Platonic radiologists sought to elevate the sensation of touch as a way to perceive these enchanted fields of force. de France writes:

> What we have said above about the handling of our instruments shows that the motor sensations of the hands are involved—in other words, and extension of the sense of Touch exerted at short range. Indeed, there is no valid reason for supposing that the sense of Touch working through the motor sensations should be in the enjoyment of extraordinary privileges in the matter of range which are denied to the senses of Sight and Hearing (1948: 12).

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[104] Sloterdijk notes that this understanding of Platonic radiation also contributed to "conceptions of a general magic of intersubjectivity emerged from the fifteenth century on… the mesmerist-magnetopathic universe, which expanded between 1780 and 1850 into a fully-fledged depth-psychological classicism" (2011, 124).

While the early twentieth century would herald new ideas regarding dowsing, the practice of *Radiesthésie* is remarkably similar to the original methods of divining. "The Rod is made of two round bits of springy wood (hazel, willow, osier, etc.)," writes de France. With the rod in each hand, "Clench both your fists and, with arms bent at the elbows and moving the fists quickly to and from each other, go forward as already described towards an object causing strong reactions" (10). However, these "strong reactions" are not generated by some medieval "secret virtue" but by electrical fields. As you move through space with your divining rod, you will feel it flip back and forth as it "will dip over positive, and rise over negative electricity" (11).

These electrical fields, while aiding the orientation of the individual, were not always considered beneficial to the body. In fact, these occult fields were sometimes viewed as possessing malevolent qualities that could penetrate and contaminate mind and body. de France notes that *Radiesthésie* could be used in conjunction with medicine to detect these "rayons nocifs" or "injurious rays." He points to work by Dr. Jules Regnault and Baron von Pohl who analyzed the effects of emanations from underground water fissures that reportedly caused cancer, tuberculosis, and rheumatism. *Radiesthésie* was uniquely positioned as a means by which these injurious rays could be located, paving the way for some sort of remedy for the person afflicted. de France offers his own prescription:

> It is clear that if there is any suspicion of their existence, it should suffice simply to move the bed of the patient, but how can the evil be foreseen without the use of the rod… Certainly the electroscope will detect the presence of these rays, but one must know exactly where to place it. Without the rod… there is no way of finding this out, the more so that

> these dangerous fissures are often only a few centimetres in width. One cannot therefore look to the electroscope for a general method of control. The rays possess great power of penetration and traverse the whole length of a building from foundations to attics" (1948: 55).

A range of evidence has since been introduced[105] that suggests that low power or low frequency electromagnetic radiation associated with electric currents does not lead to health hazards, although there are a number of associated unknowns and not-yet-debunked fears such as radiation emissions from mobile digital devices (where the "injurious rays" that the divining rod could detect are replaced by radio frequency absorbed by the body and that is measured as the Specific Absorption Rate (SAR)). Living in an increasingly electrified world, de France sought to introduce a device that could not only locate and sense this hidden electromagnetic radiation but also help alleviate anxieties and fears associated with the idea that this radiation invisibly penetrates everything and everyone.

Henri Mager was also interested in possible interactions between the divining rod and invisible fields of electricity. He based his approach on a theory of the electrical circuitry of the body and the use of the device to connect that circuit with the earth. In *Water Diviners and Their Methods* (1931), Mager argues that the divining rod allows for the human body to form a closed loop completes an electrical circuit. The divining rod reacts to discharges brought on by electrical feedback:

> When the point of the rod encounters the flux of force which overlies subterranean water, or one of the planes of force which forms the immense field bordering the flux on both sides, a discharge passes through the head

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[105] "Electromagnetic fields and public health," *World Health Organization*, June 2007, accessed February 27, 2013, http://www.who.int/mediacentre/factsheets/fs322/en/index.html.

> and one branch of the rod. The earth providing a path for a return current, the two branches of the rod, which form an angle, are traversed by currents opposite in direction, and, according to Ampère's laws, repelling one another; the two branches which are bound to one another try to free themselves; they exert force; they visibly 'work'… it moves through contact with the flux of force which overlies subterranean water in motion… its movement is due to the action of a field of force, to the action of radiant energy (Mager 1931, 8).

When, however, held by a human being and brought into contact with fields of radiant energy, the rod only seems to move when the vibrations between the electrical sphere and the operator's body are similar. Mager's "law of likes" elaborates on Greek theories of sympathetic force: "If a body is brought into a vibratory field, having similar vibrations to itself no interference is caused to the vibratory manifestations. Inversely, if a body is placed in a field of different vibrations, the vibratory manifestations are paralysed" (207). Importantly, divining rods do not seem selective as to which vibratory manifestations they encounter as they "pick up all the manifestations of force in space," including the increasing number of wireless signals spanning the globe (207). As a result of their efforts to interact with these manifestations, Mager therefore suggests a dowser should be considered to a "*radio-telluriste*, the interpreter of *radio-tellurie*" because, he asserts, dowsers "embrace the whole of the phenomena which in 1914, we designated 'Universal Activity.' The terms *radio-scopie* or *radio-logie* could be applied to the study of these phenomena, since they are concerned with radioations, vibrations, waves, manifestations of force" (102). In a manner similar to that of other allegorical machines, positioning the divining rod as a divine interface able to mediate "Universal Activity" amalgamates metaphysics and science through the efforts to interpret the sublime.

INTUITING ARCHETYPES

Mager's technique extends to more marginalized approaches to divining. He began to incorporate visual cues into his divining, a practice outlined in his "Method of Colours." After painting his divining rods black and covering the handles with white tape, he discovered certain direct associations between a particular color and the directional points on a compass. He also found that a color's orientation varies according to the individual as each person seems to have a different directional palette.

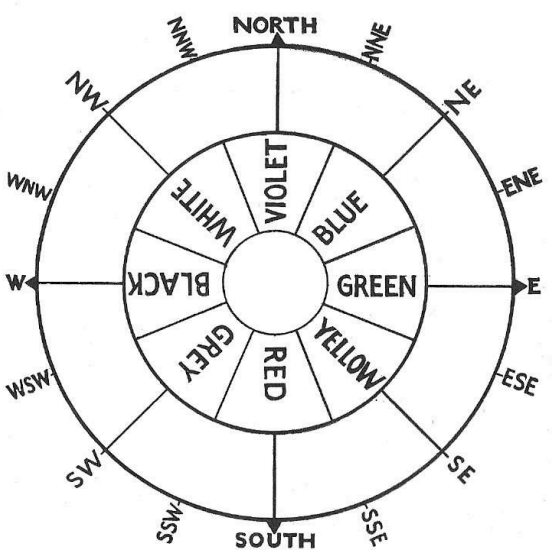

Figure 6.3 Henri Mager's Colour Compass (1931)

Mager describes his process of discovering this method:

> I placed the violet sector in the magnetic meridian and opposite it the red section. Using a black-white detector (black shafts, white binding) to pick up discharges, during a circular progression in a clockwise direction, I ascertained that two planes of vibration were aroused, one towards the north and the other towards the south. Having discovered this I arranged the other sectors, blue to the north-east, green to the east, yellow south-east, grey beyond the red or south-west, black west, white north-west, and the rosette was complete. The black-white detector then enabled one to ascertain that two new planes of vibration had come into being, one on the

> east and the other on the west. My modest rosette had become a thing of significance, since it threw out four far-reaching planes of force towards the four cardinal points (1931, 205).

Mager further determined that the colors correspond to specific types of metals contained within the water that was found. “I could almost instantaneously tell the character of the water (i.e. whether it be normal or contain iron, silica, magnesia, etc.), whether it be normally drinkable or contaminated, and if so to what extent” (204). Claiming to have stumbled upon this finding in 1919, he subsequently developed an elaborate methodology and produced his own version of the compass rose on which the cardinal directions are replaced by colors and its directionality determined by the integration of the diviner’s mind and his or her rod.

What is particularly interesting is the way that Mager’s method conceives of the divining rod as a technology to mediate fundamental truths. He describes this as a mode of “intuitive perception” that elaborates upon what de France understood to be movement towards a perfected mode of divining. de France calls this form of intuition *teleradiesthesia* and notes that it allows for the “immediate and complete cognition of any object or truth” (1948: 75). He identifies a split between practitioners of r*adiesthesia* and *teleradiesthesia* but argues that both, “whilst preserving their independence and refraining from mutual criticism, should continue to be members of the same society” (80). This is important for Mager because he views the dowsing rod as way of uncovering a form of archetypical knowledge or “ancient impressions which have been lying in our storehouse of accumulated experience forming the collection of mental pictures, ideas and foundations of judgments” (1931, 15).

Investigation into the practice of dowsing, then, leads to a configuration of the allegorical machine in near supreme form by pushing towards an interfaceless interface that revives a Gnostic form of intuitive inspiration. As an operation that foreshadows Google's position as a networked storehouse of absolute knowledge (Hillis, Petit, and Jarrett 2013), this mode of intuition is a projection that links with corresponding truths. The result of using the divining rod to tap into these archetypes is akin to building a metaphysical connection between heaven and earth through which inspiration occurs.

Like divine inspiration provided by the *primum mobile*, the mystic sympathy of the magnetic poles, and the networked intelligence within the "pervasive imaginaries" of augmented reality (Tarkka 2005), the allegorical machine is situated as supporting this mode of "intuitive perception." The divining rod becomes the interface that mediates pure thought transmission,[106] an outcome which underscores the recurring "dynamics of the desire for enchantment and the pathos of disenchantment" (Sloterdijk 2011: 268). This desire never surceases and resurfaces with with respect to digital technologies as the connection to the network offers something akin to "a direct experience of the infinite" (Rushkoff 1994: 100). On a related note, Timothy Leary describes the "ecstasy of the ultimate hack" that will propel humanity towards a cybernetic Eden of fulfilled

[106] For futurists such as Ray Kurzweil (1999), the body is viewed as a restrictive system to be left behind, its flesh and blood an abject obstacle for the mind to overcome. Kurzweil predicts that within a few decades when we achieve the technological singularity, human consciousness will be easily uploaded to computers (the body is now just a "mind file") allowing the individual to achieve immortality (as a dynamic and conscious subentity connected to a larger "spiritual machine" as "our mind is now just one big happy society"). These cyber-fantasies of radical disembodiment and transcendence point to the necessary impediment our embodiment exercises on our persistent cultural desires for spiritual transcendence.

human potential or a "satori of harmonious human-computer communication resulting from the infinite regress into meta-levels of reflection of self."[107] For Mager, the divining rod supports a similarly sublime configuration of pure communication where the meeting of minds and the space beyond space becomes a form of telepathy:

> I have constructed a detector, which enables me to pick up the field of force which accompanies any human brain and consequently the field of thought-manifestation, a field external to the subject. When the field of force which accompanies the subject… and the more restricted field of force which accompanies the working of the subject's brain, come into contact with the field of force which accompanies and permeates subterranean water, direct perception by the brain can in certain cases by considered a possibility (1931, 16).

Attempts to connect to these archetypical fields of force are also found in the practice of using divining rods to sense lines that extend beneath or around ancient monuments and megaliths. Analysis of these "ley lines," inspired by the Chinese concept of feng shui, indicates the alignment of certain landforms with various built structures and was valued by ancient civilizations as a way to indicate symmetry between sacred places and invisible networks of power. Leys connect ancient sites and holy places situated across the landscape in straight lines from one to several miles in length. These monuments and natural formations were aligned with the directionality of these fields of force because these spaces "were variously used for transmission. . . of spirit, for the spirits of the landscape, and, possibly for externalized human consciousness" (Pennick and Devereux 1989: 258). Dowsers argue that ley lines, understood as "conduits of spirit" (255), can be found, for example, in traditional Chinese "secret arrows" that

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[107] Timothy Leary and Eric Gllichsen, "Digital Polytheism," *Deoxy.org*, October 1998, accessed February 27, 2013, http://deoxy.org/l_digpol.htm.

conduct the vital force of life or *Qi*, Celtic fairy paths, Native American shrines, burial grounds, votive offerings, and the Nazcan lines in Peru. British dowser Bill Lewis considers the use of the rod to be crucial to uncovering how "megaliths provide the interface between sinuous subterranean forces and straight overground energy; an interaction further affected by cosmic and possibly atmospheric influences" (Devereux and Thomson 1979: 65).

Guy Underwood's theory of "geodetic lines" suggests that ley lines converge at blind springs where ancient holy sites, stone circles, and barrows form points of communication between water lines and terrestrial energy fields. By using the divining rod, one connects with an "Earth Force," which "manifests itself in lines of discontinuity, which I call geodetic lines, and which form a network on the surface of the Earth" (1973: 18). This force is indicative of the wider generative power of nature, which Underwood describes as the "'Great Arranger'—that balancing principle which keeps all Nature in equilibrium" and bases this theory on the Platonic Demiurge who fashioned and shaped the material world and Anaxagoras's concept of "Nous" with the Mind as the ultimate ordering force (20). Paul Devereaux and Ian Thomson note that by attempting to use the divining rod to locate these primary lines of force, a practitioner is closer "to a remote time when people's lives were closely in step with elemental and spiritual realities, when the landscape, the heavens and the human mind were understood as one deeply interdependent whole" (1979: 9). More recently, Jeffrey Keen has argued that the divining rod is the one instrument that can locate and mediate this "Universal Force," something that science is unable to uncover:

> Conventional science cannot explain many phenomena in nature that seem to involve concepts such as non-locality or coherence, all of which imply instantaneous communication across vast distances in space-time… Recent research has demonstrated that the human mind is intrinsically linked to these phenomena, and the author's own research has proven that a profitable approach is to use the mind to explore the structure of the Universe… dowsing, in its widest sense, used properly, is a very powerful tool in unlocking the mysteries of non-locality, consciousness, and the nature of the Universe (2005: 15).

Of course, the desire to unlock the mysteries of consciousness and the universe means that the dowser in some way comes to terms with the dowsing rod as an idealized interface with the sublime. Echoing Kant and Burke, British dowser Grahame Gardner wonders, "could it be that we are dealing with phenomena at the very limits of human comprehension, a quantum world where language and conventional understanding fail us"?[108] For Gardner, dowsers make a mistake if they only use the rod to achieve complete understanding of this universal force. He suggests that divining is best used to create and sustain sacred spaces. "To construct a sacred space," he writes, "is to precisely position ourselves in Space and Time. We are creating a psychic bubble of space that is a microcosm of Universe." The development of this psychic bubble is key to linking together with the interdependence of reality. "Thus, by marking out and orienting our space to the cardinal directions," Gardner continues, "we create very real energetic anchors to Middle World (the Earth we walk on). By positioning the space on an earth energy power spot, we create links to Lower World, and by including astronomical alignments, such as a solstice sunrise, we can draw upon Upper World energy."

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[108] Grahame Gardner, "Power Dowsing," *Western Geomancy*, April 2009, accessed February 27, 2013, http://westerngeomancy.org/articles/power-dowsing-2009/.

The creation and maintenance of these "energetic anchors" positions these sacred spaces "between the worlds."[109] The desire to develop and access such a shared sacred space extends to digital locative media, which proponents suggest allow people to "step into a different world."[110] Indeed, this sense of sacred potentiality extends to devices such as the iPad, which is used to visualize the digital network layered over material space and grant them access to "World 2.0."[111] As the astrolabe's use for orienting oneself to Qibla and the magnetic compass' ability to indicate the heavenly poles indicate, the revelation of sacred spaces by allegorical machines underscores the technological attempts to relate the human subject and world in ways that recalibrate a magical unity. As Simondon reminds us, this is a magical universe where a "privileged place, a place that has a power, is one which draws into itself all the force and efficacy of the domain it delimits; it summarizes and contains the force of a compact mass of reality; it summarizes and governs it, as an highland governs and dominates a lowland; the elevated peak is the lord of the mountain" (2011: 412).

Gardner's promotion of the divining rod as a way to access sacred spaces "between the worlds" feeds into the contemporary popular imagination. The celebrated 2009 film *Coraline* features a protagonist who actively engages the divining rod.

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[109] Grahame Gardner, "Creating a Sacred Space," *British Society of Dowsers Earth Energies Group*, 2003, accessed February 27, 2013, http://www.britishdowsers.org/EEG_site/archive/articles/asa2003_issue32/SS_gardner.htm.

[110] Maarten Lens-FitzGerald, "Tablets are great to play Immersive Augmented Reality" *Layar Blog,* September 2, 2010, accessed February 23, 2013, http://www.layar.com/blog/2010/09/02/tablets-are-great-to-play-immersive-augmented-reality/.

[111] Tish Shute, *UgoTrade: Augmented Realities in World 2.0*, accessed February 27, 2013, www.ugotrade.com.

Coraline, a stop-motion animation, centers on a young girl who seeks to escape the stress and loneliness produced by moving to a new home and her out-of-touch parents. Leaving her frustrations behind, Coraline explores the surrounding forests with her divining rod while chanting "magic dowser, magic dowser, show me the well!" Instead of finding water, she opens a passage that leads her into the "Other World," which features a terrifying parallel world that tries to persuade her to leave her former world behind. The space revealed to Coraline is less sacred and more demonic and she eventually encounters a primal and shadowy force that offers a distorted reflection of her home. Here, the divining rod serves as a symbol for the wider function of allegorical machines and the sublime otherspaces that they interface.

I have offered a number of accounts that indicate that the history of the divining rod is a history of contested terrain for ir/rational means of making the invisible visible. Agricola wrote, "There are many great contentions between miners concerning the forked twig, for some say it is of the greatest use in discovering veins, and others deny it" (1556, 38). Divining is not now, neither has it ever been, accepted by mainstream science but its continuing popularity raises fascinating questions about the efforts to systematize the ability to sense what might lie "beyond space." In 1959, Harvard Anthropologist Evon Z. Vogt and University of Oregon psychologist Ray Hyman published *Water Witching U.S.A.,* a study of water dowsing in the United States. They sent questionnaires to a representative sampling of county agricultural extension agents. Fifty-six percent of the respondents expressed outright disbelief in the validity of water dowsing. However, twenty percent admitted to a belief in the efficacy of the practice, and another twenty-four

percent wrote that they were open-minded on the issue. Vogt and Hyman estimated there were 25,000 water dowsers plying their trade in the U.S., although by 1998, *Popular Mechanics* reported that the American Society of Dowsers retained around 4,200 members (Wilson 1998). Vogt and Hyman describe dowsing as "outcast" by geologists, water engineers, and other scientists, though in their conclusion note "that water witching is a clearcut case of magical divination in our culture which persists because there are potent psychological and social reasons for it" (192).

Despite the divisiveness regarding its use, the imaginations associated with the device continue. Technological attempts to mediate invisible electromagnetic fields of force, however, are today more often described in terms of information networks. Digital networks allow "for an imitation of the now impossible, imaginary spheric security. Now networks… are meant to replace the celestial domes; telecommunication has to reenact the all-encompassing" (Sloterdijk 2011, 25). iPads and smart phones reanimate the astrolabe, magnetic compass, and the diving rod in various ways and in the following chapter, I analyze digital locative media's place within the broader constellation of allegorical machines.

VII. THE OTHER SIDE OF TOO FAR: ON DIGITAL LOCATIVE MEDIA

> Who gave us the sponge to wipe away the entire horizon? What were we doing when we unchained this earth from its sun? Where is it moving to now? Where are we moving to? Away from all suns? Are we not continually falling? And backwards, sidewards, forwards, in all directions? Is there still an up and down? Aren't we straying as though through an infinite nothing? Isn't empty space breathing on us? Hasn't it got colder?
> —*Friedrich Nietzsche (1882), The Gay Science.*

The desire for spatial orientation and a correspondence with an omnipresent field that transcends direct sensibility carries with it a range of spiritual imaginations that have long been associated with allegorical machines. This is apparent in the early 1990s and the expansive use of the internet and other information technologies: "Recite to yourself some of the traditional attributes of the word 'spiritual': mythic, magical, ethereal, incorporeal, intangible, nonmaterial, disembodied, ideal, platonic. Is that not a definition of the electronic-digital?. . . The quantum-electronic universe of information defines the new spiritual state. These 'spiritual' realms, over centuries imagined, may, perhaps, now be realized!" (Leary 1994, 5). Efforts to realize the spiritual otherspace through the "electronic-digital" are now at the forefront of attempts to unveil networked augmented reality with locative media.

