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Californians and their Earthquakes: Post-Earthquake Public Information Infrastructures

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Californians and their Earthquakes: Post-Earthquake Public Information Infrastructures

By

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Abstract

California and their Earthquakes:

Post-Earthquake Public Information Infrastructures

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This dissertation analyzes Californians' information infrastructure after three Bay Area earthquakes: 1868 Hayward Fault Earthquake, 1906 San Francisco Earthquake and Fire, and 1989 Loma Prieta Earthquake. I use qualitative and historical research approaches, focusing on documents produced by state and local governments, newspapers and letters by Californians. In my analysis, I employ the construct of "information infrastructure" from the field of Science and Technology Studies to describe the complex constellation of practices, technology and institutions that underpins the public sphere. Four themes help develop the idea of public information infrastructure: continuity, reach, informational authority and multiple infrastructures. First, major disruptions such as earthquakes challenge the continuity of public information infrastructure while making infrastructure visible. For example, after the 1906 earthquake and fire, refugees had to reassemble their social geography. Friends, loved ones, employers and employees all wanted to locate each other and notify others of their well-being. While the physical information infrastructure was destroyed, the ways that people worked and organized was not. Thus, with some work-arounds, information infrastructure within San Francisco was reassembled to working order. Second, I look at one of the qualities of information infrastructure that is considered fundamental – that of the reach of infrastructure across space. In 1868, the circulation of documents to far away audiences shaped the earthquake narrative locally. Third, I examine claims to informational authority. My dissertation begins in 1868, at a time when there were not shared scientific earthquake descriptors such as magnitude, when it took weeks for a newspaper to travel from San Francisco to New York, and when there was no professionalized class of "responders" or specialized government response. The Chamber of Commerce claimed the authority to explain the earthquake. The bureaucratization of disaster response and the rise of scientific explanations for earthquakes shaped infrastructure and information practices, such that by the 1989 earthquake government officials claimed the authority to

explain what had happened. The intertwining of science, the state, and infrastructure helped constitute and legitimize a new set of informational authorities, and provide a lens with which to design post-disaster information systems and policy today. Last, I argue that there is not just one information infrastructure, but multiple infrastructures supporting multiple publics. Alternate infrastructures supported Chinese people in 1906 and Spanish-speakers in 1989 when attempting to get aid or find loved ones. My research ties together how technology, media organizations, government institutions, and scientific explanations of earthquakes contribute to a sensemaking epistemology for Californians.

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I have a copy of "Sorting Things Out," that belonged to Peter Lyman. Inside Leigh Star had signed it with the inscription, "fellow traveler." Although I

never met her, I count Leigh Star as a guide; and although Peter was not around, I often considered his wisdom. Books by many scholars, most of whom I will never meet, inhabit the pages of this dissertation. Being in conversation with them gave me much energy when writing got a little lonely.

I'm so proud to count the all of the School of Information doctoral students as fellow travelers – they are a talented and impressive group. My senior colleagues, Vivien Petras, Yuri Takhteyev, Joe Hall, and Mahad Ibrahim were mentors in my first years. Josh Blumenstock, Christo Sims, Liz Goodman, Ashwin Mathew, and Daniela Rosner have provided important feedback on different stages of work. Elisa Oreglia has shown me how to be a patient colleague and a great researcher. I was lucky enough to be in a PhD cohort with Janaki Srinivasan, Dan Perkel and Ryan Shaw; I count them as friends and teachers. The classicists, my reading group, are the best intellectual companions that I can imagine.

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Introduction

On the morning of January 9, 1857, Fort Tejon, in sparsely populated Southern California, was near the epicenter of a 7.9 magnitude earthquake on the San Andreas Fault.[1] It was the largest earthquake experienced in California since statehood and felt north of Sacramento, and south to San Diego, near the state's southern border. Only one or two deaths can be attributed to the earthquake, but risk-modeling agencies estimated that a similar earthquake in 2007 would have left $150 billion in damage.[2] A Santa Barbara newspaper reported:

> So far as our present information extends, [the earthquake] was felt as far south as Los Angeles. It extended to Point Conception west-ward. No information has yet been received from towns situated north of this place, but we shall doubtless hear of its effects in many localities as yet unheard from.[3]

"Information" in 1857 was defined as "news communicated by words or writing," and "knowledge" as derived from more ephemeral communication.[4]

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[1] United States Geological Survey (USGS), "Historic Earthquakes: Fort Tejon, California," accessed 6 December 6, 2011, http://earthquake.usgs.gov/earthquakes/states/events/1857_01_09.php.

[2] The USGS reports one death, while the Southern California Earthquake Data Center (SCEDC) reports two. SCEDC, "Significant Earthquakes and Faults: Fort Tejon," accessed December 6, 2011, http://www.data.scec.org/significant/forttejon1857.html; USGS, "Historic Earthquakes: Fort Tejon, California."
The SCEDC and others argue that the minimal damage was due to the fact that California was sparsely populated, particularly near the earthquake epicenter. The population of California was about 92,597 at the time of the 1850 U.S. Census, and quadrupled in size by the time of the 1860 census to 379,994. (The census figure is actually from 1852, since the 1850 census burned in a fire in San Francisco.) Census figures are from Allan Pred, *Urban Growth and City-Systems in the United States, 1840-1860* (Cambridge, MA: Harvard University Press, 1980): 21.
Many references to the 1857 earthquake were compiled by Duncan Carr Agnew, in "Reports of the Great California Earthquake of 1857" (University of California San Diego: Scripps Institution of Oceanography, 2006), accessed December 5, 2011, http://escholarship.org/uc/item/6zn4b4jv. Agnew compiled seventy-seven first hand accounts of the earthquake.

[3] *Santa Barbara Gazette*, January 15, 1857, from Agnew, "Reports of the Great California Earthquake of 1857," 24.

[4] Noah Webster's 1844 and 1857 *American Dictionary of the English Language* said that information meant "Intelligence; notice; news or advice communicated by word or writing," "Knowledge derived from reading or instruction," and "Knowledge derived

A number of different documentary-related practices influenced 1857 knowledge about the earthquake. Today, making sense of an earthquake would involve an entirely different set of institutions and practices. Although the word "information" was used conventionally in 1857 as it is today—to connote something communicated or known —the meaning has changed over time to reflect the practices of the era and its technologies, institutions, and ideologies. Today, we tend to use "information" in a more expansive sense, as something "out there" to be captured.[5] This disembodied notion of information provides a challenging and, I hope to demonstrate, fruitful site for historical analysis.

My dissertation examines documents related to three earthquakes in the San Francisco Bay Area in 1868, 1906, and 1989, and how practices related to "information" are shaped by the historical moment. This introduction uses the 1857 earthquake to introduce the central concept of "information infrastructure" and how the social world shapes practices related to information. (Chapter Two explains information infrastructure in more depth and how it frames research questions about the information and disasters.) In the next section, I return to the 1857 Fort Tejon earthquake and consider how documents about the earthquake might have circulated, and what information the Santa Barbara newspaper might have looked for.

1857 Fort Tejon Earthquake

The above quote from the 1857 Santa Barbara newspaper suggests that people sought a broad assessment of the effects of the earthquake. What they got in response reflected the tools and techniques available for making sense of an earthquake. The 1857 earthquake was described in contemporary newspapers, letters, and other periodicals. Most of the mail, including newspapers, circulated on boat or horseback through the federal postal system, with private "express" companies augmenting the federally run post office where there was

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from the senses or from the operation of the intellectual faculties"; the last was a legal definition, "Communication of facts for the purpose of accusation; a charge or accusation exhibited to a magistrate or court." Noah Webster, *An American Dictionary of the English Language,* revised and enlarged by Chancey A Goodrich. (Springfield, MA: George and Charles Merriam, 1857).

[5] However, "information" as it is now used suggests a broader, sometimes naturalistic, concept. Geoffrey Nunberg, "Farewell to the Information Age," in *The Future of the Book,* G. Nunberg, ed. (Berkeley, CA: University of California Press, 1996). This dissertation takes as a starting point that "information" is an unstable word, embedded in a social world. This concept is argued in works such as *The Social Life of Information*, and is discussed in more depth in the next chapter.

little service for the "last mile."[6] News from Fort Tejon was urgent because the damage there was extreme, so the news was sent to Stockton via express. The expressman, Mr. Canaday, while traveling on horse to Stockton, observed that earthquake damage decreased as he went north.[7] Through the process of circulating documents, he was able to learn details about the earthquake. Canaday's report was the first printed newspaper story that circulated widely and said the damage was worst in Fort Tejon. Effectively, the process of delivering the news was integral to uncovering the story of what had happened.

One central question involved *when* the earthquake had happened. Issues with timekeeping were discussed in both popular newspapers and in a scientific publication. In 1857, John Boardman Trask, associated with the California Academy of Sciences, was attempting to document earthquakes in California. Trask used time to create an explanation of the earthquake location, but time was strictly local in 1857.[8] Trask believed that San Francisco felt the earthquake first. The times he had collected said that the earthquake had first been felt in San Francisco, and so he deduced that the origin of the earthquake was closest to San Francisco.[9] It was not just the inconsistent timekeeping that could have misled Trask. San Francisco was at the center of the Western United States in terms of newspaper and document circulation, population, and economy; there were likely more people with watches, and possibly more

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[6] Pred, *Urban Growth and City-Systems in the United States, 1840-1860*, 149.

[7] Mr. Canaday informed the newspaper that, "through information obtained along his route [from Fort Tejon] to this city [Stockton], he is satisfied that the force of the shock was gradually less as it approached northward." This is the first time, on January 16, that a newspaper reported that the damage was worst in Fort Tejon. *Stockton Daily Argus,* January 16, 1857, from Agnew, "Reports of the Great California Earthquake of 1857," 47. Santa Barbara and Los Angeles received news from Fort Tejon that appeared in newspapers there: Mr. Warner delivered news to Santa Barbara; Mr. Bateman to Los Angeles. *Los Angeles Star*, January 17, 1857; *Santa Barbara Gazette*, January 22, 1857.

[8] Standard Time is officially established in 1883 as a result of pressure from scientists Ian R. Bartky, "A Switch in Time," *Prologue: Quarterly of the National Archives and Records Administration* 33, no. 4 (Winter 2001): 268; Ian R. Bartky, "The Adoption of Standard Time," *Technology and Culture* 30, no. 1 (1989): 25-56.

[9] John B. Trask, "On the direction and velocity of the earthquake in California of January 9, 1857," read by Dr. John B. Trask before the California Academy of Natural Sciences, San Francisco, March 30, 1857; published in *Proceedings of the California Academy of Science*, 1 (1857): 109-110; republished in *American Journal of Science,* 25, no. 73 (May 1858): 146–148. Trask attempted to normalize the time.
This misunderstanding is even more compelling when considering that it took less than two weeks for newspapers using reports to state that the most damage from the earthquake occurred in Fort Tejon. *Stockton Daily Argus,* January 16, 1857, from Agnew, "Reports of the Great California Earthquake of 1857," 47.

potentially "reliable" data points in San Francisco.[10] Contemporary timekeeping practices and California demographics were reflected in Trask's observation. Trask's paper about the 1857 earthquake reflected current practices, but these weren't what a modern observer might expect. Throughout this introduction, I will continue to refer back to the 1857 earthquake to explore some of the issues involved in investigating the information practices after a disaster, but also to discuss problems with using historical cases and twenty-first-century theoretical frames.

Public Information Infrastructure

The concept of information infrastructure, defined as "pervasive enabling resources," is helpful for describing aspects of the world that shape "information." Information infrastructure researchers say that infrastructure is much more than the physical aspects of infrastructure, or the "tubes and wires." Rather, information infrastructure refers to the complex constellation of people, practices, technologies, and institutions that might contribute to the "pervasive enabling resources," which facilitates making, circulating, and using "information."[11] In 1857 earthquake, the information infrastructure included letters and newspapers circulated via boat, post, and expressmen. This 1857 example clearly demonstrates that infrastructure is not simply "tubes and wires," an important starting point of this dissertation. Canaday's work as an expressman was performing infrastructure. The postal workers delivering mail were infrastructure to those looking for news of the earthquake, such as the scientist Trask.

Most canonical research about information infrastructure has focused on how it supports scientific research. This dissertation will consider the context of *public* information infrastructure. The analytical framework of information infrastructure is useful for analyzing the complex relations between people, institutions, and technologies involved in making, circulating, and using documents in science settings.[12] Extending information infrastructure to public settings means borrowing much of the analytical rigor these theoretical concepts have garnered and attempting to describe the information

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[10] "[I]t must be borne in mind, that out of San Francisco, and Sacramento, (where there are proper chronometers corrected daily for science and navigation)." *Santa Cruz Sentinel*, January 31, 1857 from Agnew, "Reports of the Great California Earthquake of 1857," 33-34.

[11] Chapter two elaborates on the concept of "information."

[12] "Document" is a term I discuss in the next chapter. It can describe photographs, government records, or newspapers. I use the term document rather than information here because document indicates something that has a material quality, that is intended to be a document, and can be circulated.

infrastructure that underpins the public. This concept is importantly looking at "information." I focus on documents created about events, rather than the ephemeral moments—the actual event or what people were thinking. The attention to documents as objects of analysis is especially appropriate for historical research. Public information infrastructure, as opposed to scientific information infrastructure, introduces some challenges, however. The public is a far more complex entity than the scientific community, with a less-defined identity and fewer shared expectations.

Research on information infrastructure suggests that infrastructure has a number of attributes. Several of these attributes were central to the way I approached my research, especially the idea that infrastructure has reach, is embedded in social worlds and institutions, is shaped by and shapes conventions of practice, and becomes visible on breakdown. In a sense, earthquakes should be an ideal focus for studying infrastructure because they are potentially sights of breakdown, where information infrastructure is made visible. The earthquake in 1857 did not necessarily "break" the information infrastructure of horses, boats, and newspapers *per se*, but the way that infrastructure itself worked was a tool for making sense of the earthquake. That is, the infrastructure that included Mr. Canaday was made visible by the earthquake. Many different disciplines have identified disaster as a location for examining aspects of the social world of particular interest to their discipline. Steven Biel says that disasters are opportunities to explore "normal" precisely because "normal" follows a disaster:

> catastrophic disturbances of routine actually tell us a great deal about the 'normal' workings of culture, society, and politics. When disasters strike, when the extraordinary occurs, the response is quite often a poignant reassertion of the familiar. The victims and witnesses of calamitous events can't but help to make sense of them in the terms available.[13]

Disasters help elucidate what is "normal" as people try to reconstruct their lives to resemble the pre-earthquake order. Biel and others suggest, however, that this "normal" may "lay . . . bare the injustices, inequities, or inefficiencies rather than the beneficence of the status quo."[14]

Another method of analyzing information infrastructure is to "invert" infrastructure.[15] In my analysis of documents about the 1857 earthquake, I

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[13] Steven Biel, "Introduction: On the Titanic Research and Recovery Expedition and the Production of Disasters," in *American Disasters,* ed. Steven Biel (New York, NY: New York University Press, 2001): 5.

[14] *Biel, "Introduction,"* 6.

[15] I refer to infrastructural inversion in a similar manner as Paul Edwards, *A Vast Machine: Computer Models, Climate Data, and the Politics of Global Warming.* (Cambridge, MA: The MIT Press, 2010): 20: "To understand an infrastructure, you have to invert it. You turn it upside down and look at the 'bottom'—the parts you don't normally

concluded that people invert the infrastructure by telling where news came from, and how it was delivered. This practice is exemplified by the discussion of timekeeping. The scientist, Trask, who was trying to understand where the earthquake originated by analysis of the times that earthquakes were felt in different areas, wrote, "Time is an important element in aiding us to form correct conclusions regarding their phenomena, and it is to be hoped that our friends in different parts of the State, in reporting the same, will be precise in this particular."[16] As the vignette opening this introduction suggests, inverting the infrastructure to make sense of the earthquake was not an activity practiced solely by scientists, but also by members of the public. Newspapers in California describing the effects of the earthquake were constantly talking about the sources of their news and how they obtained it, revealing the information infrastructure and some information practices.

Themes

Four themes emerged from my research to advance the idea of public information infrastructure.[17] The first theme underscores how some conventional practices survive disastrous disruptions in information infrastructure. The second theme looks at what is fundamental to information infrastructure, the idea that infrastructure has reach, and considers the implications of reach. The third theme focuses on institutions that claim informational authority. I particularly notice the rise of institutions whose purpose is to respond to disasters, and how these institutions are increasingly reflective about their own actions. The last theme addresses the multiple infrastructures for knowledge in multiple publics.

(Dis)continuity

Infrastructure researchers say that infrastructure is shaped by conventions of practice. The 1857 earthquake makes it clear that standardized timekeeping conventions were critical to helping people understand what had happened.

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think about precisely because they have become standard, routine, transparent, invisible. These disappearing elements are only figuratively " below " the surface, of course; in fact they are the surface." The original sense of the term infrastructural inversion was set forth by Geoffrey Bowker, "Information Mythology and Infrastructure," in Lisa Bud-Frierman, ed. *Information Acumen: The Understanding and Use of Knowledge in Modern Business* (London,UK: Routledge, 1994): 231-247.

[16] Trask, "On the direction and velocity of the earthquake in California of January 9, 1857," 109-110.

[17] These themes overlap in various ways. Considering how they are intertwined and overlap is future work that I touch on in my conclusion.

Creating earthquake catalogs, as Trask did, or even consulting experts to explain the cause of earthquakes are information-related practices that appear in the 1857 example. Practices constitute infrastructure, and simultaneously infrastructure enables and constrains practice. This perspective tempers the idea that a disaster might in fact act as a clean slate with which social differences wash away, as the ground shakes for each person. Another dimension of information infrastructure that implicitly emphasizes continuity is the idea of an installed base. Researchers say that infrastructure changes are made to the existing installed base—"optical fibers run along old railroad lines."[18]

Information infrastructure explicitly takes into account breakage. The argument says that when infrastructure breaks, what made the infrastructure work becomes easier to "see"—breakage allows special access to the inner workings of infrastructure. Furthermore, much of the research in disaster studies suggests that disasters are occasions to understand what underpins "normal" society. I argue strongly in favor of a narrative of continuity, but I try to be specific regarding what about public information infrastructure is continuous: dominant institutions and information-related practices. When physical information infrastructure breaks, people improvise .[19]

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[18] Susan Leigh Star, "The Ethnography of Infrastructure." *American Behavioral Scientist* 43, no. 3 (1999): 382.

[19] The potential for improvisation can be understood as built on the installed base on which people can innovate. There is a long history of research about emergent "organizational behavior" after disaster, which, understandably, does not put information infrastructure at the forefront of the analysis. The newest research in this vein is about improvisation, as it relates to planned emergency response. This research outlines three different kinds of organizational improvisations: reproductive, adaptive, and creative Reproductive improvisations occur when plans can't be carried out, but when what is planned can be reproduced in another form. Adaptive improvisation occurs when the plans do not anticipate the situation, and thus needed to be adapted. Creative improvisation is when the plans did not exist before the event. Although this typology has some problematic assumptions, it also suggests a useful typology for understanding different improvisations with information infrastructure. This analysis of improvisation calls into question how much can be planned for after a disaster; however, the framework does not take into account what people did before a disaster not in plans. What people did before a disaster may not have been *planned* to occur after a disaster, but would have been totally appropriate for them to take on as a task because it involved much of their daily routine before the disaster. Rather than classify improvisations of an organization's behavior relative to plans, I look at improvisation of information infrastructure, or improvisations that make use of information infrastructure. Reproductive improvisations involve remaking the information infrastructure; adaptive improvisations make use of the information infrastructure to fulfill new needs. Creative improvisations could be when the installed base of information infrastructure needs to be improvised *and* there is a new need. To

One quality of information infrastructure is that it is *embedded* in places, social worlds, and institutions. The sparsely populated 1857 Southern California meant that relatively few lives were lost in the earthquake, compared to what could be the case if such an earthquake happened in the same location today. In a relatively empty state, it might be easy to imagine that the earthquake was a "natural" disaster. I described how Trask's analysis of the 1857 earthquake was shaped by information infrastructure, which was centered in San Francisco, the hub of California business and population. The information infrastructure was embedded in this social arrangement, and thus shaped Trask's narrative. For the most part, the institutions that are powerful and dominate the information infrastructure before earthquakes continue to dominate afterward. In fact, organizations with the most resources can devise interesting workarounds to maintain their powerful position in the information infrastructure. If anything, earthquakes seem to be followed by a reinforcement of existing power structures. In the cases that I examine, although physical infrastructure may be harmed, practices and the way that people organize are much more enduring. This echoes information infrastructure research that examines development of new infrastructure leading to a number of tensions "as practices, organizations, norms, expectations, and individual biographies and career trajectories bend—*or don't*—to accommodate, take advantage of, and in some cases simply survive the new possibilities and challenges posed by infrastructure."[20]

Earthquakes can be huge disruptions. As far as the public information infrastructure is concerned, earthquakes can destroy physical infrastructure and, paradoxically, can be extraordinarily helpful for people who want to make sense of what has happened. The chapter on the 1906 earthquake, the most destructive earthquake that I examine, argues that the ways people make and produce the information infrastructure, and the ways that people make use of information infrastructure, can endure when physical infrastructure does not. Because of "contingencies," things take unexpected turns (i.e., disasters force these issues). Information practices are not for all time, and are forcefully

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this end, the creation of a registration system in 1906 is the closest to a creative improvisation as well as the organization to track new addresses and the sudden need to reconceptualize where everyone was—however, these creative improvisations are rather rare. Tricia Wachtendorf, "Improvising 9/11: Organizational Improvisation Following the World Trade Center Disaster" (PhD Dissertation, University of Delaware, 2004). (Wachtendorf has written about this in a number of articles such as Tricia Wachtendorf and James M Kendra. "Improvising Disaster in the City of Jazz: Organizational Response to Hurricane Katrina," (SSRC online, 2006).)

[20] Paul N. Edwards, Steven J. Jackson, Geoffrey C. Bowker, and Cory P. Knobel, January 2007, "Understanding Infrastructure: Dynamics, Tension, and Design." Report of a Workshop on History & Theory of Infrastructure: Lessons for New Scientific Cyberinfrastructures."

shaped by particular institutional and technical configurations, but are slow to change in that moment. Thus, even though a disaster might create a new information "need," the information practices (what people *do*) remain unchanged from pre-disaster norms.

Reach

I focus on the reach of infrastructure to places that didn't feel the earthquakes under consideration. In other words, in this theme I focus on the reach of information infrastructure across space.[21] The idea of spatial reach means that information infrastructure facilitates the circulation of documents beyond where they are created. In the case of earthquakes, it refers to how the news of earthquakes might be carried widely. The three earthquakes that this dissertation explores all had cross-continental infrastructure in place that made it easy for people located elsewhere to find out about earthquakes instantly. Documents that were produced about the disaster probably served purposes beyond simply aiding locally affected people. In this sense, the contours of the information infrastructure very much shape how people assess earthquakes.

My research indicates that the relationship between information infrastructure and documents is often difficult to untangle. For example, documents about the 1857 earthquake tell a story about the infrastructure, but that infrastructure shapes the story that is told (i.e., the expressman was able to tell that the earthquake damage was worst in Fort Tejon as he was on his delivery route, developing infrastructure). One quality of information infrastructure that seems to clearly shape the stories that are told is the reach of infrastructure beyond a particular place or community. In 1857, the post office enabled infrastructure to reach beyond the immediate communities, such as Santa Barbara. The reach of the immediate infrastructure in California extended to mostly places where the earthquake had been felt. The reach of California infrastructure was different than the rest of the United States. Communication between California and the rest of the United States was arduous and slow. Mail was sent by boat through or around South America. Because California in 1857 was very "new" to most of the people who moved there (or most of the people from whom we have records), the fact that earthquakes happen in California – that California is earthquake country – was

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[21] Information infrastructure researchers say infrastructure is defined by,"a certain kind of reach over time,space, and a range of human and institutional activities." Other themes, especially "multiple infrastructures," touch on the idea of reach across "human and institutional activities" more broadly. Steven J. Jackson, Paul N. Edwards, Geoffrey C. Bowker, and Cory P. Knobel. "Understanding Infrastructure: History, Heuristics, and Cyberinfrastructure Policy." *First Monday* 12, no. 6 (2007). Last accessed on November 6, 2007: http://firstmonday.org/issues/issue12_6/jackson/index.html.

debated and considered, in part because there were no scientific theories about the relation of faults to earthquakes and in part because of concerns about what people thought far away. And what people thought in faraway places had everything to do with the circulation of documents. In 1857, where residents of California tried to make sense of an earthquake in a sparsely populated country, with few experts to explain why earthquakes happen or professionals to respond to earthquakes, the infrastructure for public knowledge was sometimes self-consciously public.

Informational Authority

The government as responders, scientists as explainers, and commercial/government physical infrastructure all have a huge impact on how we understand disasters today.[22] In 1857, there were no shared scientific earthquake descriptors such as magnitude. It took weeks for a newspaper to travel from San Francisco to New York, and there was no professionalized class of "responders" or specialized government response. The historical record illustrates how the bureaucratization of disaster response and the rise of scientific explanations for earthquakes shaped infrastructure and information practices. The intertwining of science, the state, and infrastructure helped constitute and legitimize a new set of informational authorities and provides a lens with which to design post-disaster information systems and policy today.

My research analyzes the way different groups claim informational authority—or "define the situation" for everyone.[23] The idea of authority is addressed in many fields, which I discuss more in the next chapter. The institutions that claim authority to describe earthquakes shift throughout California's history. In each historical moment I examine, the particular

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[22] But the differences in between these institutions are important—both exist for their own advancement, but for one, being part of the scientifically principled global infrastructure is more important.

[23] Disaster researchers, after assessing disaster studies literature in 2011 (much of it their own) proposed:

"Disaster research has shown that once those who have experienced a sudden onset disaster have ensured their own survival and assisted others in their immediate vicinity, they typically seek information. In ambiguous situations, the information sought may involve a credible definition of what just happened and whether the danger has passed. They certainly want to know the status of family and friends who may have been affected by the event and report their own status to those outside the area of impact. In situations in which the disaster agent is readily identifiable, information sought may include an understanding of how extensive the impact was, how officials are responding and how to secure assistance. In short, people seek to define the situation." James D. Goltz, and Dennis S Mileti, "Public Response to a Catastrophic Southern California Earthquake: A Sociological Perspective," *Earthquake Spectra* 27, no. 2 (2011): 494.

configuration of institutions involved in California earthquake response is hugely important to what documents were circulated. In the case of 1868, as we shall see, the scientists were not active in producing documents to help the public make sense of the earthquake. Citizens looked for and provided explanations of the earthquake and best building practices. The Chamber of Commerce was interested in controlling the message about the earthquake damage (particularly for Eastern businessmen). They claimed the "authority" to explain the earthquake on behalf of the city. On the other hand, during the 1989 earthquake, professional disaster responders planned to define the situation by influencing the disaster narrative circulated by media companies; in their reporting on the earthquake, media companies sought out government officials. The rise of a formalized informational role for professional responders is apparent where the informational activities of institutions are of primary interest. My focus is on institutions that claim authority, and how their claims to authority might be made visible in the information infrastructure.

Multiple Infrastructures

The theme of multiple infrastructures is about the ability of information infrastructure to reach across humanity to the vulnerable or the marginal. One of the most promising developments in disaster research has been in the development of the "vulnerability" approach, which advocates that different groups of people might have different experiences with a disaster.[24] This approach does not necessarily account for the role of information in a group's capacity to deal with a disaster, but it does usefully point to the idea that different groups experience disaster with "differential vulnerability."[25] Research in the geography, anthropology and sociology traditions has emphasized that those who suffer most in disasters are the vulnerable and marginalized. In the case of the earthquakes under consideration, different social groups are served, or not, by different aspects of public information infrastructures. Many studies have examined how groups of people experience earthquakes differently when one considers building codes and quality, or the type of planned response that a society has in place. This dissertation looks at how people experience

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[24] "The most important departure from the hazard/event/behavior focus that had characterized the field since the 1950s was the refinement of the concept of vulnerability, which looks at those aspects of society that reduce or exacerbate the impact of a hazard." Anthony Oliver-Smith, "Theorizing Disasters: Nature, Power, and Culture," in *Catastrophe and Culture: The Anthropology of Disaster*, eds. Susanna M. Hoffman and Anthony Oliver-Smith (Santa Fe, NM: School of American Research Press, 2002): 27.

[25] Garcia-Acosta, Virginia. "Historical Disaster Research," in *Catastrophe and Culture: The Anthropology of Disaster*, eds. Susanna M. Hoffman and Anthony Oliver-Smith (Santa Fe, NM: School of American Research Press, 2002): 61.

disasters from the perspective of differential vulnerability and information infrastructure.