In this chapter I provide an outline of digital locative media that also speaks to the case studies and the literary exegesis offered in previous chapters. I do so to emphasize how these contemporary technologies involve an interplay of metaphysics, economics, and materialism that is rooted in a deep history of orientation technologies and

imaginations. I start by describing the contemporary locative milieu and then offer a technical description that highlights how locative hardware and software are used by government, artistic, and commercial entities. I then analyze how locative media are linked to the wider aims and dreams of ubiquitous computing and augmented reality programs. Finally, I analyze how this terrain sets the stage for an artistic community to conceptualize and establish much of the early foundations for locative media, only to have commercial and corporate forces appropriate and expand locative media's use. The imaginations and desires that were opened by the early artistic "probes" I examine provided the undergirding for the dominant logic of commercial technology firms that today compete to offer the best sublime interface. This is exemplified in the rise of locative media positioned as the modern solution to "see what's on the other side of too far."

REINTRODUCING LOCATIVE MEDIA

Armed with a computer and a mobile global positioning system (GPS), adventurous hikers have been engaging in a technological treasure hunt known as "geocaching" (Willis 2010). The practice involves hiding a container filled with a logbook and various trinkets in a publicly-accessible location, determining the latitude and longitude coordinates of the container's position, and publishing this information online for geocachers all over the world to find using locative technologies. GPS became fully operational in 1995 and was used exclusively by the U.S. military "to precisely

locate both enemy and friendly forces."[112] President Clinton expanded GPS satellite use in May 2000 to "make GPS more responsive to civil and commercial users worldwide,"[113] and the number of geocaches since have grown to the hundred of thousands and the practice is emblematic of modern uses of digital navigation technologies. Much like past navigational technologies, GPS and digital locative media have a significant effect on how individuals move through material space:

> 'Why are they all going the wrong direction?' my husband asked as we walked along a trail behind the environmental education center at Lake Wallenpaupack...
> 'We must be getting close,' I said after we'd walked at least a mile. My husband and I peered under rocks, kicked piles of dead leaves and moved hunks of driftwood in hopes of being the first to locate the cache.
> 'Did you enter the coordinates properly?' my husband asked.
> 'Of course,' I snapped back. 'I'm not an idiot.'
> After an hour of searching, our hopes of finding the cache dwindled and we turned back toward the education center. As we walked, my husband once again asked if I entered the coordinates correctly. I scrolled to the coordinate screen on the GPS to prove to him I entered the digits properly and, much to my horror, the coordinates didn't sync.[114]

As this pair attempts to locate the geocache, their frustration and "horror" illustrate a general fear of disorientation or disconnection from the digital network. According to the screen of the navigational device, they were in the wrong space heading in the wrong

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[112] "The Global Positioning System for Military Users: Current Modernization Plans and Uses," *Congressional Budget Office,* October 28, 2011, accessed February 27, 2013, http://www.cbo.gov/publication/42727.

[113] "Civilians Can Use Military GPS Data," *The White House: Office of the Press Secretary*, May 1, 2000, accessed February 27, 2013, http://usgovinfo.about.com/library/news/aa050300b.htm.

[114] Jennifer Leckstrom, "Geocaching Requirements: Confidence and the Correct Coordinates," *Pocono Record*, November 29, 2009, accessed February 27, 2013, http://www.poconorecord.com/apps/pbcs.dll/article?AID=/20091129/OUTDOORS/911290321/-1/NEWSMAP.

direction. Recently, search and rescue operations performed by the United States Park Service have increased (from 2,430 in 2005 to 3,593 in 2009) and many believe this is partly attributable to consumer technologies. In fact, the Park Service has created a new category alongside "darkness" and "animals" to classify the reasoning behind these rescue cases: "inattention to surroundings." Jackie Skaggs, a spokeswoman for Grand Teton National Park, comments that "Because of having that electronic device, people have an expectation that they can do something stupid and be rescued."[115] Indeed, to borrow from McLuhan's terminology, the current technological "environment" has accompanied an understanding that it possible for us to move our way through space in paths that seemingly defy everything but the speed of light.

The discourses surrounding anxieties of being lost, the development of technological aids in being found, and one's connection to physical space and location have certainly shifted and intensified due to the complexities of digital information and communication technologies. As Laura Kurgan notes, "The older and perennial question of 'Where am I?,' the question that gives rise both to panic and to new discoveries, has been replaced or displaced by a stranger interrogative, 'Which pixel am I standing on?'" (1995, 42). The panic and exploration once the purview of sailors using the magnetic compass is reanimated with digital modes of orientation. The imagined second layer of space has been exteriorized on the screen, where users ease concerns over their location and meandering movements through the world by virtue of the certainty of their blinking representation on a real-time map. Examples in the popular press abound. The

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[115] Lesie Kaufman, "Technology Leads More Park Visitors Into Trouble," *The New York Times,* August 22, 2010, pg A1.

2007 *New York Times* holiday technology guide details the "exceptional" utility of locating oneself and digitally overlaying material space with informational code. In articles such as this, digital location becomes the means of reducing the anxiety of orientation as it "can help keep track of every move you make, oh, and those around you too." The author, attempting to use the navigational device, vents his frustration when he cannot properly calibrate the device to effectively locate himself on the screen: "After a few frustrating days—this thing is STILL not tracking me?—the buttons started to make sense and the functions seemed to fall into place."[116] His frustration with not being located and connected to the network quickly subsided after the device began to blink, revealing that he had finally been located on a digital map.

Beyond the encouraging words of support for technologies that track your movement to and from the supermarket, users of locative media are encouraged to explore the world without fear of losing connection to the network. This is featured, for example, in Verizon's celebration of its ubiquitous network, as the telecommunication company attempts to ease the anxieties of mobile, "always-on" customers and encourage users to "Not Be Afraid of Dead Zones," or spaces where they cannot connect to the network. Another Verizon campaign uses vibrantly colored U.S. maps to compare the firm's geographical coverage of high-speed service to AT&T's. Quite literally, Heidegger's "world-as-picture" is offered as an enframed and calculable vision of the United States and so to soothe the nerves of the current or potential Verizon subscriber.

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[116] Schwartz, J. "Something to Watch Over You: G.P.S. Can Help Keep Track of Every Move You Make, Oh, and Those Around You Too," *The New York Times*, December 5, 2007, p. H1.

But what happens when one is moving through the streets, blinking on the screen, and connected to the ubiquitous network? Apple Computers, like other technology firms, is hard at work to give users a tool to rethink orientation, and made this clear in a recent job description: "We want to take Maps to the next level, rethink how users use Maps and change the way people find things. We want to do this in a seamless, highly interactive and enjoyable way."[117]

It would seem that there would already be a popular term that would refer to the fear of being lost since the diagnosis of nomophobia, or the fear of being without one's mobile phone, is supported by the medical community. In general, fear of being lost is referred to as mazeophobia, which seems an obvious descriptor of an age-old paranoia. However, mazeophobia is not an officially recognized clinical diagnosis[118] and the term seems to have originated in a widely circulated press release for Garmin GPS devices. "Garmin products, of course, are not only for the mazeophobics, as for 20 years already these Global Positioning System devices have found extensive use in aviation, marine and general consumer applications."[119] With "mazeophobic" standing in for an official clinical diagnosis, one wonders to what degree the logic of the commodity has distorted

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[117] Originally online at http://jobs.apple.com/index.ajs?BID=1&method=mExternal.showJob&RID=44070&CurrentPage=3 but has since been taken down after the position was filled. News reports on this position are still online such as http://www.appleinsider.com/articles/10/07/30/starting_with_ipad_launch_apple_began_using_its_own_mapping_databases.html (accessed February 27, 2013).

[118] After completing a search on Google, I encountered the term, of all places, as a response to a form on Answers.com: http://wiki.answers.com/Q/Is_there_a_name_for_fear_of_getting_lost (accessed February 27, 2013).

[119] "Garmin Maps - Keeping You on Track!," *Scribd*, May 9, 2009, accessed February 27, 2013, http://www.scribd.com/doc/15098009/Garmin-Maps.

our perception of mobility and space, and the technologically-aided production of space. How have developers of locative media and augmented reality, such as Garmin, shaped our expectations of being oriented according to the digital network and in ways similar to the authors noted above who wrote in support of the marvelous magnetic compass and other earlier magic locative media?

The shifting logic of mazeophobia in the age of ubiquitous networks, pervasive mobile communication technologies, and locative media accompanies a desire to connect to a network of complete and total information. This is not unlike the mediation of the *primum mobile* or the heavenly poles. But if this is so, then, in the age of computerized databases and archives,connecting to total information is also a component of what Bernard Stiegler (2009, 9) describes as the ongoing "industrialization of memory" driven by, in part, the desire to exteriorize the infinite archive. Indeed, the digital network, positioned as the metaphysical space beyond space, faces an inherent tension as it is situated to accommodate "infinite retentionality (that is, in fact, God's memory) faced with the finitude of failings" (10-11). Locative media have brought Girodano Bruno's magic mnemotechnics into everyday practice where "the infinite comprehended in the finite" is an outcome of connecting to the sublime network (Nelson 2001, 198). As such, locative media inherit and are built upon the tangled histories of previous attempts to mediate the universal or primary space beyond space. However, the ability of hardware and software to store countless fragments of information often confronts us with dilemmas such as "when is it important to remember?" and "when is it important to forget?" Such a discussion brings to mind Jorge Luis Borges' labyrinthine Library of

Babel, the greatest imaginable source of information "composed of an indefinite, perhaps infinite number of hexagonal galleries" (1998, 112). For Borges, the space that contains the complete exteriorization of knowledge and memory is also the space of "total" and "endless" disorientation.

LOCATIVE PROCEDURES

I want now to focus on the technical specificity of the devices in order to highlight the influence of the physical medium and its algorithms on locative media. Technology does not determine particular outcomes but a close reading of the technology reveals a range of characteristics that should not be ignored. For instance, as a locative media user moves through physical space, a range of coordinated hardware and software processes leads to a determination of the shifting mobility of that user and a visualization of this is articulated to that material space. To better frame my analysis of locative media, I outline a few of the technical details regarding how networked technologies are utilized to determine geographic position including geolocation, radiolocation, and trilateration. These processes are the modern foundations upon which the ancient desires and anxieties of interfacing the sublime are built.

One way in which digital information is associated with physical location is through a process described as geolocation. This location technology identifies a user's unique Internet Protocol address (IP address) to determine the physical position of the user's computer that is accessing information located on the network. Every computing device is assigned a unique IP address when it initially accesses the Internet. An IP

address, in the way that it allows for spatial identification online, is comparable to a street address being a primary identifying feature for physical places. Geolocation allows a website to attach a specific geographical location to the user who is navigating hyperlinks and databases.[120] When someone accesses a website that utilizes geolocation technology, the IP address of that user's computer and any additional information regarding the computer's configuration is communicated to the geolocation provider's server. This provider identifies where the user is physically located and sends the information back to the website that is subscribing to the service, which can then modify its networked software according to its interests. When the location of the user is established, geolocation databases then use the new data to adapt the demographic information that has previously been logged. Geolocation providers such as Neustar Quova, Digital Envoy, and Digital Element offer comprehensive geographic information services for their customers, which is pulled primarily from IP addresses. Many clients use this technology because it allows them to collect and categorize the continent, country, time zone, state, city, postal code, latitude, longitude and phone prefix of a particular customer. Other geolocation companies supply additional network connection information that is

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[120] The link between networked information and physical space was originally accomplished in association with the development of an aggregated database that connected the IP addresses of users' computers to specific countries, cities and eventually, zip codes. Local internet service providers (ISPs) then began to allocate particular ISP addresses to customers depending on the geographic region in which they were connecting to the network. As a result, groups of IP addresses are assigned to individual universities, corporations, or other institutions, all of which have specific geographical locations. After a user's computer is provided with an IP address and then granted access to information online, the geolocation technology traces packets of data as they pass through routers whose geographic position is known, thereby narrowing down the specific geographic location of each address past the specificity of a zip code and towards the particular router used to access the internet.

associated with IP addresses, including the connection type, bandwidth, and ownership of each address, which are commonly provided to webmasters.[121]

The effects of geolocation software are wide-ranging because both the content that is offered as well as the interactions between individuals through networked forms of communication can be determined by the cultural, political, and economic contexts of the geographic access point. For example, geolocation technology can predetermine the language and currency that someone would typically use for a website that is accessed by multilingual users. Casinos operating online can preclude users from using their service if they are accessing the site from countries where gambling is prohibited (King 2010). The rights surrounding music or video broadcasts can be managed and enforced on the internet according to specific market restrictions.[122] Corporations that are subject to national regulation, like pharmaceutical and financial-service businesses, can be certain that the online sale of goods and services conforms to the laws where the individual user accesses their website. Nation-states can use geolocation software to regulate hate speech materials, such as a French court's ruling in 2000 in which the LICRA v. Yahoo case was

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[121] Additional amounts of detailed information that Quova logs includes the Autonomous System Number (ASN), carrier name, top-level domain (TLD), second-level domain (SLD) and registering organization. For geographic information, Quova includes a set of confidence factors. These indicate the reliability of the geographic location of an IP address.

[122] MLB Advanced Media, *"*System for verifying access based on a determined geographic location of a subscriber of a service provided via a computer network," *United States Patent Office*, Patent 8,213,898, July 3, 2012, accessed February 27, 2013, http://patft.uspto.gov/netacgi/nph-Parser?Sect1=PTO2&Sect2=HITOFF&p=1&u=%2Fnetahtml%2FPTO%2Fsearch-bool.html&r=1&f=G&l=50&co1=AND&d=PTXT&s1=7,486,943&OS=7,486,943&RS=7,486,943.

found to prevent French users from seeing Nazi paraphernalia on auction webpages. More recently, geolocation has been used by Twitter to "reactively withhold content from users in a specific country—while keeping it available in the rest of the world."[123]

Since most users are not always statically tied to a desktop computer that is located in one particular place, a second type of locative media technology incorporates what is described as radiolocation to track the fluid mobility of individuals in "real time." This is accomplished primarily through data collected from mobile computing devices. This type of locative media is heralded as a substantial platform for future applications largely as a result of the increasing prevalence of mobile phones and global positioning systems (GPS). Most modern mobile phones now have GPS pre-installed and locating these devices with GPS enabled involves calculating a phone's position based on methods of triangulation.[124] Since the U.S. Department of Defense[125] stopped scrambling GPS signals for civilian use in 2000, the technology has been installed in devices from watches and cars to refrigerators.

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[123] "Tweets Must Still Flow," *Twitter Blog,* January 26, 2012, accessed February 27, 2013, http://blog.twitter.com/2012/01/tweets-still-must-flow.html.

[124] Triangulation involves measuring the time needed for a radio signal to reach the GPS handset from at least three satellites.

[125] The GPS system itself was based on Navstar, a constellation of 24 satellites operated by the U.S. Department of Defense. A new system is currently being developed by the European Union named Galileo and was hoped to complement the Navstar system in 2008 by allowing a higher level of accuracy and extended coverage at high latitude. However, shortfalls suspended the project until 2014 and the E.U. is currently spending billions of dollars for an alternative satellite system that would be under their control. Defense Industry Online Staff, "Galileo Project Faces More Certain Future," *Defense Industry Daily*, August 20, 2012, accessed February 27, 2013, http://www.defenseindustrydaily.com/galileo-gps-project-faces-uncertain-future-03312/.

However, many mobile devices do not have GPS capabilities so location is extracted through auxiliary means. While GPS will be the central feature of mobile technologies in the future, trilateration is a technique used to identify location information through mobile phone networks. While many techno-futurists and locative media proponents describe how the devices unveil "pervasive imaginaries" that are layered over material space (Tarkka 2005), the reality is that this augmented reality is calculated according to our movements that are relative to physical "cells" of mobile networks:

> Mobile networks, traditionally referred to as 'cellular' networks, consist of 'cells.' Cells are essentially geographic radio frequency (RF) signal serving zones around a tower or base station. Each cell within a cellular network is geographically defined by the range that RF signals propagate to continuous space. When a mobile phone user is moving and enters a serving cell, network base stations are designed to recognize that the user is within the serving proximity of the station's neighborhood. The base station then automatically 'locks on' to the mobile, and 'hands off' the call from one base station and corresponding cell to the next base station and serving cell within the network (Spinney 2003, 260).

Geospatial positioning in a mobile network is achieved either through network-centric or device-centric approaches. In network-centric systems, one or more network base stations calculate the distance to a mobile device and transmit the results to a database within which location is measured and collected. In device-centric systems, the mobile device performs the calculation itself based on environmental information gathered from the mobile network (Horsmanheimo, Jormakka, and Lähteenmäki 2004).[126]

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[126] There are also hybrid solutions that combine the advantages of both systems. For instance, some mobile devices perform the calculations of geographic position and transmit results to an external device in the network for further processing.

Understanding the technical operations associated with trilateration and radiolocation technologies is essential to developing a nuanced approach to their implementation by social, commercial, and governmental actors. These include mobile carriers like AT&T and Verizon, agencies like the U.S. State Department, and public and private research teams. Due to the wide range of participating actors, accurate radiolocation technologies are used in conjunction with a wide range of wireless applications. This includes the U.S. emergency services E911 regulation, which is a mandate that mobile phones must be able to be automatically positioned within 150 feet.[127] The implementation of the E911 mandate involved collaboration between the FCC and private mobile phone companies during its initiation in 2001: The Federal Communications Commission (FCC) "conditionally approved, with certain modifications, the compliance plans of five nationwide carriers—Nextel, Sprint, Verizon and the GSM portions of AT&T Wireless and Cingular's networks."[128]

Radiolocation is also prominent in retail, marketing and advertising contexts. Applications have been devised that would tempt nearby users into stores by delivering geographic messaging information. Mobile commerce or m-commerce hopes to augment location information with the personalization of product delivery by obtaining the history of the user's purchases (Barnes 2003). This customer then would be able to either receive

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[127] "911 Wireless Services," *Federal Communications Commission,* May 26, 2011, accessed February 27, 2013, http://www.fcc.gov/guides/wireless-911-services.

[128] "FCC ACTS ON WIRELESS CARRIER AND PUBLIC SAFETY REQUESTS REGARDING ENHANCED WIRELESS 911 SERVICES," *Federal Communications Commission*, October 5, 2001, accessed February 27, 2013, http://transition.fcc.gov/Bureaus/Wireless/News_Releases/2001/nrwl0127.html.

advertisements that are actively "pushed" onto them or the customer could actively "pull" those messages based on radiolocational data. Much like how producers have implemented modes of geolocation, producers typically use a complex amalgamation of the Cell ID, Angle of Arrival, and Time Difference on Arrival techniques that run in the background behind a user-friendly interface. I am outlining a platform that essentially masks the techniques used to extract the location of any person who uses a computer or carries a mobile communication device. This coordination of a locative interface and material movement is enabled with location-based social networking (LBSN) where services such as Foursquare, Brightkite, and Whrrl (which has since been bought by Groupon to integrate its location-based services into its discount coupon service) allow for a customer to share locational data with networked devices and applications.

As geolocation, radioloction, and trilateration become more widespread, locative media are also becoming the standard means for mapping the digital network over physical objects and space. In fact, many proponents envision a future where all digital information has a material counterpart. As Gordon and de Souza e Silva suggest, "unlocated information will cease to be the norm" as physical materiality and location will operate as a "near universal search string for the world's data" (2011, 20). This sense of universality accompanies a second sense that informational fields are just beyond reach or perhaps threatening to infiltrate the physical world. As McCullough notes, "information is now coming to you—with you, wherever you are; and is increasingly *about* where you are. In the process, one belief that has changed is that the way to find and use networked information must be solitary, sedentary or virtual" (2006, 26). Indeed,

discovering this information is as easy as powering on a mobile device and using it to reveal the layers of information that surround you.