In information infrastructure research, Star's idea of infrastructural "orphans" points to the issue of differential vulnerability: some people are left out of particular infrastructures.[26] Certainly, there are ways that infrastructures are entirely exclusive by design; for example, special communication infrastructures for professional disaster responders are often exclusive. Often, however, the very poor, especially those who are transient, are excluded from public information infrastructures. My findings contend that sometimes there is not just one public information infrastructure, but multiple infrastructures supporting multiple publics. In the case of the Chinese in 1906 or Spanish speakers in 1989, multiple information infrastructures meant that people used alternate approaches to getting aid and finding loved ones. There is not a single information infrastructure underpinning a single public sphere, but multiple infrastructures supporting multiple publics.

Summary of Earthquakes

Examining documents reveals the workings of information infrastructure provides important insights for how people experience disasters. The next chapter takes a longer look at the motivations for research on disasters, and goes into more detail about the theoretical constructs described here. I will also briefly discuss the research methods that my theoretical orientation suggests and the limitations of a historical approach. More detail about my research is included in an "Essay on Sources" in the appendix of this dissertation. The following paragraphs briefly summarize the earthquake moments I researched.

1868 Hayward Fault Earthquake

I begin my dissertation with the earthquake that was considered "the big one" until 1906. It occurred on October 18, 1868 on the Hayward Fault. This chapter helps to destabilize any assumptions that one might make about how disaster response was "supposed" to work, since no government disaster response apparatus existed, and there were no agreed-on scientific

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[26] Susan Leigh Star, "Orphans of Infrastructure: A New Point of Departure," summarized in a paper about "The Future of Computing: A Vision" of the Oxford Internet Institute, Oxford e-Research Centre, Queen Mary University of London, and University College London, held at Newnham College, Cambridge, on March 29-30, 2007. Accessed June, 2012: http://www.oii.ox.ac.uk/research/publications/FD11.pdf.

explanations of earthquakes. After the earthquake, the power of certain organizations, in particular, the Chamber of Commerce, to dominate the information infrastructure was made visible. In the absence of any informational authority to put forth a locally believable narrative of what happened, San Franciscans came up with their own lessons about the earthquake, and these lessons were printed in local newspapers. The working and non-working state of the information infrastructure itself served as a way for people to make sense of the earthquake. The telegrams sent, far from conveyors of "truth," were reflections of the interests of those who claimed informational authority.

1906 San Francisco Earthquake and Fire

This chapter turns to another aspect of infrastructure, focusing on how people were accounted for by family members and love ones, as well as by institutions. I analyze how the telegraph and postal infrastructure were used to get in touch with people, and how registration bureaus were used to locate people. Institutions, exemplified by the post office, relied on their old work practices, but gradually adopted new innovations for delivering mail to accommodate the unusual circumstances and volatility in locations. The mainstream press not only dominated the narrative of what happened, but was the central broadcasting location for personal whereabouts. The pre-disaster information infrastructure — work practices, powerful institutions such as newspapers, and progressive ideologies—guided the way that the public information infrastructure was reconstituted. When aspects of the information infrastructure did not work, it was often improvised in creative ways.

1989 Loma Prieta Earthquake

The 1989 Loma Prieta Earthquake was a magnitude 6.9 earthquake approximately 60 miles south of San Francisco—not the "big one" that so many San Franciscans feared for so long, but it still caused significant damage and loss of life. In this chapter, I focus on the role of some state institutions, given the responsibility to "respond" in the overall informational experience of Californians. Alternate information infrastructures served the Spanish-speaking population. Unlike the other earthquakes referenced in this study, a variety of government agencies whose purpose was earthquake response were involved in creating information related to the Loma Prieta earthquake. I argue that the post-earthquake information infrastructure reflected the state's understanding of the population of California; this vision did not always correspond with the reality on the ground. The media were widely criticized for alarmist reporting of the earthquake. Attention to the worst destruction followed both events,

possibly fueled by what some have characterized as the American audience's fascination with destruction.

Today, the image of earthquakes and California are inseparable in both popular culture and in public information campaigns. Publicly funded organizations publish guides such as "Putting Down Roots in Earthquake Country" for Northern and Southern California.[27] Californians check the United States Geological Survey website, "Did you feel it?" to understand where and when earthquakes happened. Images relating earthquakes and California are prominent in any number of pop culture venues.[28] In the 3D videogame-like music video for *Californication* by the Red Hot Chili Peppers, the musicians navigate through California when it is hit by an earthquake. The movie "2012" is about a 10.5 magnitude earthquake in Los Angeles.[29] Earthquakes and California seem unquestionably linked in the public imagination, but this was not the case in the first earthquake explored in this dissertation.

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[27] Southern California Edition: Prepared by the Southern California Earthquake Center (SCEC) and the Department of the Interior United States Geological Survey (USGS), in cooperation with the National Science Foundation (NSF), the Department of Homeland Security Federal Emergency Management Agency (FEMA) and the California Earthquake Authority (CEA), with contributions from many members of the Earthquake Country Alliance available at http://www.earthquakecountry.info/ (Fall 2008 Southern California edition, accessed August 23, 2010).
Northern California Edition developed by: American Red Cross, Bay Area Chapter, Association of Bay Area Governments, California Earthquake Authority, California Geological Survey, Earthquake Engineering Research Institute, Governor's Office of Emergency Services, San Francisco Office of Emergency Services and Homeland Security, Southern California Earthquake Center, Structural Engineers Association of Northern California, University of California Berkeley, U.S. Department of Homeland Security, Federal Emergency Management Agency. U.S. Geological Survey (2005 Northern California edition, accessed August 23, 2010).

[28] One California-based Major League Soccer team is called the San Jose Earthquakes.

[29] Representations of Los Angeles in disaster movies is discussed extensively in Mike Davis, *Ecology of Fear : Los Angeles and the Imagination of Disaster* (New York: Vintage Books, 1999).

Chapter 2: Research Approach

The example of post-disaster information practices in 1857, set forth in the introduction, draws attention to the ways that disaster response is different today. One obvious example is that we have a scientific understanding of earthquakes now that prompts someone who feels an earthquake to wonder where the epicenter of the earthquake is and what the magnitude is, descriptions that might be supplied by the United States Geological Survey (USGS). People might also expect some expression of formal response by local or federal government, including explanations of what has happened and what to do next. The documents that circulate about disaster today are wildly different than in 1857 because of the technologies that are in place, conventions of practice around something like timekeeping, and government institutions. "Information infrastructure" is one framework to describe the relations of a society's institutions, people, technologies, and practices that produce, circulate, and use documents.[1] In the information infrastructure today, people expect that the USGS, using their instrumentation, might quickly provide maps of where an earthquake epicenter was, and that the Federal Emergency Management Agency (FEMA), along with branches of local government, might tell people where to go for help and what to anticipate in terms of aid. The information infrastructure shapes how people make sense of the earthquake because it influences who people expect to get information from, what they believe it should tell them, what it will mean, and what is called irrelevant or informative.

This chapter attempts to briefly outline the theoretical and methodological work that inspires my thinking. First, I consider how and why various scholarly fields have chosen to do research about disasters. How

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[1] There are other ways to talk about these complex relations. "Information order" is used by C. A. Bayly in his work to describe a configuration of institutions and practices in nineteenth-century Indian and British society in India, which are associated with information-related activities, particularly surveillance. Bayly is a historian and "information order" is not as widely used in the field of "information studies" as "information infrastructure." C. A. Bayly, *Empire and Information: Intelligence Gathering and Social Communication in India, 1780-1870* (New York, NY: Cambridge University Press, 1996). In sociology, Dan Ryan's work on the sociology of notification has also discussed the "information order" and proved a useful analytical device particularly for thinking about notification norms. Dan Ryan, "Getting the Word Out: Notes on the Social Organization of Notification," *Sociological Theory* 24, no. 3 (2006): 228-253.

different fields define "disaster" has implications for how disasters should be studied and what might be learned. Research on disasters suggests that looking at disasters might provide insights into the normal operations of information infrastructure in extraordinary times. The next two sections examine the idea of information and information infrastructure. I look at why "information" is difficult to define. I attempt to find a more stable concept for "information." Information infrastructure as a framework, the object of my analysis, raises a number of questions for my dissertation. The last section lays out my research questions, and how I plan to answer them.

Disaster Research: Why and How?

My approach to disaster research is drawn from work on information infrastructure, but also from perspectives of disaster researchers from other fields. Research about disasters indicates not only *why* people might want to study disasters, but also *how* to approach research of disasters. In some sense, they are totally entwined: how people approach research on disasters has everything to do with why they believe disasters are worth studying, and vice versa. There is some debate about why people in the human sciences might study disasters. Debates have centered around whether disasters are the products of the "normal" workings of society, and places to see how the "normal" gets reconstructed, versus ideas that disasters are opportunities to witness the exceptional or the most basic aspects of "human nature." Both can be true. I see my work as building on the recent anthropological and historical traditions of research on disasters, that disasters are opportunities to understand the everyday, or what infrastructure researchers say is sometimes transparent. The idea that one studies disasters because they are a place to observe what people believe is "normal" (answering *why* disasters) leads to an approach of *how* that suggests continuity because people attempt to rebuild whatever existed previously. Thus, if information infrastructure is destroyed in a disaster, people will try to reassert the normal.

Disasters as a Clean Slate

The idea that disasters are a site to understand what people believe is normal is somewhat counterintuitive. Contemporary writers suggest that disasters are an occasion where "human beings reset themselves to something altruistic, communitarian, resourceful, and imaginative after a disaster, that we revert to something we already know how to do."[2] This is an old idea. One historian wrote that, amongst other perspectives, "Defoe considers . . . the way that

[2] Solnit, Rebecca, *A Paradise Built in Hell: The Extraordinary Communities that Arise in Disaster. A Paradise Built in Hell* (New York, NY: Viking, 2009): 18.

disasters reveal something about the essential nature of human beings, by showing what is left when all the familiar customs and institutions of civilization are taken away."[3] Although the idea that disasters provide a "clean slate" to observe humans does not resonate with most disaster research, disaster sociologists have shown that people help each other and behave pro-socially after a disaster—suggesting that the idea that human beings reset themselves to be benevolent is a supportable perspective.[4]

A related idea of "creative destruction," used mostly in economics, hypothesizes that disasters are not necessarily clean slates, but opportunities for the markets to work more efficiently; this idea is even invoked to explain that disasters destroy old technology, and the newer technology that replaces it leads to growth in gross domestic product.[5] Taken to extremes, creative destruction can be used to make a form of a clean slate argument—that the "shock" of something like a disaster can be used to justify political activities such as privatization.[6] On closer inspection, however, creative destruction arguments are not "clean slate" arguments, as privatizing institutions have long been in place. Schumpeter said that the "process of creative destruction" outlined by Marx shows that the "evolutionary character" of capitalism is not simply due to war, or population increases, but intrinsic to the nature of capital accumulation and the search for innovation and investment.[7] For Schumpeter, destruction is not a negative necessity, but a positive opportunity for advancement. Manuel Castells posits that the "spirit of informationalism," his characterization of the current/future information age, "is the culture of

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[3] G. A. Starr, "Defoe and Disasters," in *Dreadful Visitations: Confronting Natural Catastrophe in the Age of Enlightenment,* ed. Alessa Johns, (New York, NY: Routledge, 1999): 32.

[4] For a summary of this research, see Kathleen Tierney, Christine Bevc, and Erica Kuligowski, "Metaphors Matter: Disaster Myths, Media Frames, and Their Consequences in Hurricane Katrina," *The Annals of the American Academy of Political and Social Science,* 604 (2006): 57-81.

[5] Jesus Crespo Cuaresma, Jaroslave Hlouskova and Michael Obersteiner, "Natural Disasters as Creative Destruction? Evidence from Developing Countries," *Economic Inquiry* 46, No.2 (April 2008): 216-226. These authors summarize other research on creative destruction and disaster and dismiss it, as they find no evidence that disasters improve developing economies using "knowledge transfer" proxies such as importation of new technology.

[6] Naomi Klein says that moments of disaster and great upheaval are styled by free-market ideologues as clean slates, and these times of "shock" are used to advance political agendas. Klein calls this "disaster capitalism." Klein's idea build largely from Marxist ideas about "creative destruction," or the idea that capital accumulation can produce a series of crises because of its instability. Naomi Klein, *The Shock Doctrine: The Rise of Disaster Capitalism* (New York, NY: Metropolitan Books, 2007).

[7] Joseph A. Schumpeter, *Capitalism, Socialism and Democracy*, 3rd ed. (New York, NY: Harper & Row, 1976): 82-83.

'creative destruction,'" accelerated by information technology.[8] In this vein, for some social theorists, disasters do not simply allow us to understand the inner workings of our social world, but are themselves ordering the working of society and are central to modern life.[9] Creative destruction suggests that why one should study disasters is because of what the disasters do, rather than what disasters reveal.

The idea of creative destruction is echoed in Kevin Rozario's understanding of society as he describes "the catastrophic logic of modernity." The "logic" is that modernization at once attempts to secure the world and make it predictable, while also introducing potential risk and disaster: "through development patterns that move through cycles of ruin and renewal . . . producing . . . social conflicts as well as technological and environmental hazards (modernity as disaster)."[10] For Rozario, the American interest in disaster and voyeuristic experience of disaster in media is itself an expression of modern capitalist order.[11] Rozario's "catastrophic logic of modernity" says that modern people and institutions are at once trying to order nature and at the same time hoping for disasters as occasion for renewal and creative destruction.[12] Thus, there is not a clean slate, and to the extent that there is destruction, in Rozario's argument, change that is the result of disaster is reinforcing a capitalist order. Similarly, another perspective is that elites use technology, development, and expertise to mitigate further disaster for

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[8] Manuel Castells, *The Rise of the Network Society,* 2nd ed. (Malden, MA: Blackwell Publishing, 2000): 215.

[9] Sociologist Ulrich Beck says that a new "risk society" is shaped by new risks created by modern technology, and how people distribute or manage risk. Fressoz argued that the concerns over distributing risk happened in the nineteenth century. Jean-Baptiste Fressoz, "Beck Back in the 19th Century: Towards a Genealogy of Risk Society," *History and Technology* 23, no. 4 (2007): 333-350.

[10] Kevin Rozario, *The Culture of Calamity: Disaster and the Making of Modern America* (Chicago, IL: University of Chicago Press, 2007): 10.

[11] "The imagination of disaster, it seems to me, has operated as a modern unconscious, as a repository of the chaotic desires that have invigorated an industrial system that depends on a dynamic balance of productive discipline (figured as order) and consumer abandon (figured as excess or chaos or catastrophe). While they were learning to love disasters, Americans were learning how to be modern—turning themselves into the hard-working, thrill-seeking citizens who would sustain, even as they chafed against, an emerging corporate consumer society and national security state." Rozario, *The Culture of Calamity,* 133.
Mike Davis calls the idea of modernity as disaster the "Dialectic of ordinary disaster" in reference to development in Los Angeles in the face of the potential for massive destruction. Mike Davis, *Ecology of Fear: Los Angeles and the Imagination of Disaster* (New York, NY: Metropolitan Books, 1999); also Mike Davis, "Los Angeles After the Storm: the Dialectic of Ordinary Disaster," *Antipode* 27, no. 3 (1995): 221-241.

[12] Rozario, *The Culture of Calamity,* 23.

themselves, which further creates the potential for disaster, and furthermore exacerbates risk for the poor.[13] That is not to say that disasters are not catalysts of social change—they can be—but the change that a specific disaster might bring about would require a longer time horizon than this dissertation will examine.[14] I am examining mostly narratives and documents related to earthquakes that are from the weeks after an earthquake, to offer glimpses of how the information infrastructure functioned in these moments.

Social Science Approaches to Disaster Research

Many academics advocate studying disasters as a way of gaining more understandings into the objects of study and theories that dominate their fields because "normal" is exposed. Here is one argument about the value of studying disaster:

> In this era, catastrophic events seem to have a revelatory quality: they offer powerful reminders of the fragility of our social and institutional architecture, making painfully evident vulnerabilities in our social organization that were otherwise invisible. By disrupting the operation of fundamental mechanisms and infrastructures of our social order, they lay bare the conditions that make our sense of normalcy possible.[15]

How various social science fields define "disasters" is important for understanding what they hope to learn from studying them. There are two perspectives on disaster discussed here. One approach originated in sociology, the other in geography and anthropology literature. Although not all researchers in each field subscribes to the definitions below, characterizations of a "sociology of disasters" and "anthropology of disaster" definition helps to

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[13] Ted Steinberg, *Acts of God: The Unnatural History of Natural Disasters,* 2nd ed. (New York, NY: Oxford University Press, 2006). Alessa Johns proposes that if "human-made disasters can rival natural ones in their destructive power, then, it is hoped, they can also challenge the consequences and reverse some of the damage." "Introduction," in *Dreadful Visitations: Confronting Natural Catastrophe in the Age of Enlightenment,* ed. Alessa Johns, (New York, NY: Routledge, 1999): xx-xxi.

[14] Charles F. Walker, "Shaking the Unstable Empire: The Lima, Quito and Arequipa Earthquakes, 1746, 1783, and 1797," in *Dreadful Visitations: Confronting Natural Catastrophe in the Age of Enlightenment,* Alessa Johns, ed. (New York, NY: Routledge, 1999):113-144.

[15] Austin Sarat and Javier Lezaun, "Introduction: The Challenge of Crisis and Catastrophe in Law and Politics," in *Catastrophe: Law, Politics and the Humanitarian Impulse,* Austin Sarat and Javier Lezaun, eds. (Amherst, MA: University of Massachusetts Press, 2009): 1.

illuminate why each field studies disaster.[16] A classic "sociology of disasters" definition is as follows:

> [a]n event, concentrated in time and space, in which a society, or a relatively self-sufficient subdivision of a society, undergoes severe danger and incurs such losses to its members and physical appurtenances that the social structure is disrupted and the fulfillment

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[16] When I refer to research in the field "sociology of disasters," I refer to a specific group of researchers who mostly trained at the Disaster Research Center and the Hazards Center and importantly not all sociologists who have worked on disasters. Kathleen Tierney, gives the history of these researchers in an article called, "From the Margins to the Mainstream? Disaster Research at the Crossroads." She described how the field of "sociology of disasters" is composed of an insular group of researchers who have come from a tradition of disaster research sponsored by the U.S. Government starting in the 1950s, which has been largely non-theoretical and out of step with mainstream sociology. The group of people who are considered to be "disaster researchers" is extremely small: "Along with geographers, sociologists are well represented in the core group of disaster researchers, but still they only number in the dozens. The number of core disaster researchers from all social sciences combined is estimated at around 200 (Natl. Res. Counc. 2006). Despite the fact that a number of well-known and respected sociologists work in the area, the field itself lacks visibility." The cohort of disaster researchers comes from one of several disaster research programs around the U.S. and tends to focus on systems theory, and this has had a profound effect on the type of research done: "The current status of disaster research in sociology is a direct reflection of how the core research cohort developed." The small group of disaster researchers has limited the potential of the sociology of disasters: "Indeed, one noteworthy feature of sociological disaster research is the extent to which the field has resisted change over time. Part of this resistance stems from the strong consensus that built up among core researchers concerning conceptual frameworks, research methods, and appropriate topics for study. In this same vein, the inbred nature of the field—that is, the fact that so many scholars have been trained by so few mentors, and over time by the students of those mentors—is a key source of inertia. In addition, reflecting its problem-focused origins and research concerns, the field has not kept apace with theoretical developments in sociology," Kathleen Tierney, "From the Margins to the Mainstream? Disaster Research at the Crossroads," *Annual Review of Sociology* 33 (2007): 503-506. Sociologists who worked from different theoretical or epistemological perspectives and who are discussed in this chapter such as Eric Kleinenberg or Karl Weick are not usually considered in this "sociology of disasters" field. Research by sociologists who generally do not work exclusively on disasters, but have examine disasters to get at a phenomena of interest are not included in the "sociology of disasters." Exemplary work in this category might include Jeanne S. Hurlbert, Valerie A Haines, and John J Beggs. "Core Networks and Tie Activation: What Kinds of Routine Networks Allocate Resources in Nonroutine Situations." *American Sociological Review* 65, no. 4 (2000): 598-618.

> of all or some of the essential functions of the society is prevented ([Quoted from] Fritz 1961, p. 655)."[17]

Anthropology differs between "hazard," which refers to an "agent" such as an earthquake, and "disaster" as "the process in which the agent and specific physical, social, and economic factors participate."[18] This definition of disaster originated in the work of geographers, especially Gilbert White, who emphasized that disasters were rooted in "societal actions (or nonactions)."[19] Geographers and anthropologists work deconstructs the "persistent Western nature-culture dualism":[20]

> In the 1970s, "Researchers from and in the third world called for a rethinking of disasters from a political-economic perspective, based on the high correlation between disaster proneness, chronic malnutrition, low income, and famine potential, which led to the conclusion that the root causes of disaster lay more in society than in nature."[21]

Meanwhile the old sociological definition puts disaster as existing in a finite time, space, and breaking from the "normal" routine.[22] Sociologist Kathleen Tierney critiqued this definition of disaster:

> virtually every aspect of Fritz's definition—that disasters are events, that they are concentrated in time and space, that physical losses are an essential element in disasters, and so on—is problematic and contested, and yet his conceptualization remains highly influential.[23]

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[17] Tierney, "From the Margins to the Mainstream? Disaster Research at the Crossroads," 505.

[18] Virginia Garcia-Acosta, "Historical Disaster Research," pp in *Catastrophe and Culture: The Anthropology of Disaster*, Susanna M Hoffman and Anthony Oliver-Smith, eds. (Santa Fe, NM: School of American Research Press, 2002): 57. Quoting from Anthony Oliver-Smith, "Introduction. Disaster Context and Causation: An Overview of Changing Perspectives in Disaster Research," in *Natural Disasters and Cultural Responses,* Anthony Oliver-Smith, ed., Studies in Third World Societies, vol. 36. (Williamsburg, VA: College of William Mary, 1986): 8. Referring to Charles E. Fritz, "Disaster. In Contemporary Social Problems," in *An Introduction to the Sociology of Deviant Behavior and Social Disorganization*, R. K. Merton and R. A. Nisbet, eds. (New York, NY/Chicago, IL: Harcourt, Brace/World Inc., 1961).

[19] Kathleen Tierney, "From the Margins to the Mainstream? Disaster Research at the Crossroads," 506.

[20] Alessa Johns, "Introduction," in *Dreadful Visitations: Confronting Natural Catastrophe in the Age of Enlightenment* (New York, NY: Routledge, 1999): xvii.

[21] Anthony Oliver-Smith, "Theorizing Disasters: Nature, Power, and Culture," in *Catastrophe and Culture: The Anthropology of Disaster*, Susanna M Hoffman and Anthony Oliver-Smith, eds. (Santa Fe, NM: School of American Research Press, 2002): 27.

[22] 509.

[23] Kathleen Tierney, "From the Margins to the Mainstream? Disaster Research at the Crossroads," 505.

In other words, according to the classic "sociology of disasters" definition, disasters are as a break from normal rather than a product of social order, the normal. These are very different justifications for why to study disasters and suggest different approaches.

While the traditional "sociology of disasters" research approach thus sees disasters as an outside agent that creates unusual circumstances in which to observe humanity, anthropologists see quite the opposite opportunity:

> If we accept that some societies live under permanent conditions of imbalance and that their "normal" state is generally characterized by huge social and economic inequalities, then it is true that if a given hazard appears and turns into a disaster, a whole series of circumstances, alliances, and relations arise. These might go unnoticed at other times or perhaps become magnified in the face of the process that the hazard unleashes.[24]

Thus, anthropologists expect that disaster exposes the "normal"—not an otherwise unknowable aspect of human nature.[25] Anthropologists, geographers, and other social scientists have thus developed the "vulnerability approach" to analyzing disasters, which assumes that a person or group might have certain characteristics that help them cope or makes them particularly vulnerable to a disaster.[26] It seems that the appeal of the vulnerability approach is that:

> [it] directs attention to the socio-spatial origins of disaster, and to the effects of social inequalities in producing and shaping disasters. . . . By searching for the underlying causes of disaster in ongoing social, political and economic dynamics of locale, it also helps connect

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[24] Garcia-Acosta, "Historical Disaster Research," 57.

[25] "When hazards threaten and disasters occur, they both reveal and become an expression of the complex interactions of physical biological, and sociocultural systems" Anthony Oliver-Smith and Susanna M. Hoffman, "Why Anthropologists Should Study Disasters," in *Catastrophe and Culture: The Anthropology of Disaster*, Susanna M Hoffman and Anthony Oliver-Smith, eds. (Santa Fe, NM: School of American Research Press, 2002): 5.

[26] Robert C. Bolin, and Lois Stanford, *The Northridge Earthquake: Vulnerability and Disaster* (New York, NY: Routledge, 1998): 6. The vulnerability approach has been adopted by many researchers in order to highlight "the characteristics of a person or group in terms of their capacity to anticipate, cope with, resist and recover from the impact of a natural hazard." Piers M. Blaikie, Terry Cannon, Ian Davis, and Ben Wisner, *At Risk: Natural Hazards, People's Vulnerability, and Disasters* (New York, NY: Routledge, 1994): 8-9. The idea of vulnerability in some ways serves as an umbrella term for multiple fields: "The views advanced by geographers, anthropologists, and other social scientists have come to be referred to as a 'vulnerability approach' to disaster (Cannon, 1994)." Bolin and Stanford, *The Northridge Earthquake*, 5-6, referring to Cannon, "Vulnerability Analysis and the Explanation of 'Natural' Disasters," in *Disasters, Development and Environment*, A. Varley, ed. (London: Wiley, 1994).

> disaster research with much broader theoretical and research issues in sociology, anthropology, and geography.[27]

Geographers and anthropologists have argued that the definitions are revealing of the perspective of the researchers. Thus, the anthropological definition sees disaster as a product of how people live, where "anthropology of disasters" has traditionally seen the disaster as an outside force acting on what is "normal." The parallel can easily be drawn between the anthropological definition of disaster and information infrastructure researchers' suggestion that when information infrastructure ceases to work, it exposes the invisible everyday work of infrastructure. The suggestion that disasters come from outside of society, blaming "chaotic nature as the culprit—to the exclusion of human economic forces—has in this country influenced not just the local response to disaster, but the entire federal strategy for dealing with the problem."[28] The basis for relief is underpinned by an understanding of disasters as "Acts of God," rather than as suffering that can be blamed on poverty, and this understanding can trace its history to the founding of the United States.[29]

Similarly, sociologist Eric Klinenberg (who was not traditionally included in the "sociology of disasters" group of researchers) analyzed how people's social worlds shaped their experience with disasters.[30] Klinenberg calls his work a "social autopsy" to call attention to the fact that, although people died of heat-related complications, social conditions "made it possible for so many Chicago residents to die in the summer of 1995," and effectively demonstrates that studying a disaster from a purely physical vantage point may not offer explanations for the number of deaths experienced.[31] Many elderly citizens who lived alone were cut off from resources that could have helped them cope with the disaster.[32] Klinenberg also shows how "place-specific social ecology and its effects on cultural practices account for much of the disparity in the heat wave mortality for two neighborhoods."[33] In this sense, there are many different calamities in one disaster, and the heat wave was experienced very differently by different social groups for a number of

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[27] Bolin and Stanford, *The Northridge Earthquake Vulnerability and Disaster*, 6.
[28] Steinberg, *Acts of God*, 10
[29] Michel L. Landis, "'Let Me Next Time Be 'Tried by Fire': Disaster Relief and the Origins of the American Welfare State 1789-1874," *Northwestern University Law Reveiw* 92, no. 3. (1998): 966-967.
[30] Eric Klinenberg, *Heat Wave: A Social Autopsy of Disaster in Chicago* (Chicago, IL: University Of Chicago Press, 2002). For discussion of Klinenberg and disaster sociology, see Kathleen Tierney, "From the Margins to the Mainstream? Disaster Research at the Crossroads," 514.
[31] Klinenberg, *Heat Wave*, 11.
[32] Klinenberg*, Heat Wave,* 230-1.
[33] Klinenberg*, Heat Wave*, 91.

reasons, including the social ecology of neighborhoods, and access to certain resources. While Klinenberg focuses on differential experience as it relates to mortality, my critical interest is amongst the experience of survivors.

Historical Disaster Research

The historian Steven Biel echoes the discussions above that disasters are opportunities to explore "normal" because:

> catastrophic disturbances of routine actually tell us a great deal about the 'normal' workings of culture, society, and politics. When disasters strike, when the extraordinary occurs, the response is quite often a poignant reassertion of the familiar. The victims and witnesses of calamitous events can't but help to make sense of them in the terms available.[34]

However, Biel and others suggest that this "normal" may "lay . . . bare the injustices, inequities, or inefficiencies rather than the beneficence of the status quo."[35] Historian Ted Steinberg has said that the idea of a "natural" disaster "positioned outside of the moral compass of society" was developed "by those in power" in the late nineteenth century "to normalize calamity in their quest to restore order," and distract from the "human economic forces" that contribute to making a disaster.[36] Historians who have looked at European and American disasters have seen disasters as both agents of change and times to observe the familiar. In general, historians have not had a consistent theoretical approach to disaster study because their emphasis is on contingency. A few essays reviewing historical work on disasters have grappled with why historians study disasters. Historians have found studying disasters can be analysis of the everyday. Eighteenth-century historian Charles Walker said that disasters can be a site where aspects of daily life might be recorded and saved in archives:

> Earthquakes and other disasters reveal aspects of society not usually visible to the curious observer; accounts describe, for example, the domestic sphere, discussing sleeping arrangements or spatial divisions, topics rarely mentioned in archival sources . . . They expose belief systems, as survivors grope for explanations, culprits, and heroes . . .

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[34] Steven Biel, "Introduction: On the Titanic Research and Recovery Expedition and the Production of Disasters," in *American Disasters* (New York, NY: New York University Press, 2001): 5.

[35] Biel, *"Introduction,"* 6.

[36] Steinberg, *Acts of God,* xxii. Steinberg borrows and builds upon arguments made by from anthropologists and geographers, especially geographer Kenneth Hewitt and anthropologist Anthony Oliver-Smith (see footnote 12 on pages 214-215).

> Often a dialectic between the return to traditional beliefs and forms of domination and the search for new meanings and structures emerges.[37]

While Walker said that earthquakes can reveal the invisible, he also says that the earthquakes "are themselves significant sources of change."[38] Explanations of disasters in the eighteenth century were sometimes underpinned by competing philosophical ideas (e.g., in *Candide* Voltaire took on Leibniz). Debates about the cause of disasters were not simply religion versus science: "the line between religion and science were more porous than later crusaders of secularization have suggested."[39] Another perspective on eighteenth-century disasters by Alessa Johns suggests the following after a disaster:

> historically, people have focused locally and desired above all a community's return to at least a modified form of the preimpact state of affairs. Indeed, those individuals or communities thinking beyond their borders in the eighteenth century most often sought to further hegemonic aims; they offered aid paternalistically in order to strengthen their grip on a devastated region and its people.[40]

Although the view on why study disasters and how to approach the study of disasters in history is similar to the perspective from anthropology, disasters may be an area that is understudied by historians, as the title, "A Neglected Field: The History of Natural Disasters," suggests.[41] Steinberg said that most of the study of disasters had been left to other social scientists. He said the "the general interpretive thrust of our culture, with respect to natural hazards has centered on denial," and this underscored the necessity for historians, with their orientation around analysis of contingencies.[42] One reason for the lack of

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[37] Walker, "Shaking the Unstable Empire," 114.

[38] Walker, "Shaking the Unstable Empire," 115. Carla Hesse also suggested that in the eighteenth century, "disasters created occasions for the reinvention of public order," and, "Every disaster bought possibilities for change in its wake." Carla Hesse, "Afterword," in *Dreadful Visitations: Confronting Natural Catastrophe in the Age of Enlightenment,* Alessa Johns, ed. (New York, NY: Routledge, 1999): 185-186.

[39] Hesse*, "*Afterword*,"* 187. Hesse later explains, "The unpredictability of natural cataclysms drove many post-Newtonian philosophers away from their comforting belief in mechanistic deism and toward the darker Humean skepticism of the later eighteenth century, with its probabilistic mentality of calculated risk" Hesse, "Afterword," 184.

[40] Alessa Johns, "Introduction," xxi. Johns, like Steinberg suggests that historians draw on the work of Hewitt and Oliver-Smith

[41] John C. Burnham, "A Neglected Field: the History of Natural Disasters," *Perspectives: The American Historical Association Newsletter* 26, no. 4 (April 1988): 22-24. Steinberg wrote a paper in which he described "the failure of historians to properly engage in the study of natural hazards." Ted Steinberg, "The Secret History of Natural Disaster," *Environmental Hazards* 3 (2001): 31.

[42] "[T]hen history would seem like the perfect antidote. What better way to treat such denial than to subject it to analysis at the hands of people professionally trained to

historians' interest in disasters might also be traced to a shift in the field. Peter Burke describes an attack on the "history of events" in the early twentieth century, where critics believed that "the historian should analyse structures rather than narrate events."[43] However, the suggestion by Biel and other historians that disasters can reveal the everyday implies that events are also told from a structural perspective [44] The characterization that historians have neglected disasters could be an overstatement as these sentiments are now at least a decade old, but it does suggest that a historical study of public information infrastructure after earthquakes might be novel.

Whether the classic "sociology of disasters" definition of disaster or the anthropological definition is used, most everyone today agrees that there is no such thing as a natural disaster. For a disaster to be considered a disaster means that some element of the constructed landscape was involved. Furthermore, they suggest that evidence produced about disaster may reflect a social milieu either playing up the tragic effects of earthquake, or deliberately downplaying the disaster—the tone of documents themselves can tell us something about how disasters are ordering society. Certainly, it is a surprise to no one that descriptions of a disaster have a highly political dimension. What is interesting and potentially revealing for me is how disaster might make certain politics visible. In particular, it makes the politics of those who make and circulate particular narratives about the disaster more obvious than they might otherwise be. There seems to be some consensus from different branches of the social sciences that disasters provide an excellent vantage point from which to analyze the operations of societies.

"Information"

This section looks at some of the work that the word "information" does, then proposes a conceptual understanding of the word that will allow me to analyze the role of information in understanding disasters in multiple cases in multiple eras. Distinguishing my analytic use of "information" from common use of the

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combat the wish to forget." Steinberg, "The Secret History of Natural Disaster," 32.

[43] Peter Burke, "History of Events and the Revival of Narrative," in *New Perspectives on Historical Writing*, 2nd Ed., Peter Burke, ed. (University Park, PA: The Pennsylvania State University Press, 2002): 283. Burke says, "Historians in these two camps, structural and narrative, differ not only in the choice of what they consider significant in the past, but also in the preferred modes of historical explanation." He says that both sides suffer from what Steinberg calls, "the assumption that distinguishing events from structure is a simple matter." Steinberg, *Acts of God,* 287.

[44] This is echoed by Burke's analysis: "Nor should we forget to ask about the relation between event and structures." Burke, "History of Events and the Revival of Narrative," 288.

word is challenging. Information is a useful concept precisely because it resembles what Bruno Latour calls an "immutable mobile"—an entity that can move from one context to another keeping its original properties.[45] Information might not have the mobility that people imagine it does, however.[46] Because of the supposed immutability of the mobile, people can assume that information retains its signification and, in fact, lends it mobility. This sentiment, which notes that information can cross social, political, and physical distances, is captured by the powerful metaphor "information flow."[47] In studies of disasters, researchers have claimed, "information flow is the central nervous system for all disaster relief efforts."[48] The potential technical enablers of information flow are not generally problematized with use of the term in the digital, networked era.[49]

People will speak of degrees of information flows; for example, in the digital era, people describe increased information flows. The idea of digital reproduction and the ubiquity of digital devices have brought proclamations that imply that information technology can somehow make space and time meaningless, although these sorts of declarations have a long history.[50] The materiality of digital documents that can be easily reproduced and conjured on devices all over the world makes the invocation of place and the materiality of information rather more difficult, and the imagination of flow easier.[51] One vexing question is how to conceptualize what people call "information" in

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[45] John Seely Brown and Paul Duguid, *The Social Life of Information* (Boston, MA: Harvard Business School Press, 2000): 198; referring to Latour 1986.

[46] For example, studies about reader response argue that the meaning of a text is not inherent in the text. The reader constructs meaning from the text.

[47] The idea of information flow comes up in research about space and implies that information can materially exist in spaces moving from one space to another. Paul Duguid, *Quality of Information Lectures*, 2006.

[48] Rebecca Knuth, "Sovereignty, globalism, and information flow in complex emergencies," *The Information Society* 15, no. 1 (1999): 11.

[49] For example, Manuel Castells, in writing about information flows, says, "It [the global city phenomenon] is a process that connects advanced services, producer centers and markets in a global network, with different intensity at a different scale depending upon the relative importance of the activities located in each area *vis-a-vis* the global network. Inside each country the networking architecture reproduces itself into regional and local centers, so that the whole system becomes interconnected at the global level," Manuel Castells, *The Rise of the Network Society* (Malden, MA: Blackwell, 1996): 411. Castells tends to treat information as simply flowing over networks without necessarily asking how the networks actually work (or don't work).

[50] The idea of information flows is also popular in economics, although it is frequently associated and probably derived from flows of capital.

[51] e.g. Jean-François Blanchette, "A Material History of Bits." *Journal of the American Society for Information Science and Technology* 62, no. 6 (2011): 1042-1057.

space.[52] For example, Saxenian uses the term "knowledge circulation" to refer to how immigrant Silicon Valley entrepreneurs have returned to their country of birth.[53] Similarly, Yuri Takhteyev used the term "knowledge flow" to demonstrate how software making practices were, in Anthony Giddens' words, disembedded and re-embedded across geographic boundaries.[54] Saxenian and Tekhteyev suggest that sometimes that when people say information flow, they are implicitly talking about what people in a place know. The assumption that information can flow conceals a lot of ideological work. Saxenian and Tekhteyev's work describes the work that has to be done to move "information"—or change what people know—that often gets attributed to the apparent robustness of information Changing what people know, however, is not just a matter of information technology, or even "information" as an "immutable mobile."

Still, the potential of information is enticing, and many projects have tried to build software to improve information flow on the assumption that if bits flow, knowledge also flows. One paper summarizes information flows, claiming that "ICT [Information and Communication Technologies] plays an important role in DM [Disaster Management], facilitating the process of information flow and coordination and enhancing disaster planning, mitigation and management."[55] The approach of computer science has been to build tools that facilitate information flow, assuming a particular result without carefully taking into consideration the context in which the information system is operating. This perspective assumes that giving people a certain piece of

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[52] E.g., Saskia Sassen, "Towards a sociology of information technology." In *The Social Study of Information and Communication Technology*, Chrisanthi Avgerou, Claudio Ciborra, and Frank Land, eds. (Oxford, UK: Oxford University Press, 2004): 77-99. Sassen says, "digital networks are contributing to the production of counter-geographies of globalization" and can be used for "global or non-local transactions" or for "strengthening local communications" (93). "It is a peculiar mix of intense engagement with the local, with place, and an awareness of other 'local' engagements across the globe" (95).

[53] Saxenian describes the mechanism for information flows in detail rather than just assuming that information flows. AnnaLee Saxenian, *The New Argonauts: Regional Advantage in a Global Economy* (Cambridge, MA: Harvard University Press, 2006). Her earlier work describes information flows among Silicon Valley and Route 128 [Boston-area] firms. AnnaLee Saxenian, *Regional Advantage: Culture and Competition in Silicon Valley and Route 128*. Cambridge, MA: Harvard University Press, 1994.

[54] Yuri Takhtyev *Coding Places: Software Practice in a South American City*, (Cambridge, MA: MIT Press, forthcoming). This is also prevalent in much of Latour's work, for example, "Circulating Reference: Sampling the Soil in the Amazon Forest" from *Pandora's Hope*, (Cambridge, MA: Harvard University Press, 1999).

[55] Aysu Sagun, Dino Bouchlaghem, and Chimay J Anumba, "A scenario-based study on information flow and collaboration patterns in disaster management." *Disasters* 33, no. 2 (2009): 216.

information will necessarily result in a set of actions—and if it fails, then the people have "malfunctioned." Information is sometimes imagined to produce a result because information is thought to be disembodied, yet meaningful. I would characterize this as "info-determinism."[56] The info-determinist perspective serves not only to deflect responsibility from public officials by implying that the "right" actions could not have been taken because the "right" information was not there, but also to re-imagine disaster response as an information problem. This understanding of information underpins much of the recent work about information systems for disaster response. Ronald Day also wrote about information determinism, albeit in a slightly different sense. Day says that information determinism refers to a sense that an "informational future" should be promoted and is actually inevitable.[57] John Seely Brown and Paul Duguid gesture to a similar idea when they refer to the temptation to reframe any problem in terms of information as "infoprefixation."[58] Similarly, Janaki Srinivasan has said that in policy circles the reification of the idea of information has occurred; people also reify information by blaming it.[59]

These theorists all point to the idea that people treat information as an ultimate good when it can be proposed as a solution without considering how what is considered information becomes meaningful in practice. Civic problems have been described as an information problem.[60] Politicians blamed the "information boogeyman," or lack of information or bad

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[56] Ronald Day uses the phrase, "information determinism": "As witnessed from European documentation through Cold War information theory and cybernetics and into the age of the "virtual," information determinism forms a discursive web that unites agencies, institutions, and cultural agencies across society toward the promotion of an information future." In Ronald E. Day, *The Modern Invention of Information: Discourse, History, and Power* (Carbondale, IL: Southern Illinois University Press, 2001): 91.

[57] Day was writing about the 1930s when tools of mechanical reproduction were often the basis of philosophical inquiry, as with Heidegger and Benjamin.

[58] Brown and Duguid define "infoprefixation" as follows: "Thus you don't need to look far these days to find much that is familiar in the world redefined as information. Books are portrayed as information containers, libraries as information warehouses, universities as information providers, and learning as information absorption. Organizations are depicted as information coordinators, meetings as information consolidators, talk as information exchange, markets as information-driven stimulus and response. This desire to see things in information's light no doubt drives what we think of as 'infoprefixation.'" Brown and Duguid, *Social Life of Information*, 21.

[59] Janaki Srinivasan, "The political life of information: 'Information' and the practice of governance in India" (PhD Dissertation, University of California, Berkeley: 2011).

[60] e. g., Jennifer S. Light, *From Warfare to Welfare: Defense Intellectuals and Urban Problems in Cold War America* (Baltimore, MD: Johns Hopkins University Press, 2003).

information, for what happened after Katrina.[61] The government response was widely considered a failure, and government reports insisted that the federal government did not have access to the right information to make appropriate decisions; information was also offered as the solution.[62] My focus on information means that I question assumptions about the veracity of information and what people will do with information, and analyze the role of institutions in information production, circulation, and quality—topics that were not the focus of the Katrina reports.[63] Whether praised or blamed, information is imagined to have a deterministic effect, and thus managed toward that end.

In his discussion of Critical Information Studies, Siva Vaidhyanathan quipped that the word information is not ideal, but, "Like an ill-fitting suit, at least it's big enough to cover everything, even if it's generally ugly."[64] Indeed, its polysemy is impressive. We may think "information" means the same thing in 1857 as in 2012, but it probably does not. Furthermore, a computer scientist may not mean the same thing that a politician means. In a way, this is the idea of information is a problematic boundary object between different fields.[65] Politicians say that they could not get the information needed to help people after Katrina; computer scientists respond that they can make information systems that will get them the right information. But what does it mean for an information system to contain information? Duguid has noted the imagined non-materiality of "information" amounts to a ghost in the machine.[66] If I have a floppy disk with a document on it, but no computer that can read the disk, can I be said to have the information in a document? Geoff Nunberg describes an imagined "information container" which can be moved from one

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61 Frances Fragos Townsend, "The Federal Response to Hurricane Katrina: Lessons Learned," Report to President Bush about Hurricane Katrina From Assistant to the President for Homeland Security and Counterterrorism (February 2006).

62 "The Secretary of Homeland Security is the President's principal Federal official for domestic incident management, but he had difficulty coordinating the disparate activities of Federal departments and agencies. The Secretary lacked real-time, accurate situational awareness of both the facts from the disaster area as well as the on-going response activities of the Federal, State, and local players." (Townsend, "The Federal Response to Hurricane Katrina," 52).

63 Assuming the veracity of information importantly ignores evidence that information is extremely politicized following a disaster.

64 Siva Vaidhyanathan, "Critical Information Studies." *Cultural Studies* 20, no. 2 (2006): 297.

65 Susan Leigh Star, and James R Griesemer, "Institutional Ecology, Translation, and Boundary Objects," Mario Biagioli, ed. *Social Studies Of Science* 19, no. 3 (1989): 387-420.

66 Duguid, "Material Matters: The Past and Futurology of the Book," in *The Future of the Book*, Geoffrey Nunberg, ed. (Berkeley, CA: University of California Press, 1996): 63-102. .

environment to another unproblematically.[67] "Information" as it is now used suggests something that is natural—something that is out there.[68] In many ways, "information" is an easy "thing" to blame or praise because when information is considered naturalistic then it is stripped of any of the politics that might influence it. The politics of information also implies that the proposed informational solutions to disasters are political, even thought they are portrayed as not being so, and likely serving those who are designated responders.

Consistent usage of "information" cannot be assumed in my sources, but I am interested in similar phenomena in different historical moments. Although information is not consistently used, it can gesture to stable concepts. Because "information" is such an ill-fitting suit, let me attempt to be slightly more specific about how I try to use this broad and sometimes unhelpful term in my analysis (as opposed what my sources mean by "information"). Although a cracked sidewalk, which after an earthquake could indicate surface fault rupture, could be called information because it informs someone, it is not what I mean by "information" here. If there was a photograph of a cracked sidewalk posted to a news website like CNN.com, or if someone sent a text message to a friend describing the location of the cracked sidewalk, that picture or text message would constitute information.

Today, those who are interested in making information systems for disaster response are difficult to pin down when they refer to "information," but I think they mean whatever can be embodied in information. When I say that information is embodied in some material form of information technology, I hope to appeal to the sensibilities of all informationalists—one cannot design an information system that accounts for all cracks in the sidewalk if those cracks in the sidewalk are not represented in some other form. The crack in the sidewalk cannot "flow" to others without representation.

The idea of "information" described above is actually much closer to a narrow conception of what Buckland calls "information-as-thing," or documents. Jonathan Furner argues that the word "information" does not actually describe any unique phenomena—it describes many ideas, for all of which there are more specific words to use.[69] Although the term "document" sounds a rather quixotic way to refer to a narrow conceptualization of information, it has a history with documentalists in the Library Sciences.[70]

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[67] Geoffrey Nunberg, "Farewell to the Information Age," in *The Future of the Book*, (Berkeley, CA: University of California Press, 1996).

[68] Nunberg, "Farewell to the Information Age."

[69] Jonathan Furner, "Information Studies Without Information," *Library Trends* 52, no. 3 (2004): 427-446.

[70] In my analysis I use the term information in the strict sense of Buckland's information-as-thing, because all of the documents I analyze are from libraries and

Document also has an implied social context—something is not a "document" unless intentionally considered so. Furthermore, using the term document implies that something was documented, not that it exists naturally in the environment. It implies a materialism that is important for this dissertation. The term document is particularly useful for analysis of communication in historical context because I rely mostly on documents (e.g., newspapers, letters, pictures, government documents) to explain and give evidence of what people did after an earthquake. In the analysis done for this dissertation, I am working with documents.

Historical studies can use documents to see the information infrastructure; the documents themselves can be understood to be artifacts of information infrastructure; documents can even describe how the information infrastructure worked. Additionally, I assume, in some cases, that public documents such as newspapers were part of how people made sense of the earthquakes. Documents can be read with an eye to how people might have used them to make sense of the earthquake; furthermore, documents can also be read for how people said they made sense of earthquakes. The organizational theorist Karl Weick developed a theory of sensemaking by examining actions during historical accidents and disasters.[71] Weick said that

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archives. I also refer to newspapers and letters as documents. Michael Buckland, "Information as Thing," *Journal of the American Society of Information Science* 42, no. 5 (1991): 351-360. See Michael Buckland, "What is a 'document'?" *Journal of the American Society for Information Science* 48, no. 9 (1997): 804-809. for a short discussion of this word. Neils W. Lund, "Document Theory," *Encyclopedia of Library and Information Sciences Third Edition* 43, no. 1 (2009): 399-432.

[71] Weick conceptualizes sensemaking as an ongoing process: "The basic idea of sensemaking is that reality is an ongoing accomplishment that emerges from efforts to create order and make retrospective sense of what occurs." Sensemaking was introduced because of "a growing dissatisfaction" decision-making as the focus of organizational analysis. Weick's study of the Mann Gulch disaster is the classic example of a study of sensemaking after a disaster. He concludes that trapped firefighters in Mann Gulch did not abandon their heavy tools and flee to save their own lives because the tools were so much of their identity. The embodied interaction between people, and people and objects in dangerous situations, are central to Weick's analysis of other disasters. In an analysis of a plane crash in Tenerife, Weick looked at how interdependencies became tighter in a stressful time, how people regressed to their automatic impulses including mindlessly obeying authority, and how this can increase the complexity of a situation. Weick also has examined the actions of the workers at the Bhopal plant disaster and suggested that the action that accompanied sensemaking prolonged the disaster because they oversimplified what was going on and made decisions that made the disaster worse. His work has been extended by researchers such as Buenza and Stark, who examined the potential role of information technology in sensemaking by showing that information technology allowed traders post-9/11 to re-establish their professional identities, and by Mills and

sensemaking is an ongoing process where people are always asking, "What is the story?"[72] Documents might be part of someone's sensemaking processes, or they might include hints of how people made sense of the situation.[73] The importance of becoming informed when something has changed (like after an earthquake) is perhaps obvious, or oversimplified, but repeated again in the disaster literature, and a starting point for me because it helps explain why disasters might be an interesting place to investigate informational phenomena. At least one of the elements that can aid in the sensemaking process are informative documents, such as newspapers, letters, photographs or maps, that would typically already be part of a person's routine. Perhaps precisely because of the importance of information after a disaster, however, there is great potential—and some might even say incentive—for manipulation of the story.

The idea of sensemaking is mostly about how documents are "consumed," and the institutional argument at the beginning of this section are about how documents get "produced." Production and consumption of documents are both social processes—the "information" does not determine the outcome. The next section reviews research about information infrastructure. After that, I'll synthesize my research approach and present my research questions.

Weatherbee, who showed that organizational identity was an important aspect of sensemaking after a hurricane in Halifax.

Karl E. Weick, "The Collapse of Sensemaking in Organizations: The Mann Gulch Disaster," *Administrative Science Quarterly* 38, no. 4 (1993): 635; Karl E. Weick, "The Vulnerable System: An Analysis of the Tenerife Air Disaster," *Journal of Management* 16, no. 3 (1990): 571-593; Karl E. Weick, "Reflections on Enacted Sensemaking in the Bhopal Disaster," *Journal of Management Studies* 47, no. 3 (2010): 537-550; Daniel Buenza and David Stark "Resolving Identities: Successive Crises in a Trading Room after 9/11," in *Wounded City: The Social Effects of the Attack on the World Trade Center*, Nancy Foner, ed. (New York, NY: Russell Sage Foundation, 2005); Jean Helms Mills and Terrance Weatherbee, "Hurricanes Hardly Happen: Sensemaking as a Framework for Understanding Organizational Disasters." *Culture and Organization* 12, no. 3 (2006): 265-279

[72] Karl E. Weick, Kathleen M Sutcliffe, and David Obstfeld. "Organizing and the Process of Sensemaking." Paul C. Nutt and David C. Wilson, eds. *Organization Science* 16, no. 4 (2005): 410.

[73] There are important ways in which the work on sensemaking is very different than my own. Weick's work on sensemaking and disasters is especially focused on what is going on inside people's heads that affects their action, whereas my focus is more describing the informational artifact, and the information environment that produced that document. Obviously, because the cases that I am examining are historical, it is hard to observe sensemaking in action. This has not proved to be an obstacle for many sensemaking researchers, including Weick, who has used documents and interviews to reconstruct the sensemaking process.

Information infrastructures

I intend this study to extend the theory of information infrastructure to talk about *public information infrastructure.*[74] Information infrastructure has not generally been used as a framework for society-level phenomena, but here I consider information infrastructure as the social and physical structure underlying the circulation of documents.[75] Public information infrastructure could be a critical analytical lens to examine the socio-technical relations that underpin concepts such as Benedict Anderson's "imagined community" or Habermas' "public sphere." As I noted in the introduction, the concept of infrastructure has been developed within the tradition of Science and Technology Studies (STS), and is generally used to study scientists.[76] Studies of infrastructure have most often looked at the development of infrastructure, and the information infrastructure itself as the object of analysis. This dissertation is a departure from traditional infrastructure studies in two ways. First, my focus is not on the making of everyday infrastructure, but how infrastructure is experienced and remade in extraordinary circumstances, and how documents are consumed. Second, I am interested in how the public makes sense of earthquakes.[77] Scientists are sometimes an important part of

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[74] An example of using the concept of "information infrastructure" as developed by Star, Bowker, Edwards, and others in non-scientific realms includes that of Daniel Perkel, "Making Art, Creating Infrastructure: deviantART and the Production of the Web," (PhD diss., University of California, Berkeley, 2011). Public information infrastructure should be read as a triad where "public" does not modify "information" or "information infrastructure." I borrow from Jean Lave and Etienne Wenger's discussion of "legitimate peripheral participation" as a triad in *Situated Learning.*

[75] Unlike "information order," which Bayly used to describe Colonial India. However, "information order" has not been established as a theoretical construct, because, I suspect, Bayly is a historian and does not see this as his project.

[76] Key work in STS on information infrastructure include: Susan Leigh Star and Karen Ruhleder, "Steps toward an Ecology of Infrastructure: Design and Access for Large Information Spaces," *Information Systems Research* 7, no.1 (1996): 111-134. ; Geoffry C. Bowker and Susan Leigh Star, *Sorting Things Out* (Cambridge, MA: MIT Press, 1999). Historical approaches to information infrastructure appear in Paul N. Edwards, "Meteorology as Infrastructural Globalism," *Osiris* 21, no. 1 (2006): 229-250; Paul Edwards, *A Vast Machine: Computer Models, Climate Data, and the Politics of Global Warming.* (Cambridge, MA:-MIT Press, 2010). (Policy-oriented body of work from the 1990s talks about information infrastructure as a national commodity.)

[77] Working within the context of information infrastructure situates the devices and technical elements of infrastructure within an institutional context, and provides insight into the making and circulating of public knowledge. In other words, the work on information infrastructure was developed as an abstract concept to examine scientists, I am going to use it to examine a problematic idea, the public.

how the public makes sense of earthquakes today, but the way that scientists themselves make sense of earthquakes is not the focus here.

In the science and technology studies tradition, infrastructure is "a broad category referring to *pervasive enabling resources in the networked form*."[78] Information infrastructure cannot be simply thought of as the "tube and wires."[79] STS theorists show that infrastructure includes a complex set of organizations, practices, and standards. Susan Leigh Star and Karen Ruhleder's original description of the dimensions of information infrastructure was succinctly summarized by Borgman as follows:

> Their eight dimensions can be paraphrased as follows: An infrastructure is *embedded* in other structures, social arrangements, and technologies. It is *transparent*, in that it invisibly supports tasks. Its *reach or scope* may be spatial or temporal, in that it reaches beyond a single event or a single site of practice. Infrastructure is *learned as part of membership* of an organization or group. It is linked with *conventions of practice* of day-today work. Infrastructure is the *embodiment of standards*, so that other tools and infrastructures can interconnect in a standardized way. It builds upon an *installed base*, inheriting both strengths and limitations from that base. And infrastructure becomes *visible upon breakdown*, in that we are most aware of it when it fails to work.[80]

These dimensions are descriptive, and helpful for specifying the facets of information infrastructure that I investigate. Dimensions such as "learned as a part of membership" clearly emphasize the scientist-oriented aspects of infrastructure and point to why extending these ideas to examine *public* information infrastructure may be more difficult. This dissertation focuses largely on a few of the dimensions of information infrastructure, that is, information practices, the embeddedness of information infrastructure, and what exactly becomes visible when infrastructure breaks down.

Dimensions of Infrastructure: Practices, Embeddedness, Reach, and Transparency

Information practices are conventions, often not explicit or formally

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[78] Geoffrey C. Bowker, Karen Baker, Florence Millerand, and David Ribes, "Toward Information Infrastructure Studies: Ways of Knowing in a Networked Environment," in *International Handbook of Internet Research*, ed. J. Hunsinger et al., (New York: Springer Science+Business Media B.V., 2010), 98.

[79] Bowker et al., "Toward Information Infrastructure Studies," 98.

[80] Christine L. Borgman, "The invisible library: Paradox of the global information infrastructure," *Library Trends* 51, no. 4 (2003): 654.

institutionalized, that shape and are shaped by information infrastructure.[81] As I set forth in the introduction, information practices are relational—one person's daily work is another's "infrastructure."[82] Additionally information infrastructure researchers say that infrastructure becomes meaningful in practice. From a very high-level perspective, my dissertation works within a practice framework which posits that people act within constrained environments, and that the constraints are relational and made in everyday practice. Paul Edwards proposed the word "infrastructuration" (after Giddens' "structuration") to describe the ways that people make infrastructure, but at the same time are limited by it.[83] I am interested in interrogating the part of this environment that makes and circulates information, and understanding the relation between these organs and information-related practice. In this dissertation, I sometimes imply that information practices make use of information infrastructure—this is not to deny that practice and infrastructure are mutually constituted, but acknowledges the relational quality of infrastructure. Furthermore, referring to practice and infrastructure helps to highlight the manner in which practice and infrastructure are related. When I say information practice in this dissertation, I am referring to the following: what people do with documents; what people say they do with documents; and what in particular people document and archive.