NETWORK METAPHYSICS

Associated with the recent popularity of the mobile downloadable"app culture" is the popular increase in locative and augmented reality applications enabled, for example, by devices such as Samsung's "Galaxy Tab" tablet computer.[129] With this flat, touch screen computing device, a user can bring up a map of the space in which he/she is currently positioned. The user can swap between an omniscient, top-down view and a "first-person" view that takes into account the specific angle of the device in relation to the objects that are currently behind the computer. Layers of information can be visualized on top of the digital image of the space physically before the person holding the computer up to the space (such as restaurant locations or reviews, distance to the next film house, proximity of friends, etc). As the computer moves, so does the information on its screen, allowing for users to treat the computer as if it was a frame to "unmask" the space around them. As one reviewer of the Galaxy computer writes, "With immersive AR [Augmented Reality] people step into a different world."[130] For Tish Shute, co-founder of the international business exposition named the "Augmented Reality Event," this is part of a

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[129] SAMSUNGmobile, "[GALAXY Tab] Official Commercial," *Youtube,* September 2, 2010, accessed February 27, 2013, http://www.youtube.com/watch?v=GPfCZC4VHnE.

[130] Maarten Lens-FitzGerald, "Tablets are great to play Immersive Augmented Reality" *Layar Blog,* September 2, 2010, accessed February 23, 2013, http://www.layar.com/blog/2010/09/02/tablets-are-great-to-play-immersive-augmented-reality/.

wider movement towards what she describes as the "World 2.0."[131] Like older allegorical machines that reveal what is between worlds or beyond this world, digital locative media promise access to an empyrean space that seemingly "upgrades" the material world.

The significant growth of locative media in the last decade has occurred in tandem with the proliferation of mobile computing devices (and the associated ideology of technological mobility), investments in infrastructure by network carriers, and the range of "hybrid positioning" techniques that these companies are offering. According to reports from market research firms, by the year 2015 revenues generated from locative media will hover around $10.2 billion,[132] include over 1.5 billion users,[133] and locative advertising will account for 60 percent of the digital advertising market. In addition, according to Flurry Analytics,[134] mobile smart phone adoption rates are moving ten times as fast as the adoption of personal computers in the 1980s, twice as fast as internet adoption in the 1990s, and three times as fast as the growth of social networking. The prolific increase in academic, corporate, engineering, and public interest in "urban

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[131] Tish Shute, *UgoTrade: Augmented Realities in World 2.0*, accessed February 27, 2013, www.ugotrade.com.

[132] "Location-Based Service: Market Forecast," Pyramid Research, May 2011, accessed February 23, 2013, http://www.pyramidresearch.com/store/Report-Location-Based-Services.htm.

[133] "Mobile Location Based Services: Applications, Forecasts & Opportunities," Juniper Research, January 3, 2010, accessed February 23, 2013, https://www.juniperresearch.com/reports/mobile_location_based_services.

[134] Peter Farago, "iOS and Android Adoption Explodes Internationally," *Flurry Blog*, August 27, 2012, accessed February 27, 2013, http://blog.flurry.com/bid/88867/iOS-and-Android-Adoption-Explodes-Internationally.

computing"[135] (Greenfield and Shepard 2007; Kindberg, Chalmers, and Paulos 2007) and "urban informatics"[136] has partly driven the increased demand for and use of locative and augmented media. In 2006, an issue of M.I.T. Press' *Leonardo Electronic Almanac* focused on locative media, and the range of contributions from scientists, engineers, architects, artists, and designers indicates the array of perspectives on this spatial technology already apparent seven years ago.

All of these locative technologies are linked to an even more extensive list of technologies with descriptors such as "ubiquitous," "pervasive," "ambient," "calm," and "invisible" computing. Behind these descriptors is an inherent political movement of the technological into the realm of everyday (and commonsensical) interactions that are intended to go unnoticed. An early vision of these technologies was outlined by Mark Weiser who in "The Computer for the 21st Century" argued that "the most profound technologies are those that disappear. They weave themselves into the fabric of everyday life until they are indistinguishable from it" (1991, 1). These technologies are what he described as "ubiquitous computing," which he argued would offer the user a liberation from the physical constraints of the personal computer anchored to a single, physical location. His perspective emphasizes that electronic computing should be dispersed

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[135] Urban computing is a field of study that focuses on the use of technology in public environments such as cities, parks, and suburbs.

[136] Urban informatics focuses less on the technology and more on the "study, design, and practice of urban experiences across different urban contexts that are created by new opportunities of real-time, ubiquitous technology and the augmentation that mediates the physical and digital layers of people networks and urban infrastructures" (see http://www.urbaninformatics.net).

throughout the social and physical worlds in which we live, rendering the devices invisible:

> Invisible technology needs a metaphor that reminds us of the value of invisibility, but does not make it visible. I propose childhood: playful, a building of foundations, constant learning, a bit mysterious and quickly forgotten by adults. Our computers should be like our childhood: an invisible foundation that is quickly forgotten but always with us, and effortlessly used throughout our lives (Weiser 1994, 8).

Weiser's efforts to recuperate the mysterious and wondrous with ubiquitous computing are significant and demonstrate a continuing attempt to reclaim the enchanted through the technological and vice versa. This desire to effortlessly merge electronic computing with our everyday lives is also rooted in recurring utopian visions of cultural and historical technological progress (Reschre 1980; Lightman, Sarewitz, and Desser 2003) as well as pervasive configurations of belief and myth when it comes to communication technology (Nye 1994; Mosco 2004). This utopian, mythic, and transcendental promise extends to the ongoing attempts to "augment reality," where the engagement with a pervasive computing environment is not meant to reduce the amount of interaction with the natural world but to allow the "inhabitants of ubiquitous worlds" to have a more active and productive interaction with their physical environments (Rogers 2006). This desire for direct correspondence between ubiquitous worlds is an augmentation of the metaphysics already at play with the astrolabe's mediation of the Ptolemaic cosmos, the magnetic orientation towards the poles, and the divining rod's intuition of archetypes of electromagnetic power. Digital augmented reality, proponents believe, would extend these practices where "technologies can be designed to augment the human intellect so that people can perform ever greater feats, extending their ability

to learn, make decisions, reason, create, solve complex problems and generate innovative ideas" (Rogers 2006, 8-9). In other words, an ability to transcend the self as currently understood.

Early devotees of cyberspace emphasized that a virtual and networked world would allow individuals to augment or transcend their physical bodies in a realm "beyond" the physical and to reassemble themselves in a disembodied virtual space (cf. Hillis 1999). Despite the perceived "newness" of the technology at play, cyberspace was in many ways "a repackaging of the old idea of Heaven but in a secular, technologically sanctioned format" (Wertheim 1999, 23). These recurring desires had earlier repackaged in formulations such as Gilbert's magnetic "organic body" (1958), Emerson's conception of the "Over-Soul" as pure Mind (2009), or Pierre Teilhard de Chardin's (1959) theological description of a "noosphere" where the articulations of social, economic, and information networks contribute to "an enforced resonance" leading toward the pinnacle of human consciousness called the Omega Point. The result is a complete transcendence of matter as "God awaits us when the evolutionary process is complete: to rise above the World, therefore, does not mean to despise or reject it, but to pass through it and sublime it" (Teilhard de Chardin 1964, 82).

Teilhard's prophecies have resonated with cyber-prophets such as Pierre Lèvy who describes an "emerging world in cyberspace" where "the electronic conference is taking shape, the infinite discourse of collective intellects. Beyond Los Angeles lies a city of angels, megalopolis of signs, now visible city of the mind, in the night, on the multiple heavens of cathode ray screens" (1997, 183). This embrace of a transcendent field of

information has led to an idealization of the network form itself: “Network science’s reliance on universality, ubiquity, and a mathematical model suggests that it really is a *metaphysics of networks*. It seeks a universal pattern that exists above and beyond the particulars of any given network” (Galloway and Thacker 2007, 118). With digital locative media, the dream of interfacing the sublime space beyond space extends the recurring logics of allegorical machines as cyberspace itself becomes “Platonism as a working product” (Heim 1993, 89).

The elevation of the immaterial flows of information above the materiality of the network and networked devices runs throughout the history of information and cybernetic theory as conceptualized information is positioned as a disembedded and disembodied field.[137] For instance, Norbert Weiner's theory of dynamic systems, known as cybernetics, acts as an alternative or precursor to network theory and was originally conceived as a field that would create a framework encompassing both biological and mechanical systems (Wiener 1961). Wiener defined cybernetics as the “study of messages, and in particular of the effective messages of control” (1950, 8). The theory of cybernetics essentially began with the idea of feedback[138] and posits that certain processes, having both a beginning and ending point, should be able to receive new input about their

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[137] From Norbert Wiener, Claude Shannon, Warren Weaver to Humberto Maturana and Francesco Varela’s approach to the autopoietic and informationally-closed system, Hayles (1999) documents this trajectory as the history of “information losing its body.”

[138] Wiener describes feedback in the following way: “It has long been clear to me that the modern ultra-rapid computing machine was in principle an ideal central nervous system to an apparatus for automatic control... With the aid of strain gauges or similar agencies to read the performance of these motor organs and to report, to 'feed back,' to the central control system as an artificial kinesthetic sense, we are already in a position to construct artificial machines of almost any degree of elaborateness of performance” (1961: 27).

environment throughout their duration. Wiener considered there to be a special relationship between computers and the human brain and viewed computerized systems as a logical step to replace human sense organs with computerized ones. Here, the cybernetic system is born and its ideals are balance, self-regulation, circularity, and control.[139]

Early cybernetic theory was also influenced by Claude Shannon's information theory, which theorizes information as a function of message probabilities and detached from context and meaning. Shannon's work with Warren Weaver is often acknowledged as the foundation for modern telecommunications and paves the way for the ARPANET in the 1960s. Shannon's work also resonates with cybernetics in its effort to define "information" as the key component of communications technologies (Wiener directly references Shannon's work). Their information theory emphasized the quantitative view of information, even at the expense of any consideration of quality or content. The goal was to develop a method for encoding a message in a way that its transmission rate through a noisy channel could be maximized and the error rate minimized—in other words, to make messages efficient and calculable. As they write, "Information must not be confused with meaning. In fact, two messages, one of which is heavily loaded with meaning and the other of which is pure nonsense, can be exactly equivalent, from the present viewpoint, as regards information" (1949, 8). This exclusion or deemphasis of information's physical qualities has contributed to the metaphysical exclusion of the

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[139] The emphasis on control is an aspect that many network theory idealists tend to ignore, which Galloway (2004) and Thacker and Galloway (2007) make clear with their use of the concept of "protocol."

ascendancy of mind that feeds the utopian rhetoric of information as a liberation from physical constraints. N. Katherine Hayles' (1999) account of the history of cybernetics and information theory emphasizes that the informatic worldview regards the material world in a fairly ambivalent way. However, while information is seen (or idealized) as being abstract, quantitative, and reducible to a calculus of management and regulation (made disembodied and immaterial), information theory cannot escape the fact that information is rooted in materiality as it is configured into communications media and biological systems.

Many proponents of augmented reality and locative media extend these components of information and cybernetic theory by positioning the technology along a continuum of "mixed reality." These mixed reality technologies seek to not just "augment" the user's relation to physical space but also to directly combine elements of the physical and the virtual within the experience of the real. Milgram, Takemura, and Kishino note, "rather than regarding [the real and the virtual] simply as antitheses, however, it is more convenient to view them as lying at opposite ends of a continuum, which we refer to as the Reality-Virtuality (RV) continuum" (1994, 1). While on one end, objects are seen to be "real" through direct observation or "sampled and then resynthesized via some display device," on the other end "virtual" objects are "simulated" through "some sort of a description, or model, of the object" (Milgram and Kishino 1994, 1).

Supporters of the mixed reality approach seek to combine the physical and the virtual to generate a "hybrid" environment from augmented reality applications. Kabisch

suggests that spatial annotation software and "pervasive computing technologies can enable a merging of 'virtual' and 'mirror' worlds into. . . *hybrid ecologies*" (2008, 227). This environment is produced either through augmented reality, which would be an attempt to enhance physical space and objects with virtual information, or augmented virtuality, which would be attempt to enhance virtual reality with physical objects and "real-world" information. Regardless, authors have noted that the shift towards hybrid environments would begin to blur the lines separating the real and the virtual: "Once we have both a 'real' three-dimensional world, and computer-constructed 'virtual' ones, the distinctions between these worlds can get fuzzed or lost" (Mitchell 1995, 20). This fuzzing is enabled by augmented reality programs such as Microsoft's "IllumiRoom," which uses projected images that surround the television set to "blur the lines between on-screen content and the environment we live in allowing us to combine our virtual and physical worlds."[140]

The desire to engage with a hybrid environment by way of locative media and augmented reality technologies reconfigures ancient magical attempts to support various engagements or "key-points" between the subject and an occulted world. For Simondon, "In such a network of key-points, of high-places, there is a primitive indistinction regarding human reality and the reality of the objective world… they are places of contact and of mixed, mutual reality, places of exchange and of communication because they form a knot between both realities" (2011, 412-413). With regards to a historical

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[140] "IllumiRoom: Peripheral Projected Illusions for Interactive Experiences," *Microsoft Research*, January 2013, accessed February 27, 2013, http://research.microsoft.com/en-us/projects/illumiroom/.

constellation of locative media, the desire to blur the distinctions between virtual and physical worlds replicates the efforts to mediate the fourth-dimensional hyperspace, the *primum mobile*, and an invisible earth force.

William Gibson, the science fiction writer who famously coined the term "cyberspace" in his short story "Burning Chrome" (1982), evokes a similar desire despite implicitly privileging the realm of cyberspace: "One of the things our grandchildren will find quaintest about us is that we distinguish the digital from the real, the virtual from the real. In the future, that will become literally impossible. The distinction between cyberspace and that which isn't cyberspace is going to be unimaginable."[141] Gibson offers a more descriptive illustration in a later work that uses locative and augmented media technology as the coveted symbol of the collapse of the virtual and the real. Cyberspace itself has folded its "consensual hallucination" inside out as the invisible networked reality flows throughout material space (1984, 51). One of the main protagonists in his novel *Spook Country* (2007) is a locative media artist named Alberto who lives in Los Angeles. While Gibson calls attention to the small screen of Alberto's locative device, which is basically a mobile phone that has a hand-held GPS device taped to it, the author's description of the visual experience that results is more akin to revealing what was a formerly invisible yet immersive environment:

> She slung the duct-taped hybrid toward Sunset, seeing a crisply defined, perfectly level plane of white cruciforms, spaced as on an invisible grid, receding across the boulevard and into virtual distance. Their square white

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[141] Andrew Leonard, "William Gibson: The Rolling Stone 40th Anniversary Interview," *Rolling Stone*, November 7, 2007, accessed February 27, 2013, http://web.archive.org/web/20071211021859/http://www.rollingstone.com/politics/story/17227831/william_gibson_the_rolling_stone_40th_anniversary_interview.

> uprights, approximately level with the pavement, seemed to continue, in increasingly faint and somehow subterranean perspective, back under the rise of the Hollywood Hills… Odile squinted over the rim of her white breakfast bowl of café au lait. 'Cartographic attributes of the invisible,' she said, lowering the bowl. 'Spatially tagged hypermedia… The artist annotating every centimeter of a place, of every physical thing. Visible to all, on devices such as these.' She indicated Alberto's phone, as if its swollen belly of silver tape were gravid with an entire future (22).

Alberto and his friends do not just view the locative and augmented reality environment as something existing solely on the other side of the screen, they are interested in moving "into the locative" (20). "See-bare-espace," another character says, cyberspace "is everting. . . Turns itself inside out" (20). Each of these spaces "shows you a different world" leading to an experience of moving through the world as if one was changing the channels on the television (64). Gibson positions locative devices as offering the possibility for immersion in a world that surrounds us but remains invisible without their aid. "But you can't just do the locative with your nervous system. One day, you will," he writes, "We'll have internalized the interface. It'll have evolved to the point where we forget about it. Then you'll just walk down the street…" (65). In other words, it would function as an allegorical machine that operates as the ultimate interfaceless interface.

Operating from a desire of complete immersion, contemporary locative media's objects and environments are presented as being somehow effaced, hidden, displaced, or otherwise beyond perception, corporally or otherwise. In many ways, locative media are part of a wider social, political, and economic apparatus invested in locating and being located. Whether this involves a mode of surveillance directed by wider political-economic structures of power or the general cultural desire or mazeophobia of being located in association with more lateral forms of surveillance (Andrejevic 2004), the use

of digital locative media to make the invisible visible has become one of the dominant logics of the contemporary era. However, locative media's origin in transnational digital art communities (the net.art movement is the primary source) reveals that these recurring desires and anxieties were apparent from the initial innovations and have since been expanded and re-imagined by diverse commercial imperatives and entities.

PERVASIVE IMAGINARIES

Following the freeing of GPS signals by the U.S. Department of Defense and the resulting development of these locative media protocols, artists and activists involved with the wider net.art movement were among the first to use mobile technologies to "annotate" places by overlaying physical space with digital information (Tuters and Varnelis 2006). These artists were operating with what McLuhan describes as an "integral awareness" of the desires to mediate the networked layers of space (1962, 65). As such, these practices were part of wider "utopian and dystopian reflections, playful and poetic manifestos as well as programs for design and policy action" (Tarkka 2005, 5). Acknowledging the history of military and information and communication technology industries in relation to early forms of locative media, these activists were intent on developing an intervention "to create new 'pervasive imaginaries' and to resist the totalizing tendencies and closures of ubicomp [ubiquitous computing] spaces" (4).

One early example in the creation of a locative imaginary is Terri Rueb's art installation, *Drift,* at the Ohne Schnur—Communication Art at the Interface between Art, Technology and Society symposium held in Munich, April 2004. Rueb describes her

project as a response to the growing ubiquity of locative technologies and the associated desires, tensions, and anxieties surrounding orientation and navigation:

> The ubiquity of GPS (global positioning satellite) and other tracking technologies suggests that "being lost" may itself be an experience that is being lost. However, simply knowing one's geographical location as expressed in longitude and latitude coordinates has little bearing on one's personal sense of place or direction. "Drift" poses the age-old question "Where am I and where am I going?" in a contemporary moment in which spatial positioning and tracking technologies provide evermore precise, yet limited, answers to this question. The installation embraces the flow of wandering, the pleasure of disorientation, and the playful unpredictability of drifting as it relates to movement and translation.[142]

"Mobile visitors" of the installation wandered the Wadden seashore in northern Germany with a GPS-enabled mobile computer and headphones in search of a range of soundscapes. Participants heard footsteps moving across a range of different surfaces and passages being read from the works of Dante Alighieri, James Joyce, Jack Kerouac, Thomas Mann, Jean-Jacques Rousseau, and Virginia Woolf. Themes of drifting, wandering, and becoming lost were addressed in multiple languages (representing the drift of meaning through translation). The installation encompassed two square kilometers that "drifted" or moved along with the tide. Traveling throughout the space gave individuals varying experiences according to their particular location and time. During low tide, sounds moved to one specific location before shifting during high tide to another. In a video for the project, Rueb describes how "visitors are asked to lose

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[142] Teri Rueb, "Drift," 2004, accessed February 27, 2013, http://www.terirueb.net/drift/index.html.

themselves in a space of layered currents of sound, sea, and interactive sounds that drift with the tides and the subtle movement of satellites."[143]

A year before the Rueb's Drift installation, Karlis Kalnins coined the term "locative media" at the Art+Communication Festival in Riga, Latvia, May 2003, as a "test-category" for media processes that implement technical features such as geolocation, radiolocation, trilateration, and GPS. Discussing the original inception of the term, Kalnins notes that "The moniker and the discourse of locative media arose here in Riga as we studied the Latvian language which does include this locative case, as does Russian (as the prepositional case), Finnish, Sanskrit and Latin" (Kalnins 2004). He wanted a descriptor that would correspond to the English prepositions "in," "on," "at," and "by," which declare a final location or time of action. For Kalnins, locative media was the closest approximation. Shortly following the Art+Communication festival, the Locative Listserv was created as a way to collect resources such as "url's about wireless, gps and mapping projects" that were "relevant to 'locative media'" (Smite 2003). In July 2003, the original Locative Media Workshop was held at the K@2 Culture and Information Centre in Karosta, a neighborhood in western Latvia. In the festival's description, organizers were clear about why the workshop was held there:

> The workshop itself will be 'location-based' in Karosta, Latvia on an abandoned Soviet-era military city on the Baltic coast. The idea of hosting the workshop in Karosta is twofold: as an explicit acknowledgment of Virilio's idea that 'one cannot understand the development of information tech, without understanding the evolution of military strategy'; and, as an attempt to locate the event outside of the global market from which these technologies have emerged. In a location that itself foregrounds issues of

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[143] Teri Rueb, "Drift (2004)," *Vimeo*, accessed February 27, 2013, https://vimeo.com/47798251.