Infrastructure theorists say that infrastructure is built on an existing installed base and is embedded in particular institutions or ideologies. The existing installed base often limits the potential to change the information infrastructure—this is a concern for researchers who aim to improve information infrastructure.[84] Embeddedness in institutions is ever present in descriptions of information infrastructure by the STS community. Studies of the emergence of global climate knowledge infrastructure, such as Paul Edwards' work on "Meteorology as Infrastructural Globalism," are studies of the sociotechnical institutions that shared meteorological data. Edwards makes it clear that institutions that are shaping information infrastructure are not just the organizations involved, such as the International Meteorologic Organization, but the governments of countries where meteorological observations occur. The focus is on how these institutions produce a type of infrastructural or informational globalism. Edwards distinguishes this type of informational globalism from general use of information infrastructure that only acknowledges how various networked technologies can "facilitate global

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[81] Star and Ruhedler, "Steps toward an Ecology of Infrastructure: Design and Access for Large Information Spaces," 5.
[82] Star and Ruhleder, "Steps toward an Ecology of Infrastructure: Design and Access for Large Information Spaces," 4-5.
[83] Edwards, "Meteorology as Infrastructural Globalism," 239.
[84] Susan Leigh Star, "The Ethnography of Infrastructure." *American Behavioral Scientist* 43, no. 3 (1999): 382.

flows of information," but they "neither produce information, nor seek to control its quality."[85]

An interesting angle on embeddedness is thinking about authority, and who has the authority to make information and circulate it. Max Weber's concept of legitimate authority posited that there were three different kinds of authority relations within organizations: traditional, rational, and charismatic authority. For Weber, bureaucracy was powerful because it is an "instrument of rationally organizing authority relations."[86] The concept of authority with "information" can be understood as different than authority within an organization. Patrick Wilson described two different kinds of authority in his work: cognitive authority and administrative authority.[87] Administrative authority is authority that comes from hierarchical relations, and probably closest to the types of authority that Weber outlined. Cognitive authority is "based on claims to special knowledge."[88] Wilson says that the epistemic authority is fundamentally relational, and he uses this variation on authority to examine the authority of a text. For Wilson, authority of a text can lie in the people, institutions, or publishers who author texts, or even forms of text (such as a dictionary).

Another dimension of infrastructure is its transparency, but as information infrastructure researchers suggest that, "an infrastructure becomes visible upon breakdown." Hence, disasters offer a "method" for studying infrastructure.[89] I don't assume that earthquakes mean that technology ceases to work. Overstating the case, one might say an earthquake was an occasion where the public information infrastructure gained visibility because people were eager for information about the earthquake. The intense attention could overwhelm the information infrastructure, revealing how infrastructure worked and was embedded in different institutions.[90] This justification for studying breakdown – that unusual circumstances reveal what is "normal"

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85 Edwards, "Meteorology as Infrastructural Globalism," 239.

86 Max Weber, *Economy and Society Volume 2* (Berkeley, CA: University of California Press, 1978): 987.

87 Patrick Wilson, *Second-Hand Knowledge: Two Kinds of Authority.*

88 Library and information sciences generally uses the term cognitive authority, but Wilson also used the term epistemic authority, which I prefer. Patrick, Wilson, "Bibliographic Instruction and Cognitive Authority," *Library Trends* 39, no. 3 (1991): 259-270.

89 The study of information infrastructure is often referred to as "boring" because infrastructure is not glamorous, tends to be hidden and its implications are not obvious. Star often refers to the "Society of People Interested in Boring Things" e. g. Susan Leigh Star, "The Ethnography of Infrastructure." *American Behavioral Scientist* 43, no. 3 (1999): 377-391.

90 This reflects the idea from the sociology of disasters that people converge upon disaster sites and infrastructure after disasters.

about information infrastructure –is in line with the assertion by disaster researchers quoted in an early section. Examining infrastructure at times of breakdown is one way of "seeing" infrastructure. Another way is to invert the infrastructure.

Infrastructure researchers "invert" the infrastructure to "look at the 'bottom'—the parts you don't normally think about precisely because they have become standard, routine, transparent, invisible."[91] There are other ways of seeing and studying infrastructure. One "method" is infrastructural inversion. Paul Edwards argues that climate scientists are always inverting infrastructure to understand where climate data comes from: "continual self-interrogation, examining and reexamining its own past."[92] Susan Leigh Star suggests that studying information infrastructure means reading a document as an artifact, a record, and a veridical representation of infrastructure.[93]

Ingrained in the definition of information infrastructure is the last attribute of infrastructure this dissertation pays close attention to: researchers say that information infrastructure is, "Defined by its reach."[94] Information infrastructures enable the circulation of documents across vast distances. What kind of distance is actually not always totally clear. Star says that: "This may be either spatial or temporal – infrastructure has reach beyond a single event or one-site practice."[95] Another explanation of reach says that information infrastructure has "a certain kind of reach over time, space, and a range of human and institutional activities."[96] People imagine that the reach of infrastructure means that all information will have the same "effect" in all

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[91] Edwards, *A Vast Machine*, 20. Paul Edwards includes the institutions, documents, and data associated with climate change in his analysis of the development of the *global knowledge infrastructure* for climate data.

[92] Edwards, *A Vast Machine,* 432.

[93] Susan Leigh Star suggests that studying information infrastructure means reading a document as an artifact, record and as a veridical representation of infrastructure. All three of these different methods imply different ways of studying information practices in a historical context. For example, newspapers as *artifacts* can be read in various libraries and archives, and sometimes have a material quality to them different than the original artifact. The newspapers have articles that can be read as *records or traces* of what people thought or what happened. But I can also understand newspaper articles themselves as *veridical representations* of people making sense of the earthquake from whatever perspective they might bring to their writing. Susan Leigh Star, "The Ethnography of Infrastructure" *American Behavioral Scientist* 43, no. 3 (1999): 388.

[94] Star and Ruhedler, "Steps toward an Ecology of Infrastructure: Design and Access for Large Information Spaces," 5.

[95] Star, "The Ethnography of Infrastructure," 381.

[96] Steven J. Jackson, Paul N. Edwards, Geoffrey C. Bowker, and Cory P. Knobel, "Understanding Infrastructure: History, Heuristics, and Cyberinfrastructure Policy," *First Monday* 12, number 6 (June 2007),
URL: http://firstmonday.org/issues/issue12_6/jackson/index.html.

places, whether it be in different geographical places, or in different social groups. The reach of infrastructure, so central to information infrastructure's definition, is sometimes the only quality of infrastructure that people imagine is important. But, what does the reach of information infrastructure mean for people who make use of it? For traditional STS studies of information infrastructure, the reach of infrastructure has helped scientists to share or even collaborate with scientists in another place or institution. In the case of public information infrastructure, reach may shape what gets circulated because of a sense of an unknown audience. Sometimes pundits imagine that it was electronic networks that first enabled global reach; this is not the case. Historians of eighteenth-century disasters noted, "Increased trade and traffic made information about disasters widely available," and widely interpreted.[97] I used the concept of reach to query how an event, such as an earthquake, might be experienced as shaking locally. But the earthquake might also be experienced as an informational event by people far away.

Research Questions and Methodology

According to information infrastructure researchers, disasters can be appropriate venues information infrastructure because the non-working of infrastructure can bring to the surface expectations of how it should work. The following sections examine the research questions that I focused on, and how I approached my research. I work from the perspective of historians, anthropologists and geographers who have done research on disasters, and claim that it is an opportunity to understand what a society thinks of as "normal." From this point of view, my research can be understood as an examination of how information infrastructure works. Here are the research questions that I address in my dissertation that focus on the public information infrastructure:

- How does infrastructure become *visible upon breakdown*?
- How is the information infrastructure *embedded* in social institutions?
- How does the *installed base* influence the potential for post-event improvisation?
- How does the *reach* of information infrastructure what documents get circulated?

Information infrastructure researchers provide a conceptual framework of attributes for analysis, and a set of questions that one could ask. The

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[97] "[E]specially in Europe or North America, where newspapers as well as published letters and journals offered vivid accounts that excited the imaginations of writers, politicians, and divines, all of whom chimed in with interpretations about the meanings of these calamitous events." Alessa Johns, "Introduction," xii.

questions are intended to advance the idea of public information infrastructure and to give insight into how information infrastructure shapes how people experience earthquakes. In some of the questions directionality is implied, but this limits my analysis. For example, information infrastructure includes physical infrastructure and information practices, which influence and shape each other.

My approach to disaster research is drawn from work on information infrastructure, described above, and from perspectives on disaster from other fields. In particular, I take from the anthropological and the historical tradition of research on disasters, that disasters are opportunities to understand the everyday, or what infrastructure researchers say is sometimes transparent. As many disaster researchers argue, although unusual circumstances might also precipitate unusual behavior, they can offer glimpses into what people believe is ordinary. Information infrastructure researchers propose certain approaches to research that I make use of in this dissertation—inverting the infrastructure and examining how it becomes visible when it breaks down. Disasters are an interesting time to examine the operation of information infrastructures precisely because there is some interest in becoming informed about the new state of the world. In the case of understanding public information infrastructures, which are produced from particular political perspectives, disruptive circumstances help researchers understand how information infrastructures work.

In the next section, I provide some details about my research methods — making use of an archive as a field site — and discuss what historical research might add to infrastructure studies. Last, I briefly consider the limitations of historical research.

"Archive as Field Site"

This dissertation examines several earthquakes in different eras, at times during which different infrastructures, social worlds, and regimes of expertise reigned; how people made sense of the earthquakes using documents had to do with how those documents circulated. For each earthquake, I assembled a number of primary and secondary sources, treating the archive as a field site.[98] Anthropologists studying historical disasters have called for a conscientious construction of the archive, assembling the field.[99]

The historical field is a series of documents (texts, maps, photographs, movies, letters, government data) that I look at to explore the research questions set forth above. Exploring the archive is not simply a matter of

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[98] Mary Des Chene, "Locating the past." In *Anthropological Locations: Boundaries and Grounds of a Field Science*, Akhil Gupta and James Ferguson, eds. (Berkeley, CA: University of California Press, 1997).

[99] Garcia-Acosta, "Historical Disaster Research."

peeling "away the fictive elements in our documents . . . [to] the real facts."[100] Natalie Zemon Davis is interested in reading archives for the stories that get told in much the same way that I read the archive for evidence of information practices and information infrastructure. Davis says that she is:

> after evidence of how sixteenth-century people told stories . . . My method . . . [is] attending closely to the means and settings for producing the stories and to the means and settings for producing the stories and to the interests held by both narrator and audience in the storytelling event. But I will also be conceiving of 'structures' existing prior to that event in the minds and lives of the sixteenth-century participants."[101]

Davis points to the archive as a place where one must simultaneously read documents for the work that the author is doing in constructing the document for an intended audience, but that one must also attend to the implications of larger "structures," which for me certainly includes information infrastructure, as well as ethnicity, language, and class.

Although the research questions about information infrastructure are new to historical studies of disaster, other research about these earthquakes exists. I use this research for context, and cite it when it is applicable. I make extensive use of footnotes to show the sources that I have consulted, but also to make clear what evidence underpins my situated perspective. Furthermore, the previous research helped me orient specific foci in each chapter; it would be overwhelming to focus on everything about the public information infrastructure in each earthquake. So, beyond the research questions about information infrastructure specified above, data collection for each chapter of the dissertation was guided by a specific focus:

1868: How did the public make sense of an earthquake?
1906: How were people accounted for after the disaster (especially those who were displaced)?
1989: How did the government participate in the information infrastructure?

Each earthquake presented a different set of research challenges: in the 1868 earthquake, I was challenged by having little data; in the 1989 earthquake, the opposite was true. With the 1906 earthquake and the 1989 earthquake, I have tried to be clear about what choices I made. In the 1906 earthquake, I chose to focus on how people were accounted for, especially the people whose homes were destroyed. I then tried to track down every document I that

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[100] Natalie Zemon Davis, *Fiction in the Archives: Pardon Tales and their tellers in sixteenth-century France*, (Stanford, CA: Stanford University Press, 1987): 4-5.
[101] Davis, *Fiction in the Archives*, 4-5.

allowed me to understand how people got in touch with their personal contacts and how institutions kept track of people. In the 1989 earthquake, I examined the vision of "public information" in disaster plans, during the earthquake, and in post-earthquake analysis. Because the volume of documentation was so great about the 1989 earthquake, I had to make "sampling" choices, focusing on a subset of documents from the federal, state, and municipal levels of government. Additionally, since I am not the first person to write about these events, prior research guided my focus in some cases—I tried to target my research on aspects of each earthquake that has not be addressed.[102]

Limitations

I analyze how information infrastructure has shaped the ways in which Californians made sense of their experiences of major Bay Area earthquakes in 1868, 1906, and 1989. Specifying the temporal dimension in which to look at earthquake is difficult, yet a necessity. I have been using the phrase "post-earthquake" without a problem. Social forces in place long before an earthquake have a huge influence on whether the earthquakes are a "disaster." Additionally, to see the results of a disaster, one needs to look far into the future, not just at immediate reactions. Because my objective was to examine how the information infrastructures present themselves during different earthquakes, however, and dissertations are limited documents, I chose to focus on a few "moments"—the immediate one to two weeks after an earthquake. I look outside of this time period when significant post-disaster practices require explanation in terms of causes coming before the disaster, or when the implications of what is done immediately after a disaster reach far into the future.

I suggest that information infrastructure is particularly useful as a framework of analysis in my study in another way: information infrastructure researchers suggest that ways of analyzing infrastructure lend themselves to historical work with documents.[103] As E.H. Carr explains, "My first answer therefore to the question 'What is history?' is that it is a continuous process of interaction between the historian and his facts, an unending dialogue between the present and past."[104] He elaborates, "The historian, being an individual, is also a product of history and society." Thus, there are some limitations in using "information infrastructure" that are similar to studying "information" in

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[102] Please see appendix A, "Essay on Sources," in which I describe what resources I found at different libraries and archives.

[103] Susan Leigh Star, "Infrastructure and ethnographic practice." *Scandinavian Journal of Information Systems* 14, no. 2 (2002): 107-122; Star, "The Ethnography of Infrastructure."

[104] E. H. Carr, *What is History* (New York: Alfred A. Knopf, 1962): 35.

the historical context—it is hard to avoid putting our thoughts about present-day concepts in the past without distorting that past. William Aspray, echoing Herbert Butterfield, reminds us to avoid "whiggish" histories.[105]

After the 1857 earthquake, people looked for "information,"—the news available—and my study will rely on what was documented (documented communication or what is written in documents). Although the definition of information shifts throughout history I focus on the rather conservative definition of information – documents – to which I alluded earlier.[106] Using this definition of information allows me to discuss "public information infrastructure" in several historical moments because it doesn't assume a stable meaning of information. Certainly, information infrastructure as a concept has been developed to address networked environments; the question is whether its development in relation to digitally networked environments makes it useless or inappropriate outside of that environment. I believe that one justification for using infrastructure is embedded in its definition that includes reach—something hardly new to today's digital networks.[107] Furthermore, doing historical work about information infrastructure is not unusual and has precedence in the work of scholars such as Paul Edwards. Historical work has taken on the topic of information infrastructure in different terms. Some historical work about how documents circulate could be characterized as descriptions of the social and business worlds facilitated by information infrastructure.[108] Other work puts the specific institutions that facilitate the circulation of documents and the social or political meaning in the forefront.[109]

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[105] William Aspray, "The History of Information Science and Other Traditional Information Domains: Models for Future Research." *Libraries the Cultural Record* 46, no. 2 (2011): 230-232.

[106] Nunberg explains that the word "information" has a acquired a multitude of meanings since the end of the World War II, but that before information might have been much closer to an idea of "fact" where "intelligence" might imply more aggregation or analysis; the work of Claude Shanon was important to this transformation.

[107] Bowker et al., "Towards Information Infrastructure Studies," 98, says: "Superadded to the term "information," infrastructure refers loosely to digital facilities and services usually associated with the internet: computational services, help desks, and data repositories to name a few. In the same vein but in a broader sweep, the Global Information Infrastructure (GII) refers to worldwide information and communication systems that process and transport data inside and outside national boundaries."

[108] Darnton, Robert. "An Early Information Society: News and the Media in Eighteenth-Century Paris." *The American Historical Review* 105, no. 1 (February 2000); Emma Rothschild, *The Inner Life of Empires: An Eighteenth-Century History* (Princeton NJ: Princeton University Press, 2011).

[109] E.g., Richard R. John, *Spreading the News: The American Postal System from Franklin to Morse*. Cambridge, MA Harvard University Press, 1998; David M. Henkin, *The Postal*

Importantly, examining historical cases might afford the opportunity to refine ideas about information infrastructure.

I examine post-earthquake information practices by focusing on the documents produced by state and local governments, scientific papers, newspapers, and letters by ordinary Californians. Studying information infrastructure in historical moments is also inevitably an exploration of various archives, themselves sensemaking resources. Some disaster researchers today are focused on the people that are affected by a disaster, but other projects, particularly those focused on information technology for disaster response, focus on "professionals," or "officials," who are ostensibly responsible for the formal response. Sometimes researchers are concerned about how people closest to a disaster are informed, but it is usually focused on how experts can get information to people.

Even though the people formally designated to respond to a disaster are often referred to as the "first responders," they are not.[110] The first responders are those who are affected by disasters. Additionally, the construction of official "responders" and non-official "victims" has a very specific historical and cultural context; the government in 1857 bears little relation to the government we have today in terms of its role in disaster response, and thus these roles are problematic. The focus of this dissertation is the non-professional disaster responder—those people who are found in all of the earthquakes that I am examining. As I said earlier, this is distinct from other information infrastructure studies, focused on professional scientists. Although institutional archives make research of everyday people possible, they also are limiting—the proclivities of archivists of different eras makes some voices (those of the wealthy, powerful white men) much easier to hear. I have tried to listen for other points of view and other voices, but in some cases, I can only notice their absence.

My research ties together how information infrastructure, government institutions, and scientific explanations of earthquakes have together contributed to a type of sensemaking epistemology for Californians through an analysis of documents. Engagement with historical documents also allows me to address a number of broader questions that animate my research. The idea of "information" suggests a transcendent category, but as I have suggested above, the universality of "information" is worthy of interrogation. Are there information practices that transcend social or historical context, or are they always specific to a time and place? How can claims about a new infrastructural epistemology be assessed? What is the relationship between

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Age: The Emergence of Modern Communications in Nineteenth-Century America. (Chicago, IL: University of Chicago Press, 2006).

110 Leysia Palen, Starr Roxanne Hiltz, and Sophia B Liu, "Online Forums Supporting Grassroots Participation in Emergency Preparedness and Response," *Communications of the ACM* 50, no. 3 (2007).

changing technological infrastructure and changing information-related practices? While my dissertation cannot possibly answer these questions, it will provide a history of information practices that may speak to these questions.

Chapter 3: 1868 Hayward Fault Earthquake

William Henry Knight, Bancroft's publishing department manager, wrote to his mother four days after the great earthquake of 1868: "You will have heard all about our great earthquake, the exagerated [sic] reports, and the succeeding reports making light of the whole affair. But a few words about it direct from one who experienced it may have a peculiar interest."[1] The next three pages of the letter provide details about the earthquake as Knight tried to make sense of what had happened in San Francisco:

> last Wednesday morning at five minutes to 8 . . . . the house . . . was shaken as by a giant . . . we all suddenly adjourned to the street—not because we were scared, of course, but we wanted to see if our neighbors were alarmed . . . I . . . immediately hurried to the store. The business streets were full of excited people, and rumors of killed and fallen walls, etc. were rife.[2]

Knight wrote his mother in New York to assure her that he was well amidst conflicting stories already sent on the cross-continental telegraph and published in the newspapers—he was anxious about the tales that might have preceded his own.

The Hayward Fault ruptured on October 21, 1868, at approximately 8:00 am. This chapter focuses on how people made sense of that earthquake, particularly the role of the information infrastructure in constructing the narrative.[3] I examine how the print and telegraphic infrastructure, as well as

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[1] William Henry Knight. Letter. San Francisco, October 25, 1868. BANC MSS 76/116, page 1. Bancroft Library, Berkeley, California. Last accessed February 1, 2011 online: http://content.cdlib.org/ark:/13030/hb6r29p1h5/?order=1

[2] Knight, letter, 1-3.

[3] Most of the chapter relies primarily on a close analysis of several California newspapers, including California's first daily, *The Daily Alta California*, in San Francisco; the year-old *San Francisco Daily Morning Chronicle*, a newspaper that pioneered a number of "sensational" twentieth-century newspaper techniques in San Francisco; and the *Sacramento Daily Union*. Other newspapers and periodicals from Alameda County (including Oakland and San Leandro), San Jose, and San Francisco were used and are noted extensively in the footnotes. I make use of the term "Californians" as in the "California public" extensively throughout the chapter. I mean the term "public" in its most problematic sense—it represents the voices of

other "organs of the public sphere," shaped the public narrative of what happened. This chapter takes on two of the themes outlined in the introduction: first, how the reach of information infrastructure and the "instant" connection of the telegraph shaped the experience of the disaster; and, second, who claimed the informational authority to explain or define the narrative of what happened. In addition, this chapter confronts an uncomfortable tension felt by residents of California: individuals were aware of earthquakes and recognized them as an inevitable consequence of living in their particular location, yet at the same time they considered them frightening and, among other things, bad for business.

Most personal letters from residents to people located outside of California presumed, as Knight's did, that they were writing in the wake of a telegraphed version of the story and indicated some anxiety about the time between when the first news of the earthquake arrived via telegram in the newspapers and the arrival of their own letters in the mail.[4] These tensions built up not only in personal relationships, but also on a political level. The reach of the telegraphic infrastructure allowed some individuals to get their story through to the eastern United States immediately. Whose story got through, however, reflected the institutional arrangements in San Francisco. Many people like Knight could not afford to send telegrams; the San Francisco Chamber of Commerce with the support of the San Francisco Board of Supervisors, sent the "correct" version of the story. The reach of the telegraphic information infrastructure was an immediate cause for concern among the business community; the perception of California as "earthquake country" was problematic for groups like the Chamber of Commerce and their business interests.

The Chamber of Commerce and some newspaper companies claimed the authority to explain what happened. The picture that people in the eastern United States had of the earthquake was also owing itself to a multitude of sources, such as illustrations, photographs, and special editions of San Francisco newspapers explicitly produced for San Franciscans to send to those located outside of the area. How were the newspaper companies to report the earthquake? On the one hand, there was competition among the newspapers to make stories maximally interesting to local patrons to sell more newspapers, which involved acknowledging the earthquake and even talking about safety

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those who wrote for and owned newspapers, and the newspapers that were widely preserved. The Annex "Essay on Sources" deals with this extensively.

[4] "I presume you have read an account in the papers of the earthquake." Nettie Denman to "Cousin," letter, December 10, 1868, mss 5/10 San Francisco Public library; also see J. McDowell to Henry A Collin, letter, October 21, 1868, Henry A. Collin correspondence, 1856-1875 Original BANC MSS 2005/196c -- BANC FILM 3233, Bancroft Library.

precautions for buildings.[5] Portrayals of the earthquake were shaped, however, by an underlying concern about the business interests of California.[6]

Charles Wollenberg argues that San Francisco newspapers were "trying to bolster business and public confidence."[7] Business interests would have wanted to downplay earthquakes because the state received investment in extractive industries.[8] Further, miners and real estate developers needed laborers, and it was easier to persuade people to migrate to a state in which it was safe to live.[9] Wollenberg argues that ensuring real estate value was not diminished was the project of many in California, including the Chamber of Commerce.[10]

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[5] "Scholars and lay people alike had a new awareness of seismic danger and of earthquake-resistant retrofit and design." Stephen Tobriner, *Bracing for Disaster: Earthquake-Resistant Architecture and Engineering 1838-1933* (Berkeley, CA: Heyday Books, 2006). The evening of the earthquake, the *Bulletin* wrote about "The Earthquake and its Lesson," *San Francisco Evening Bulletin,* October 21, 1868. Also see "The Results and Lessons of the Earthquake," *Daily Alta California*, October 22, 1868. The last section of this chapter gets into the "lessons" of the earthquake.

[6] For one thing, Brechin argues, San Francisco was built largely on the extraction of goods from the earth. Gray Brechin, *Imperial San Francisco: Urban Power, Earthly Ruin* (Berkeley, CA: University of California Press, 2006). Charles Wollenberg argued that many newspapers joined together with the Chamber of Commerce in promoting San Francisco as a safe place to live and invest. Charles Wollenberg, "Life on the Seismic Frontier : The Great San Francisco Earthquake (Of 1868)." *California History* 71, no. 4: 502.

[7] Wollenberg, "Life on the Seismic Frontier," 502.

[8] As Brechin writes in *Imperial City*, San Francisco was built on profits of companies who profited from the extraction of goods from the earth;[rpt] also Richard A. Walker, "California's Golden Road to Riches: Natural Resources and Regional Capitalism, 1848-1940." *Annals of the Association of American Geographers* 91, no. 1 (2001): 167-199.

[9] "It was to be expected that exaggerated stories of the earthquake would be sent to the East, and would be circulated so as to alarm people there for the safety of friends and relatives of Californians, and to deter persons from coming to the Pacific coast." "Earthquake Exaggerations," *Daily Alta California*, November 7, 1868.

[10] Wollenberg argues that real estate prices were paramount to understanding how San Franciscans reported the earthquake. Wollenberg, "Life on the Seismic Frontier," 502. (e.g., "In the excitement yesterday many foolish people were prophesying a great depreciation in city property. This is all nonsense. . . . no such shocks can seriously interfere with the destiny of San Francisco, which is to become one of the greatest cities of the world within a few years." "Depreciation of Property," *Daily Morning Chronicle*, October 22, 1868.). One letter written immediately after the earthquake indicated that the primary concern of some people after the earthquake, after feeling safe, was real estate value: "The confidence of our people in San Francisco's future is not shaken in the least; nor has real estate in that part of the city built on natural or

The first half of this chapter gives an overview of the earthquake; it then goes on to analyze the use of the information infrastructure in California, focusing on print and the telegraph as methods for circulating documents. I follow the news of the earthquake going from west to east, looking at how town newspapers reported local damage. People tried to make sense of the earthquake in the scientific and cultural terms available. The telegraph allowed newspapers to include other towns in their reporting, although the telegraph reports were not always reliable. I then turn my attention to how the earthquake was reported in the eastern United States, with particular attention to the reporting of estimated aggregate damage. The San Francisco Chamber of Commerce crafted a stylized telegram about the earthquake damage to serve their commercial interests; but, this information had to compete with images and special illustrated newspaper editions. The California public was partly trying to make sense of the damage for themselves, but also for the public in the eastern United States—a connection facilitated by the telegraph.

The second half of this chapter focuses on authoritative information about what happened and how to proceed. The local government and the California Academy of Sciences had the opportunity to try to shape how to make sense of the earthquake as people searched for informational authorities. The government decided to rebuild its properties based on their concerns about how those buildings would be perceived, rather than based on the advice of architects. Scientists never produced a report about the earthquake. Government and scientific institutions failed to produce the insights that the public sought. In lieu of these institutions taking charge of the "response," the Chamber of Commerce formed the "Earthquake Committee" to make scientific findings, and the public came up with their own "lessons learned."

Overview of the Earthquake

Different reports today say 30 people died as a result of the earthquake.[11] The earthquake had an epicenter in Alameda County, near

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original ground declined in value to the extent of a dollar." C. W. C., correspondence, "San Francisco, Nov. 9," Chicago *Tribune*, November 25, 1868.

[11] "Historic Earthquakes: Hayward, California," U.S. Geological Survey (USGS), accessed April 17, 2011, http://earthquake.usgs.gov/regional/states/events/1868_10_21.php. Modified and abridged from Carl W. Stover and Jerry L. Coffman, *Seismicity of the United States, 1568-1989,* U.S. Geological Survey Professional Paper 1527, (Washington, D.C.: United States Government Printing Office, 1993.) The USGS report says the following: "Property loss was extensive and 30 people were killed. Five deaths were reported in San Francisco, out of a population of 150,000, where the total property loss was estimated to be $350,000 ($5-100 Million in 2007 dollars)." The Lawson report said that the "total list of casualties numbered to about 5, and about 25 more occurred

Hayward, and had a an estimated magnitude of 6.8 to 7.0.[12] Although the earthquake was in the East Bay, many of the damaged buildings were in San Francisco, particularly on made (fill) land. The population of California had grown significantly since 1857, but Alameda County was still sparsely populated: the population according to the 1860 census was 8,927, and in 1870 the population was 24,237.[13] Conversely, San Francisco County was more densely populated and grew from 56,802 in 1860 to 149,473 in 1870.