> place and time, we will explore the potential for mobile, locative media to express issues of memory and of place through wireless locative games and other artistic interventions involving the local community.[144]

The workshop was crucial because it brought together "many early practitioners and inspired much of the current interest in locative media."[145] The result of the workshop was to frame locative media as useful tactical and strategic tools for appropriating and subverting the "command and control infrastructure."[146] There was also a widely shared belief that locative media could offer a useful platform for reclaiming the physical world through an extension into an augmented or hybrid ecology. This extension was premised on a belief that the interiority of the mind could be exteriorized leading to the possibility that one could interact with a supra-sensible field of space that seemingly transcends the physical world. In this way, using digital locative media to unveil the immanence of information networks enables modes of spiritual practice as it maps cyberspace overtop material space. This is a view of cyberspace as the "new Jerusalem. . . the weightless palace" that "comes down out of heaven itself" (Benedict 1992, 14) and today revealed via locative media.

In conjunction with this line of thinking, workshop participants were asked to consider ways in which digital locative media could be understood in relation to older

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[144] "Locative media (and ad-hoc social networks) introduction," *Locative Listserv*, 2003, accessed February 27, 2013, http://locative.x-i.net/intro.html.

[145] Drew Hemment, "Locative Arts," August 2004, accessed February 27, 2013, http://web.archive.org/web/20110724102601/http://www.drewhemment.com/2004/locative_arts.html.

[146] Drew Hemment, "Locative Dystopia 2," August 2004, accessed February 27, 2013, http://web.archive.org/web/20110724103720/http://www.drewhemment.com/2004/locative_dystopia_2.html.

practices of meaning-making and then relate this relationship to a reclamation of the physical world. In other words, locative media already were understood to have the capacity to generate a sense of enchantment with space in ways that recalled older combinations of the astronomical/astrological and the spiritual/technical (or as a realization of older magical mnemotechnics). Organizers noted that they hoped "to seriously address the issue of how the emergence of these new technologies relates to the disappearance of magik."[147] Digital locative media were understood as having the capacity to reintegrate magical or porous relations to space into everyday practice in ways that are also seen with earlier locative media. The allegorical machine is consistently presented as a way to overcome what Norbert Elias (1968) identifies as the "invisible wall" or what Taylor (2007) refers to as "buffered subjectivity" where both theorists understand the interiorized subjectivity is presented as being spatially distinct from other individuals, objects, and material space. Positioning digital locative media as an interfaced exteriority not only recalls the practices and beliefs involved with earlier locative media, it promises a modern configuration of a magical unified space. For Simondon, the unity afforded by a magical world is "made of a network of places and things that have a power and are bound to other things and other places that also have a power. Such a path, such an enclosure, such a *temenos* contains all the force of the land, and is the key-point of the reality and spontaneity of things, as well as of their accessibility" (2011, 412).

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[147] "Locative media (and ad-hoc social networks) introduction," *Locative Listserv*, 2003, accessed February 27, 2013, http://locative.x-i.net/intro.html.

Consideration of the digital network as a potential reconfiguration of this magical unity played a formative role in the makings of an essay that has been influential within the nascent locative media community. Ben Russell's *Headmap Manifesto* (1999), which involved an early utopian declaration of the socio-technical potentiality of location-aware computing devices, was a foundational document for the artistic movement (Hemment 2006). Russell's manifesto incorporates an eclectic "sequence of text fragments dealing with the social and cultural implications of location-aware devices" (1999, 1). The digitally distributed text imagines the wide ranging possibilities of newly emerging wireless digital technologies that could combine networked information with geographic context. Russell notes that these "location-aware" devices would allow for interactions in the physical world where computational techniques and code would no longer be confined to the screen of the computer. This would represent a dramatic modification in computing, which would involve a shift:

> from the 'inside' view that developed after the failure of the space programme, the closure of the frontiers, the rise of television, early computing, interiorised simulation and drug culture… towards an 'outside' view—a recolonisation of the real world, computers becoming invisible, mobile, networked and location aware, the real world augmented rather than simulated (5).

For Russell this outward projection of mind involves an interface where "constructs drawn from dreams and myth shape the outside more tangibly than ever before" (5). His ideas about the interface were refined by participants at the 2003 Locative Media Workshop in Latvia, where one project entitled "Mapping and Sewing Together Mythologies" focused on using locative media to physically navigate a shared

networked space that is constructed out of collected mythologies and memories.[148] This digital orientation incorporates dreams and desires of materializing the immaterial, making the invisible visible, manifesting the inside world on the outside, which emphasizes the continuing presence of the imaginative frameworks of allegorical machines to mediate the infinitude of space. In a way, this was embraced by the net.art community because it externalized the mythic cyberspace "paradise" by orienting it as a ubiquitous and pervasive field just beyond our senses (Stenger 1992).

To support this outward recolonization of material space, Russell assembled a range of radical discourses on politics, technology, alternative community formation and sexualities in support of an idyllic future where everyday life is supported and invigorated by location-aware technologies. In the portion entitled "Situations," Russell incorporated fragments from Situationist International musings on psychogeography, which attempts to develop a new awareness of one's surroundings through a consideration of the "specific effects of the geographical environment on the emotions and behaviour of individuals."[149] Psychogeographical practices such as the "dérive" were conceptualized to support unplanned and unexpected journeys through a landscape as a way to generate a more authentic experience of place. Following the publication of Russell's manifesto, psychogeography became a popular way to describe the emerging field of locative media (Chang and Goodman 2006). Its influence on the use and

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[148] The "Mapping and Sewing Together Mythologies," *Locative Listserv*, July 2003, accessed February 27, 2013, http://locative.x-i.net/mm/.

[149] "Who," *The Toronto Psychogeoraphy Society*, accessed February 27, 2013, http://psychogeography.ca/who.htm.

expansion of location-based technologies in the artistic community underscores how psychogeographical practices[150] were translated from paper to digital mapping (Pinder 2005, 408). In their own words, this artistic community attempted to use these principles to "re-enchant urban space" (McGarrigle 2010) through a process of "building magical realms" with locative media (Nolan 2006).

However, approaching psychogeography with locative media was not supported by everyone in the activist and artistic communities. For instance, Brian Holmes (2004) questions whether the ideals of the dérive could actually be implemented with locative media, underscoring the tension that while "aesthetic form of the dérive is everywhere… so is the hyper-rationalist grid of Imperial infrastructure." Therefore, as celebrants of locative media offer the technology as a "new kind of locational humanism, tailored to the worldwide wanderer," they also ask, "what would it really take to lose yourself in the abstract spaces of global circulation?" Ultimately, many artists were concerned that any attempts to offer an aleatory experience of space would simultaneously reinforce the "infallible performance by the satellite mapping system." Many locative media artists became increasingly reluctant to position their locative work as making any sort of political intervention.

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[150] In May 2003, for instance, the Psy.Geo.Conflux event was held to explore the psychical and psychological landscape of New York City. Organized by Christina Ray, founder of the artist-run Glowlab and an active psychogeographer, and Dave Mandl, a member of the Brooklyn Psychogeographical Association, the festival was intended to "explore the various ways in which artists, writers, and theorists are interpreting the idea of psychogeography today, at a time when the paper maps used in early dérives have been supplemented by mobile phones, GPS systems, and advanced field-recording techniques." Mandl D, Ray C, O'Rourke K, et al. (2003) Three days of psychogeographic heaven: An overview of the Psy. Geo.Conflux2003 in NYC, Year Zero One 12. Available at: http://www.year01.com/forum/issue12/ conflux.html (accessed November 2011).

RETHINK POSSIBLE

Predictably, it was not long before locative media were transplanted from artistic and activist terrain to more commercial applications. In July 2006, a "rapid prototyping" residency program called "Almost Perfect" was organized and sponsored by Hewlett-Packard (HP) and hosted by the Banff New Media Institute in Alberta, Canada. The residency offered a platform for artists and programmers to conceptualize and prototype locative media projects within the framework of HP's proprietary Mediascape authoring software. Andrea Zeffiro, an initial participant, recounts her experience as something that veered sharply away from a purely artistic vision:

> Participants were pushed to explore the Hewlett Packard platform—to consume it and produce with it—and the emphasis was on the platform itself, as opposed to individual intent… The residency then, was not an occasion for participants to execute proposed projects. Instead, it served as a backdrop for Mediascape testing. Hewlett-Packard's (HP) partnership with the Banff New Media Institute (BNMI), supplied HP with access to a group of individuals with whom the company could test its Mediascape platform (Zeffiro 2012, 181).

HP's locative toolkit was intended to offer a platform that would allow users to create interactive software that could link audiovisual materials with particular movements through space. For instance, a user could use the software to create an interactive tour where information is presented to the user according to what he or she is looking at, moving towards, or his or her close physical proximity. In the *Mediascape Experience Design Guidelines* pamphlet that was published by HP,[151] users are encouraged to create applications that offer an "immersive flow" but also warned that the

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[151] Josephine Reid, "mscape Experience Design Guidelines," *HP Computers,* December 2007, accessed February 27, 2013, www.hpl.hp.com/downloads/mediascape/mscape_Experience_Design_Guidelines v2.pdf.

development of "immersive moments may be terrifying, confusing or euphoric." This warning implicitly reiterates the long history of allegorical machines—where interfacing with the sublime space beyond space involves a balance between the beautiful with the terrifying. The overall goal for HP was to offer a way to create and offer connections to "a *digital landscape* in which digital content and applications overlay the physical landscape of our environment" but within the bounds of HP's position of authority (Reid et. al. 2005b, 5).

Corporate support and extension of locative media were also at play within the influential Urban and Social Tapestries research programs run by the non-profit U.K. creative studio, Proboscis. The programs ran from 2002 to 2007 and were invested in using locative media technologies to investigate how "people could 'author' the environment around them."[152] By "building up organic, collective memories that trace and embellish different kinds of relationships across places, time and communities," the Tapestries projects developed a "public authoring" software that combined geographic information systems (GIS) and locative media. However, the projects were the result of substantial financial backing from the HP Research Laboratories and the research and development wing of France Télécom, among others.[153]

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[152] "Public Authoring in the Wireless City," *Urban Tapestries*, accessed February 27, 2013, urbantapestries.net.

[153] Other financial contributors include the London School of Economics, Birbeck College, Orange, and the Ordnance Survey.

Writing in 2011, Kazys Varnelis, Director of the Network Architecture Lab at Columbia University, described this commercial adoption and expansion of the beliefs set forth by the net.art community:

> Even as former supporters pronounced new media dead, it began to permeate the physical world, formerly derided as 'meat space.' Launched into a collapsing economy a month after 9/11, Apple Inc.'s iPod set the stage for a new generation of portable technological devices. With Global Positioning System (GPS) devices and mobile phones becoming more common, technologically informed artists, hackers, and entrepreneurs alike envisioned that these could be used to produce digital media bound to a particular location in the real world… Locative media remained the stuff of demos and art-technology festivals until 2008 when Apple released the GPS-enabled iPhone 3G. Paradoxically, the mass realization of locative media seems to have taken the wind out of its sails as an art form (2011).

The widely used iPhone and its associated digital software platform, the App Store, offered consumers programs that translated the technologies of the locative media movement into small, downloadable packages. Some of the early offerings included: Yelp, which offered hotel, restaurant, and entertainment suggestions based on the user's proximity; Hotels.com, which allowed users to make reservations based on their phone's location; and CitySense (brought to us by the aptly named *Sense Networks*), which utilized locative information pulled from phones connected to the network to visually represent the location of mobile users as they passed through various urban centers in order to help customers answer the question, "Where is everyone going right now?"[154] The occulted ubiquitous network could now be unveiled with a device that was small enough to fit in your pocket.

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[154] "CitySense: Real-time nightlife discovery and social navigation," *Sense Networks,* accessed February 27, 2013, https://www.sensenetworks.com/products/macrosense-technology-platform/citysense/.

Seeking to capitalize on the shift towards locative media, AT&T rebranded itself and positioned its network and devices as offering a unique opening into this digital plane of experience. In 2010, the "Rethink Possible" campaign debuted as part of a wider effort to recast the telecommunications corporation as a lifestyle company. With "Rethink Possible" as the new "brand message," notes Gregg Heard, Vice-President of brand identity and design for AT&T, "we're shifting to focus on how technology is enabling our life."[155] By de-emphasizing its focus on the speed of its network and area of coverage, the company infuses a contemporary capitalized appeal with the ancient metaphysics of spatial orientation and network navigation. It encourages customers to "expand your boundaries of can, see what's on the other side of too far, play the angel's advocate. . . Rethink Possible."[156]

As part of this campaign, the company introduced a range of new videos, including one which features a fast talking city-dweller using an AT&T mobile device walking from the urban center to the depths of a forest only to (unexpectedly it seems) encounter a man dwelling there. The forest-dweller who is wearing furs and iron hunting traps around his shoulders seems confused by the presence of the man with the smart phone. The city-dweller gasps at the sight of the other and clicks buttons on his display to reveal his precise geographic location as indicated by a pin falling on a digital map. He turns around and escapes the seemingly "threatening" forest-dweller as the words

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[155] Kunur Patel, "AT&T's Strategy to Win Consumer Love: Be Human," *Ad Age,* April 18, 2012, accessed February 27, 2013, http://adage.com/article/special-report-digital-conference/strategy-win-consumer-love-human/234204/.

[156] AT&T, "Rethink Possible," *Youtube*, April 8, 2010, accessed February 23, 2013. http://www.youtube.com/watch?v=7EhQitYGuBk.

"There's more to great conversations than talking, Rethink Possible" flash on at the viewer.[157] Here, the AT&T user is offered reassurance that unplanned or unexpected encounters with the "other" in physical space can always be ameliorated by connecting to the reliable and familiar presence of the digital network. In other ads, possibilities offered by locative media are cast in more blatantly spiritual terms and the promise of the network is enmeshed in states of wonder and transcendence. These ads include the theme of Willy Wonka's "Pure Imagination" as a male user's face is illuminated by the screen's divine display,[158] refreshing the animist characterization of its network as having a "living, breathing intelligence… a network of possibilities." In another advertisement titled "Convert the Nonbelievers," a user is seen transmitting his networked message as he stands on the edge of the roof of a skyscraper adorned with angel wings and looks down on his followers below receiving his message.[159]

Many information and communication technology companies have approached locative media in similar ways to AT&T by echoing the recurring human desire for spatial annotation and augmentation. The "Star Walk" program is a popular downloadable application for the iPhone and iPad developed by Vito Technology and has won multiple awards including an Apple Design Award at the iPad Developer Showcase in 2010. This program is offered to users as a mobile astronomical laboratory that allows them to

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[157] AT&T, "Rethink Possible Walking & Talking," *Youtube*, September 16, 2010, accessed February 27, 2013, http://www.youtube.com/watch?v=FsSS1K2QTss.

[158] AT&T, "Rethink Possible Birthday," *Youtube*, September 26, 2010, accessed February 23, 2013, http://youtu.be/nZMZoy3rrlM.

[159] AT&T, "Rethink Possible: Great Expectations," *Youtube*, August 29, 2010, accessed February 26, 2013, http://www.youtube.com/watch?v=ixnGnen5-SE.

overlay or “augment” the skies above with an informational universe. “Firm believers in education and the potential of combining education and technology,” Vito note in its mission statement, it wants “to create a new way of learning with iPhone apps that unifies beauty, fun and interest.” This unification of beauty and education summons the deep history of allegorical machines where devices such as the astrolabe were supported as an educational tool to reveal correspondences between the ordered cosmos and the soul. C.E.O. Victor Toporkov extended this allusion in an interview, when he suggested that using the iPad’s digital compass to simply indicate directionality was not good enough for the company’s purposes: “As a result of heated discussions we had a very simple idea: if someone wants to watch the night sky with the help of iPad, they should simply tilt the iPad upwards.” The dream of the astrolabist to directly unveil the occulted heavens or that of the dowser to intuit the electromagnetic fields of force are reimagined and realized with the iPad, where the orientation of hidden worlds is mapped onto the screen.

One of the main features of the Star Walk application communicates the geolocation of the end user to the iPad’s accelerometers in order to track movement of the device in the user’s hands. The process results in visuals that are matched on the screen with what he or she can see on the other side of the device. If the user moves his or her hands that are holding the iPad up to the sky, the image shifts to match that movement. It can look like the user is holding an empty, black or white frame up to the sky yet within the frame, celestial objects, constellations, and an abundance of annotated information appear superimposed over the stars on the screen. The screen of the iPad reproduces whatever angle the night sky would provide the user at that moment, and a whole range

of interactive information appears over the view of the sky as well, as if the user has control over a portal to the heavens. One reviewer of the application implicitly argues that this locative media experience is a way to rekindle an exciting relation with the stars: "Man has been looking to the stars since the dawn of time. Now you can make your star gazing experience truly exciting with the Star Walk for iPad."[160] "Choose a clear night and hold your phone skyward, and the heavens suddenly make sense," writes another.[161] After thousands of years of allegorical machines, the iPad is positioned as the conclusive answer to the age-old desires to get oriented with an intelligible empyrean space.

Other features that come bundled with the software include a "spectrum Bar" that allows users to make the invisible optical wavelengths of the electromagnetic spectrum including Gamma Ray, X-Ray, H-alpha, Infrared, Microwave, and Radiowaves visible to the human eye. In many ways, this colorful visualization serves as the most succinct realization of the recurring desires associated with all the earlier locative media I have introduced. The Star Walk application also includes a "Time Machine" option, which allows the user to visually represent where the distant bodies in the universe were anytime in the past and in the future. The blend of locative and augmented reality "provides viewers an augmented reality experience that you've probably only experienced in a planetarium. Star Walk and an iPad deliver this power to the palm of

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[160] Cristi, "Star Walk for iPad - App Review," *PadGadget*, April 21, 2010, accessed February 27, 2013, http://www.padgadget.com/2010/04/21/star-walk-for-ipad-app-review/.

[161] Tedeschi, Bob. (2010, April 29). "When You Wish Upon a Star, Now You Can Call It by Name," in *The New York Times*. Pg. B8.

your hands."[162] Producers of the application realize the progress myth by suggesting that viewing the night sky without a media apparatus is a limiting experience and they position the application as a compact planetarium that allows users to uncover the hidden truth of the celestial heavens and the mysteries of space and time. The representation of reality offered by the planetarium is extended and "augmented" as if the informational cosmos is more real than the real itself (and certainly more "usable" and "interactive").

When I attended the 3rd Joint International Conference of the Pan-American Mobilities Network and the Cosmobilities Network in 2012 (focused on locative media), I participated in a session devoted to instructing participants how to program an introductory locative media application. "Between Reality and Virtuality: An Introduction to Augmented Reality" was led by a speaker who offered instructions on how to use the Layar Reality Browser with the Apple iPhone and Google Android operating systems. With a mobile device's digital video camera, gyroscope, and GPS, "digital 'layers' are displayed on your smartphone's camera view, enhancing your view of the real world" and letting you "[e]xperience the world in a whole new way," Layar writes on its download page.[163] "Layar merges the online and offline worlds, bringing new levels of engagement to a previously one-way conversation."[164] The session leader positioned Layar within a broad history of popular imaginings of the technology from Star Trek's mobile tricorder

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[162] Cristi, "Star Walk for iPad - App Review," *PadGadget*, April 21, 2010, accessed February 27, 2013, http://www.padgadget.com/2010/04/21/star-walk-for-ipad-app-review/.

[163] "Layar - Augmented Reality," App download page, accessed February 27, 2013, https://itunes.apple.com/app/layar-reality-browser/id334404207.

[164] "What is Layar?" *Layar*, accessed February 27, 2013, http://www.layar.com/what-is-layar/.

used for sensor scanning and data recording, to Robocop's heat-sensing and digital tracking helmet, and on to Iron Man's interactive suit. "Augmented reality," he noted, "once limited to the realm of science fiction, is now part of our everyday life."