The earthquake was felt on the San Francisco Peninsula in San Mateo County—damaging the courthouse in Redwood City—and San Leandro, a town close to the epicenter. At the southern end of the San Francisco Bay, the spire of the Presbyterian church in San Jose fell. Despite this damage, after the earthquake most Californians turned to San Francisco, the business and population center of the state, to see how the residents of the city fared. According to analysis by Steven Tobriner, approximately 50 buildings in San Francisco were "wrecked" or "badly shattered."[14] Architectural details such as cornices and other decorative embellishments were often destroyed. The damage done to San Francisco, in terms of 1868 dollars, was a subject of great debate and will be elaborated on later in this chapter; estimates at the time put the damage somewhere between $300,000 and $5,000,000.

Reporting on Local Damage

There was demand within San Francisco for news about the earthquake. The *San Francisco Evening Bulletin* kept their presses running late, "so great was the demand for information in regard to what had happened."[15] To fulfill this

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from secondary causes." Andrew Lawson, *The California Earthquake of April 18, 1906, Report of the State Earthquake Investigation Commission in Two Volumes and Atlas* (Washington, D.C.: Carnegie Institution, 1908): 434-448.

[12] Hayward was referred to as Haywood and Hayward's. "October 21, 1868 Hayward California Earthquake," U.S. Geological Survey (USGS), accessed April 17, 2011, http://earthquake.usgs.gov/regional/nca/1868/.

[13] See the Annexes for more information about the Bay Area population and for maps of the earthquakes.

[14] Tobriner completed a careful analysis of building damage from the newspaper reports after 1868, and made a map which summarized the damage, and showed that most of it was indeed on what was called made land. Stephen Tobriner, *Bracing for Disaster: Earthquake-Resistant Architecture and Engineering 1838-1933* (Berkeley, CA: Heyday Books, 2006): 3:49.

[15] *San Francisco Evening Bulletin*, October 22, 1868. "Unparalleled Journalism," *San Francisco Daily Morning Chronicle,* October 22, 1868. It seems that there was a paper issued in the morning at the normal time for the *Chronicle*, another edition issued at around 1:00 pm, and a third edition issued at 3:30 pm. The *Chronicle* reported that 9,000 copies of the extra on the day of the earthquake were sold. Of course, this

demand, newspapers reported on damage in their own city, in other affected areas, and on the well being of other people. In San Francisco, where most of the damage occurred, newspapers advertised that their reporters had collected all of the information regarding damage to various buildings and people who might have been hurt. Generally, a city newspaper would report the damage to their area in great detail, describing each damaged building, business, and person. Sometimes the descriptions seem to be organized by location, as if personnel from the *Daily Morning Chronicle* had walked the streets noting all of the damage they saw or heard of and printed the notes directly into the newspaper. Other newspapers reported using similar protocols. The *San Francisco Morning Call* noted, "The lengthy report of the calamitous event . . . has been collected by faithful and reliable reporters, who speak from personal observation. It will be found nearly correct in detail."[16]

On the evening of the earthquake the *Daily Morning Chronicle* printed an extra issue, and the editors were quick to pat their own back with the announcement that this was an act of "unparalleled journalism."[17] The *Chronicle* bragged, "our account was so full [in the Extra] that the evening papers fell far short of it in completeness of detail." The *Extra* included long lists of incidents, each described by a sentence or two, gathered by the *Chronicle* staff.

Printing a newspaper after the earthquake was difficult. In some newspaper rooms, type was strewn all over the floor. As the earthquake occurred just after 8:00 am, morning newspapers had already been published; evening newspapers effectively had the "scoop," but had to produce an edition with a shaken printing room.[18] Many working in the print rooms were reluctant to return to work, yet because of the desire for extra editions of the

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might have been pure exaggeration, but the reports of demand for news indicate the importance of the newspaper for the public.

[16] The *San Francisco Morning Call*, October 22, 1868. "The lengthy report of the calamitous event which occurred in this city yesterday, published in THE CALL this morning, has been collected by faithful and reliable reporters, who speak from personal observation. It will be found nearly correct in detail."

[17] "Unparalleled Journalism," *San Francisco Daily Morning Chronicle,* October 22, 1868. The *Chronicle* described their reporting practices: "From eight o'clock in the morning . . . half a dozen regular and special locals . . . were actively employed in gathering the facts and details of the catastrophe. Before noon all the intelligence relating to the earthquake had been collected, digested and printed . . . One [local reporter] was dispatched across the bay to gather intelligence in regard to the results of the catastrophe in Alameda county."

[18] One paper actually printed a story that the injury caused their printing office made it impossible to print news about the earthquake itself. "By the Vallejo Route," *Sacramento Daily Union*, October 27, 1868, quoting from the *Pacheco Gazette* of October 24, 1868.

newspaper, there was additional pressure for workers to return to the office.[19] Some damaged offices, such as that of the *San Francisco Evening Bulletin*, managed to print an evening newspaper the day of the earthquake.[20] Not all were like the *Bulletin*, however; newspaper companies that were in smaller towns or that printed non-English newspapers recovered more slowly.[21]

Not surprisingly, given the origination of the earthquake, some reports said the most damaged newspaper was in San Leandro—the *Alameda County Gazette*.[22] The newspaper did print an edition several days after the earthquake and declared, "[W]e . . . make no apology for our somewhat demoralized appearance, for we are thankful as we look upon the wreck around us, that we are able to issue even these few hastily written words."[23] Newspapers were proud about getting timely newspaper publication, so accusations of disruption of printing were contentious, but also sympathetic to damaged brethren.[24]

There was demand for news and competition to get the story out despite challenging printing conditions. The reporting was not always straightforward. Reports about physical damage to buildings were interspersed with news about injured people and even the dead. The *Extra Chronicle*

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[19] "Brief Items," *Sacramento Daily Union*, October 27, 1868; "Laboring Under Difficulties," *San Francisco Daily Morning Chronicle*, October 23, 1868; "The Earthquake in San Francisco," *Sacramento Daily Union*, October 27, 1868

[20] "The 'Bulletin' Yesterday," *San Francisco Evening Bulletin,* October 22, 1868

[21] Both the *San Francisco Daily Alta California* and the *San Francisco Daily Morning Chronicle* reported that the *Hebrew* newspaper was damaged badly. "Our Great Calamity," *San Francisco Daily Morning Chronicle*, October 22, 1868; "Local Intelligence. The Great Earthquake of 1868," *San Francisco Daily Alta California*, October 22, 1868. Printers in the small towns south of San Francisco, such as San Jose, were reported to have a particularly difficult time with the earthquake. *San Jose Mercury News*, October 22, 1868; *San Jose Weekly Argus*, October 24, 1868; "Quick Dispatch," *Sacramento Daily Union*, October 24, 1868.

[22] "The Great Earthquake," *Daily Alta California*, October 23, 1868, quoting the *Oakland News* of October 21, 1868.

[23] The October 24, 1868 edition of the *Alameda County Gazette* opens with, "[W]e present you, dear reader, with our earthquake edition"—their first paper issued after the earthquake on October 21, 1868. The advertising pages for the inside of the paper were only "slightly pied . . . by . . . judiciously patching up the dead matter which was not 'pied,' we are enabled to put in an appearance." ("Pied" here refers to the type being in disarray.) The newspaper explained that the first and fourth pages of the newspaper were printed before the earthquake, but that these "two principle [sic] advertising pages are worthless" so they would publish a "small sheet" next week.

[24] The Oakland *Daily Transcript* vociferously objected to the *San Francisco Bulletin* accusation that their type was mixed up. "A Very Horny Dilemma," *Oakland Daily Transcript*, October 23, 1868. The *Daily Transcript* demonstrated some camaraderie and sympathy in their comments about the *Gazette*: "This is rather hard upon our brother but we are satisfied that he will come out all right yet." "A Very Horny Dilemma," *Oakland Daily Transcript*, October 23, 1868.

included descriptions of seven deaths in San Francisco and one death in Alameda County.[25] Newspaper reporting about death in San Francisco was confusing. As an example, the *Daily Alta California* reported on the number of deaths on October 22: "[F]our persons were killed by the falling of cornices and chimneys."[26] However, the newspaper seemed to include reports of five deaths in San Francisco.[27] Although it was initially uncertain exactly how many people had died, newspapers quickly arrived at the number of four dead in the city of San Francisco and one dead in San Leandro. Eventually, the death of a city employee at the courthouse in San Leandro was added to the four deaths from San Francisco, so summaries of damage said "five were thus killed."[28] Newspapers were very optimistic about their reports: "It is marvelous that so few lives should have been lost amid such a wreck of matter."[29]

How Newspapers Described the Earthquake

Newspaper articles made comparisons between California and elsewhere in the world, particularly South America, as a way of downplaying the damage. Recent earthquakes in South America had claimed thousands of lives. The *Daily Alta California* reassured readers by describing how similar devastation in other cities after earthquakes could not happen in San Francisco because, for example, houses in Quito, Ecuador used mud rather than mortar.[30] People also made sense of the damage by describing how the earthquakes in South America felt.[31] Discussions of the earthquake

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[25] "Extra," *San Francisco Daily Morning Chronicle*, October 21, 1868.

[26] "The Results and Lessons of the Earthquake," *Daily Alta California*, October 22, 1868.

[27] The list included five people: (1) William Best, killed in the yard of the Occidental Hotel; (2) William Kellog Strong; (3) James B. Mansfield, died on Clay street after a cornice or fire-wall falling on him; (4) "On Taylor street, above Sutter, --- -----, whilst working in the back yard, was killed by a falling chimney"; and (5) "Late in the afternoon the corpse of a Chinaman, frightfully disfigured, was dug out . . . on Clay street." "Local Intelligence. The Great Earthquake of 1868. List of Casualties," *Daily Alta California*, October 22, 1868. The next day, the *Daily Alta California* reported four deaths, but they were not consistent about the names of the dead they reported. "Local Intelligence. After the Earthquake," *Daily Alta California,* October 23, 1868. The casualties included Best, Strong, Mansfield, and, "Kung Yung, aged forty-one, killed at or near No. 410 Clay street." One person disappeared from the accounts without explanation.

[28] *The Golden Era,* October 24, 1868.

[29] "By Telegraph," *San Francisco Daily Morning Chronicle*, October 21, 1868.

[30] "Some Facts about Earthquakes," *Daily Alta California*, October 24, 1868.

[31] "A gentleman who was in Callao during the recent earthquake in that city, says that the shock yesterday in San Francisco was equal in violence but much shorter in

acknowledged that "*California is an earthquake country,*" but only so far as to say that it is not like other earthquake countries.[32]

There were a number of other ways in which newspapers and other periodicals sought to reassure their readers and investors and make sense of the earthquake: equating earthquakes to other natural disasters experienced in eastern states, arguing for a nihilistic attitude (i.e.,the earth is one unavoidable disaster), insisting the 1868 earthquake would be the worst earthquake anyone would experience in California, and connecting California earthquakes to worldwide phenomena.[33] These techniques helped reassure the readers and business interests, in addition to helping sell newspapers.

Some reports said people ran into the streets screaming because they were reminded of the news of destructive earthquakes in South America.[34] Accounts of the earthquake often tried to characterize the reaction of the California public. At once, the mass of people was described as terribly frightened and calm; laughing without a care in the world and running into the streets, terrified; panicked, brave and noble.[35] Newspapers even went as far as encouraging a boastful attitude in the face of earthquakes: "Californians are remarkable for their disregard of human life."[36] After weeks of aftershocks,

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duration." W. H. H., "My First Experience of an Earthquake," *Sacramento Daily Union,* October 23, 1868.

[32] "Earthquake Theories," *Overland Monthly and Out West Magazine* 1, no. 5 (November 1868): 474 (accessed from American Periodicals Series Online in December 2009). [emphasis in original]

[33] Comparing San Francisco to other locales experiencing earthquakes and comparing earthquakes to other disasters: "Some Facts about Earthquakes," *Daily Alta California*, October 24, 1868. Nihilism in San Francisco: "An Unsafe Planet," *Daily Morning Chronicle*, October 23, 1868. Assurance that this would be the worst California earthquake: *Oakland Daily News,* October 22, 1868; "The Great Earthquake: World wide disturbance," *San Francisco Evening Bulletin*, October 21, 1868.

[34] "They seemed to feel that from flood and fire there was escape, but from earthquakes—especially like that of which they were doubtless reminded in South America—none." "City Intelligence at San Francisco," *Sacramento Daily Union,* October 22, 1868. The report was from "A gentleman who came up from San Francisco last evening." One letter writer noted that people could not help but remember the stories of the devastation of the earthquake in South America: "This introduction is immediately induced from the burning memory of what a sister continent has just experienced." H.P., "The Great Earthquake," *Daily Alta California*, October 24, 1868.

[35] "General Remarks," *Alameda County Gazette*, San Leandro, October 24, 1868; "The Effect on Men and Animals," *Daily Alta California*, October 22, 1868; "Extra! Earthquake," *Daily Morning Chronicle*, October 21, 1868.

[36] "Pacific Slope Intelligence," *Daily Alta California*, October 25, 1868; the same report in the *San Francisco Evening Bulletin* "Effects of the Earthquake at San Francisco," *San*

however, descriptions of the mood of Californians appearing in the *Chicago Tribune* were much less glorious and decidedly more pained.[37] The variation in descriptions betrays the newspapers' anxieties about how to portray the San Francisco public, which reflects tensions between playing the earthquake up or down.

Social practices of 1868 shaped the manner in which people's reactions to the earthquake were described. Newspaper reports of gender-based behavior tell of emotional women as an impediment to the reasonable reaction of men.[38] In some cases, women were apparently so frightened that they could not stay conscious;[39] many articles reported women having trouble staying on their feet.[40] Not only were women portrayed as useless after the earthquake, but the fact that the earthquake occurred early in the morning meant that there was occasion for women to be inappropriately dressed, an apparently titillating experience for many people writing about the earthquake.[41] A popular trope was that of women being "dishabille," meaning undressed;[42] this was usually announced by the newspapers with great pleasure and much winking that "ladies" were found in such a state.[43] The sight of discombobulated and disoriented women was often portrayed as quite funny and even ludicrous, and shows how even a dramatic event such as an earthquake had to fit dominant gender narratives.[44]

Some newspapers published stories trying to downplay the earthquake for business purposes, but some of the newspaper companies likely had an eye to their readers. People of the Bay Area likely wanted to be soothed, and they may have wanted exciting stories to send friends—desires that may have been

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Francisco Evening Bulletin, October 24, 1868, quoting the October 23, 1868 edition of the *Marysville Appeal*.

[37] C. W. C., correspondence, "San Francisco, Nov. 9," *Chicago Tribune*, November 25, 1868.

[38] *San Francisco Evening Bulletin*, October 21, 1868.

[39] "Local Intelligence. The Great Earthquake of 1868," *Daily Alta California*, October 22, 1868.

[40] "City Incidents," *Daily Morning Chronicle*, October 21, 1868; "The Earthquake in Stockton," *Sacramento Daily Union*, October 23, 1868; "Earthquake Over The Bay," *Daily Morning Chronicle*, October 22, 1868; "Local Intelligence" and "Our Institutions of Learning," *Oakland Daily Transcript*, October 26, 1868.

[41] "Earthquake Over The Bay," *Daily Morning Chronicle*, October 22, 1868; " Local Intelligence," *Daily Morning Chronicle*, October 22, 1868.

[42] "The scene that then ensued beggars all description—men, women and children rushed frantically forth *en dishabille* into the streets, panic-stricken, and scarce knowing whither to turn for safety, and tremblingly awaiting what the next moment should bring forth." "Earthquake Over The Bay," *Daily Morning Chronicle*, October 22, 1868.

[43] *San Jose Weekly Argus,* October 24, 1868.

[44] "Local Intelligence. The Great Earthquake of 1868," *Daily Alta California,* October 22, 1868.

at odds and were reflected in the conflicting descriptions of the "spirit of the people" or in making sense of the earthquake by comparison. Comparing the earthquake in California to those experienced elsewhere was one way of dealing with tension between selling newspapers, interests in the growth of California, and the problematic fact that earthquakes happened more frequently in California than in other states.

Reporting on Other Places

Newspaper reporters were able to cover their cities, and perhaps nearby cities, on the day of the earthquake, but people were eager to understand the impact of the earthquake around California—thus, newspaper companies made use of the telegraph. In regular circumstances, large daily San Francisco newspaper companies relied on the telegraph for urgent news, although the details about the news were scant. After the earthquake, San Francisco newspapers turned to the telegraph to find out what was happening in other locations that may have felt the earthquake. Most of the local newspapers reported on damage in other cities from telegrams, usually printed grouped by region or county. This made it possible to ascertain the reach of the earthquake and the relative impact in different regions.

Newspapers promised that their telegraphic dispatches were unique, but nearly identical reports under the headline of "Telegraph" appeared in the *Daily Morning Call, Daily Morning Chronicle,* and *Daily Alta California.*[45] (The *Sacramento* Daily *Union*, the *Daily Alta California* and the *Evening Bulletin* apparently enjoyed exclusive access to California Associated Press dispatches, but these dispatches were occasionally "stolen" by other newspapers.)[46] That the *Call, Alta*, and *Chronicle* had similar reports for cities indicates that whatever telegrams got through on the day of the earthquake became the story that all subsequent descriptions of the earthquake must have had to acknowledge.

The first reports of faraway damage printed in newspapers were

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[45] The *Daily Morning Call*, which claimed in gothic font and bold headlines, that their reports were "By Western Union Line" and "Specially to this *Daily Morning Call*." The *Daily Alta California* proudly declared that the Telegraphic reports they had were from "The State Line." The *Daily Morning Chronicle* reported that their dispatches were "Special Dispatches to the Chronicle." The *Daily Alta California* was in the California Associated Press group with the San Francisco *Evening Bulletin* and the Sacramento *Daily Union*. The *Daily Morning Chronicle* was an upstart that was not included in the Associated Press group. John Denton Carter, "The San Francisco Bulletin, 1855-1865: A Study in the Beginnings of Pacific Coast Journalism" (University of California, 1941): 243; Richard Schwarzlose, *The Nation's Newsbrokers: Vol. 2, The Rush to Institution, from 1865 to 1920* (Evanston, IL: Northwestern University Press, 1990).
[46] John Bruce, *Gaudy Century: The Story of San Francisco's Hundred Years of Robust Journalism* (New York: Random House 1948.

received by telegraph, but detailed reports were received via letter or eyewitness report or else copied from another town's newspaper. Initial skeletal reports coming from the telegraph were fleshed out with detail and commentary from other newspapers in what Kielbowicz called the "two step flow."[47] As Knight's mother might have read newspapers giving details about the earthquake from telegrams, Knight's letter filled in the details and personalized the earthquake.

Some communities in the East Bay tried to contact San Francisco, but found that telegraph communication had been cut off.[48] Similarly, a San Francisco newspaper reported that the telegraph was "not operating" the morning of the earthquake.[49] Faced with a non-working telegraph and desperate to hear from San Francisco, Oaklanders tried to work around broken parts of the telegraphic network by sending messages from Oakland to San Francisco via Sacramento.[50]

In one case, the *San Francisco Daily Morning Chronicle* sent reporters to Oakland. The *Chronicle* asserted the day after the earthquake that the impact was dramatic: "To add to the terror of the scene, large trees . . . were uprooted."[51] These reports outraged the Oakland newspaper reporters and editors: "The eyes of the *Chronicle* reporter must have been remarkably sharp, for he saw what no other person in the city saw if he did see any of our oak trees uprooted from their beds."[52] The *Chronicle* argued, "The *Oakland News* is trying to make out that there was no earthquake in Oakland worth mentioning."[53] Oakland newspapers countered saying, "[visitors from San Francisco] had been reading the *Chronicle*, and expected to see things here in a . . . worse state."[54] The debate between the *San Francisco Daily Morning Chronicle*

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[47] Richard B. Kielbowicz, "News Gathering by Mail in the Age of the Telegraph : Adapting to a New Technology." *Technology and Culture* 28, no. 1 (1987): 26-41.In the book *News in the Mail,* Kielbowicz also argues that the telegraph promoted the ideas behind inverted journalism. The telegraph was for "facts," whereas the details would be filled in by other means. Richard B. Kielbowicz, *News in the Mail: The Press, Post Office, and Public Information, 1700-1860s* (Westport, CT: Greenwood Press, 1989).

[48] *Oakland Daily News—Extra!* October 21, 1868.

[49] "Weekly Trade Summary," *Daily Alta California,* October 22, 1868.

[50] "The Earthquake Yesterday," *Oakland Daily Transcript,* October 22, 1868.

[51] "Earthquake Over The Bay," San Francisco *Daily Morning Chronicle*, October 22, 1868.

[52] "The Earthquake. Oakland Misrepresented," Oakland *Daily News*, October 22, 1868.

[53] Our Oakland friends would fain to have us believe that there has been no earthquake shock of any consequence in the Terminal Metropolis. This is disingenuous and absurd." "Oakland and the Earthquake," *San Francisco Daily Morning Chronicle*, October 24, 1868.

[54] Other papers in Oakland directly took on the *Daily Morning Chronicle* for false reports: "Yesterday being a fine day, a large number of persons came over from San

and the Oakland newspaper companies is emblematic of the character and humor of some of the newspapers of the era—not only of the *Chronicle's* particularly "sensationalistic" style, but also of the regional rivalries at stake in the reporting of the earthquake, the latter of which shaped how the earthquake was reported. No city wanted to appear as the most dangerous, and all wanted to appear to be "safe" from earthquakes. Cities tried to bolster their image after the earthquake, often at the expense of others. As one example of this, the *Oakland News* said that San Franciscans were buying homes for themselves in Oakland as a safety precaution.[55]

To combat the negative perceptions of residents buying property elsewhere, the Alameda County *Gazette* asserted that "People will not be frightened away by earthquake" and printed advertisements claiming that the "Real Estate office of G. E. Smith" was "crowded" with San Franciscans buying "farms and homestead in Alameda County."[56] San Jose, California, 50 miles to the south, also claimed that people were buying property there in favor of San Francisco.[57] In the aftermath of the earthquake, the earthquake was interpreted in whatever manner pleased people—for newspapers, they wanted to increase their circulation, and to the extent that newspapers saw themselves as invested in their cities, they also wanted to portray the damage as minimal.[58]

Telegraph Offices as Sites for News

Many people were not content to wait for newspapers to print the news. After people outside of San Francisco felt the earthquake, they rushed to telegraph offices to learn about their businesses and brethren in San Francisco. A Sacramento newspaper said, "the telegraph offices were besieged" with people wanting to know the effect of the earthquake, "citizens rightly judging that if the shock was so heavy in Sacramento, its effects at the Bay City must be most disastrous."[59] Many telegrams were reportedly sent to San Francisco.

Francisco to [Oakland]" who exclaimed, 'I don't see any traces of the earthquake. . . . There were no trees torn up after all.' Evidently they had been reading the *Chronicle*, and expected to see things here in a much worse state than they really are." *Oakland Daily Transcript*, October 26, 1868.

[55] *Oakland Daily News,* October 22, 1868.

[56] *Alameda County Gazette*, San Leandro Saturday, October 31, 1868.

[57] *San Jose Weekly Argus*, October 31, 1868

[58] Charles Wollenberg, "Life on the Seismic Frontier: The Great San Francisco Earthquake (of 1868)." *California History* 71, no. 4 (1991/2): 494-509. Wollenberg makes it clear that newspapers were invested in boosting their cities, and his analysis is discussed in detail later in this article.

[59] "City Intelligence," *Sacramento Daily Union,* October 22, 1868.

People outside of San Francisco imagined that their impulse to get in touch with loved ones in San Francisco was equally returned. Reports said that people sent "innumerable messages," but hardly any answers were received because the people in San Francisco "were too excited, undoubtedly, to attend to telegraphing."[60] The volume of telegrams to San Francisco was so great, the *Daily Alta California* joked that a telegram inquiring about the well-being of a "Mrs. Smith" was answered: "Mrs. Smith all right; in capital health and spirits; sends her love" despite the fact that the recipient "did not have the slightest idea *which* Mrs. Smith was meant."[61]

Outside of the Bay Area, telegrams were posted on bulletin boards as a way of broadcasting what happened. According to a local newspaper from Marysville, a town in the northern Sacramento Valley, a telegram from San Francisco was, "posted on bulletin-boards, which was read by thousands during the day, and in the afternoon we received many calls from citizens who were anxious for later and more specific reports."[62] As post offices in Gold Rush–era California had served as locations to make contact with people far away, the telegraph offices after the earthquake were sites to hear about the news of the earthquake and ascertain the well being of family.[63]

The telegraph offices were also sites of rumor—news exaggerating the damage in San Francisco spread all over the state. Some of these rumors said that San Francisco was destroyed and that 60 bodies were recovered.[64] Newspapers often blamed (or cited) the telegraph offices as the rumor originators.[65] The narrative about the impact of the earthquake in San Francisco as it unfolded in Virginia City, Nevada, on the east side of the Sierra Nevada, serves as an example of the rumor unfolding in the town, as told in the newspaper. "At first the story ran that at least one-half of the city of San Francisco had been swallowed up, and Oakland and other towns almost demolished."[66] After this, people looked to the telegraph office to hear the

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[60] "The Earthquake in Sacramento," *Daily Morning Chronicle*, October 22, 1868. Quoting from the *Sacramento Record* of October 22, 1868.

[61] "Mrs. Smith All Right," *Daily Alta California,* October 25, 1868.

[62] "The Great Earthquake: Marysville," October 23, 1868, *Daily Alta California*. Quoting from the *Appeal* of 22 October 1868.

[63] Richard R. John, *Spreading the News: The American Postal System from Franklin to Morse* (Cambridge, MA: Harvard University Press, 1998): "The Imagined Community," 112-169; David M. Henkin, *The Postal Age: The Emergence of Modern Communications in Nineteenth-Century America* (Chicago, IL: University of Chicago Press, 2006): "Precious as Gold," 119-146.

[64] *San Jose Daily Patriot,* October 21, 1868. Unable to get in touch with San Francisco, the *San Jose Daily Patriot* got a message from Santa Clara with this startling bit of news about 60 bodies.

[65] *The Daily National*, Grass Valley, Nevada County, California, October 21, 1868.

[66] "The Great Earthquake," *Daily Alta California*, October 23, 1868., quoting from the *Territorial Enterprise* of October 22, 1868.

latest news, and heard that all of the news was coming from an operator in Oakland whose office was a wreck and had "cut the wires" outside of town, meaning that there was no news directly from San Francisco.[67] The *Oakland Daily News* later disputed the story of the Oakland operator.[68] In Virginia City, the story about the Oakland operator "excited rather than allayed the general anxiety." Even after a connection was finally made with San Francisco, and an "Extra Edition" of the newspaper was issued, "a number of private dispatches" were received, and "the excitement was continually kept alive—the more news, the more the eager people clamored for news."[69]

The *Daily Alta California* lamented the impact of the first telegrams sent, blaming a "mischievous person" and the telegraphers for "exaggerating every notable occurrence."[70] The newspapers were able to use the telegraph operators as a foil for misinformation. There would have also been rivalry between newspaper companies and the telegraph companies. The newspaper companies needed to have the latest news and were at the mercy of the telegraph companies and their high rates.

The cross-continental telegraph was relatively new, having been completed in 1862.[71] When the cross-continental telegraph was first completed, the local California press celebrated the new infrastructural addition to California: "No ten days will hereafter elapse before the news of each day on the Atlantic is known on the Pacific. . . . They are *no longer strangers*, for the lightning has annihilated a continent as an obstacle to *intellectual communication*."[72] The telegraphic aspirations make it clear that there was no inherent relationship between the truthfulness of the stories circulated and the method for circulation itself. Even if newspapers themselves espoused a deterministic account of the telegraph, the newspaper companies were doing some of the work assessing the telegrams. The telegraph promised that people would have more immediate access to events in faraway places, but the existence of the telegraphic infrastructure did not mean that the assessment of the events that were circulated had any correspondence to truth—the work of assessing the truthfulness of telegrams fell to people, and often to newspapers to assess reports for people.

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67 *"The Great Earthquake," Daily Alta California, October 23 1868, Quoting from the Territorial Enterprise of October 22, 1868*.

68 *Oakland Daily News,* October 24, 1868.

69 "The Great Earthquake," *Daily Alta California*, October 23, 1868, quoting from the *Territorial Enterprise* of October 22, 1868.

70 "Editorial Notes," *Daily Alta California,* October 24, 1868.

71 The development of the cross-continental telegraph, as well as description of the newspapers' relations with the telegraph, are described in detail in the Annex: Essay on Sources.

72 "Completion of the Overland Telegraph," *Sacramento Daily Union*, October 24-25, 1861 [emphasis added].