Outside of the seminar settings where creators are instructed to connect with moments of imagined technological progress, other individuals are framing locative devices in similar ways. Science fiction writer Bruce Sterling is one of the more active proponents of translating the dreams of various locative media and augmented reality imaginations into functional applications. Since 2003, he has covered these topics on a popular blog sponsored by the periodical *Wired*, aptly titled, "Beyond the Beyond"[165] (which could be read as a response to figures such as Giordano Bruno). He has recently promoted the speculative "Theriomorphous Cyborg" project, developed by the New York based architectural designer, Simone Ferracina. This project is modeled as an immersive game where users "level up" by engaging tiered fields of locative media. At "each level, the game interface establishes a different environment-world and endows users with non- and extra-human senses." Ferracina elaborates:

> Set in a near-future environment teeming with locative media, sensors and portable devices and co-constructed by virtual objects and information overlays, the project aims to establish and activate new relations between human cyborgs and their 'sentient' environment. The animal Umwelt becomes a metaphor for designing and opening up new perceptual realities and fields of experience—and reach previously invisible worlds.[166]

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[165] Bruce Sterling, *Beyond the Beyond*, accessed February 27, 2013, http://www.wired.com/beyond_the_beyond/.

[166] Simone Ferracina, "Theriomorphous Cyborg," accessed February 27, 2013, http://simoneferracina.com/Theriomorphous-Cyborg.

One game level adapts a user's vision to visually represent magnetic fields (recalling both the magnetic compass and the divining rod). Another uses feeds pulled from closed-circuit television cameras to create "cyborgian eyes." These new layers of supersensible worlds are unlocked for the user through these digital orientation and navigation platforms. In effect, reaching "beyond the beyond" is made possible by a transparent orientation to the digital network. The "Theriomorphous Cyborg" is emblematic of the modern subject who uses these machine to interface "previously invisible worlds" beyond reach for millennia. The digital network inherits the "invisible worlds" of the Ptolemaic cosmos, the magnetic poles, a fourth dimensional hyperspace, and the earth's electromagnetic earth force.

THROUGH A GLASS, DARKLY

The future of allegorical machines is being engineered today and is on its way from the door of the lab to the marketplace. These devices are intended to eliminate as much interference between the interface and the physical world as possible, inching closer to the dream of an interfaceless interface. For computer designers and engineers, the dream's realization has taken the form of wearable computers and hands-free interfaces. For the dominant producers of commercial information and computing technologies, the ability to deliver a technology that could unveil more of the hidden networked environment is worthy of significant investment, and locative media are viewed as viable platforms to deliver on this promise. In June 2011, Google hired Richard DeVau away from Apple to assist with its work on wearable computing technologies. DeVau described

his work in the early 2000s as "Memory Glasses" and summarizes his design decision for this heads-up display (HUD): "The short version is that I can improve your performance on a memory recall task by a factor of about 63% without distracting you, in fact without you being aware that I'm doing anything at all. Even more interesting is that giving you wrong information subliminally doesn't seem to mess you up."[167] DeVau's project would prove a crucial starting point for Google's future design interests.

By December 2011, Google's secretive research and development operation (code-named the Google X Lab) was rumored to be actively involved with projects such as robotic cars and space elevators, and hard at work developing interactive glasses that would allow the wearer to overlay networked information atop what is visibly apparent through the glasses. Seth Weintraub, a blogger for the site *9 to 5 Google,* broke this information to the internet community and noted that the glasses would allow for "augmented reality that would tie into Google's location services. A user can walk around with information popping up and into display—Terminator-style—based on preferences, location and Google's information."[168] The eventual name of the venture, "Project Glass,"[169] associates the wearable technology with the smooth transparency of the fabled translucent interface. Since Google remains unsure of the technology's mass market

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[167] Seth Weintraub, "Wearables Expert Richard DeVaul Jumps Ship from Apple to Google," *9 to 5 Google*, June 24, 2011, accessed February 27, 2013, http://9to5google.com/2011/06/24/wearables-expert-ridard-devaul-jumps-ship-from-apple-to-google/.

[168] Seth Weintraub, "Google X's wearable technology isn't an iPod Nano, but rather a heads up display (glasses)," *9 to 5 Google*, June 24, 2011, accessed February 27, 2013, http://9to5google.com/2011/12/19/google-xs-wearable-technology-isnt-an-ipod-nano-but-rather-a-heads-up-display-glasses/.

[169] "Project Glass," *Google*, accessed February 27, 2013, g.co/projectglass.

appeal, its development and beta-testing has largely operated in secret. In the early months of 2012, Google reportedly spent $120 million on a new facility near its California headquarters to test this "precision optical technology."[170] A number of senior figures have publicly demonstrated how the glasses function and the overall concept of the project was popularized in a web video produced and distributed by Google in April 2012.[171] The goal is not just unveiling the hidden layers of the internet that surrounds material space but also to let the user engage with the "next dimension of Google maps," the "Outernet."[172]

The technology was described by pundits as a "prosthetic eye-based display computer"[173] and producers behind the Google Glass video noted, "We think technology should work for you—to be there when you need it and get out of your way when you don't… that helps you explore and share your world." This vision of the future, titled "One day…," is shot from the perspective of a man who wakes up in his New York City apartment and puts on the glasses. Seeing the world through his subject position via the lens of Google Glass and the Android mobile software, the audience sees a range of

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[170] Matt Warman, "Google 'plans secret lab,'" *The Telegraph*, February 13, 2012, accessed February 27, 2013, http://www.telegraph.co.uk/technology/google/9079062/Google-plans-secret-lab.html.

[171] Google, "Project Glass: One day…" *Youtube*, April 4, 2012, accessed February 27, 2013, http://youtu.be/9c6W4CCU9M4.

[172] Todd Wasserman, "How Google Glass Could Change Advertising," *Mashable*, January 23, 2013, accessed February 27, 2013, http://mashable.com/2013/01/23/google-glass-advertising/.

[173] Steven Levy, "Google Glass Team: 'Wearable Computing Will Be the Norm," *Wired*, June 29, 2012, accessed February 27, 2013, http://www.wired.com/gadgetlab/2012/06/clear-glass-leaders-googles-wearable-computing-breakthrough-explain-it-all-for-you/.

applications from weather reports to visualized network messages. Later on, as he makes his way to the subway station the man sees that its entrance is overlaid with a graphical notification that subway service at the stop has been suspended. Since the glasses have a "gyroscope, accelerometers, and compasses for making the system aware in terms of location and direction," the man can bring up the Google Map software on his display that will guide him to the bookstore he wants to visit. The display re-orients and navigates according to the mobility of his body and the direction in which he looks. Reaching the store, he asks, "Where's the music section?" A map appears before his eyes and helps him navigate to that part of the shop. Once there, he asks the device if one of his friends had made it there to meet him. The display loads locative information drawn from his friend's mobile device to show the man that his friend is 402 feet away. After tracking down his friend, he climbs stairs to a skyscraper's roof to share his sunset view with someone that he is talking to in a video chat. Editorialists noted how the glasses allow for seemingly impressive exploits: "not only instant communication across blocks or continents, but also an almost god-like access to information about the world around us. The Man in the Google Glasses can find his way effortlessly through the mazes of Manhattan; he can photograph anything he sees; he can make an impulse purchase from any corner of the world."[174]

In a 2012 interview, Babak Parviz, one of Glass' lead engineers, outlined the goals for the technology. It would "enable people to communicate with images in new ways, and in a better way… It's my expectation that in three to five years it will actually look

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[174] Ross Douthat. "The Man With the Google Glasses," *The New York Times*, April 15, 2012, SR11.

unusual and awkward when we view someone holding an object in their hand and looking down at it. Wearable computing will become the norm."[175] With networked information overlaying physical space, the intention is to provide a platform that will reveal the space beyond space right before the eyes, as opposed to the hands, of the user. Not to be outmaneuvered, in 2012 Apple was granted patents for its version of augmented reality and locative media lenses. With Apple's version, however, the user does not look through a lens. Instead, the device's LED lasers project information directly onto his or her retina, leading to a sense of complete immersion in augmented reality.[176] This retinal display detects eye movements in order to simulate two- and three-dimensional images over the rest of the user's field of sight, avoiding the need for a screen at all. At least in Apple's proposal documents, the interface seems to recede and the unification of virtual and physical worlds is within reach of the user.

Apple, Google, AT&T, and other locative media developers actively reiterate technological attempts to sense what lies beyond space. Though based on advanced digital technology, the overarching thematics and desires articulate to the deeper constellation of locative media I have set forth. Google Glass represents the latest attempt to realize an empyrean space through an "interfaceless" interface. As a naming strategy,

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[175] Steven Levy, "Google Glass Team: 'Wearable Computing Will Be the Norm," *Wired*, June 29, 2012, accessed February 27, 2013, http://www.wired.com/gadgetlab/2012/06/clear-glass-leaders-googles-wearable-computing-breakthrough-explain-it-all-for-you/.

[176] Apple Inc., "Peripheral Treatment for Head Mounted Display," *United States Patent Office*, patent 8,212,859, October 13, 2006, accessed February 27, 2013, http://patft.uspto.gov/netacgi/nph-Parser?Sect1=PTO2&Sect2=HITOFF&p=1&u=%2Fnetahtml%2FPTO%2Fsearch-bool.html&r=3&f=G&l=50&co1=AND&d=PTXT&s1=8212859&OS=8212859&RS=8212859.

"Google Glass" serves serves as a distillation of the allegorical machines I have analyzed, as it evokes the 1 Corinthians 13:12 verse: "For now we see through a glass, darkly; but then face to face: now I know in part; but then shall I know even as also I am known." For Paul, embodied sight is akin to seeing through an imperfect mirror and always leads to incomplete knowledge. Perfect clarity is only achieved when coming face to face with a God who presents complete knowledge because he knows all.

Paul's verse also reimagines a section from Plato's *Phaedrus*: *"*For there is no light of justice or temperance or any of the higher ideas which are precious to souls in the early copies of them: they are seen through a glass dimly; and there are few who, going to the images, behold them in the realities, and these only with difficulty" (250b).[177] The result is a locative interface "that does not mediate. . . It describes itself as a door or a window or some other sort of threshold across which we must simply step to receive the bounty beyond. But a thing and its opposite are never joined by the interface in such a neat and tidy manner" (Galloway 2012, 53). The metaphysical parallel of the sensible and the intelligible (*eidos*) is an inherent feature of these spatial interfaces. These are intermediaries with an ever-occulted world and material sites for making the immeasurable, the infinite, the vague, and the unfathomable over into the sensible and the intelligible. In the final chapter, I outline common threads and arguments that weave across allegorical machines.

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[177] It is curious, however, to consider which one is original and which is the interpretation. If we go by the dates of the oldest manuscripts that currently known, then Plato's manuscript would go back to 895 C.E., although fragments have been recovered from the second or third century C.E. See *The Oxford Handbook of Plato*. ed. Gail Fine. Oxford: Oxford University Press. 2008. For Paul, the oldest manuscript dates back to 200 C.E. See http://www.religion-online.org/showarticle.asp?title=91#_Toc439066013.

VIII. CONCLUSIONS: VAGUE BEYOND THE FRINGE

My aim in these pages has been to shift the study of locative media away from an analysis that is dependent upon boundaries marked by algorithmic or digital technologies and towards an analysis of allegorical machines. The ahistoricism that plagues many assessments of contemporary digital technologies relegates media studies to various presentist accounts and concerns. I hope that my media archaeological account of locative media challenges the hegemony of traditional media models as a way to assess the implications of technological operations, interfaces, and imaginations. Methodologically, I have tried to rethink the relationship between technological practices and conditions of sensation and experience because I believe that inquiries into locative media should not be blinded by the interfaces themselves—by screen effects—but instead should open their eyes to the complex articulations that attend these devices and assemblages. In tracing a history from the astrolabe to contemporary digital locative media, I have shown how the desires and practices of interfacing the "space beyond space" operate as a reverberating topos that has remained at the heart of these allegorical machines.

To consider digital locative media as part of a wider constellation of allegorical machines emphasizes the practices, affects, and experiences tied to the spheric security of secondary layers of imagined or informational space. Or as Alexander Galloway suggests, "the interface is ultimately something beyond the screen. . . the interface is a

general technique of mediation evident at all levels; indeed it facilitates the way of thinking that tends to pitch things in terms of 'levels' or 'layers' in the first place" (2012, 54). The locative media I have examined together suggest that layers of a reticulated "all-encompassing" field (from the *primum mobile* to the digital network) are oriented on the opposing end of the locative interface. The shadow spaces of allegorical machines are always beyond reach and their layers exceed the material environment.

I want to return to the definition of the interface I offered in the introduction: a liaison between at least two bodies or spaces that generates animations such as the desire or fear of uncovering what is beyond space. Interfacing the otherspace has taken many unworkable forms over time, leading to a range of recurring interface effects or animations. With my focus on the articulations among navigation and orientation technologies, practices, experiences, and affects, the constellation of allegorical machines I identify calls attention to how mobile interfaces operate as thresholds between the material and the imagined, the lived and the desired and the feared. In so doing, the constellation I identify has spiraled around a consideration of spatial interfaces that function as "mysterious zones of interaction that mediate between different realities" (Galloway 2012, vii). These are thresholds that have long haunted media technologies and the seemingly ever-present attempts to construct forms of mediation that increasingly promise to mediate less.

Making the interface invisible would serve as a functional, and thereby immanent, equivalent to transcending to a unified reality beyond space. While computer engineers rehabilitate older allegorical machines via a "dream of eliminating the interface, of

breaking down the barrier of the screen and eliminating the distinctions made between this side and that side" (Jacobs 1990, 40ff), the interface remains caught in a contradictory middle position: whether the astrolabe or the iPad, it remains a conduit for complete immediacy and an ongoing barrier to such immediacy. Despite the desire for the gradual removal of the locative medium, from the astrolabe's brass discs used to decode the heavens to Microsoft's interest in beaming locational information onto the retina, the medium's very materiality of the medium always provides the local conditions for the sensation of a malleable boundary among the human, its technology, and the world. While technological forms drift over time, residual effects based on human habits, practices, and imaginations continue to be animated by interfaced encounters with space. Indeed, the interface never involves a simple transparency as opposed to an ongoing process of intelligibility or translation.

The persistent desire for an immanent transcendence between the subject and the world (or worlds) beyond is built upon recurring attempts to provide access to a "magical universe" of infinite correspondences "made up of the network of places providing access to every domain of reality: it consists of thresholds, summits, boundaries, and crossing points that are connected to one another by their singularity and their exceptional nature" (Simondon 2011, 414). Allegorical machines are positioned as the interfaces that materialize what Simondon describes as "key-points" or thresholds that come in between subject and world. Such thresholds "are places of contact and of mixed, mutual reality, places of exchange and of communication because they form a knot between both realities" of the human and the world (412-413). In the words of digital locative media

and augmented reality proponents, this involves the desires of unveiling and transcending into a "mixed reality" (Milgram et al. 1994, 1) or "hybrid ecologies" (Kabisch 2008, 227) that promise a unified field of experience. The longing for transcendence into the layers of the interface extends across the human landscape and the danger is that the immanent work that is necessary in this world is cast aside, eclipsed, made invisible, or deemed unworthy of attention.

The development of contemporary communication and information technologies has given rise to pervasive notions that boundaries between human and world, if they exist at all, are somehow infinitely malleable. For example, the nebulous interface between the human and its electronic technology has become a crucial site for enacting the twin cycles of resistance and power due to its position as an ambiguous threshold and today serves a significant role in relocating or redefining the human as part of a cybernetic system of information circulation and management. The more invisible or transparent the interface, the more perfect the fiction of a total imbrication with the force fields or spheres of a new reality structured by information technology.

New forms of augmented reality are big business. For corporations such as AT&T, the politics and economics of interfaces to "see what's on the other side of too far" involve an approach to space that is rooted in a broader logic of interactive ineffability where occulted space is made un/intelligible according to Neoliberal demands. This is apparent in such proposals as Novak's "liquid architecture" (1991), which is driven by the vision of a utopian future of individually customized, overlapping, and co-existing worlds that can be rendered invisible at the touch of a button. The interactive ineffability

that is built on the twin processes of "show me what I want to know" and "hide what I don't want to know" assumes that users can afford the admission price to the commodified otherspace on offer.

In response to the transcendent desires that attend to digital locative media, I offer a few thoughts regarding the interdependent relations between experience and space. As a process of allegorical practice, these key-points or thresholds that come between subject and world involve a technique of interpretation or intelligibility. This entails interpreting space as a way to configure a sense of relation among one's self, material space, and the space beyond—a "mediation between internal and external levels" (Galloway 2012, 74) predicated on a desire for ordered intelligibility. By offering ways of making unknown features of space intelligible, these spatial interfaces represent attempts to recover, while not quite saying so, a deeper magical tradition within which thresholds operate as intermediaries between nature and super-nature.

The hype surrounding contemporary allegorical machines works to imply that space itself is positioned as a cryptogram in need of decryption. The interface is bound to the possibility of rendering a suspected unknown presence intelligible. The interface, therefore, works to instill a sense of unease with the unknown whose layers of unpredictability and indefiniteness threaten a sense of holism among mind, body, and world. The very desire for a "premodern" porous subjectivity implies that the "modern" buffered subjectivity is the norm, yet, our history is suffused with permeable "animation relationships. . . spheric liaisons are brought up in which reciprocal animations generate themselves through radical resonance; each of them demonstrates that real subjectivity

consists of two or more parties" (Sloterdijk 2011, 53). Subjectivity involves a field of dyads in which meaning is constituted in the engagement or encounter between ourselves and the world is made meaningful.

While our experience of being in space is tied to the perceived, conceived, and lived production of space, the presence of the unknown is also a constitutive experiential aspect of being in space. Hence my effort to sketch out the ethical and political potentialities of folding an acceptance of the unknown or vague back into the process of experiencing space. As a way of exploring the amorphous articulations across various registers of the unknown, subjective experience, and space, I would like to refer back to Doreen Massey and William James. In *For Space* (2005), Massey offers three propositions as to how space should be theorized and imagined. First, space is "the product of interrelations; as constituted through interactions, from the immensity of the global to the intimately tiny" (9). Second, space is "the sphere of the possibility of the existence of multiplicity. . . the sphere in which distinct trajectories coexist; as the sphere therefore of coexisting heterogeneity" (9). Third, space is "always in the process of being made. It is never finished; never closed" (9). Massey is interested in defending space in a way that leads to a flexibly generative ethics and politics that can account for her propositions which are intended to open up our approach to conceptualizations of space so that we can better understand the modes of intelligibility and marginalization that occur with various "power-geometries" of the flows and interconnections of space. Spaces, therefore, are made and remade as their relations of production are always in process.

There is a productive relation between Massey's work on space and that of William James, who is interested in the experiences of the human subject "taken all together, a quasi-chaos" and who provides a defense of the "vague" and the "ineffable" which play a key role in the fundamental ambiguity that pervades the "richness" and "intensity" of life (1967, 60). Starting with his *Principles of Psychology* (1890) and continuing through the rest of his work, James proposes that experience is a product that is always in process, "continuously changing," and never finished (1967, 286). He also argues that experience includes a range of "concatenated" substantive parts and interpenetrating transitive points of mediation (1908, 148). These are actively involved in a wider "profusion" akin to an unfinished stream that never stops flowing (191). Finally, because we rely too heavily on operations of (linguistic or otherwise) systemization, James asserts that we tend to favor modes of exclusivity at the expense of accepting the integrated animations of life. Such a stance leads one to suppose that if there is no way to articulate an experience, then that experience cannot exist. He describes this process of systemization as a "focalization" that implicitly creates a boundary or fringe and he further suggests that the concept of the "vague" should be revitalized as an inclusive approach to the intensity of life.

For Massey and James, experience and space are tied to modes of perpetual interrelationality and intersubjectivity as our experience of space is always in a process of being made. When we encounter a sublime or ineffable object, then, we can be reminded that the real is essentially unrepresentable. This is the danger with the dreams and the inherent impossibility of pure direct communication where an authentic representation of

self and world is both impossible and never sufficient. This is a theme that runs throughout this constellation of allegorical machines, which operate as spheric liaisons predicated on making a range of unknown forms, from the vague to the sublime and ineffable, intelligible. This process has long been at work with our relationship to media technologies as we continually face "a hidden world which, regardless of how much knowledge we produce about it, always retains some remainder that lies beyond the scope of our capacity to reveal its hiddenness" (Thacker 2011, 53). Yet, as James asks, is our instinctive belief in these unrepresentable "higher presences. . . but the pathetic illusion of beings with incorrigibly social and imaginative minds?" (1967, 63). Not necessarily, I suggest, as those social and imaginative minds are actively involved with coexisting and unending processes of meaning in association with so-called "higher presences." This is the principal value of the vague which, for James, comes from "his pragmatic principle that these beliefs make a difference, and that all acting is acting if" (Peters 1999, 193).

The politics of the interface, then, from the astrolabe and magnetic compass to the divining rod and digital locative media, involves a division of the sensible where a contestation over what is "the given" involves a struggle over what is beyond the senses (cf. Rancière 2003). How can a politics and ethics that accounts for an inherent hiddenness or vagueness take shape and why would such a formation be valuable? This is the key question for Thacker, who asks "what would it mean to consider a political theology of the hiddenness of the world (that is, an occult political theology)?" (2011, 95). He continues, "the enigma we face is how to confront this world, without immediately presuming that it is identical to the world-for-us (the world of science *and*

religion), and without simply disparaging it as an irretrievable and inaccessible world-in-itself" (97). The political and ethical potentialities resulting from my interest in folding the vague, sublime, or unknown back into the experience of space do not mean that we only identify and defend presumed "multiple modernities." By incorporating an acceptance of the vague into an experience of space, we can furnish a multi-focal ground for the "possibility of the existence of multiplicity" or a platform for "coexisting heterogeneity" that "is never finished; never closed" (Massey 2005, 9). This is due to the unending intensity of life, which precedes our modes of focalization or interpretation and always includes support for the integration of the vague surplus or aura that is beyond the fringes of space, self, or other.

My interest in the phenomenology of the sublime, the ineffable, the vague, and the mysterious reflects my understanding that our experience always includes an overflow of the mysterious or inarticulate. In a way, this links to Mark Hansen's (2004) interest in the mediated proprioception of the body yet such an approach fails to account for a broader integration of the vague. Proprioception involves the negotiation of our bodily senses in developing a sensory connection to objects that are beyond our bodily limits in a wider relational field of space. Proprioception occurs, for example, when we position our mind and body in lived space in relation to people and objects that we know are situated beyond our ability to sense them (in imagined space). However, despite the integration of this unconscious link with the co-constitutive mode of being in space, proprioception remains bound by the systematic knowledge that something is out there. Farman (2012) adapts this approach to proprioception in relation to locative media yet

restricts his analysis to the digital mobile interface that permits users to reconfigure the ways that they embody space so that they seem simultaneously positioned on the screen and in material space. He mistakes the ghosts in the machine for his own body as he searches for his "lost" embodiment through the interface where he thinks his body is hidden among the layers. I argue that the interface, despite its historical positioning, situates the experience of unknown or supersensible space as a condition that should be made intelligible which positions the dis-embodied field of the vague as always "out there" and in need of technological or magical recovery. The result, as seen with media theorists such as Farman, is a sense that without an orientation device, the body and mind is lost in a defective and alienating disorientation in material space.

In response, a politics that accounts for a multi-focality of the vague would involve a "radical neutrality" built upon a continuously changing process of inquiry (Buck-Morss 2009, 150). Such an inquiry actively assumes that experience and space are part of a moving ground. The politics itself would involve a radical neutrality that demands and supports a porous (and certainly precarious) space among self, other, and world where unknown and vague objects and conditions are not understood as risks or threats. I am calling for a political amorphology that involves a sense of neutrality which precedes and actively assumes the conceptual (linguistic, political, economic) process of intelligibility. Including the vague within spatial experience should be based on a concern for a porosity—in the form of mercy—that overcomes modes of identification or systematization. Therefore, the process of experiencing space should be supported by the productive potentialities of the vague in the face of interfaced layers of intelligibility.

Such a radical neutrality would involve an empiricism of the vague that operates in a similar way to Gilles Deleuze's transcendental empiricism within which modes of intelligibility operate inside the givens of experience itself (1994). This is an empiricism to the extent that it depends on the force of an encounter to generate thought. Therefore, it is not the object of the encounter that is important as the goal is not the representation or sensation of the object akin to a Kantian form of empiricism where experience is only made intelligible when organized by forms of sensibility (such as space and time). On the contrary, the object of the *encounter* is the *occasion* of thought but not that which is to be thought. In this respect, transcendental empiricism differs from traditional empiricism in that its object is that which is, in a sense, imperceptible. This involves a presupposition that there is something un-thought that always exceeds thought or there is always something vague beyond the interface. The ethical and political amorphology of this position points to the necessary inclusion of the vague within the experience of space as it would "not coalesce around any given formal essence or definitional predicate" and "finds its power in incontinence and transformation, not unification or repetition" (Galloway 2012, 142).

This encounter with the vague can be considered within a broader ontology of the multiple (cf. Badiou 2005). This encounter is inherently aleatory and therefore cannot be predicted outside of a singular engagement. The politics involve an activism that is based purely on present situations that can take advantage of a rupture of the encounter. This is a formation of a multiplicity that includes elements of the undecidable or indiscernible which erupts from or interrupts the normal regime of knowledge that relies on the

classifications of the well known or intelligible. Such an encounter can be seen in a revolutionary political moment or an amorous experience that changes life itself. Perhaps, though, this type of encounter can also be considered in conjunction with our relations to materiality and the vague in an everyday sense. This is at play with the recent turn to vital materialism, which "affirms a figure of matter as an active principle, and a universe of this lively materiality that is always in various states of congealment and diffusion, materialities that are active and creative without needing to be experienced or conceived as partaking in divinity or purposiveness" (Bennett 2010, 93). What if a politics of the vague includes the power of a rupture that is open to mysterious fields of human, non-human, and even inanimate agencies? Such a politics would be grounded in an acceptance, in a very Jamesian fashion, that our pluriverse is articulated with and crossed over by fluid intermixtures both sensed and un-sensed, known and unknown.

The fringe, then, is always a part of the experience of being in space because we are always "fringed by a 'more'" (James 1967, 71). As all spaces are enmeshed with co-existence, the otherspace, too, is a space that we always experience in all its undefinable or unarticulated glory. This is an acceptance of our experiences as "a quasi-chaos" (ibid., 60) that involves embracing the sublime, ineffable, mysterious, and vague as a constitutive element of the experience of being in space. This experience, then, is analogous to an open understanding of and support for the mysterious where being or reality is not understood as a problematic to be solved and instead is something we "attest to" (Marcel 1965). Support for the mysterious can offer a ground for a politics and ethics that utilizes an experience of the vague as a site for future actualizations. This involves a

process of mercy where the indefinite operations of hope or belief can be abstracted from political campaigns or capitalist machines and re-articulated to mysterious encounters of ourselves, others, and the world. The challenge, then, "is not to be true to our own interiority but to have mercy on others for never seeing ourselves as we do" (Peters 1999, 266-267). Or, in the words of H.P. Lovecraft, "The most merciful thing in the world, I think, is the inability of the human mind to correlate all its contents" (2005, 167). I believe that the most merciful thing in the world, then, should be the inability of the human to correlate what is beyond the fringe.

Figure 8.1 Photo by the author

REFERENCES

Addison, Joseph. 1712, June 23. *The Spectator* 412: 66-69.

Adorno, Theodor W. 1966. *Negative Dialectics*. Trans. E.B. Ashton. New York: Seabury Press.

Agricola, Georgius. 1950. *De Re Metallica*. Trans. Herbert Hoover and Lou Henry Hoover. New York: Dover Publications.

Agrippa, Henry Cornelius. 1993. *Three Books of Occult Philosophy*. Ed. Donald Tyson. Trans. James Freake. St. Paul, MN: Llewellyn Publications.

Anderson, Benedict. 1983. *Imagined Communities: Reflections on the Origins and Spread of Nationalism*. London: Verso.

Anderson, Richard Lloyd. 1984. "The Mature Joseph Smith and Treasure." *BYU Studies* 24: 492-94.

Andrejevic, Mark. 2004. *Reality TV: The Work of Being Watched*. Lanham, MD: Rowman and Littlefield.

Anhaltin, C.M. 1659. *Slot en Sleutel van de Navigatie, ofte Groote Zeevaert*. Amsterdam.

Arendt, Hannah. 1958. *The Human Condition*. Chicago: University of Chicago Press.

Badiou, Alain. 2005. *Infinite Thought*. New York: Continuum.

Baldwin, M.R. 1985. "Magnetism and the Anti-Copernican Polemic." *Journal of the History of Astronomy* 16: 155-174.

Barlow, W.H. 1849. "On the Spontaneous Electrical Currents Observed in the Wires of the Electric Telegraph." *Philosophical Transactions of the Royal Society of London* 139: 61-72.

Barnes, S.J. 2003. "Known By the Network: the Emergence of Location-Based Mobile Commerce." *Advanced Mobile Commerce Technology:* 171-189.

Barney, Darin. 2000. *Prometheus Wired: The Hope for Democracy in the Age of Network Technology***.** Chicago: Univerity of Chicago Press.

Barney, Stephen A. 1979. *Allegories of History, Allegories of Love*. Hamden, CT: Show String Press Inc.

Barrett, Sir William. 1926. *The Divining Rod: An Experimental and Psychological Investigation*. London: Methuen & Co. Ltd.

Batting, Rudolph. 1558. *Compendiosa usus astrolabii*. Paris: Jacob du Puys.

Bauman, Zygmunt. 2000. *Liquid Modernity*. Malden, MA: Polity Press.

Bauman, Zygmunt. 2007. *Liquid Times: Living in and Age of Uncertainty*. Malden, MA: Polity Press.

Beichler, James Edward. 2007. "Three Logical Proofs: The Five-Dimensional Reality of Space-Time." *Journal of Scientific Exploration* 21(3): 523-542.

Benedict, Michael, ed. 1992. *Cyberspace: First Steps*. Cambridge: MIT Press.

Benjamin, Park. 1898. *A History of Electricity*. New York: John Wiley and Sons.

Benjamin, Walter. 1969. "Theses on the Philosophy of History." In *Illuminations*, ed. Hannah Arendt, 253-264. Trans. Harry Zohn. New York: Schocken.

Benjamin, Walter. 1996. *The Origin of German Tragic Drama*. Trans. John Osborne. London: Verso.

Benjamin, Walter. 1999. *The Arcades Project*. Trans. Howard Eiland and Kevin McLaughlin. Cambridge: Harvard University Press.

Bennett, Jane. 2001. *The Enchantment of Modern Life: Attachments, Crossings, and Ethics*. Princeton: Princeton University Press.

Bennett, Jane. 2010. *Vibrant Matter: A Political Ecology of Things*. Durham: Duke University Press.

Bennett, J.A. 1980. "Cosmology and the Magnetical Philosophy, 1640-1680." *Journal of the History of Astronomy* 12: 165-177.

Berland, Jody. 2009. *North of Empire: Essays on the Cultural Technologies of Space*. Durham: Duke University of Press.

Blackman, M. 1983. "The Lodestone: A Survey of the History and Physics." *Contemporary Physics* 24(4): 319-331.

Blagrave, John. 1585. *The Mathematical Jewel.* London.

Bohr, Niels. 1987. "Nobel Prize in Physics Award Address." In *The World of Physics* vol. 2, ed. Jefferson Hane Weaver, 315-338. New York: Simon and Schuster.

Bolter, Jay David and Richard Grusin. 1999. *Remediation: Understanding New Media*. Cambridge, MA: MIT Press.

Borges, Jorges Luis. 1998. "The Library of Babel." In *Collected Fictions*, trans. Andrew Huxley, 112-118. New York: Penguin Books.

Brooke, John Hedley. 1991. *Science and Religion: Some Historical Perspectives.* Cambridge, UK: Cambridge University Press.

Brown, Nancy Marie. 2010. *The Abacus and the Cross*. New York, NY: Basic Books.

Bruce, Steve. 1996. *Religion in the Modern World: From Cathedrals to Cults.* Oxford: Oxford University Press.

Bruce, Steve. 2002. *God is Dead: Secularization in the West*. Oxford: Blackwell.

Bruno, Giordano. 1584. *On the Infinite Universe and Worlds: To the Most Illustrious*. Venice.

Bryan, Margaret. 2011. *Lectures on Natural Philosophy: The Result of Many Years' Practical Experience of the Facts Elucidated. Cambridge:* Cambridge University Press.

Buck-Morss, Susan. 2009. *Hegel, Haiti, and Universal History.* Pittsburgh: University of Pittsburgh Press.

Burke, Edmund. 1990. *A Philosophical Enquiry into the Origin of our Ideas of the Sublime and Beautiful*. Ed. Adam Phillips. Oxford: Oxford University Press.

Burke, Kenneth. 1984. *Permanence and Change: An Anatomy of Purpose*. Berkeley, CA: University of California Press.

Campbell, Joseph. 2008. *The Hero with a Thousand Faces*, 3rd ed. Novato CA: New World Library.

Carey, James W. 1988. *Communication as Culture: Essays on Media and Society*. New York: Routledge.

Carey, James W. and John J. Quirk. 1988. “The Mythos of the Electronic Revolution.” In ed. James W. Carey. *Communication as Culture: Essays on Media and Society*. New York: Routledge.

Cassirer, Ernst. 1948. T*he Renaissance Philosophy of Man*. Chicago: The University of Chicago Press.

Castells, Manuel. 2000. *The Rise of the Network Society*. Oxford: Blackwell.

Cerf, Christopher and Victor Navasky. 1984. *The Experts Speak*. New York: Pantheon Books.

Chang, Michele and Elizabeth Goodman. 2006. “Asphalt Games: Enacting Place Through Locative Media.” Leonardo Electronic Almanac 14(3): http://www.leoalmanac.org/wp-content/uploads/2012/07/Asphalt-Games-Enacting-Place-Through-Locative-Media-Vol-14-No-3-July-2006-Leonardo-Electronic-Almanac.pdf (accessed March 2, 2013).

Chardin, Jean. 1735. *Voyages du Chevalier Chardin, en Perse, at autres lieux de l’’orient*, volume 3. Amsterdam: Jean Wolters & Ysbrand Haring.

Chaucer, Geoffrey. 1870. *The Treatise on the Astrolabe*. London: John Russell Smith.

Clarke, Arthur, C. 1973. *Profiles of the Future: An Enquiry into the Limits of the Possible*. New York: Orion Publishing Group.

Coleman, E.C., ed. 2006. The Travels of Sir John Mandeville. Gloucestershire, UK: Nonsuch Publishing Limited.

Couldry, Nick and Anna McCarthy, ed. 2004. *MediaSpace: Place, Scale and Culture in a Media Age*. London: Routledge.

Couliano, Ioan P. 1987. *Eros and Magic in the Renaissance*. Trans. Margaret Cook. Chicago: The University of Chicago Press.

Cowan, Ruth Swartz. 1983. *More Work for Mother: The Ironies of Household Technology from the Open Hearth to the Microwave*. New York: Basic Books, Inc.

Crang, Mike and Stephen Graham. 2007. “Sentient Cities, Ambient Intelligence, and the Politics of Urban Space.” *Information, Communication & Society* 10(6): 789-817.

Crary, Jonathan. 1990. *Techniques of the Observer: On Vision and Modernity in the Nineteenth Century*. Cambridge, MA: MIT Press.

Crowley, Aleister. 1991. *Magick in Theory and Practice*. Secaucus, NJ: Castle Books.

Curtius, Ernst Robert. 1953. *European Literature and the Latin Middle Ages*. Princeton, NJ: Princeton University Press.

Davis, Erik. 1998. *Techgnosis: Myth, Magic, and Mysticism in the Age of Information*. New York: Three Rivers Press.

de Chardin, Pierre Teihard. 1959. *The Phenomenon of Man*. Trans. Bernard Wall. New York: Harper & Row.

de Chardin, Pierre Teihard. 1964. *The Future of Man*. Trans. Norman Denny. New York: Harper Torchbooks.

de France, Henry. 1948. *The Elements of Dowsing*. Trans. A.H. Bell. London: G. Bell & Sons Ltd.

de Morais e Sousa, Luiz. 1924. *A Sciencia Nautica dos Pilotos Portugueses nos Seculos XV e XVI*, 2 vols. Lisbon: Imprenta Nacional.

de Pizan, Christine. 1940. *Le Livre des fais et bonnes meurs du sage roy Charles V*, vol. 2. Ed. S. Solente. Paris: Champion.

de Quincey, Thomas. 1890. *The Collected Writings.* London: A & C Black.

de Sacro Bosco, Joannes. 1949. *The Sphere of Sacrobosco and Its Commentators.* Ed. Lynn Thorndike. Chicago: The University of Chicago Press.

de Souza e Silva, Adriana, and Daniel M. Sutko. 2009. *Digital Cityscapes: Merging Digital and Urban Playspace*s. New York: Peter Lang.

de Vries, Hnet and Samuel Weber, ed. 2001. *Religion and Media.* Stanford: Stanford University Press.

de Waal, M., 2012. "The Ideas and Ideals in Urban Media Theory." In ed. Foth, Marcus, Laura Forlano, Christine Satchell, and Martin Gibbs. *From Social Butterfly to Engaged Citizen: Urban Informatics, Social Media, Ubiquitous Computing, and Mobile Technology to Support Citizen Engagement*. Cambridge, MA: MIT Press.

Dee, John. 1570. *The Mathematicall Praeface to Elements of Geometrie of Euclid of Megara*. London.

Deleuze, Gilles. 1988. *Foucault*. Trans. Séan Hand. London: The Athlone Press.

Deleuze, Gilles. 1994. *Difference and Repetition*. Trans. Paul Patton. New York: Columbia University Press.

Deleuze, Gilles. 1995. "Postscript on Control Societies." In *Negotiations: 1972–1990*. Trans. Martin Joughin. New York: Columbia University Press.

Derrida, Jacques. 1998. "Faith and Knowledge: The Two Sources of 'Religion' at the Limits of Reason Alone." In *Religion*, ed. Jacques Derrida and Gianni Vattimo, 1-79. Stanford: Stanford University Press.

Devereux, Paul and Ian Thomson. 1979. *The Ley Hunter's Companion*. London: Thames and Hudson.

Dicken, Peter. 2000. "A New Geo-economy." In *The Global Transformations Reader: An Introduction to the Globalization Debate*, ed. David Held and Anthony McGrew, 303-310. Cambridge, UK: Polity.

Dixon, Thomas, Geoffrey Cantor, and Stephen Pumfrey, ed. 2010. *Science and Religion: New Historical Perspectives*. Cambridge, UK: Cambridge University Press.

Dodge, Martin and Rob Kitchin. 2005. "Code and the Transduction of Space." *Annals of the Association of American Geographers* 95(1): 162-180.

Dodge, Martin and Rob Kitchin. 2007. "'Outlines of a World Coming into Existence': Pervasive Computing and the Ethics of Forgetting." *Environment and Planning B: Planning and Design* 34(3): 431-445.

Dohrn-van Rossum, Gerhard. 1996. *History of the Hour: Clocks and Modern Temporal Orders*. Trans. Thomas Dunlap. Chicago: University of Chicago Press.

During, Simon. 2002. *Modern Enchantments: The Cultural and Secular Power of Magic*. Cambridge, MA: Harvard University Press.

Durkheim, Émile. 2001. *The Elementary Forms of Religious Life*. Trans. Carol Cosman. Oxford: Oxford University Press.

Dutton, Benjamin. 1934. *Navigation and Nautical Astronomy*, 5th edition. Annapolis: US Naval Institute.

Elias, Norbert. 1968. *The Civilizing Process: The History of Manners*. Trans. Edmund Jephcott. New York: Urizen.

Eliade, Mircea. 1959. *The Sacred and the Profane: The Nature of Religion*. Trans. W.R. Trask. New York: Harcourt Brace.

Ellis, Arthur J. 1917. *The Divining Rod: A History of Water Witching*. United States Geological Survey, Water-Supply Paper 416.

Ellul, Jacques. 1964. *The Technological Society*. Trans. John Wilkinson. New York: Vintage Books.

Emerson, Ralph Waldo. 2009. *Essays: First Series*. Waiheke Island, NZ: Floating Press.