The telegraph offices were an important location for inquiring about the fate of other communities. When people did go to the telegraph offices to find out what had happened, however, they were greeted with rumors. The working telegraph might have been a conduit for mischief, but the broken telegraph was cause for panic, as the skeletal version of what happened could be filled in by a person's imagination. The way the telegraphic infrastructure worked—and after the earthquake, temporarily didn't work—served to shape the story as it unfolded.

San Francisco Chamber of Commerce Damage Estimates

As Knight's letter suggests, there was general anxiety about how the earthquake was reported in the eastern United States. The East Coast discovered the news of the earthquake via three telegrams, which appeared in various forms in its newspapers.[73]

The first telegraph messages sent to the eastern United States were evasive about aggregated damage estimates: "At the present writing, 9 a.m., no estimate of damage can be made, though it is considered comparatively small."[74] Despite the attempts to avoid it, aggregated damage estimates were sought and speculated on immediately after the earthquake. The *Daily Alta California* reported that getting the "correct" story out was discussed at an impromptu Board of Supervisors meeting held on the day of the earthquake.[75] The third dispatch to the eastern United States on October 21, 1868, concluded: "The Chamber of Commerce held a meeting to-day and resolved to telegraph to the Chambers of Commerce in New-York, Philadelphia, Boston, Chicago, London, Paris and Hamburg the account of the disaster."[76] According to some, the Chamber of Commerce assembled "in the parlor of the Bank of California and prepared the following despatch" for their peers in Eastern cities.[77] The full text of the telegram follows:

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[73] *Frank Leslie's Illustrated Journal* printed the text from the telegrams, saying, "We publish the dispatches *as received*, the details, though necessarily meagre, showing that the damage has been considerable," as if the raw text of the telegrams had some kind of inherent truth buried in their unedited form. *Frank Leslie's Illustrated Journal,* November 7, 1868. Versions of the same dispatches from San Francisco appeared in newspapers such as the *Chicago Tribune* and the *New York Times* on the day after the earthquake, October 22, 1868.

[74] "California," *Chicago Tribune*, October 22, 1868.

[75] "Local Intelligence. Special Meeting of the Board of Supervisors," *Daily Alta California,* October 22, 1868.

[76] "California," *New York Times,* October 22, 1868; "California," *Chicago Tribune*, October 22, 1868.

[77] Other reports say they met at the Merchants' Exchange. "Local Intelligence," *Daily Alta California,* October 22, 1868.

> A severe shock of earthquake, experienced here at 7:50 A. M. Considerable alarm felt at time of occurrence. A good many buildings on made ground injured. Custom House and City Hall, both poorly constructed, badly injured, and some buildings in process of erection have fallen in. Some parapet walls falling have caused the loss of four lives. No damage to well-constructed buildings. Total loss on property will not exceed $300,000."[78]

This was far less than other estimates made in the days after the earthquake, which said that damage could cost several million dollars.[79]

Although the Chamber of Commerce's telegram was apparently constructed on the day of the earthquake, their report did not appear in the eastern newspapers with first news of the earthquake. The October 22, 1868 *New York Times* reported "Nearly a Million Dollars Worth of Property Destroyed" in headlines.[80] In the weeks after the earthquake, the Chamber of Commerce estimates do not seem to have resonated with newspapers in the east, who continued to report several million dollars in losses.[81] The London *Times* printed a letter in which the correspondent said that "unreliable telegrams" were from people "desirous of suppressing as much as possible the disastrous effect and great damage done to property."[82] Later, the *Chicago Tribune* printed a letter "From Our Special Correspondent" which called the estimates by the Chamber of Commerce "simple absurdity."[83] Weeks after the

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[78] "Local Intelligence. The Great Earthquake of 1868," *Daily Alta California*, October 22, 1868. This also appeared in the *Daily Morning Call* and other newspapers on the same day.

[79] e.g. "Nearly Four Millions," *Daily Alta California,* October 22, 1868; The *San Francisco Chronicle* claimed that it was "impossible to estimate the damage" but that it "cannot fall short of $3,000,000." "Our Great Calamity," *Daily Morning Chronicle,* October 22, 1868.

The *Sacramento Daily Union* reported that, "though the damages to property were at first roughly estimated at 'several millions,' the result was not so fearful nor so destructive of life as was apprehended"; in the same paragraph, however, they also conclude, "The list of buildings thrown down or damaged foots [?] up a large number—large enough to justify a fear that the first reports of losses may not have been exaggerated." The "Earthquake," *Sacramento Daily Union*, October 22, 1868.

[80] "California," *New York Times,* October 22, 1868. Or the newspapers dismissed the message if they did receive them.

[81] e. g. "California," *Chicago Tribune*, October 25, 1868.

[82] Letter from Richard T. Blackburn, "On The San Francisco Earthquake," *London Times*, November 21, 1868.

[83] "San Francisco. The Great Earthquake. Full Particulars of the Event and its Results. From Our Special Correspondent," San Francisco, Oct. 21, 1868, 2:35 p.m. in *Chicago Tribune*, November 5, 1868.

earthquake, The *New York Times* said, "The destruction of property cannot be overestimated at $1,250,000."[84]

The Chamber of Commerce Damage Estimates in California

In areas affected by the earthquake outside of San Francisco, newspapers called the estimates "extravagant" and "an affront to rational observation and common sense."[85] The *Sacramento Daily Union* was highly critical of the estimates and cautioned: "Men of capital are not going to be deceived by misstatements or gulled into confidence . . . by under-estimates of damages even on the authority of leading citizens and leading journals."[86] They acknowledged that while "San Francisco cannot seriously suffer in a depreciation or loss in property without making all the rest of the State a sharer in the calamity . . . it is easy to make up a detailed statement with much semblance of truth and disguising the whole truth."[87] California newspapers argued about the damage figure for weeks, with most newspapers outside of San Francisco arguing that its Chamber of Commerce number understated the real amount. Most of the time, newspapers did not cite a precise source or methodology for their estimates; an exception was the *San Francisco Bulletin*, which simply added up the costs that were associated with injury to various buildings as reported by building owners, and put the number at $350,000. The *Sacramento Daily Union* called out *Bulletin* reporters, whose estimate actually supported the Chamber of Commerce, for not seeing that "losers" were giving false statements, where the *Union* estimate of "several millions" was "'editorially made'" from telegrams from uninterested parties.[88] The *Union* concluded, "[I]t would have inspired more confidence abroad" if there were not "a studied purpose of concealment and prevarication."[89] "News Dealers" published a pamphlet, likely by people related to the *San Francisco Evening Bulletin,* to examine the veracity of the estimates of the Chamber of Commerce.[90] Using "personal inspection by our reporter" and "estimates of

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[84] "California," *New York Times,* November 9, 1868.

[85] "Extravagant Estimates," *Oakland Daily Transcript*, October 26, 1868.

[86] "Truth the Best Policy," *Sacramento Daily Union*, October 26, 1868.

[87] "Losses by the Earthquake," *Sacramento Daily Union*, November 2, 1868.

[88] Further, "We prudently withheld their information till it had been confirmed" that the "ridiculously low estimate made out by the local papers and the parties assuming to inform the Eastern public" were incorrect. "Losses by the Earthquake," *Sacramento Daily Union*, November 2, 1868.

[89] "Losses by the Earthquake," *Sacramento Daily Union*, November 2, 1868.

[90] "The Great Earthquake in San Francisco: Estimated Damages in Detail" (published by White & Bauer, News Dealers, Washington Street, Opposite the Post Office, San Francisco, 1868). I read that the writer of the pamphlet was related to the *Bulletin*; I see the relationship with the *Bulletin* from the fact they published a letter addressed to

the builders and owners," the writers determined that the loss in the city "will not exceed $500,000."[91] The pamphlet concluded, "The estimate of the Chamber of Commerce was perhaps within the mark; but was a reasonable and judicious judgment at the moment."[92] This was not the only report claiming to have taken a systematic survey, however. In 1908, George Davidson, who worked for the U. S. Geodetic and Coast Survey revealed (or claimed) that in 1868, after extensive analysis, his group of investigators had put the damage at $1.5 million, but that his estimates and a report on the scientific causes of the earthquake had been suppressed.[93]

The ambiguous descriptions of damage even reflected a reticence to publicly acknowledge the idea that California was a place where earthquakes regularly happened. *The Overland Monthly* boldly declared, "It is assumed what few will now be disposed to deny, that *California is an earthquake country*."[94] Without a widely accepted theory relating faults to earthquakes, some newspapers even wondered, "What are earthquakes doing in California?"[95]

Sensationalist newspapers and unscrupulous capitalists account for some of the wild variation, but the measurement of what exactly is "caused" by an earthquake is difficult to quantify in dollars—an ambiguity that people took advantage of. Surprisingly, despite the amount of damage being wildly debated at the time, a number close to that of the "estimation" by the Chamber of Commerce shows up in popular reports today.[96] The narrative made by the Chamber of Commerce group seemed to try to underestimate the damage to San Francisco, and some, but not all, San Francisco newspapers

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"Editor Bulletin," they claimed the same estimation techniques as the *Bulletin*, they quoted the *Bulletin* in their description of the earthquake, and finally, in the following sentence: "The earthquake, of which we have given our readers a full and particular account in the Bulletin . . ." White & Bauer, "The Great Earthquake in San Francisco," 17. In city directories they are listed under White's name as "Robert White and Emile Bauer, news agents and stationers, 413 Washington" (Bauer is listed as "Bauer, Emile, (White & B.)"; there is also a White listed as "White, John, advertising clerk Evening Bulletin,"); in *The San Francisco Directory For the Year community December 1st, 1869* (San Francisco: Compiled and Published by Henry G. Langley; also Bacon & Company, 1869): 87, 636.

91 "The Great Earthquake in San Francisco," 3-4. The *Sacramento Daily Union* had been arguing with estimates of $350,000 to $400,000 made by *Bulletin* journalists in the newspaper. "Losses by the Earthquake," *Sacramento Daily Union*, November 2, 1868.

92 "The Great Earthquake in San Francisco," 16.

93 William H. Prescott, "Circumstances Surrounding the Preparation and Suppression of a Report on the 1868 California Earthquake." *Bulletin of the Seismological Society of America* 72, no. 6 (December 1, 1982): 2392.

94 "Earthquake Theories," 474.

95 "Minor Topics," *New York Times,* October 23, 1868.

96 Wollenberg, "Life on the Seismic Frontier," 502. e.g. "Historic Earthquakes: Hayward California," USGS says $350,000 of damage was done.

joined together in promoting San Francisco as a safe place to live and invest; still, these efforts to convince people in the eastern United States, or even just in Sacramento, were not necessarily successful.[97] Examining how the California newspapers talked about the earthquake for eastern audiences gives an idea of how the reach of information infrastructure shaped local conversations. The Chamber of Commerce tried to be the informational authority, but the process of estimating damage was clearly problematic, as the *Sacramento Daily Union* cautioned that "the authority of leading citizens and leading journals" was under suspicion.[98]

For Eastern Friends

Although some newspapers may have intended to downplay the damage, or to stick to the estimate given by the Chamber of Commerce, other newspapers, photographers, and printers were anxious to capitalize on of the images of the damage. San Francisco was a growing city, and the telegraph provided a way for people to immediately hear news, but other media provided actual detail about what happened. Letters such as Knight's were one way that people might learn about an earthquake from loved ones far away. Another way was for people to send along newspapers designed for faraway audiences. The *Daily Alta California* advertised an issue of *Golden Era* "suitable for mailing to Eastern friends" that "gives a correct idea of the effects of the shock."[99] Newspapers were often sent through the mail to personal acquaintances, a practice from before the Postal Acts of 1845 and 1851 (which lowered the cost of sending letters).[100] The newspaper companies advocated that the newspapers were not just for broadcast, but could also play a part in personal communication to friends in the eastern United States. The *Daily Alta California* created a smaller sized "Half-Sheet . . . Steamer Alta" for nine cents that had a "full and complete account" of the great earthquake.[101] "Steamer" versions of newspapers were often made by larger newspaper companies for the explicit purpose of summarizing news for another locale, and published at weekly intervals. After the earthquake, many newspapers published special issues for sending outside of California.

Another manner in which people in the eastern United States learned about the earthquake was through imagery. Printers in the Bay Area produced a variety of publications to send to "Eastern friends" that included images of the earthquake, either as sketches printed in periodicals or sketches sent

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[97] Wollenberg, "Life on the Seismic Frontier," 502.
[98] "Truth the Best Policy," Sacramento *Daily Union*, October 26, 1868.
[99] "For Eastern Friends," *Daily Alta California*, October 27, 1868.
[100] Henkin, *The Postal Age: The Emergence of Modern Communications in Nineteenth-Century*.
[101] "Account of the Great Earthquake!" *Daily Alta California*, October 28, 1868.

through the mails on letter sheets; others might have purchased a photograph of the damage to send to someone.[102]

The enterprising *Daily Morning Chronicle* began advertising a "special edition" to be illustrated with sketches and published a week after the earthquake. The special edition would purportedly contain "a thorough, reliable and complete history of the great disaster" meant to "make it more

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[102] "For Eastern Friends," *Daily Alta California*, October 25-27, 1868. A number of letter sheets with illustrations of the earthquake damage circulated: e.g., D. Appleton & Co, "Earthquake in San Francisco, Oct. 21st 1868." Reproduced in *The Henry H. Clifford Collection: Part Three, California Pictorial Letter Sheets*. Prepared for Auctions on October 26, 1994. (Austin, TX: Dorothy Sloan—Rare Books, 1994): Item 54; Plate 23. The Society of California Pioneers Library; George H. Baker, "Appearance of Morse & Heslep's Flour Mill, Hayward's, as left by the Earthquake of Oct. 21, 1868. Loss $12,000," in Joseph Armstrong Baird, Jr. *California's Pictorial Letter Sheets: 1849-1869* (San Francisco, CA: David Magee, 1967): Item 253.
The *Daily Alta California* also advertised they "received from D.E. Appleton & Co., photographs of the Court House at San Leandro, and the warehouse and mill at Hayward's—which were destroyed by the earthquake. " Appleton's also advertised in the San Francisco *Daily Morning Chronicle*, October 24-27, 1868 "Vaughan" advertised "thousands of views of the effects of the earthquake . . . come at once." *Daily Alta California*, October 25, 1868. Some of Muybridge and Vaughan's photos are currently held in archives and museums, are photographs of the most heavily damaged buildings ss. [many are visibly through the Online Archive of California (e.g., Eadweard J. Muybridge, "Effect of Earthquake in San Francisco, 21 Oct. 1868," Bancroft Library, Identifier:1--CDV, accessed online April 18, 2012: http://www.oac.cdlib.org/ark:/13030/tf0199p0n9/?order=1). Hector W. Vaughan, "Ruins of unidentified building. Following earthquake of 1868. San Francisco," Bancroft Library, Identifier:10—CDV, accessed online April 18, 2012: http://www.oac.cdlib.org/ark:/13030/tf4199p24r/?order=1 There were also stereoptic images taken of the earthquake: Isaiah W. Taber, "Effects of the Earthquake, Oct. 21, 1868, Railroad House, Clay St.," Pacific Coast Views, Image #984. Bancroft Library, Identifier: :9—STER, accessed online April 18, 2012: http://www.oac.cdlib.org/ark:/13030/tf9779p5rc/?order=1 With a few exceptions of "illustrated" newspapers, daily newspapers did not have images in them regularly in 1868. An advertisement immediately after the earthquake advertised "Appleton's Letter Sheet," which had "Illustrations and a complete account of the recent Earthquake," stating that the letter sheet was "The most convenient form to send East." "Advertisements," *Daily Alta California*, October 28, 1868. The three telegraphic dispatches in *Frank Leslie's Illustrated Newspaper* appeared alongside a number of drawings of buildings in San Francisco before there was any damage. The pictures were views of the city hall and the "Plaza looking to the city hall." *Harper's Magazine* published sketches of the San Leandro courthouse on November 28, 1868.

intelligible to Eastern and other readers."[103] The first page of the newspaper was almost covered with illustrations of the most damaged buildings in San Francisco.

Photographers seized the opportunity to profit from the earthquake. Immediately after the earthquake, newspapers anticipated, "We may expect numerous photographs of the ruins caused by the earthquake."[104] The *Daily Alta California* teased, "The enterprising photographers must hurry up" because "in two weeks more nearly all the damages will have been repaired, and in two months the stranger will seek in vain for any extensive traces of the ravages of the greatest earthquake that ever shook and startled San Francisco."[105] Bay Area newspapers were anxious about how artists would portray the earthquake, worrying that "the publication of their engravings will damage California in the eyes of those living in the Atlantic States."[106]

This section examined how local earthquake damage was described in the newspapers. Reporting about damage in faraway places exposed tensions between newspapers and the telegraph, between different newspapers, and even between Bay Area towns and cities. Reporting the damage in the eastern United States exposed concerns about how California, as an "earthquake country," would be perceived. The San Francisco Chamber of Commerce claimed the authority to tell the story of the earthquake via telegraph to the eastern United States; nonetheless, the narrative did not resonate the way that people expected, being frequently contested by the letters from local observers and editors of newspapers in nearby cities. With the backdrop of struggles around the reach of the information infrastructure, the rest of this chapter explores the issues associated with informational authority in San Francisco.

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[103] Illustrated Earthquake Edition, *San Francisco Daily Morning Chronicle*, October 28, 1868 (also advertised in the *Daily Alta California* and the *Daily Morning Chronicle* on October 27, 1868).

[104] "Our Great Calamity," *San Francisco Daily Morning Chronicle*, October 22, 1868. Two days later, the *Daily Alta California* noted, "The photographers were at work before the buildings had fairly ceased shaking"; "The photographs are neatly executed, and give a most excellent idea of the present appearance of the buildings referred to." "Local Intelligence. After the Earthquake," *Daily Alta California*, October 23, 1868.

[105] "Local Intelligence. After the Earthquake," *Daily Alta California*, October 23, 1868. The images were by photographers such as Eadweard Muybridge, who published under the pseudonym "Helios." "Photograms of the Earthquake Scenes," *Daily Alta California*, October 28, 1868; "Earthquake Views," *Sacramento Daily Union*, October 28, 1868; Eadweard J. Muybridge, "Verso," Identifier:1A- Bancroft Library. Accessed online December 2, 2010:
http://www.oac.cdlib.org/ark:/13030/tf796nb86w/?brand=oac4; Also Rebecca Solnit, *River of Shadows: Eadweard Muybridge and the Technological Wild West* (New York, NY: Viking, 2003) describes Muybridge's early work.

[106] "San Leandro and Hayward's," *Daily Alta California*, October 27, 1868, quoting the *Oakland News* of October 26, 1868.

The Government Response

Government officials, such as the mayor of Oakland or the San Francisco Board of Supervisors, used the local newspapers to communicate with the public about relocated government buildings, the fate of some public buildings, and fire safety. Cities had some knowledge and personnel to fight fires. Because of previous experiences, there was great concern after the 1868 earthquake that a destructive fire would start; thus, much of the early communication was related to fire safety. The *Oakland Daily News* printed an *Extra* on the day of the earthquake with the headline, "Orders of the mayor!!" that explained fire safety precautions.[107] The next day, the *Oakland Daily Transcript* reported that the mayor of Oakland, Samuel Merritt, had circulars distributed throughout the city.[108] The government in San Francisco used newspapers to communicate with the public about fire safety as well, but apparently all of this communication did not entirely prevent fires.[109]

Within cities, the government issued fire warnings in the newspapers. Meanwhile, newspaper companies looked to the government for an assessment of buildings. Firewalls were a particularly contentious topic. After San Francisco burned several times in its first decade of existence, firewalls had been erected as a way of containing conflagrations. In the face of earthquakes, however, firewalls were unreinforced piles of bricks waiting to be knocked over. The journals and newspapers complained about these firewalls and wondered who was responsible. The *Overland Monthly* wrote the following:

> A fire-wall fell . . . burying two innocent victims beneath its fragments. Who is responsible? Are republican cities without government, or is that government only for commercial purposes? It were better for the credit of our city that half the brick structures in town should be pulled down than one should fall in another convulsion, burying one invaluable life in its ruins.[110]

Newspapers argued that the government should regulate firewalls and extended this argument to all buildings in San Francisco. The *Daily Alta*

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[107] "Extra!" *Oakland Daily News*, October 21, 1868.

[108] *Oakland Daily Transcript,* October 22, 1868.

[109] William Martis, "Caution Regarding Chimneys," *San Francisco Evening Bulletin,* October 21, 1868. "The fire was caused by an improperly constructed chimney, which, being crushed by the earthquake, allowed the fire to communicate with the woodwork." The newspaper noted that the family was of "Spanish or Italian descent," which begs the question of whether they spoke English, or if the warnings printed in the papers reached non-English speaking communities in San Francisco. "Fire Yesterday Afternoon," *Daily Alta California*, October 23, 1868.

[110] "Earthquake Theories," 480. This sentiment was echoed in many other newspapers: "Some Facts about Earthquakes," *Daily Alta California*, October 24, 1868; "Unsafe Buildings," San Francisco *Daily Morning Chronicle*, October 22, 1868; "Editorial," *San Francisco Call*, October 22, 1868.

characterized the activities of those who built the buildings that fell: *"every fatal casualty was the result of criminal carelessness*."[111] The *Chronicle* also used the descriptor "criminal carelessness" to describe the reconstruction process, complaining that "the authorities" ought to take action.[112] Some reporting indicated that the San Francisco "authorities" did try to protect citizens from fallen debris immediately following the earthquake, but generally the focus was on shortcomings of government action protecting the public from shoddy building practices

The *Daily Morning Chronicle* outlined how they thought the San Francisco Board of Supervisors should become involved through the appointment of a committee of expert architects and builders; they advocated that the commission was not just a way to ensure the safety of Californians, but also to ensure the business interests of the city.[113] While the *Daily Morning Chronicle* advocated for a commission to inspect the buildings in San Francisco following the earthquake, the *Daily Alta California* and *Overland Monthly* wanted a permanent position to oversee the proper building practices, a Superintendent of Buildings, or a permanent commission.[114] The newspapers demanded oversight of reconstruction, inspection of the current state of buildings, and creation of a long-term position for building construction oversight. Although the interest in oversight could be attributed to populist bluster, it also indicates a possible interest in government regulation over antiseismic building codes, something that would not be addressed at the California State government level for another 75 years.

The call for more oversight can also be read as a search for an authoritative body to define the situation. The next two sections examine the activities of several institutions that might have been authoritative informational bodies for the public, via the documents that these institutions produced (or, as it turns out, did not produce). First, I examine the efforts of government organizations to report on the status of public buildings. Then, I look at the activity of the California Academy of Sciences and the Chamber of Commerce's Earthquake Committee.

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111 "Local Intelligence. The Great Earthquake of 1868," *Daily Alta California*, October 22, 1868. [emphasis in original.]

112 "Local Intelligence," *Daily Morning Chronicle*, October 25, 1868.

113 "Danger from Insecure Buildings," *San Francisco Daily Morning Chronicle*, October 25, 1868.

114 The *Alta* wanted a Superintendent of Buildings ("Repairing Damages," *Daily Alta California*, October 24, 1868). Meanwhile, the *Overland Monthly* advocated for "commission with power to command that all buildings and walls or chimneys endangering life, private as well as public," "Earthquake Theories," 480.

Reporting about Government Buildings

Most public buildings in San Francisco were the responsibility of the city government. The San Francisco city government did not create any of the permanent commissions; instead, they made decisions about *public* buildings in the days after the earthquake, such as the Custom House, schools, and City Hall. Newspapers opined that federal- and city-owned buildings fared particularly badly during the earthquake.[115] Architecturally, government buildings were made to have a strong and clear physical presence. San Francisco public buildings used or mimicked styles that were popular in the East, but, as it turned out, were not durable in earthquake-prone California.[116] Local politics were significant in shaping the discussions about rebuilding and illustrative of local conflicts about building.

Reports about what was to be done with the Customs House were conflicting. At one point two engineers supposedly "made a survey" of the building and recommended that it should be demolished.[117] Later, a report said that the situation was less decisive, and eventually one of the engineers claimed that he had not even inspected the building.[118] In the face of no federal authority stating otherwise, the *Bulletin* invited the public to decide for themselves the damage: "It is now believed by hundreds of person who have examined the Custom House building, that it has been but slightly injured, if at all, by the late shock. Thus, another heavy estimate charged to the recent earthquake disappears."[119] The *Bulletin* attempted to use the confusion about the Custom House to appeal to the populace to dismiss earthquake damage.

Decisions made about what to do with the San Francisco schools were an example of how experts would investigate buildings, make formal reports printed in the newspaper, and officials would thus heed the experts' suggestions.[120] Many students were at school the morning of the earthquake and were sent home by the superintendent, leaving San Franciscans

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115 "An earthquake now and then will winnow the town of dilapidated and insecure structures." "Financial and Commercial," *Daily Alta California*, October 23, 1868.

116 Tobriner, *Bracing for Disaster,* 3:44.

117 "United States Engineers Condemn the Custom-House Building," *Daily Morning Chronicle*, October 25, 1868; "Removal of the U. S. Custom House," *Daily Alta California*, October 24, 1868.

118 "The Custom House Building," *Daily Alta California*, October 25, 1868; Colonel Mendell, "Editor Bulletin," San Francisco *Evening Bulletin*, October 26, 1868. According to Wollenberg, repair of both the Custom House and City Hall was later taken up at much expense. Tobriner said that the Custom House was eventually demolished, as it could not withstand the earthquakes sitting on "made land." Tobriner, *Bracing for Disaster*, 3:44.

119 "The Custom House," *San Francisco Evening Bulletin*, October 26, 1868

120 The first statewide antiseismic laws were passed in 1933 after an earthquake in Long Beach destroyed several (thankfully empty) school buildings.

speculating about when students should return to schools.[121] An architect was appointed by the superintendent, and made an official report to the Board of Education on October 24, 1868, saying the school buildings were safe for students.[122] The report concluded with a statement that articulated what the public must have wanted to hear in terms of a guarantee of safety, and also stated that his report was "on record."[123] Putting the report on record gave the proceedings a level of accountability that was not available for non-public buildings. As with the communication about fire codes, the newspapers printed the message from the superintendent of schools to tell San Franciscans about when schools would be open, as well as the text of the report by the architect.[124]

At a special Board of Supervisors meeting, the Board appointed a committee of government officials and people with credentials in architecture to examine and report to the Board on "the condition of the public."[125] On October 23, 1868, the committee reported to the Board of Supervisors saying City Hall should be "taken down to the . . . second story floor."[126] Following the advice from the report, Supervisor Shrader advocated that the second floor of City Hall be dismantled and rebuilt with wood rather than stone, incurring

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121 "Local Intelligence," *San Francisco Daily Morning Chronicle*, October 22, 1868.
122 "Board of Education," *Daily Alta California*, October 25, 1868.
123 "Board of Education," *San Francisco Daily Morning Chronicle*, October 25, 1868.
124 J. Denman, Superintendent of Public Schools, "The Public Schools," *Daily Alta California*, October 22, 1868.
125 "Local Intelligence. The Great Earthquake of 1868," *Daily Alta California*, October 22, 1868. The committee included "William Crane , David Farquharson, Architects, and George Cofran, Superintendent of Streets, be and are hereby requested to act with a Committee of the Board, consisting of Supervisors Nunan and Ashbury." Craine and Cofran also investigated the damage of the 1865 earthquake on the custom house, Wm. Craine and George Cofran, "Report of damage to Custom House by the earthquake of Oct. 8, 1865," October 17, 1865, MSS 2005/26 c. Bancroft Library.
126 "Local Intelligence," *Daily Alta California*, October 24, 1868. The report included other buildings such as the firehouses, the city hospital, and other public buildings. This report was printed in the newspapers as was the resulting resolutions of the Board of Supervisors. Of particular interest had been how to manage the records held in the City Hall because finding space appropriate for records storage was not straightforward. "Earthquake," San Francisco *Daily Morning Chronicle*, October 23, 1868 In addition to the cost of rebuilding, moving offices and renting space elsewhere was expensive. But the appointed committee evaluated the Hall of Records and determined that with some adjustments, they could remain as they were—effectively settling the debate. William Crane, David Farquharson, George Cofran, Edward Nunan, and Monroe Ashbury, "Vacating the Premises." "Earthquake," *San Francisco Daily Morning Chronicle*, October 24, 1868; The letter also appeared in, "Local Intelligence," *Daily Alta California*, October 24, 1868.

"as little expense as possible." Shrader's resolution was rejected.[127] The plan was debated on the grounds that rebuilding with wood, Shrader's plan, was an inexpensive alternative. Supervisor Stanyan invoked the expertise of the architects to argue for the wood second floor. However, another supervisor, Mr. Nunan, was "decidedly opposed to rebuilding with wood. It would be a confession of weakness and admission of our fear that a brick building would not stand."[128] This resolution was "re-offered" at the next meeting on October 26, 1868, and rejected again.[129] In the end, the resolution was again rejected because appearance was paramount to the Supervisors – more important than safety or economy.