Empson, William. 1951. *The Structure of Complex Words*. Cambridge: Harvard University Press.

Engelke, Matthew. 2010. "Religion and the Media Turn: A Review Essay." *American Ethnologist* 37(2): 371-79.

Ernst, Wolfgang. 2005. "Let There Be Irony: Cultural History and Media Archaeology in Parallel Lines." *Art History* 28: 582-603.

Evans, James. 1998. *The History and Practice of Ancient Astronomy*. Oxford: Oxford University Press.

Faraday, Michael. 1852, July 31. "New Series." *Chambers's Edinburgh Journal* 18(448): 79.

Farman, Jason. 2012. *Mobile Interface Theory: Embodied Space and Locative Media*. New York: Routledge.

Fernández-Armesto, Felipe. 2006. *Pathfinders: A Global History of Exploration*. New York: W.W. Norton & Company, Inc.

Fletcher, Angus. 1964. *Allegory: Theory of a Symbolic Mode*. Ithaca, NY: Cornell University Press.

Focard, Jacques. 1556. *Paraphrase de l'astrolabe.* Lyons.

Foucault, Michel. 1970. *The Order of Things: An Archaeology of the Human Sciences*. New York: Vintage Books.

Foucault, Michel. 1972. *The Archaeology of Knowledge and The Discourse on Language*. Trans. A.M. Sheridan Smith New York: Pantheon Books.

Foucault, Michel. 1973. *The Birth of the Clinic: An Archaeology of Medical Perception*. Trans. A. M. Sheridan Smith. New York: Vintage Books.

Foucault, Michel. 1977. *Discipline and Punish: The Birth of the Prison*. Trans. Alan Sheridan. New York: Vintage Books.

Foucault, Michel. 1980. Power/Knowledge: Selected Interviews & Other Writings, 1972-1977. Ed. Colin Gordon. New York: Pantheon Books.

Foucault, Michel. 2007. *Space, Knowledge and Power: Foucault and Geography*. Ed. Jeremy W. Crampton and Stuart Elden. Burlington, VT: Ashgate Publishing.

Frank, Adam. 2012, March 6. "Dark Matter, Dark Energy and the Shadow Universe" on *National Public Radio*'s "Cosmos and Culture" (13.7). http://www.npr.org/blogs/13.7/2012/03/06/148039168/dark-matter-dark-energy-and-the-shadow-universe (accessed March 2, 2013).

Freud, Sigmund. 1930. *Civilization and Its Discontents.* Trans. Joan Riviere. New York: Norton.

Fromm, Erich. 1961. *Marx's Concept of Man*. New York: Frederick Ungar Publishing.

Fusoris, Jean. 1412. *Composition et usage de l'astrolabe*. Paris.

Galloway, Alexander R. 2012. *The Interface Effect*. Malden, MA: Polity Press.

Galloway, Alexander R. and Eugene Thacker. 2007. *The Exploit: A Theory of Networks*. Minneapolis, MN: University of Minnesota Press.

Gandz, Solomon. 1970. *Studies in Hebrew Astronomy and Mathematics.* New York: Ktav Publishing House.

Gelernter, David. 1991. *Mirror Worlds: or the Day Software Puts the Universe in a Shoebox... How it Will Happen and What it Will Mean*. New York: Oxford University Press.

Gibbs, Sharon L. and George Saliba. 1984. *Planispheric Astrolabes from the National Museum of American History*. Washington, D.C.: Smithsonian Studies in History and Technology.

Gibson, William. 1984. *Neuromancer*. New York: Ace Books.

Gibson, William. 2007. *Spook Country*. New York: G.P. Putnam Son's.

Gideon, Siegfried. 1969. *Mechanization Takes Command*: *A Contribution to Anonymous History*. New York: WW Norton and Co.

Gilbert, William. 1893. *William Gilbert of Colchester, physician of London*. Trans. Paul Fleury Mottelay and Edward Wright. New York: John Wiley & Sons.

Gilbert, William. 1958. *De Magnete*. Trans. P. Fleury Mottelay. New York: Dover Publications.

Gitelman, Lisa. 2006. *Always Already New: Media, History, and the Data of Culture*. Cambridge: MIT Press.

Goodman, David and Colin Chant, ed. 1999. *The European Cities and Technology Reader: Industrial to Post-Industrial City*. London: Routledge.

Gordon, Eric and Adriana de Souza e Silva. 2011. *Net Locality: Why Location Matters in a Networked World*. Chichester: Wiley-Blackwell.

Graham, Stephen. 1998. "The End of Geography or the Explosion of Place? Conceptualizing Space, Place and Information Technology." *Progress in Human Geography* 22(2):165-185.

Graham, Stephen. 2003. "Excavating the Material Geographies of Cybercities." In *The Cybercities Reader,* ed. Stephen Graham, 138-142. London: Routledge.

Graham, Stephen and Simon Marvin. 2001. *Splintering Urbanism: Networked Infrastructures, Technological Mobilities and the Urban Condition*. London: Routledge.

Grant, Edward, ed. 1974. *A Source Book in Medieval Science*. Cambridge, MA: Harvard University Press.

Gregory, Derek. 1994. *Geographical Imaginations*. Cambridge, MA: Blackwell Publishers.

Gregory, John, ed. 1991. "Extracts from the Mysteries of Egypt." In *The Neoplatonists.* London: Kyle Cathie.

Greenfield, Adam and Mark Shepard. 2007. *Urban Computing and Its Discontents*. The Architectural League of New York Situated Technologies Pamplets 1. New York: The Architectural League of New York.

Gunning, Tom. 1995. “Phantom Images and Modern Manifestations: Spirit Photography, Magic Theater, Trick Films, and Photography’s Uncanny.” In *Fugitive Images: From Photography to Video*, ed. Patrice Petro, 42-71. Bloomington, IN: Indiana University Press.

Gunther, Robert Theodore. 1927. “The astrolabe: Its uses and derivatives” *Scottish Geographical Magazine* 43(3): 135-147.

Gunther, Robert Theodore. 1932. *The Astrolabes of the World.* London: Holland Press.

Gurney, Alan. 2004. *Compass: A Story of Exploration and Innovation*. New York: W.W. Norton & Co.

Guye, Samuel and Henri Michel. 1971. *Time and Space: Measuring Instruments from the Fifteenth to the Nineteenth Century*. New York: Praeger.

Habermas, Jürgen. 1984. *The Theory of Communicative Action*. Trans. Thomas McCarthy. Boston: Beacon Press.

Hale, Edward E., ed. 1888. *The Arabian Nights: A Selection of Stories*. Boston, MA: Ginn and Company.

Hansen, Mark B.N. 2004. *New Philosophy for New Media*. Cambridge, MA: MIT Press.

Harmon, Katherine. 2004. *You Are Here: Personal Geographies and Other Maps of the Imagination*. Princeton, NJ: Princeton Architectural Press.

Harvey, David. 1990. *The Condition of Postmodernity*. Cambridge: Blackwell.

Hayles, N. Katherine. 1999. *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics*. Chicago: University of Chicago Press.

Heelas, Paul. 1996. *The New Age Movement: The Celebration of the Self and the Sacralisation of Modernity.* Oxford: Blackwell.

Heiberg, J. L., ed. 1903. “The Almagest.” In *Claudii Ptolemaei opera quae exstant omnia*. Lipsiae: Teubner.

Heidegger, Martin. 1977. *The Questions Concerning Technology and Other Essays*. Trans. William Lovitt. New York: Harper and Row.

Heim, Michael. 1993. *The Metaphysics of Virtual Reality.* Oxford: Oxford University Press.

Hemment, Drew. 2006. "Locative Media." *Leonardo Electronic Almanac* 14(3): http://www.leoalmanac.org/wp-content/uploads/2012/07/Guest-Editorial-by-Drew-Hemment-Leonardo-Electronic-Almanac.pdf (accessed March 2, 2013).

Henderson, Linda Dalrymple. 1983. *The Fourth Dimension and Non-Euclidean Geometry in Modern Art*. Princeton, NJ: Princeton University Press.

Herodotus. 2008. *An Account of Egypt*. Trans. G.C. Macaulay. Rockville, MD: ArcManor.

Hetherington, Kevin. 2001. "Phantasmagoria/Phantasm Agora: Materialities, Spatialities and Ghosts." *Space and Culture* 11/12: 24-41.

Hillis, Ken. 1999. *Digital Sensations: Space, Identity, and Embodiment in Virtual Reality*. Minneapolis, MN: University of Minnesota Press.

Hillis, Ken. 2009. *Online a Lot of the Time: Ritual, Fetish, Sign*. Durham, NC: Duke University Press.

Hillis, Ken, Michael Petit, and Kylie Jarrett. 2013. *Google and the Culture of Search*. New York: Routledge.

Holmes, Brian. 2004. "Drifting Through the Grid: Psychogeography and Imperial Infrastructure." http://www.springerin.at/dyn/heft_text.php?textid=1523&lang=en (accessed March 2, 2013).

Horkheimer, Max and Theodor W. Adorno. 1972. *Dialectic of Enlightenment*. New York: Herder and Herder.

Horsmanheimo, Seppo, Henryka Jormakka, and Jaakko Lähteenmäki. 2004. "Location-aided Planning in Mobile Network: Trial Results." *Wireless Personal Communications* 30(2-4): 207-216.

Howells, Harvey. 1979. *Dowsing for Everyone: Adventures and Instruction in the Art of Modern Dowsing*. Brattleboro, Vermont: The Stephen Greene Press.

Huhtamo, Erkki. 2011. "Dismantling the Fairy Engine: Media Archaeology as Topos Study." In *Media Archaeology: Approaches, Applications, and Implications*, ed. Erkki Huhtamo and Jussi Parikka, 27-48. Berkeley, CA: University of California Press.

Huhtamo, Erkki and Jussi Parikka, ed. 2011. *Media Archaeology: Approaches, Applications, and Implications*. Berkeley, CA: University of California Press.

Impey, Oliver and Arthur MacGregor, ed. 1985. *The Origins of Museums: The Cabinet of Curiosities in Sixteenth- and Seventeenth-Century Europe*. Oxford: House of Stratus Ltd.

Ingersoll, Alex M. 2011. "The Shadow of the Tourist and the Lines of Desire in the Digital City." *Media Fields Journal* 2: 1-11.

Innis, Harold. 1951. *The Bias of Communication*. Toronto: Toronto University Press.

Innis, Harold. 2007. *Empire and Communications*. Lanham, MD: Rowman & Littlefield Publishers.

Jacobs, Karrie. 1990. "Design for the Unreal World." *Metropolis* 10.

James, William. 1908. *Pragmatism.* New York: Longmans, Green and Co.

James, William. 1967. *Essays in Radical Empiricism and A Pluralistic Universe.* Glouster, MA: Peter Smith.

James, William. 1983. "The Hidden Self." In *Essays in Psychology,* vol. 13. Ed. Frederick H. Burkhardt, Fredson Bowers, and Ignas K. Skrupskelis. Cambridge, MA: Harvard University Press.

James, Roger Clarke and Glenn James. 1992. *Mathematics Dictionary,* 5th ed. New York, NY: Chapman and Hall.

Jonkers, A.R.T. 2003. *Earth's Magnetism in the Age of Sail*. Baltimore, MD: The John Hopkins University Press.

Joy, Eileen, Anna Klosowska, Nicola Masciandaro, and Michael O'Rourke, ed. 2013. *Speculative Medievalisms: Discography*. Punctum Books: Brooklyn, NY.

Kabisch, Eric. 2008. "Datascape: A Synthesis of Digital and Embodied Worlds." *Space and Culture* 11(3): 222-338.

Kalnins, Karlis. 2004. "Locative is a case not a place." *[Locative] Listserv.* http://web.archive.org/web/20050907080544/http://db.x-i.net/locative/2004/000385.html (accessed March 2, 2013).

Kant Immanuel. 1951. *Critique of Judgement.* Trans. J.H. Bernard. New York: Hafner Press.

Kant, Immanuel. 1978. *The Critique of Judgement.* Trans. James C. Meredith. Oxford: Oxford University Press.

Keary, C.F. 1882. *Outlines of Primitive Belief Among the Indo-European Races*. New York: C. Scribner's Sons.

Keen, Jeffrey. 2005. *Consciousness, Intent, and the Structure of the Universe*. Victoria, BC: Trafford Publishing.

Kelly, Kevin. 1994. *Out of Control: The Rise of Neo-Biological Civilization*. Reading, MA: Addison-Wesley.

Kindberg, T., Chalmers, M. and Paulos, E. 2007. "Guest Editors' Introduction: Urban Computing." *IEEE Pervasive Computing* 6(3):18-20.

King, Kevin F. 2010. "Geolocation and Federalism on the Internet: Cutting Internet Gambling's Gordian Knot." *The Columbia Science and Technology Law Review* XI:41-75.

Kirkham, Francis W. 1967. *A New Witness for Christ in America: The Book of Mormon (Volume 1 & Volume 2)*. Provo, Utah: Brigham Young University Press.

Kittler, Friedrich A. 1990. *Discourse Networks 1800/1900*. Trans. Michael Metteer and Chris Cullins. Stanford: Stanford University Press.

Kittler, Friedrich A. 1999. *Gramophone, Film, Typewriter.* Trans. Geoffrey Winthrop-Young and Michael Wutz. Stanford, CA: Stanford University Press.

Klein, Jacobus. 1658. *An Virgula Mercurialis agat ex Occulta Qualitate*. Dissertation, Wittenberg.

Kluitenberg, Eric. 2011. "On the Archaeology of Imaginary Media." In *Media Archaeology: Approaches, Applications, and Implications*, ed. Erkki Huhtamo and Jussi Parika, 48-70. Berkeley, CA: University of California Press.

Köbel, Jacob. 1535, *Astrolabii declaratio, eiusdemque usus mire jucundus, non modo astrogis, medicis, geographis.* Mainz.

Koyré, Alexandre. 1957. *From the Closed World to the Infinite Universe*. Baltimore, MD: Johns Hopkins University Press.

Krebs, Robert E. and Carolyn A. Krebs. 2003. *Groundbreaking Scientific Experiments, Inventions and Discoveries of the Ancient World*. Westport, CT: Greenwood Press.

Kreutz, Barbara. 1973. "Mediterranean Contributions to the Medieval Mariner's Compass." *Technology and Culture* 14(3): 367-383.

Kunitzsch, Paul. 1981. "On the Authenticity of the Treatise on the Composition and Use of the Astrolabe Ascribed to Messahalla." *Archives internationales d'histoire de sciences* 31: 42-62.

Kurgan, Laura. 1995. "You Are Here: Information Drift." *Assemblage* 25: 15-43.

Kurzweil, Ray. 1999. *The Age of Spiritual Machines: When Computers Exceed Human Intelligence*. New York: Penguin Books.

Latham, Ronald, ed. 1972. *The Travels of Marco Polo*. Harmondsworth, Penguin Books.

Latour, Bruno. 1993. *We Have Never Been Modern*. Trans. Catherine Porter. Cambridge, MA: Harvard University Press.

Latour, Bruno. 2010. *On the Modern Cult of the Factish Gods*. Durham, NC: Duke University Press.

Leary, Timothy. 1994. *Chaos and Cyberculture*. Ed. Michael Horowitz. Berkeley, CA: Ronin Publishing, Inc.

Lefebvre, Henri. 1991. *The Production of Space*. Trans. Donald Nicholson-Smith. Malden, MA: Blackwell Publishing.

Lévy, Pierre. 1997. *Collective Intelligence*. Trans. Robert Bononno. New York: Plenum.

Levy, Steven. 1994. *Hackers: Heroes of the Computer Revolution*. New York: Penguin Books.

Lewis, C.S. 1938. *The Allegory of Love: A Study in Medieval Tradition*. Oxford: Oxford University Press.

Lewis, C.S. 1964. *The Discarded Image: An Introduction to Medieval and Renaissance Literature*. Cambridge: Cambridge University Press.

Lightman, Alan, Daniel Sarewitz, and Christina Desser. 2003. *Living With the Genie: Essays on Technology and the Quest for Human Mastery*. Washington: Island Press.

Locke, John. 1691. *Some considerations of the consequences of the lowering of Interest*. London: Awnsam & John Churchill.

Lorch, Richard. 2005. *Al-Farghānī On the Astrolabe*. Wiesbaden, Germany: Franz Steiner Verlag.

Lovecraft, H.P. 1968. "Letter from Lovecraft to Farnsworth Wright, 5 July 1927." In *Selected Letters II, 1925-1929*, ed. August Derleth and Donald Wandrei. Sauk City: Arkham House.

Lovecraft, H.P. 2005. *Tales*. New York: The Library of America.

Lovink, Geert. 2003. *My First Recession: Critical Internet Culture in Transition.* Rotterdam: V_2 Publishing/NAI Publishers.

Lyotard, Jean-Francois. 1991. *Lessons on the Analytic of the Sublime*. Stanford: Stanford University Press.

MacKenzie, Donald and Judy Wajcman, ed. 1985. *The Social Shaping of Technology*. Milton Keynes: Open University.

Mager, Henri. 1934. *Water Diviners and Their Methods*. Trans. A.H. Bell. London: G. Bell & Sons Ltd.

Mahdi, Muhsin. 1984. *The Thousand and one nights (Alf layla wa-layla) from the earliest known sources. Arabic text edited with introduction and notes,* vol 1. Leiden: Brill Publishers.

Mannheim, Karl. 1971. *From Karl Mannheim*. Ed. Kurt H. Wolff. Oxford: Oxford University Press.

Manovich, Lev. 2006. "The Poetics of Urban Media Surfaces." *First Monday Special Issue 4*. http://firstmonday.org/htbin/cgiwrap/bin/ojs/index.php/fm/article/view/1545/1460 (accessed March 1, 2013).

Marcel, Gabriel. 1965. *Being and Having: An Existentialist Diary.* New York: Harper and Row, Harper Torchbooks.

Marcuse, Herbert. 1964. *One-Dimensional Man*. Boston: Beacon Press.

Marlowe, Christopher. 2008. *Doctor Faustus and Other Plays.* Ed. David Bevington and Eric Rasmussen. Oxford: Oxford University Press.

Martin, David. 1978. *A General Theory of Secularization*. Oxford: Blackwell.

Marvin, Carolyn. 1988. *When Old Technologies Were New: Thinking About Electric Communication in the Late Nineteenth Century*. New York: Oxford University Press.

Marx, Karl. 1988. *The Communist Manifesto.* Ed. Frederic L. Bender. New York: W.W. Norton & Company.

Marx, Leo. 1964. *The Machine in the Garden: Technology and the Pastoral Ideal in America*. New York: Oxford University Press.

Massey, Doreen. 2005. *For Space.* Los Angeles: Sage.

Mayer, Leo Ary. 1956. *Islamic Astrolabists and Their Works*. Geneva: Albert Kundig.

Maxwell, James Clerk. 1904. *A Treatise on Electricity and Magnetism*. New York: Dover Publications.

McCarthy, Anna. 2001. *Ambient Television: Visual Culture and Public Space*. Durham, NC: Duke University Press.

McCredie J.R. 1992. *Samothrace VII, The Rotunda of Arsinoe*. Princeton, NJ: Princeton University Press.

McCullough, Malcolm. 2006. On the Urbanism of Locative Media. *Places* 18(2): 26–29.

McGarrigle, Conor. 2010. "The Construction of Locative Situations: Locative Media and the Situationist International, Recuperation or Redux?" *Digital Creativity* 21(1): 55-62.

McLuhan, Marshall. 1962. *Gutenberg Galaxy.* Toronto: University of Toronto Press.

McLuhan, Marshall. 2003. *Understanding Media: The Extensions of Man*. Ed. W. Terrence Gordon. Corte Madera, California: Ginko Press.

Meillassoux, Quentin. 2010. *After Finitude: An Essay on the Necessity of Contingency*. New York: Continuum.

Meliteniote, Theodore. 1990. *Tribiblos Astronomique, Livre I*. Ed. and trans. Regine Leurquin. Amsterdam: Gieben.

Metcalf, Samuel L. 1833. *A New Theory of Terrestrial Magnetism*. New York: G&C&H Carvill.

Metzger, Therese, and Mendel Metzger. 1982. *Jewish Life in the Middle Ages: Illuminated Hebrew Manuscripts of the Thirteenth to the Sixteenth Centuries*. New York: Alpine Fine Arts Collection.

Meyer, Birgit and Peter Pels, ed. 2003. *Magic and Modernity: Interfaces of Revelation and Concealment*. Stanford: Stanford University Press.

Meyrowitz, Joshua. 1985. *No Sense of Place: The Impact of Electronic Media on Social Behavior*. New York: Oxford University Press.

Milgram, Paul and Fumio Kishno. 1994. "A Taxonomy of Mixed Reality Visual Displays." *IEICE (Institute of Electronics, Information and Communication Engineers) Transactions on Information and Systems*, Special Issue on Networked Reality, E77D (12): 1321-1329.

Milgram, Paul, Haruo Takemura, Akira Utsumi and Fumio Kishino. 1994. "Augmented Reality: A Class of Displays on the Reality-Virtuality Continuum." *Proceedings of Telemanipulator and Telepresence Technologies SPIE* 2351: 282-292.

Miller, Arthur I. 2002. "Erotica, Aesthetics and Schrödinger's Wave Equation." In *It Must Be Beautiful: Great Equations of Modern Science*, ed. Graham Farmelo, 110-131. London: Granta.

Miller, J. Hillis. 1981. "The Two Allegories." In *Allegory, Myth, and Symbol*. Ed. Morton W. Bloomfield. Cambridge, MA: Harvard University Press.

Mitchell, William J. 1995. *City of Bits*. Cambridge: MIT Press.

Monmonier, Mark. 1996. *How to Lie with Maps*. Chicago: The University of Chicago Press.

Mosco, Vincent. 2004. *The Digital Sublime: Myth, Power, and Cyberspace*. Cambridge: MIT Press.

Motzo, Bacchisio. 1947. *Il Compasso da navigare*. Cagliari: University of Cagliari.

Mowlabocus, Sharif. 2010. *Gaydar Culture: Gay Men, Technology and Embodiment in the Digital Age*. Surrey, UK: Ashgate.

Muller, Friedrich. 1878. *Lectures on the Origin and Growth of Religion.* London: Longmans, Green.

Mumford, Lewis. 1934. *Technics and Civilization.* New York: Harcourt Brace.

Nelson, Victoria. 2001. *The Secret Life of Puppets*. Cambridge: Harvard University Press.

Neeham, Joseph and Colin A. Ronan. 1986. *The Shorter Science and Civilisation in China*, vol 3. Cambridge: Cambridge University Press.

Neugebauer, Otto. 1949. "The Early History of the Astrolabe." *Isis* 40: 240-56.

Noble, David F. 1997. *The Religion of Technology: The Divinity of Man and the Spirit of Invention*. New York: Alfred A. Knopf.

Nolan, Stuart. 2006. "Building Magical Realms: Responses to Pervasive and Locative Media Technology." *Digital Creativity* 17(3): 185-192.

North, J.D. 1988. *Chaucer's Universe.* Oxford: Clarendon Press.

Novak, Marcos. 1991. "Liquid Architectures in Cyberspace." In *Cyberspace: First Steps,* ed. Michael Benedikt. Cambridge, MA: MIT Press.

Nye, David E. 1994. *American Technological Sublime*. Cambridge: MIT Press.

O'Riordan, Kate. 2005. "From Usenet to Gaydar: A Comment on Queer Online Community*." ACM SIGGROUP Bulletin* 25(2): 28-32.

Overbye, Dennis. 2010, November 17. "A Costly Quest for the Dark Heart of the Cosmos." *The New York Times*, A1.

Packer, Jeremy. 2008. *Mobility Without Mayhem: Safety, Cars, and Citizenship*. Durham, NC: Duke University Press.

Parikka, Jussi. 2012. *What is Media Archaeology?* Malden, MA: Polity Press.

Partridge, Christopher Hugh. 2005. *The Re-enchantment of the West: Alternative Spiritualities, Sacralization, Popular Culture and Occulture*, vol 1. London: Continuum Press.

Pascal, Blaise. 2008. *Pensées*. London: The Echo Library.

Pennick, Nigel and Paul Devereux. 1989. *Lines on the Landscape: Leys and Other Linear Enigmas*. London: Robert Hale.

Peoples, Scott. 1998. *Edgar Allan Poe Revisited*. Woodbridge, CT: Twayne Publishers.

Perkins, Maurice. 2001. *The Reform of Time: Magic and Modernity*. London: Pluto Press.

Peters, Edward. 1978. *The Magician, the Witch, and the Law*. Philadelphia: University of Pennsylvania Press.

Peters, John Durham. 1999. *Speaking into the Air: A History of the Idea of Communication*. Chicago: The University of Chicago Press.

Philoponus, John. (1932). "Concerning the using and arrangement of the astrolabe and the things engraved upon it." In *The Astrolabes of the World,* ed. Robert Theodore Gunther, 61-81. Trans. H.W. Green. London: Holland Press.

Pinder, David. 2005. "Arts of Urban Exploration." *Cultural Geographies* 12(4): 383–411.

Plato. 1995. *Symposium and Phaedrus*. Rrans. Benjamin Jowett. Mineola, NY: Dover, 1995.

Plattes, Gabriel. 1639. *A Discovery of Subterraneall Treasure*. London.

Plotinus. 1956. "Porphyry's Life of Plotinus." In *The Enneads*. Trans. Stephen Mackenna. London: Faber and Faber.

Poe, Edgar Allan. 2006. *The Complete Tales and Poems of Edgar Allan Poe*. New York: Barnes and Noble.

Poulle, Emmanuel. 1954. "L'Astrolabe medieval." *Bibliotheque de l'ecole des Chartes* 112.

Powell, Corey S. 2002. *God in the Equation: How Einstein Transformed Religion*. New York: Free Press.

Rampley, Matthew. 1999. "Archives of Memory: Walter Benjamin's Arcades Project and Aby Warburg's Mnemosyne Atlas." In *The optic of Walter Benjamin*, ed. Alex Coles, 94-119. London: Black Dog.

Rancière, Jacques. 2001. "Ten Theses on Politics." *Theory and Event* 5(3): np.

Rancière, Jacques. 2003. “Comments and Responses.” *Theory and Event* 6(4): np.

Raymond, R.W. 1883. *The Divining Rod*. American Institute of Mining Engineers, vol 11. Pp. 610-626.

Reid, Josephine, Richard Hull, Kirsten Cater, and Constance Fleuriot. 2005a. “Magic Moments in Situated Mediascapes.” *Proceedings of the 2005 ACM SIGCHI International Conference on Advances in computer entertainment technology*: 290-293.

Reid, Josephine, Kirsten Cater, Constance Fleuriot, and Richard Hull. 2005b. “Experience Design Guidelines for Creating Situated Mediascapes.” *HP Laboratories Bristol*. http://www.cs.bris.ac.uk/Publications/Papers/2000510.pdf (accessed March 2, 2013).

Rescher, Nicholas. 1980. *Unpopular Essays on Technological Progress*. Pittsburgh: University of Pittsburgh Press.

Rheingold, Howard. 2002. *Smart Mobs: The Next Social Revolution*. Cambridge, MA: Perseus Publishing.

Rogers, Yvonne. 2006. “Moving On From Weiser’s Vision of Calm Computing: Engaging UbiComp Experiences.” In *Ubicomp 2006 Proceedings*, ed. Paul Dourish and Adrian Friday, 404-421. Berlin: Springer-Verlag.

Rogoff, Irit. 2000. *Terra Infirma: Geography’s Visual Culture***.** New York: Routledge.

Roller, Duane Henery DuBose. 1959. *The “De Magnete” of William Gilbert.* Amsterdam: Hertzberger.

Romanyshyn, Robert. 1989. *Technology as Symptom and Dream*. New York: Routledge.

Runcorn, Stanley Keith. 1958, 15 May. “Theories of the Earth’s magnetic field.” *The New Scientist* 3(78)*:* 19-22.

Rushkoff, Douglas. 1994. *Cyberia: Life in the Trenches of Hyperspace*. San Francisco: Harper.

Russell, Ben. 1999. *Headmap Manifesto*. http://technoccult.zippykidcdn.com/wp-content/uploads/library/headmap-manifesto.pdf (accessed March 2, 2013).

Schivelbusch, Wolfgang. 1988. *Disenchanted Night: Industrialization of Light in the Nineteenth Century*. Berkeley, CA: University of California Press.

Sconce, Jeffrey. 2000. *Haunted Media: Electronic Presence from Telegraphy to Television*. Durham: Duke University Press.

Scott, Sir Walter. 1829. "Anne of Geierstein, or, The Maiden of the Mist." In *The Waverley Novels*, vol. 11. London: A. & C. Black.

Shannon, Claude E. and Warren Weaver. 1949. *The Mathematical Theory of Communication*. Urbana, IL: University of Illinois Press.

Shelley, Mary. 1995. *Frankenstein Or, The Modern Prometheus*. New York: Smithmark Publishers.

Sherman, Barrie and Phillip Judkins. 1992. *Glimpses of Heaven, Visions of Hell: Virtual Reality and its Implications*. London: Hodder & Stoughton.

Simondon, Gilbert. 2011. "One the Mode of Existence of Technical Objects." Trans. Ninian Mellamphy, Dan Mellamphy, and Nandita Biswas Mellamphy. *Deleuze Studies* 5(3): 407–424.

Skelton, R.A., Thomas E. Marston, and George D. Painter. 1965. *The Vinland Map and the Tartar Relation*. New Haven: Yale University Press.

Sloterdijk, Peter. 2011. *Bubbles: Spheres I*. Los Angeles: Semiotext(e).

Soja, Edward M. 1989. *Postmodern Geographies: The Reassertion of Space in Critical Social Theory*. London: Verso.

Smite Rasa. 2003. "Welcome to LOCATIVE MEDIA list." *[Locative] Listserv.* web.archive.org/web/20050219122612/db.x-i.net/locative/2003.txt (accessed March 2, 2013).

Smith, Julian A. 1992. "Precursors to Peregrinus: The Early History of Magnetism and the Mariner's Compass in Europe." *Journal of Medieval History* 18: 21-74.

Smith, Richard G. 1997. "The End of Geography and Radical Politics in Baudrillard's Philosophy." *Environment and Planning D: Society and Space* 15(3): 305-320.

Soares, T. Sousa, ed. 1978. *Crónica dos feitos notáveis que se passaram na conquista de Guiné*. Lisbon: Academia Portuguesa da História.

Spigel, Lynn. 1992. *Make Room for TV: Television and the Family Ideal in Postwar America*. Chicago: The University of Chicago Press.

Spinney, Jonathan E. 2003. "Mobile Positioning and LBS Applications." *Geography* 88(4): 256-265.

Stark, Rodney. 1999. "Secularization, R.I.P." *Sociology of Religion* 60(3): 249-73.

Steinschneider, Moritz. 1857. *Jewish Literature from the Eighth to the Eighteenth Century.* London: Longman, Brown, Green, Longmans, and Roberts.

Sterne, Jonathan. 2003. *The Audible Past: Cultural Origins of Sound Reproduction*. Durham, NC: Duke University Press.

Stiegler, Bernard. 2009. *Technics and Time, 2: Disorientation*. Trans. Stephen Barker. Stanford: Stanford University Press.

Stenger, Nicole. 1992. "Mind is a Leaking Rainbow." In *Cyberspace: First Steps*, ed. Michael Bennedict. Cambridge: MIT Press.

Still, Alfred. 1946. *Soul of Lodestone: The Background of Magnetical Science*. New York: Murray Hill Books.

Stimson, Alan. 1988. *The Mariner's Astrolabe: A Survey of Known, Surviving Sea Astrolabes.* Utrecht: Hes Publishers.

Stöffler, Johann. 1513. *Elucidatio fabricae ususque astrolabii.* Oppenheim.

Stolow, Jeremy, ed. 2013. *Deus in Machina: Religion, Technology, and the Things in Between*. Fordham, NY: Fordham University Press.

Styers, Randall. 2004. *Making Magic: Religion, Magic, and Science in the Modern World*. Oxford: Oxford University Press.

Tarkka, Minna. 2005. "Labours of Location: Acting in the Pervasive Media Space." *Diffusion*. http://diffusion.org.uk/?p=105 (accessed March 2, 2013).

Tarr, Joel A. and Gabriel Dupuy. 1988. *Technology and the Rise of the Networked City in Europe and America*. Philadelphia: Temple University Press.

Taylor, Charles. 2007. *A Secular Age*. Cambridge: The Belknap Press of Harvard University Press.

Taylor, E.G.R. 1957. *The Haven-Finding Art: A History of Navigation from Odysseus to Captain Cook*. New York: American Elsevier Publishing Co.

Thacker, Eugene. 2011. *In the Dust of this Planet: Horror of Philosophy vol. 1*. Alresford, UK: Zero Books.

Thielmann, Tristan. 2010. "Locative Media and Mediated Localities: An Introduction to Media Geography." *Aether* 5(A): 1-17.

Thomas, Keith. 1971. *Religion and the Decline of Magic*. London: Weidenfeld & Nicolson.

Thorndike, Lynn. 1953. *A History of Magic and Experimental Science*, vol. 5. New York: Columbia University Press.

Thorndike, Lynn. 1965. *Michael Scot*. London: Nelson.

Thrift, Nigel. 2008. *Non-Representational Theory: Space, Politics, Affect*. New York: Routledge.

Todorov, Tzvetan. 1975. *The Fantastic: A Structural Approach to a Literary Genre*. Trans. Richard Howard. Ithaca, NY: Cornell University.

Tolkien, J.R.R. 1966. "On Fairy-Stories." In *The Tolkien Reader,* 33-99. New York: Ballantine Books.

Tromp, Solco W. 1949. *Psychical Physics: A Scientific Analysis of Dowsing, Readiesthesia and Kindred Phenomena*. Elsevier: Houston.

Tuan, Yi-Fu. 1974. *Topophilia: A Study of Environmental Perception, Attitudes, and Values*. Prentice-Hall, Englewood Cliffs, NJ.

Tuan, Yi-Fu. 1977. *Space and Place: The Perspective of Experience*. Minneapolis, MN: University of Minnesota Press.

Turner, Anthony John. 1973. "Mathematical Instruments and the Education of Gentlemen." *Annals of Science* 30: 51-88.

Turner, Anthony John. 1985. *Astrolabes, Astrolabe Related Instruments*. Ed. Bruce Chandler. Rockford, IL: Time Museum.

Turner, Gerard L'E. and Elly Dekker. 1993. "An Astrolabe Attributed to Gerard Mercator, c. 1570." *Annals of Science* 50: 403-43.

Tuters, Marc and Kazy Varnelis. 2006. “Beyond Locative Media: Giving Shape to the Internet of Things.” *Leonardo* 39(4): 357-363.

Underwood, Guy. 1973. *The Pattern of the Past*. London: Abacus.

Underwood, Peter. 1980. *The Complete Book of Dowsing and Divining*. London: Rider & Company.

Van Sittert, Lance. 2004. “The Supernatural State: Water Divining and The Cape Underground Water Rush, 1891-1910.” *Journal of Social History* 37(4): 915-937.

Varela, Consuelo, ed. 1984. *Cristobal Colon: Cartas y documentos completos.* Madrid: Alianza.

Varnelis, Kazys. 2011, September. “The Rise and Fall of New Media in the Art World.” *Frieze Magazine* Issue 141: http://frieze.com/issue/article/down-the-line/ (accessed March 2, 2013).

Vesser, H. Aram, ed. 1989. *The New Historicism*. New York: Routledge.

Virilio, Paul. 1977. *Speed and Politics*: *An Essay on Dromology*. Trans. Marc Polizztti. Los Angeles: Semiotext(e).

Virilio, Paul. 1997. *Open Sky*. Trans. Julie Rose. London: Verso.

Vogt, Evon Z. and Hyman, Ray. 1959. *Water Witching Witching U.S.A: A New Look at the Ancient Art of Dowsing*. Chicago: The University of Chicago Press.

Warner, Marina. 2006. *Phantasmagoria: Spirit Visions, Metaphors, and Media into the Twenty-first Century.* Oxford: Oxford University Press.

Waters, David W. 1978. *The Art of Navigation in England in Elizabethan and Early Stuart Times.* London: National Maritime Museum.

Waters, David W. 1980. *Science and the Techniques of Navigation in the Renaissance*. London: National Maritime Museum.

Watts, Pauline Moffitt. 1982. *Nicolaus Cusanus: A Fifteenth-Century Vision of Man.* Leiden: Brill Publishers.

Weber, Max. 1981. *From Max Weber: Essays in Sociology*. Ed. H.H. Gerth and C. Wright Mills. Oxford: Oxford University Press.

Weiser, Mark. 1991. “The Computer for the 21st Century.” *Scientific American* 265(3): 94-104.

Weiser, Mark. 1995. “The Technologist’s Responsibilities and Social Change.” *Computer-Mediated Communication Magazine* 2(4): 17.

Wellman, Barry. 2002. “Little Boxes, Glocalization, and Networked Individualism.” In e.d Tanabe, Makoto, Peter van den Besselaar, Toru Ishida, 10-25, *Digital Cities II: Computational and Sociological Approaches*. Berlin: Springer-Verlang.

Wertheim, Margaret. 1999. *The Pearly Gates of Cyberspace: A History of Space from Dante to the Internet*. New York: W.W. Norton & Company.

Weschler, Lawrence. 1995. *Mr. Wilson’s Cabinet of Wonder: Pronged Ants, Horned Humans, Mice on Toast, and Other Marvels of Jurassic Technology*. New York: Pantheon Books.

Wetzel, Michael. 1989. “Von der Einbildungskraft zur Nachrichtentechnik: Vorüeberlegungen zu einer Archäologie der Medien.” In *Mediendämmerung: Zur Archäologie der Medien,* ed. Peter Klier and Jean-Luc Evard, 11-39. Berlin: Edition Tiamat.

Wiener, Norbert. 1950. *The Human Use of Human Beings: Cybernetics and Society*. Boston: Houghton Mifflin.

Wiener, Norbert. 1961. *Cybernetics: Or, Control and Communication in the Animal and the Machine*. Cambridge, MA: MIT Press.

White Jr., Lynn. 1978. *Medieval Religion and Technology: Collected Essays.* Berkeley: University of California Press.

Williams, David R. 1987. *Wilderness Lost: the Religious Origins of the American Mind*. Cranbury, NJ: Associated University Presses, Inc.

Willis, Katherine S. 2010. Hidden treasure: Sharing Local Information. *Aether*: *The Journal of Media Geography*: 50-62.

Wilson, Jim. 1998. “Dowsing Data Defy the Skeptics.” *Popular Mechanics* 176(12): 46.

Winner, Langdon. 1986. *The Whale and the Reactor: A Search for Limits in an Age of High*
Technology. Chicago: University of Chicago Press.

Witmore, Christopher L. 2004. “On Multiple Fields. Between the Material World and Media: Two Cases from the Peloponnesus, Greece.” *Archaeological Dialogues* 11(2): 133-164.

Witmore, Christopher L. 2006. “Vision, Media, Noise and the Percolation of Time: Symmetrical Approaches to the Mediation of the Material World.” *Journal Of Material Culture* 11(3): 267-292.

Yates, Frances A. 1964. *Giordano Bruno and the Hermetic Tradition*. Chicago: The University of Chicago Press.

Yates, Frances A. 1972. *The Rosicrucian Enlightenment.* London: Routledge.

Yates, Frances A. 1974. *The Art of Memory*. Chicago: The University of Chicago Press.

Zeffiro, Andrea. 2012. “Practice Makes Almost Perfect: A Methodological Reflection.” *Canadian Journal of Communication* 37: 179-187.

Zielinkski, Siegfried. 1996. “Media Archaeology.” *CTheory* ga111. http://www.ctheory.net/articles.aspx?id=42 (accessed March 2, 2013).

Zielinkski, Siegfried. 2006. *Deep Time of the Media: Toward an Archaeology of Seeing and Hearing by Technical Means*. Trans. Gloria Custance. Cambridge, MA: MIT Press.

Žižek, Slavoj. 1992. *Enjoy Your Symptom! Jacques Lacan In Hollywood and Out*. New York: Routledge.

Žižek, Slavoj. 2001. *On Belief.* New York: Routledge.