The California Academy of Sciences

As far away as Chicago, newspapers anticipated the delivery of a report about the earthquake from a group of "learned men" at the California Academy of Sciences.[130] At the first meeting after the earthquake on November 2, 1868, the *Meeting Minutes* of the Academy reflected that the members thought the public expected that a report would be released. The president of the Academy, Dr. James Blake, believed that time was required to do such a study, and that only when the study was completed would it be released to the public. The committee resolved to have a committee report on the earthquake but "laid over" the resolution because there was not a "quorum present."[131]

At the next bi-weekly meeting of the Academy on November 16, 1868, it appears that some progress was made, as one member produced "a specimen . . . from the fissure at Hayward, caused by the earthquake."[132] According to the *Meeting Minutes*, "A discussion of the recent earthquake

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127 With only three "ayes" and seven "nos." "Local Intelligence," *Daily Alta California*, October 24, 1868.

128 "Board of Supervisors," San Francisco *Daily Morning Chronicle*, October 27, 1868. Shrader countered that "The taxpayers were in favor of economy, and would prefer that a tent were erected over the hall than that $100,000 or $150,000 should be expended for the purpose of making people believe that there had been no earthquake."

129 "Board of Supervisors," *Daily Alta California*, October 27, 1868.

130 C. W. C., correspondence, "San Francisco, Nov. 9," Chicago *Tribune*, November 25, 1868. Carl-Henry Geschwind, *California Earthquakes: Science, Risk, and the Politics of Hazard Mitigation* (Baltimore, MD: The Johns Hopkins University Press, 2001): 16.

131 California Academy of Science, *Stated Meeting Minutes Jan., 1868 - Jan., 1872*, Dated: San Francisco, Nov. 2, 1868. p 74. California Academy of Science Archives; notes from these meetings inform the [ss] Theodore Henry Hittell, *The California Academy of Sciences: A Narrative History 1853-1906*, ed. by Alan E Leviton and Michele L Aldrich (San Francisco, CA: California Academy of Sciences, 1997).

132 California Academy of Science, *Stated Meeting Minutes Jan., 1868 - Jan., 1872*, November 16, 1868. California Academy of Science Archives.

followed and a partial report of investigations was made." On December 21, 1868, Dr. Blake presented a map showing "the direction in which the earthquake wave struck." Blake gave his "partial verbal report of his observations on the subject." The *Meeting Minutes* concluded, "Investigations on the subject are still in progress."[133] The members of the Academy were gathering the evidence that could have been used to make a report.

Reporting on the earthquake was also the province of the "Earthquake Committee," a committee formed by the Chamber of Commerce, the very organization that had sent the telegram to the Eastern United States that had tried to deliberately downplay the earthquake.[134] This committee did aim to be some of what the newspapers agitated for—namely, a group of people who would come up with practical advice about building in the future. There were five subcommittees formed in late November 1868, each concerned with different aspects of earthquakes and structures: "bricks, stones, and timbers"; "limes, cements, and other bonds and braces"; "structural designs"; "scientific inquiry and collection of facts"; and "Legal—The Law Governing Building."[135] The Chamber of Commerce Earthquake Committee charged with scientific inquiry included Dr. Blake, as well as a Dr. Trask, who reported on the 1857 earthquake to the California Academy of Sciences and had completed numerous other earthquake investigations. Trask was sometimes called "California's first geologist."[136]

The records of the different committees are inconsistent, but indicate that "all of the subcommittees were hard at work"; although their findings may not have been published in a single formal report, some of their work appeared in newspapers as letters or personal publications.[137] George Gordon was the head of the Joint Earthquake Committee, and he immediately engaged in putting advertisements in the *Daily Alta California* asking for members of the public to submit plans for earthquake safe buildings for a reward – what now might be regarded as crowdsourcing.[138] In fact, much of the investigation seemed to hinge on gathering archival records and the experiences of people in the building.[139] Gordon wrote vigorously about the need to synthesize the

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133 Blake was not present at the meeting on December 17, 1868. California Academy of Science, *Stated Meeting Minutes Jan., 1868 - Jan., 1872*, December 21, 1868. California Academy of Science Archives.

134 Many California scholars characterize the business community of San Francisco as being accustomed to playing prominent roles in civic life.

135 "Local Intelligence," *Daily Alta California*, November 25, 1868.

136 Trask also appeared in the introduction.

137 Tobriner, *Bracing for Disaster*, 3:54

138 *Daily Alta California*, December 5, 1868—this advertisement appeared in the paper throughout early December.

139 Rowlandson wrote: "To those correspondents who favored the Committee with their individual earthquake experiences, the reasons above given will, it is hoped,

experiences of the public in a report, inviting people to contribute what they learned to the Committee.[140]

At the annual Chamber of Commerce meeting on May 12, 1869, the Earthquake Committee apparently promised that the report would be available in two months, but an article about the meeting said that, in the meantime, Committee Secretary Rowlandson, had released a pamphlet.[141] Gordon died in May 1869 not having produced the report—so the two-month deadline came and went.[142] And, the Rowlandson pamphlet, although promising, did not provide Californians any analysis they found relevant.[143] Despite the death of Gordon and the pamphlet produced by Rowlandson, the California press was still interested in learning of the outcome of the project.[144] At the following

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suffice as an apology for thus apparently overlooking their interesting communications. The time may perhaps arrive when I may be able to make ample compensation for thus subjecting them, temporarily, to the neglect of silence." Thos. Rowlandson, *A Treatise on Earthquake Dangers, Causes and Palliatives* (Dewey & Co. Publishers and Patent Agents, Office of the "Mining and Scientific Press" San Francisco, 1868). I derived the date and the background on Rowlandson from Michele L. Aldrich, Bruce A. Bolt, Alan E. Leviton, and Peter U. Rodda, "The Report of the 1868 Hayward Earthquake," *Bulletin of the Seismological Society of America* 76, no. 1 (1986): 71-76.

140 George Gordon, letter to Chamber of Commerce, *Daily Alta California,* January 13, 1869. The letter was read by George Gordon read at the Chamber of Commerce quarterly meeting on January 12, 1869: ". . . it is earnestly to be hoped that all persons will contribute their experiences—equally the mistakes as the successes—so that we may concentrate information for the guidance of us all in the future. . . ."

141 "Annual Chamber of Commerce Meeting," The *San Francisco Daily Morning Chronicle*, May 12, 1869. "The Secretary of that Committee, Professor Rowlandson had published a pamphlet on that subject under the auspices of several members of the Committee. This work of Mr. Rowlandson, though not the official report, contained a large amount of valuable information on the subject of earthquakes."

142 "A great deal of material was apparently sent to Gordon, but he died suddenly on May without having produced a draft." Wollenberg, "Life on the Seismic Frontier," 507.

143 "Strength of Buildings," *Daily Alta California*, May 15, 1869. "We looked with interest through the new essay, hoping to find something applicable to the wants of Californian builders, but we were disappointed, for nearly all the space is devoted to points that are of very little practical value." Details about California were scant in the Rowlandson pamphlet because apparently Rowlandson was told not to comment on the California earthquake following his dismissal from the Committee. On the title page of his book, he refers to himself as "Fellow of the Geological Society, London and *Late* Secretary of the Joint Committee on Earthquake Topics"

144 "Why not report," San Francisco *Daily Morning Chronicle,* Aug 28, 1869. "It is reported that number of plans have been submitted. If this is so, it is highly desirable that the Committee should decide upon their respective merits and communicate the result to the public. The matter is one in which every person contemplating buildings

annual meeting of the Chamber of Commerce in 1870, James Blake and Rowlandson, apparently reinstated, presented the results of the study, but the results were clearly not what people expected, as they did not provide the practical instructions that the Committee had promised.[145] The report was not even read at the meeting, and instead was simply filed to be published in the annual report, effectively ensuring that much of the California public would not see it.[146]

There has been much written about the existence or non-existence of a report giving details about the 1868 earthquake, and whether a report was suppressed. Prescott presented a letter from George Davidson, a well-reputed surveyor, who claimed that the committee head, Gordon, suppressed the report because it would reflect poorly on the business prospects for the city, a sentiment reflected in the Lawson report.[147] Today, scholars Wollenberg and Tobriner describe Gordon's previous interest in safe building, making the assertion that Gordon was the obstacle to report publication problematic.[148] The view of Aldrich et al. is that no report was ever created: "Both Blake and Rowlandson stress not Gordon, but financial considerations as the primary cause for the committee's failure."[149] There is no conclusive evidence whether the report was unfunded or never issued according to Wollenberg.[150]

Underfunding the writing of a report had the same effect of ensuring that a public report was not made about the earthquake. Gordon's initial report to the Chamber of Commerce in January 1869 asked that each member donate $500.[151] If the members of the Chamber of Commerce were not receptive to this, perhaps they were effectively ensuring that this committee would not be able to produce a report that was the systematic investigation with practical results that was promised. Members of the finance committee later appealed to the public for money to cover "experiments and

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is deeply interested. But all means let us have that report." Newspapers are tricky to interpret because of divergence between public interest and press interest.

145 "Chamber of Commerce," *Daily Alta California,* May 11, 1870; "Chamber of Commerce Meeting," *San Francisco Daily Morning Chronicle,* May 11, 1870.

146 Aldrich et al., "The 'Report' of the 1868 Hayward Earthquake."

147 Prescott, "Circumstances Surrounding the Preparation and Suppression of a Report on the 1868 California Earthquake"; Aldrich et al., "The 'Report' of the 1868 Hayward Earthquake"; Lawson, 1908.

148 Tobriner, *Bracing for Disaster,* 3:56; Wollenberg, "Life on the Seismic Frontier."

149 Both Wollenberg and Aldrich et al. cite James Blake saying that there was insufficient funding for the project *Annual Reports to the San Francisco Chamber of Commerce* from 1870.

150 "No direct evidence exists to confirm or deny Davidson's charge." p507 "Life on the Seismic Frontier: The Great San Francisco Earthquake (Of 1868)" by Charles Wollenberg in California History, Vol. 71, No. 4 (Winter, 1992/1993), pp. 494-509.

151 George Gordon, letter to Chamber of Commerce, *Daily Alta California,* January 13, 1869.

investigations," however, promising that, "The labors of the Committee being in the interests of the people, their proceedings will be published from time to time."[152] Furthermore, people did not seem to lose interest in the earthquake; the *Daily Alta California* published a letter saying, "it is natural to suppose that more reliable information can be brought together in this State, both of practical as well as theoretical nature."[153]

Regardless of the activities of the Earthquake Committee, why was nothing issued by the California Academy of Sciences? Money seemed to be one obstacle, but money had not been publicly raised for earthquake investigations in the past. The minutes of the California Academy of Science indicate that reports about earthquakes were frequently read by Trask.[154] Tobriner argues that in addition to Rowlandson's publication and Gordon's death, Rowlandson's disparaging remarks about the qualifications of the committee might have contributed to the delayed report.[155] Theoretical knowledge about seismology was not so important to the Earthquake Committee; they professed many times that their focus was on practical findings, and perhaps the previous studies did not provide the practical

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[152] "James Otis, Louis Sachs, R. B. Swain, James Linforth, Finance Committee." "An Appeal For Funds," *Daily Alta California,* December 5, 1868, letter dated December 3, 1868.

[153] Observer, "The Earthquake Investigation," *Daily Alta California*, December 7, 1868; the letter is addressed to "Editors Alta," and dated December 5, 1868. The article also takes an awkward stance with business matters, "the future of our city . . . as the second imperial city on the American continent, in the absence of any scientific association with means sufficient to conduct a thorough investigation, it reflects greatly of the Chamber of Commerce that they have taken the initiative . . . It is not a natural conclusion that, because we discuss this subject, we acknowledge an element of danger; or if we did, it is the part of the prudent man to know his danger, so as to be prepared to meet it."

[154] *Synergy*, 15 (Published monthly by the Bay Area Reference Center (BARC) as part of the joint reference project the San Francisco Public Library and the North Bay Cooperative Library System in San Francisco, CA: George Lithograph, 1969), 4. In the California Academy of Science Proceedings, Trask published at least ten articles in his career. The first, in 1856, was a catalogue of earthquakes in California from 1812 to 1856. The most recent were, "Earthquakes in California form 1800 to 1864," "Earthquakes in California during 1864," and "Earthquakes in California during 1865" in *Proceedings of the California Academy of Natural Sciences, Volume 3: 1863-1867* (San Francisco, CA: Bacon and Company, Printers, 1868): 130, 190, 239.

[155] Tobriner, *Bracing for Disaster,* 3:58. California was certainly not a hotbed of seismology knowledge at the time—Japan and Europe were developing serious research programs about earthquakes. Although the California Academy of Science Library was being built up, Rowlandson sites the Odd Fellows' Library as having a particularly useful collection of earthquake literature. Rowlandson, *A Treatise on Earthquake Dangers, Causes and Palliatives*, 4

instructions that were applicable to Californians.[156]

Newspaper articles asked if government would have a part to play in making sense of building conditions and in circulating that knowledge. The government, as reported in the newspapers, made decisions about earthquake damage with an eye to how buildings such as City Hall would appear to others. Scientists could have stepped in and given authoritative explanations about what happened—even though, as in 1857, they might have been wrong—but none assumed this role. Both groups had the opportunity to establish some kind of informational authority and explain to people what had actually happened, but they did not. The Chamber of Commerce formed the Earthquake Committee ostensibly to assist in coming up with practical and scientific findings about the earthquake. Much like how the Chamber of Commerce decided to telegraph the "correct" version of the aggregated earthquake estimates to the eastern United States, it stepped in to be the informational authority and "explain" what had happened. The Earthquake Committee did not, however, generate the documents that many called for. Without the government or scientists giving the public legitimate, authoritative explanations for what had happened and what should be done, the public information infrastructure, so deeply embedded in the newspaper companies, mostly relied on what those newspaper companies wanted to say.

Lessons Learned

The newspapers of the city of San Francisco printed "lessons" from the earthquake, many of them circulated by people working on the Earthquake Committee, or with the local government on inspections of public buildings.[157] The evening of the earthquake, the *Bulletin* wrote about "The Earthquake and its Lesson."[158] The lessons of the earthquake were often tempered by an

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[156] It is worth noting that the goals of the committee were to have guidance that was practical for the public to use, from their inception: "Resolved. That our researches and experiments shall be subsidiary to this practical result, and that the promotion of abstract science be considered as secondary and incidental thereto." "Local Intelligence," *Daily Alta California,* November 25, 1868.

[157] "Scholars and lay people alike had a new awareness of seismic danger and of earthquake-resistant retrofit and design." Tobriner, *Bracing For Disaster*, 3:58.

[158] The earthquake "repeats with terrible emphasis the warning the people of this city had three years ago . . . to build strongly, on strong foundations; to iron brace ever the stoutest walls, and to avoid heavy projecting cornices and loosely attached ornamentation." The article goes on to say that even though the earthquake was part of a larger phenomena, the "local lessons it teaches" should be attended to. *San Francisco Evening Bulletin*, October 21, 1868; see also "The Results and Lessons of the Earthquake," *Daily Alta California*, October 22, 1868, and W, "Local Intelligence," *Daily Alta California*, October 26, 1868, letter addressed "to Editors Alta," October 24, 1868.

attitude that implied that sturdy building practices were obvious, and the solution to avoiding future damage was simply a matter of people engaging in the best building practices.[159] In fact, in some cases, the press adopted a nearly Darwinian view of buildings after earthquakes—namely, the weak buildings were destroyed in the earthquake, leaving the city filled with strong buildings.[160] In many newspapers the lessons were boiled down to one attribute: made land. Made land was a problem that Californians could identify and attempt to fix.[161] The lessons were apparently so pervasive that the *San Francisco Daily Morning Chronicle* said, "Since Wednesday last we have been treated by the city press to no less than seven long-winded, tedious, prosy disquisitions on 'The Lessons of the Earthquake.'"[162]

The challenge was for people to understand how to adapt to California earthquakes, not something with which new immigrants would have been familiar. The *Scientific American*, printed in New York, summarize this attitude in an article titled, "The California Earthquakes—A Different System of Building Necessary."[163] Californians also cautioned each other that they needed to adopt new thinking about building. Gordon argued, ". . . To build against earthquakes requires us to unlearn much, and disembarrass ourselves of many preconceived architectural notions."[164] The idea that building practices had to be different in California was expressed was in discussions about the height of buildings. Local wisdom said that in California buildings should not be taller than four stories, and this was expressed again in the lessons.[165] Another focus of the "lessons" circulated by the public was building materials. Although much information in the newspapers appeared to focus on best practices for building stone and brick buildings, people seemed to be most interested in abandoning these materials in favor of constructing wooden buildings.[166] After the earthquake, people opted to sleep outside, but others chose to go to friends' wood-frame houses rather than sleep in brick buildings—this appeared to be in contrast to the local government's decision to remake a stone story on the City Hall, rather than a wooden one.[167] The tone of many

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159 "Local Intelligence. The Great Earthquake of 1868," *Daily Alta California*, October 22, 1868.

160 "The Real Estate Market," *San Francisco Daily Morning Chronicle*, October 25, 1868.

161 Illustrated Earthquake Edition, *San Francisco Daily Morning Chronicle*, October 28, 1868.

162 "Prosy 'Lessons,'" *San Francisco Daily Morning Chronicle*, October 25, 1868.

163 *Scientific American* XIX, no. 22, November 25, 1868, 342.

164 George Gordon, letter, *San Francisco Evening Bulletin*, October 27, 1868.

165 ""Theory of Earthquakes—Suggestions," Oakland *Daily Transcript*, October 22, 1868

166 "Financial and Commercial," *Daily Alta California*, October 23, 1868

167 *San Francisco Evening Bulletin*, October 23, 1868. "The following letter to a gentleman in this city contains interesting information not given in any other account:

newspapers made it sound as if constructing a building of no more than four stories or using wood was something that should be obvious.[168] In fact, belief about wood-frame buildings was so pervasive, the *Chronicle* felt they could claim, "Frame dwelling houses are in demand. Scarcely one can be found which is unoccupied."[169]

This chapter builds on two contemporary pieces of work about the 1868 earthquake that address in different ways how people in California learned about earthquakes. Wollenberg focused on the argument that the San Francisco newspapers aimed to persuade the public that a "commercial city could prosper in earthquake country" because "the damage from the 1868 earthquake was due to human error, that could be corrected."[170] Wollenberg points out that, despite this interest in correcting building practices, the "most ambitious attempt to study and learn from the earthquake," headed by George Gordon, real estate investor, on behalf of the Chamber of Commerce, "had come to nothing."[171] Tobriner states that some of the architects and builders in California learned a great deal from the 1868 earthquake, and their building practices reflected new understandings of buildings during earthquakes. Tobriner sees genuine interest in learning better building practices for business reasons, but also in building more stable structures. He focuses on informal learning by builders and architects in his analysis of building techniques and practices.[172] Wollenberg implies that perhaps without a documentary trail or systematic study, it was more difficult to conceive of legislation or more permanent long-term changes. There was no report issued by the authorities,

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Hayward's October 21, 1868"; B. C. T, "California . . . From Our Own Correspondent," *New York Times,* November 9, 1868.

[168] In fact, it might have been—there is evidence from the 1857 earthquake that there were specific knowledge associated with earthquakes in California, and Tobriner has documented this.

[169] "City News in Brief," San Francisco *Daily Morning Chronicle*, October 24, 1868.

[170] Wollenberg, "Life on the Seismic Frontier," 502.

[171] Wollenberg, "Life on the Seismic Frontier," 507. Philip Fradkin, in *Magnitude 8: Earthquakes and Life along the San Andreas Fault,* depicted the production of the report in even darker terms. Fradkin says, "nothing was learned from the earlier experience" and Californians adopted "policy of assumed indifference" to earthquakes. Philip Fradkin, *Magnitude 8: Earthquakes and Life Along the San Andreas Fault* (Berkeley, CA: University of California Press, 1999): 76; P80-81. Tobriner used a chapter of his book, *Bracing for Disaster*, to arguing against the assertion that Californians had learned nothing from the 1868 earthquake: "[H]istorical records show that architects, engineers, and even everyday citizens understood the consequences of the earthquakes of the 1860s and tried to inventory the damage, to understand what had happened, to retrofit buildings to resist future earthquakes, and to build earthquake-resistant structures," Tobriner, *Bracing for Disaster,* 3:35.

[172] Both authors agree that whatever lessons had been learned and put into practice with buildings were forgotten in the following decades, or at least, not always enacted.

and the Chamber of Commerce was clearly interested in repressing or ignoring evidence about earthquakes; however, Californians made sense of the earthquake and learned from it, as evidenced in Tobriner's study of building practices and the "lessons learned" shared in the newspapers.

Conclusions

I argue that the process of making sense of the earthquake must be read through two lenses that speak to the themes of this dissertation: institutions claiming authority and balancing competing local interests on a national stage—in the parlance of information infrastructure researchers, coming to terms with the reach of "instant" telegraph. This chapter also illustrates how these two themes are related: the reach of information infrastructure was tied to how groups claimed informational authority, and why they desired it.

With the cross-continental telegraph, and the newspaper as a microphone for the telegraph, on the day of the earthquake people all over the United States knew about the event. In my analysis of the relationship between information infrastructure and how people experience an earthquake, I argue that the reach of the telegraphic infrastructure enabled more immediate knowledge of the earthquake across California and the rest of the United States, but had little relationship to constructing an accurate account of what happened. California had become part the national information infrastructure—connected by the circulation of newspapers, as well as by the telegraph.[173] The reach of the infrastructure enabled people located far away to know about what had happened, but, paradoxically, it also could have motivated the Chamber of Commerce to set forth an authoritative narrative of what happened via their telegram and via the Earthquake Committee.

The Chamber of Commerce does not appear to have been entirely successful at convincing people of their narrative at the time. The public looked to non-commercial institutions to provide explanations of what happened and what to do. Without the government acting as an informational authority, or scientific explanations of the earthquake, people were faced with a conflicting cacophony of stories undoubtedly shaped by business interests in San Francisco who were promoting California and by people interested in selling newspapers and other periodicals. In the midst of these conflicting narratives, Californians also shared "lessons learned" in print. These lessons were articulations of local informal knowledge about how to build.

All Californians were involved in the tasks set forth by Knight: evaluating "exaggerated" accounts versus reports that "make light of the whole

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[173] Newspaper exchanges would remain important until the subsidies were reduced in 1873 so that it became quite expensive to exchange papers through the mail. Kielbowicz, "News Gathering in the Age of the Telegraph," 39-41.

affair." Californians in damaged areas could see what happened to their communities with their own eyes, but they were still trying to sort out the fate of other locales. Without trusted institutions to tell a story of the earthquake, most people were left, like Knight's family, trying to make sense of a multitude of accounts of a rather frightening event.

Many of the complicated dynamics around the reach of information infrastructure and claims to informational authority were consistent throughout the different earthquake moments in this dissertation. In 1906, again, newspaper companies and business elites claimed the informational authority to explain the earthquake.

Chapter 4: The 1906 Earthquake and Fire

On April 18, 1906, a magnitude 8.0 earthquake shook buildings in San Francisco to the ground, breaking many of the pipes that carried water and gas in the city. Fires that started as a result of the earthquake raged for four days, leaving approximately half of the city's population homeless and destroying at least two-thirds of the built-up area including the business district. The disaster was immediately documented and retold in a number of books, magazine articles, photographs, and even theater productions. Personal correspondence also provided critical insights into the event.

Correspondence between Sarah Phillips and George W. Jones, in Schenectady, New York was dominated by discussions of how to best get in touch, how the telegraph system was working, and when and how George found out about the earthquake, as well as Sarah's well being.[1] The day of the earthquake Sarah wrote to George, "I have written and wired you but I do not believe you will receive either message."[2] The day of April 18, George wrote to Sarah that he "read every bit of news that has come in the papers . . . I am so anxious to hear."[3] Sarah understood the magnitude of George's emotional burden, and assured him, "I know how you felt. . . . And that is the reason I hurried to assure you of our safety."[4] The means for instant news, the

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[1] Sarah's father and George were cousins; Sarah and George were married. Sarah survived the earthquake unharmed. Initially Sarah's flat survived the earthquake. It was later destroyed in the fire, however, and she had to move to her friend's house on Stanyan. This account of Sarah and George is based on a collection of their letters edited and published by the California Genealogical Society: Dorothy Fowler, *A Most Dreadful Earthquake: A First-Hand Account of the 1906 San Francisco Earthquake and Fire—With Glimpses into the Lives of the Phillips-Jones Letter Writers* (Oakland, California: California Geneology Society, 2006).

[2] First quote from Fowler, *A Most Dreadful Earthquake,* 11, Letter No. 4, April 18, 1906.

[3] Fowler, *A Most Dreadful Earthquake,* 14, Letter No. 5, April 18, 1906.

[4] Fowler, *A Most Dreadful Earthquake,* 38, Letter No. 12, April 28, 1906. Sarah's companion also reassured George that Sarah did not want him wondering about her

telegraph, which Sarah and George relied on, didn't work after the earthquake and fire:

> I went directly to the W. U. [Western Union] Office which was a wreck. However, there were hundreds ahead of us and we worked our way through the debris to the desk. When I saw the pile of telegrams waiting to be sent and was told that the wires were all down I left the office at Pine & Montgomery & went to the Postal [Postal Telegraph-Cable Co.] at Montgomery & Market. The office was dreadfully wrecked but one machine was ticking away so I left my message. When the fire swept all away I thought that possibly all messages were destroyed. The next day I sent a message by W. U., a young man who was going to Haywards . . . took them . . . to send them.[5]

Whereas most of Sarah's telegrams seem to have been lost in the fire, on April 28, almost a week after the earthquake, Sarah received two telegrams from George by mail.[6] Sarah sent letters with updates about her ordeal, and augmented her letters to George with San Francisco newspapers.[7] The mail system, Sarah reported, "allows all mail to go through without stamps or envelopes and such funny things go into the box."[8] But finding people, for Sarah and for the Post Office, was not always easy. Sarah lost her apartment in the fire, and once the fire finally stopped, Sarah and her companion walked over 100 blocks around hilly San Francisco to find their mail—which had been sorted and was waiting for them at Sacramento and Fillmore.[9] Sarah reported, "We are trying to locate our friends . . . it is hard to see mothers looking for children and husbands for wives." She described the ways in which displaced San Franciscans attempted to find each other: "Cards are tacked all over fences, poles, etc. Asking different ones to report at certain places."[10] Sarah worried about a friend she had not heard from, Lizzie Gleason, and advertised

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well being based on newspaper reports: "She was so anxious to have the telegram reach you before you would see an account of it in the paper." Fowler, *A Most Dreadful Earthquake,* 34, Letter No. 11, April 27, 1906.

[5] Fowler, *A Most Dreadful Earthquake,* 29-30, Letter No. 10, April 27, 1906.

[6] Fowler, *A Most Dreadful Earthquake,* 36, Letter No. 12, April 28, 1906.

[7] Fowler, *A Most Dreadful Earthquake,* 27*,* Letter No. 9, April 25, 1906; Fowler, *A Most Dreadful Earthquake,* 37, Letter No. 12, April 28, 1906.

[8] Fowler, *A Most Dreadful Earthquake,* 24, Letter No. 8. April 23, 1906 [morning letter]. Sarah did not have to "take advantage of the privilege," because she had saved letters and stamps for mail when she abandoned her flat.

[9] Fowler, *A Most Dreadful Earthquake,* 15-20, Letters No. 6 & 7 from Sarah on April 23, 1906.

[10] Fowler, *A Most Dreadful Earthquake,* 17-18, Letter No. 6, April 23, 1906.

for her, wrote letters, and was planning on going to all of the registries to look for her.[11]

Overview of the Argument

This chapter is about the information infrastructure that facilitated accounting for individuals—essentially, how the information infrastructure of 1906 helped and didn't help Sarah as she attempted to notify George and locate her friends. After news of the earthquake, people were desperate to hear from friends and loved ones, but also employees, employers, and those who owed them money. The earthquake and fire meant that thousands of people had scattered all over the Bay Area, and so each person's social geography had shifted. Their friends, family, and places of work were in different places. For people who did not own land, this movement was possibly permanent. People updated others with their new location by sending telegrams if the telegraph was working, or by mail—if they knew where to send letters.

The most extreme cases of people attempting to locate loved ones involved physically going into San Francisco to find them. Stories circulated of people stuffing notes searching for loved ones inside loaves of bread sent for refugees.[12] As Sarah described, the city of San Francisco was littered with notes of people attempting to find each other. Residents of San Francisco designated a fence on which loved ones might leave notes as they attempted to locate each other.[13] Bulletin boards near where refugees fled also were places people

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[11] Fowler, *A Most Dreadful Earthquake,* 26, Letter No. 9, April 25, 1906. This letter gives hints as to how Sarah and her acquaintances attempted to locate Lizzie: "Mr. Rush has searched for her and we have advertised and written letters but we have heard nothing. Tomorrow, I will begin a systematic search, going to each one of the registry bureaus." (Lizzie was eventually found—she was in a hospital after stepping on a nail.)

[12] "Message in a loaf of bread," *San Francisco Chronicle* April 30, 1906; Richard Schwartz, *Earthquake Exodus, 1906: Berkeley Responds to the San Francisco Refugees* (Berkeley, CA: RSB Books, 2005): 86, describes a similar account. "Notes Hidden in Loaves of Bread," *Berkeley Daily Gazette*, April 26, 1906.

[13] One example of a posted notice read: "To be found at about 250 yds. West of Children's Playground, G. G. Park, Bernice Blacklock, Freddie Blacklock, Leona Blacklock, Mrs. Irene R. Smith, J. J. Smith, Joe Schaeffer, Arthur Moore." This is from an article 20 years after the earthquake: "The Great Fire of 1906: Adventures in Finding Lost Friends and Relatives—A Fence-Post Directory," *Argonaut*, April 2, 1927. Last accessed April 22, 2012: http://cdn.calisphere.org/data/13030/jt/hb7n39p2jt/files/hb7n39p2jt-FID59.jpg; also Schwartz, *Earthquake Exodous*, 84.

could physically go.[14] These symbolic traces of people's whereabouts dotted San Francisco, signals that life would come back. Photographs of the burnt areas of San Francisco show signs hanging on wreckage painted on sheet proclaiming that a business would return.[15] The system of posting notes and signs had limitations, however; people were so spread out that there was no guarantee anyone would happen upon a sign. Many efforts at putting all these signs and notes in a more recognizable repository cropped up in the form of registration bureaus. Sarah explains that she might go to *all* the registration bureaus to look for a friend of hers. Newspapers, fraternal organizations, relief committees, and the police all set up registry bureaus around San Francisco and the surrounding areas to which people had fled. Furthermore, many people put notices, such as "E. E. Hinman, at Touraine Hotel, Oakland, would like to find Mrs. Hinman, wife, in San Francisco," in newspapers inquiring about the status of others or giving their own whereabouts—possibly somewhat akin to what Mr. Rush advertised.

This chapter focuses on the theme of continuity. The 1906 earthquake is the most disruptive earthquake that I examine in this dissertation from the perspective of physical damage and lives lost, and thus the one that presents the most interesting opportunity to probe questions about continuity and discontinuity.[16] The earthquake and resulting fire destroyed the information infrastructure in San Francisco, making telegraph lines inoperable, ruining telephone exchanges, and burning printing presses and paper. Furthermore, it

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[14] "S.F. after 1906 fire [and] earthquake. [Refugees at bulletin board in camp. Unidentified location.]" Photographs, local call number FN-12364, California Historical Society. Last accessed February 12, 2012: http://content.cdlib.org/ark:/13030/hb6n39p1w6/?order=1.

[15] Signage around town hung on burnt buildings showing that a business would again be set up there. There is a picture that was cut out from a commemorative picture book that was a picture of a sign on a burnt building with a caption, "how they came back." Scrapbook 82, San Francisco Public Library.

A horse with a carriage attached was draped with the a sign that said "safes opened" parked in front of a sign advertising safe removal and opening, and building wrecking services. RG111-SC, Records of the Office of the Chief Signal Officer—Prints-Military History 1860-1938—box 732, photos numbered SC-95230. National Archives, College Park, MD.

A photograph of Fillmore Street, the main commercial street after the earthquake shows a number of sign-making shops advertised. From the Records of the Bureau of Public Roads—Slides—Photographs of the aftermaths of the San Francisco Earthquake April 1906, box 1, slide number 30-HH-4, National Archives, College Park, Maryland.

[16] The 1906 San Francisco Earthquake and Fire was, as the historian Ted Steinberg argues, the "archetype" twentieth century disaster. Ted Steinberg, *Acts of God: The Unnatural History of Natural Disaster in America*, Second Edition (New York, NY: Oxford University Press, 2000): 25.

scattered San Franciscans throughout the Bay Area. In reconstituting the information infrastructure, old institutions adopted new techniques and new institutions adopted old techniques pointing toward a story of continuity in post-disaster response. The story of the infrastructure is one in which the way that people organized and worked proved powerful. Where technical telegraph infrastructure faltered, the bureaucratic work practices of the post office remained. Despite the destruction of all of the newspaper presses, newspapers remained the best way to quickly broadcast personal news—a powerful position. The relief committee registration process represented new institutions for citizens to deal with, but the practices of the census and the Progressive charity rehabilitation ideologies were familiar.

Other books and papers about the 1906 earthquake have not put the information infrastructure for personal communication at the center of their study, but as Sarah and George's story makes clear, the information infrastructure that people used to account for each other was central to many people's experience of the disaster. I build on research focused on how newspapers participated in "seismic denial."[17] Researchers have documented how newspapers colluded with the railroad giant Southern Pacific and others to ensure that the narrative of the disaster focused on fire and ignored the still politically inconvenient earthquake.[18] The wealthiest San Franciscans owned the city's newspaper companies, which occupied the most iconic downtown San Francisco buildings. That the newspapers participated in the campaign to downplay the earthquake was important because of their centrality in the San Francisco public sphere.[19]

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[17] Gladys Hansen and Emmet Condon. *Denial of Disaster: The Untold Story and Photographs of the San Francisco Earthquake of 1906* (San Francisco, CA: Cameron and Co., 1989): 107-134 (Chapter on the "Politics of Disaster").
Several historians, including Ted Steinberg and Carl-Henry Geschwind, argue that there was a concerted campaign to minimize the amount of damage done by the earthquake, and to deny that earthquakes could harm Californians in the future—similar to what happened with nineteenth-century earthquakes, like the one in 1868. "Californians reacted" to the earthquake and fire by relying "on patterns of behavior established in response to previous earthquakes."
Carl-Henry Geschwind, *California Earthquakes: Science, Risk, and the Politics of Hazard Mitigation* (Baltimore, MD: The Johns Hopkins University Press, 2001): 21; Steinberg, *Acts of God*, 26-36; Ted Steinberg, "Smoke and Mirrors: The San Francisco Earthquake and Seismic Disaster," in *American Disasters*, edited by Steven Biel, (New York, NY: New York University Press, 2001): 103-128.
[18] This argument is advanced in several works: Hansen, *Denial of Disaster*, 109-110; Geschwind, *California Earthquakes*, 20-23; Steinberg, *Acts of God*, 30.
[19] Many books, plays, photographs, and other media did not participate in downplaying the earthquake, but did exactly the opposite and sensationalized the disaster.

Notification with Telegrams and Letters

Personal Use of the Telegraph

The telegraph was very much in demand after the earthquake and fire, particularly outside of San Francisco. People all over California and the United Stated mobbed telegraph offices attempting to send telegrams to San Franciscans.[20] The recollections of Berkeley students living outside of the area affected by the earthquake show that many students remember families finding out about the earthquake in a newspaper, and then anxiously sending telegrams to get in touch with family members inside of San Francisco.[21] "There was considerable excitement in the store as everyone gathered to read the paper . . . There was also considerable anxiety in our home during the ensuing days because of the difficulty in getting a reply to a telegram to some of our relatives who were visiting in San Francisco at the time of the fatal calamity."[22] That replies were not forthcoming was a source of anxiety for many families: "I found my folks already preparing to send a telegram in order to inquire about the fate of relatives living in San Francisco. We waited impatiently for three days before definite word of their safety reached us."[23] In one case, it was not the telegram that relieved the family's anxiety, but a letter: "I remember my mother's sending numerous telegrams to relatives . . . After a few days we received some mail and were greatly relieved . . . pieces of

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[20] "Crowds Begging Temblor News," *Los Angeles Herald,* April 19, 1906*;* "Chicago People in Much Anxiety," *Chicago Daily Tribune*, April 19, 1906; "Inquiries Swamp Telegraph Lines," *Chicago Daily Tribune*, April 20, 1906.

[21] These recollections were collected in 1919 by a UC Berkeley professor. Many of the students were very young at the time, so their recollections are of dubious quality. There are, however, many of them, and they paint a broad picture of information practices, particularly as experienced within families, that was hard to get elsewhere. Stratton's assignment reads as follows: "Earthquake of 1906: Where were you at the time? Write as detailed and precise an account as you can of your own recollections of the earthquake and fire of 1906. Tell if you remember them, the events of the day and evening before the eathquare [sic], the doings and thought of yourself during and after the earthquake. the [sic] doings of your family and neighbors, -- all these for the days and weeks following until the earthquake no longer figures in the events. Tell nothing that you do not personally remember. If you remember little tell that little carefully." George Malcom Stratton, Recollections of the San Francisco 1906 Earthquake by Stratton Students, Bancroft Library, local call number BANC MSS C-B 1032, Carton 6.

[22] W. Kennedy in Stratton, Recollections of the San Francisco 1906 Earthquake by Stratton Students, folder 1. W. Kennedy sec. B Row 14 seat 14 living in Rocky Ford, Colorado.

[23] M. L. Gelber in Stratton, Recollections of the San Francisco 1906 Earthquake by Stratton Students, folder 1. M. L. Gelber B-12-2 [typed] living in New York City.

cardboard without stamps and the postage was paid when they reached us."[24] Messages that were often simply, "Alive and well; lost everything."[25] Additionally, money could be "wired," thus those who had lost everything might have been particularly eager to pick up telegrams given that it was "better to receive a message back from a friend that has some money to send."[26]

Even the world's most powerful were at the mercy of the broken and backlogged telegraph network. Communications from international diplomats to the Secretary of State sought personal information about loved ones in the affected areas, as well. Heads of state with connections to people in the Bay Area included inquiries into the well being of specific individuals in their official correspondence with the Department of Defense. A telegram addressed to "The Governor of California, Sacramento," stated, "At the insistance of Austro-Hungarian Ambassador, I have the honor to request information regarding fate or whereabouts of Charles Seigler, whose address is given as 'General Delivery, San Jose' and of Hugo Bettelheim, who is described as 'Merchant at Burlingame near San Mateo.'" A handwritten reply reads, "Referring to inquiry Charles Siegler native Austria Province Bohemia Alive and well" and is signed, Geo. C. Pardee, Governor.[27] But most people did not get response from the California governor as to the whereabouts of the people they sought; the majority was stuck with the overwhelmed telegraph wires. Many articles say that agents dealt with telegrams in the order received, although other articles make it clear that there was much discretion on the part of the operators: "[H]e must know at a glance the matter that should be put ahead and then he must see that it is routed with the least possible delay and in the most direct way."[28]

After the earthquake, although the bandwidth was severely limited,

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[24] Corinne Connell, in Stratton, Recollections of the San Francisco 1906 Earthquake by Stratton Students, folder 1, Corinne Connell A-16-1 - San Diego.

[25] "Thousands of messages have flashed across the wires since that memorable morning . . . the accumulated messages have crept well up into hundreds at times during the past few days." Miss Alice G. Eccles, "Telegraph Wires Are Laden With Messages," *Oakland Tribune*, April 22, 1906.

[26] Miss Alice G. Eccles, "Telegraph Wires Are Laden With Messages," Oakland *Tribune*, April 22, 1906; Alice Hutchinson, Earthquake Letters, April 18-May 2, 1906, MS 3482, California Historical Society. Last accessed through the Online Archive of California April 23, 2012:
http://content.cdlib.org/view?docId=hb7g5008cg&brand=oac4.

[27] Record Group 59 General Records of the Department of State, Miscellaneous Correspondence, 1784-1906, Special Series of Domestic and Miscellaneous Messages of Condolence, Official Messages on the San Francisco Earthquake, April 19-25, 1906, Box 1; NARS A-1; Entry 182, National Archives, Washington, D.C.

[28] "Telegraph office perched on pole—How the Western Union built a new plant in four days," San Francisco *Chronicle*, April 30, 1906.

there was a connection from Oakland to the rest of the country. Western Union officials claimed that the first story of the earthquake was sent "by means of relays, Los Angeles, Salt Lake, Denver and other places" by an operator perched on a telegraph pole in Oakland.[29] In San Francisco, for several hours after the earthquake, the Postal Telegraph was operable and giving news about the progression of the fire. The fire eventually shut this office down, making it impossible for people in San Francisco to telegraph people outside of the city.[30] Afterward, the manager of the Postal Telegraph Cable Company was quoted as saying that they bravely "worked in San Francisco during the fire until we were put out of the building."[31] One newspaper dramatically claimed that San Francisco was without service "for the first time in history."[32] The telegraph was critical to the process of news collection for the newspaper companies, and they described their workarounds extensively.[33] The telegraph companies quickly set up offices in Oakland that

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[29] "Telegraph office perched on pole - How the Western Union built a new plant in four days," San Francisco *Chronicle*, April 30, 1906.

[30] Apparently a dramatic last telegraph was sent out: "The city practically ruined by fire. It's within half a block of us . . . The Call Building is burned out entirely. The Examiner Building just fell in a heap . . . They are blowing standing buildings that are in the path of flames with dynamite. No water. It's awful. There is no communication anywhere and entire phone system is busted. I want to get out of here or be blown up." Chief Operator Postal Telegraph Office, San Francisco, Cal., 2:20 P. M. from William Bronson, *The Earth Shook, the Sky Burned: A Photographic Record of the 1906 San Francisco Earthquake and Fire,* 100th Anniversary Edition, (San Francisco, CA: Chronicle Books, 1959): 56.

[31] Miss Alice G. Eccles, "Telegraph Wires Are Laden With Messages," *Oakland Tribune*, April 22, 1906.

[32] "Telegraph office perched on pole—How the Western Union built a new plant in four days," San Francisco *Chronicle*, April 30, 1906.

[33] That the newspapers and the telegraph were completely intertwined in their operation became clear as the non-working cables were the subject of several stories. Despite the fact that all of the daily San Francisco newspapers saw their offices burn to the ground, a *San Francisco Bulletin* editorial declared that, "The maintenance of telegraphic communication with the outside world has been one of the most difficult matters with which the newspapers have had to contend." As in 1868, newspapers companies were heavily dependent on the telegraph for stories from far away. The telegraphic infrastructure had grown, and the stories sent via telegraph had grown in length as well. In the years since 1868, the Associated Press and UDP [spell out on first instance] had come to dominate the wire service, and were integral to newspaper reporting. The newspaper went without reliable telegraph lines into San Francisco for a week, having reporters carry stories across the San Francisco Bay on boats to Oakland to be printed or sent to the rest of the country. "Newspapers Show Great Resources: Under Incredible Difficulties All But One of the San Francisco Dailies Survive," San Francisco *Bulletin*, April 29, 1906; "S.F. telegraph office's first stand under a roof in shack on Oakland water front [caption on print: 2nd office in shack.

would temporarily replace the multitude of offices in San Francisco.[34] Interestingly, the only telephone that would have been available for non-military purposes was converted to a telegraph.[35] Eventually, makeshift telegraph offices were set up in the burnt districts of San Francisco.[36]

The *Los Angeles Herald* declared that it was "impossible" to send telegrams in screaming headlines.[37] The *Los Angeles Times* whipped the entire city into a frenzy, releasing six extras throughout the day as every bit of news about San Francisco trickled in: "The extras were bought with a fever and read with an avidity beyond precedent."[38] At this point, "Thousands of people in Los Angeles had thousands of relatives in San Francisco," and likely wondered, "How would it be with them?" The worried Angelinos "filed" telegrams that were not sent.[39] The *Los Angeles Times* said that the one working Postal Telegraph cable was used exclusively by the newspapers from 8:00 a.m.

Oakland.]," photograph, California State Library. Accessed via the Online Archive of California September 14, 2011: http://www.oac.cdlib.org/ark:/13030/hb5d5nb3tt/?order=1. The *Chronicle* summarized their technical needs required to inform people of the outside world: "What the press can do toward satisfying this desire will depend on the mechanical possibility of the telegraph and the available printing presses." Quoting from the *Chronicle* on April 26, 1906. R. Quinn, *The San Francisco Press and the 1906 Fire. History of San Francisco Journalism Project, Vol. V,* edited by E. L. Daggett (San Francisco, CA: W.P.A Northern California., 1940): 30.

[34] "Telegraph office perched on pole—How the Western Union built a new plant in four days," *San Francisco Chronicle*, April 30, 1906.

[35] "Long-Distance Phones Work," *San Francisco Bulletin*, April 23, 1906; "The Great Fire of 1906 - LI: Troubles and Achievements of the Press and the Telegraph Companies," *Argonaut*, April 09, 1927; "the wireless" was also used to deliver messages: "The Great Fire of 1906 - LII -- How the Wireless Helped -- Unique Achievement of the "Daily News," *Argonaut*, April 16, 1927.

[36] Photographs show offices located in makeshift shacks in burned areas of the city. For example, see photograph RG111-SC, Records of the Office of the Chief Signal Officer—Prints-Military History 1860-1938, box 732, photograph number SC-95177. National Archives, College Park, MD; "Telegraph office in election booth on Van Ness Avenue," Photograph, California State Library. Accessed via the Online Archive of California December 3, 2010: http:/www.oac.cdlib.org/ark:/13030/hb5d5nb3tt/?order=1; "Makeshift office of Postal Telegraph Co. Commercial Cables, in front of their ruined building. Market St." Photograph, local call number FN-34762, California Historical Society. Accessed via the Online Archive of California December 3, 2010: http://content.cdlib.org/ark:/13030/hb796nb67f/?order=1.

[37] "Impossible to Send Messages," *Los Angeles Herald*, April 21, 1906.

[38] "Carries Dismay to Sister City," The *San Francisco Call*, April 22, 1906, from the *Los Angeles Times.*

[39] "Carries Dismay to Sister City," The San Francisco *Call*, April 22, 1906, from the Los Angeles *Times.*

to when the cable went down. This meant that none of the concerned citizens of Los Angeles could wire friends in San Francisco.[40] While newspapers companies printed extras telling of every moment of destruction, people would still hang out around the telegraph offices, waiting for the latest updates about San Francisco.[41] The telegraph services prioritized newspaper companies over individuals. Given the limited bandwidth of the Bay Area initially, the non-working telegraph might have further reinforced people's telegraph use because the newspapers had priority over individuals, so the newspapers had more access to news from elsewhere.

In the Bay Area, many anticipated, as Sarah had, that their loved ones would want to hear from them given the dramatic news. As Sarah explained, the telegraph offices in San Francisco on the day of the earthquake had large queues; the same was true in Oakland.[42] One San Franciscan reported his experience: "[T]he knowledge of friends and relatives at the mercy of the yellow press sent me quickly to the Telegraph office. I stood in line for ten minutes before I wasted my money on messages that were never sent or got lost on the way."[43] Sarah and George were dependent on the telegraph companies—Western Union, Pacific Telegraph and Telephone, and the Postal Telegraph Company—all of which Sarah tried to use the day of the earthquake with no instant results. Even though the telegraph cable wasn't working, it seems that Western Union continued to collect telegrams throughout the afternoon of the day of the earthquake.[44]

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[40] Chicago apparently had been able to get a cable to the Ferry building in San Francisco. In Chicago priority was given to the news coming out of San Francisco, rather than sending messages there. "Chicago People in Much Anxiety," *Chicago Daily Tribune*, April 19, 1906.

[41] "Seek Tidings From Home," *Chicago Daily Tribune*, April 19, 1906.

[42] "Crowds trying to telegraph relatives from Oakland offices," California State Library, accessed via the Online Archive of California, December 3, 2010: http://www.oac.cdlib.org/ark:/13030/hb5d5nb3tt/?order=1.

[43] Cameron King, Jr., deputy registrar of voters at City Hall, to Anna Strunsky Walling. They met through the Socialist Labor Party. Mary McD. Gordon, "Notes on Documents: Earthquake and Fire in San Francisco," *Huntington Library Quarterly* 48, No. 1, American Issue (Winter, 1985): 69-79; "Overcharging for Telegrams," *San Francisco Chronicle*, April 22, 1906. (Allegations of overcharging for telegrams appear to be justified.)

[44] "At 3 o'clock it had got to the Palace Hotel on the Mission-Street side, and by 3:30 it was well on fire. About this time I went into the Western Union Telegraph office, and while writing a telegram to Nellie and Robert, who were on their way to New York, the announcement was made that no more telegrams would be received." James B. Stetson, "San Francisco during the eventful days of April, 1906: personal recollections," page 10, Bancroft Library. Last accessed on April 23, 2012: http://content.cdlib.org/view?docId=hb4p3007dw&brand=oac4.

In the Bay Area, managing the backlog of telegrams required that people work day and night to sort through them. It was not just that the telegraph lines were congested and that stacks of telegrams needed to be sent—incoming telegrams were practically undeliverable. "Even . . . an army of messengers … would be of little value for the reason that the people are scattered far and wide and a journey from the ferry building to Western Addition, or to the refugee camps consumes many hours."[45] People simply could not be located by the messenger boys usually deployed across cities to deliver telegrams from offices to their recipients. That is, even if the telegrams got though, the recipients were scattered across San Francisco and the entire Bay Area. Cities had an increasingly complex system of telegraph messengers who would deliver telegraphs within cities. Telegrams that were sent took many days to reach their destination because sometimes people could not be found.[46]

In the case of Los Angeles, a city with many ties to San Francisco, the disconnection with San Francisco was so problematic, the situation so desperate, and the backlog of telegrams so great that, "the Western Union Telegraph Company sent more than 5,000 private messages to San Francisco and Oakland aboard the Owl to be delivered by special messengers."[47] Trains from Chicago apparently carried telegrams as well.[48] Trains carried telegrams in

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[45] ""Impossible to Send Messages,"" *Los Angeles Herald*, April 21, 1906; ""Useless to Send Telegrams,"" *The Chicago Daily Tribune,* April 21, 1906.

[46] T.W. Goulding, Letter to J.P. Spanier: LS, London, April, 24, 1906, BANC MSS C-Z 95, The Bancroft Library. Last accessed on April 23, 2012: http://content.cdlib.org/ark:/13030/hb8x0nb6qx/?order=1.

[47] "Messages Sent North Upon the Owl," *San Francisco Bulletin*, April 21, 1906.

[48] James A. Warren, Telegram, April 20, 1906, MS 3461, California Historical Society. Last accessed on April 23, 2012: http://content.cdlib.org/ark:/13030/hb2d5nb1gr/?order=1.
Reports about the volume of telegraphs are present in many newspaper articles and in letters as well: "Telegrams could be sent from Oakland, but it was almost impossible to get over there, and then almost as impossible to get a telegram sent as thousands and thousands of telegrams were filed and as many received. It is said that 10,000 telegrams alone were received by mail from outside points, at Oakland, and they say that the Western Union at Chicago took 15,000 telegrams they could not get on the wire, so put a messenger on the train and sent him through with them. Mr. Shields received a telegram from Seattle on the 27th. that was filed there on the 18th. Mr. Brick, one of our travelers received a telegram here in the office on the 30th. in the morning from Newark, New Jersey, dated there the 18th. I tried to telegraph the first thing Wednesday morning but was informed the wires were down, and then immediately the fire got full sweep and the mails were out of commission." Charles E. Leithead, "account of the 1906 San Francisco earthquake and fire," pages 11-12, California Historical Society, local call number MS 3487. Last accessed on April 23, 2012: http://content.cdlib.org/view?docId=hb6b69p1t6&brand=oac4.

"great bulk" out of San Francisco.[49] As the stories of Sarah and George indicated (although it may not have been publicized), telegrams were sent through the mail as well.[50] Eventually, telegrams for people of the Bay Area made their way to relief headquarters and to Western Union offices, and awaited retrieval. Lists of the telegram recipients appeared in local papers.[51]

The Post Office

As the letters from Sarah and George report, telegrams were sent through the mail. The fact that telegrams became post office mail was not lost on William Burke, secretary to the San Francisco postmaster at the time of the earthquake. Burke wrote the most celebratory, and probably the most complete, account of the post office activities in a 20-year anniversary issue of the *Argonaut*: "The best proof of the inadequacy of the telegraph service was the fact that thousands of telegrams were being mailed under two-cent stamps in the Post Office, the telegraph companies trusting to the postal service to deliver them."[52] But how did the post office, whose very existence relies on people being at certain places, reform so quickly after the earthquake when the places no longer existed?

The main post office in San Francisco was famously saved by its employees. Six branch offices and twenty-two substations (places where people could drop mail off, but were not staffed by post office employees) burned.[53] According to Burke, amazingly, no mail was lost in the catastrophe. After the earthquake, and while the fire was still burning, the first focus of the post office was dealing with outgoing letters. "The theory of the postmaster was

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[49] T.W. Goulding, Letter to J.P. Spanier: LS, London, April, 24, 1906, BANC MSS C-Z 95, The Bancroft Library. Last accessed on April 23, 2012: http://content.cdlib.org/ark:/13030/hb8x0nb6qx/?order=1.

[50] There are some examples of postmarked telegrams. Arthur Dangerfield, Telegram, Postmarked April, 23 1906, local call number BANC MSS 94/24 c 1:06, Bancroft Library. Last accessed on April 23, 2012: http://content.cdlib.org/ark:/13030/hb558007gz/?order=1.

[51] "Uncalled for Telegrams," *San Francisco Bulletin*, April 28, 1906; "Undelivered Telegrams," *San Francisco Bulletin*, April 29, 1906.

[52] William F. Burke, "The Great Fire of 1906-XXXV. How the Post Office Rose superior to the Disaster—Unstamped Cuffs as Mail Matter," *The Argonaut*, December 18, 1926.

[53] Randy Stehle, "Auxiliary Markings—'Burned Out' in the 1906 San Francisco Earthquake and Fire" [originally published in *La Posta*. 20, No. 6 (December 1989-January 1990): 7-12] and Randy Stehle, "Auxiliary Markings: "Burned Out" in the 1906 San Francisco Earthquake and Fire—Recent Discoveries & a Re-examination of the Resumption of Normal Postal Service" [originally published in *La Posta* 29, No. 3 (June-July 1998): 7-28]. In Randy Stehle, *Postal History of the 1906 San Francisco Earthquake and Fire* (La Posta Publications, 2010): 7 & 12.

that the first need of the stricken citizens of the city was to get word to their friends on the outside that, while they were still alive, they were in great need."[54] Mail service was partially restored on April 20 in San Francisco with collections on foot and by mounted collectors on April 21.[55] The postmen announced that mail would be accepted written on any material and without stamps, and that they would be back later in the day to collect it.[56] People reported learning about the well-being of loved ones from letters on everything from wrapping paper to scraps of newspaper.[57]

Getting letters out of the city was clearly a priority for the post office, but that seemed almost easy compared with the challenge of delivering mail to residences that no longer existed or to people who were scattered. Postmaster Fisk publicly asked that people address their letters to San Franciscans to their original address, unless they had a new address.[58] This effort was further handicapped when the Department (presumably in Washington) reassigned 42 clerks and 25 carriers from the 350 available in the San Francisco office to Oakland, and 4 clerks to Berkeley to help with the influx of refugees[59] It "seriously delayed" the working of the San Francisco Post office—"Like taking the life preserver from a drowning man and telling him to swim for it."[60] By June 1, 1906, Burke estimated that the Post Office had almost 200,000 "forwarding orders and changes of address." Newspapers and magazines wanted their subscription lists reviewed, and there was a lot of duplicative information about businesses. Carriers whose districts were burnt worked to keep files on where people had relocated, and eventually districts were redrawn. The post office reorganized quickly to deal with the mail of people who had been "burned out."

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54 Before the earthquake, sometimes the mail was handled by street cars with "United States Mail" signs. One of these signs was hung on an automobile on April 21, and driven around to where people were located to let them know that the Post Office would be picking up outgoing mail: "The effect was electrical. . . . [people] shouted in a state bordering on hysteria. . . . As we went on into the Presidio there was almost a riot. . . . It was the same in the park." Burke, "How the Post Office Rose superior to the Disaster,"

55 Burke, "How the Post Office Rose Superior to the Disaster."

56 News spread quickly. "Letters sent without stamps," *San Francisco Chronicle*, April 21, 1906; "San Francisco Postoffice is Again at Work—Mails being distributed and collected at branch stations for refugees—every facility afforded to the public for communication with outside," *San Francisco Call*, April 22, 1906.

57 See, for example, Hilda Blight letter to Mrs. A.E. Mitchell, Message, "We are all well." April 22, 1906, MS 3463, California Historical Society. Last accessed : http://content.cdlib.org/ark:/13030/hb429005w7/?order=3.

58 "All mail held at local office," *San Francisco Chronicle*, April 22, 1906.

59 Burke, "How the Post Office Rose Superior to the Disaster."

60 Burke, "How the Post Office Rose Superior to the Disaster."

An analysis of post-earthquake mail indicates that the post office adopted several mail annotations to deal with the new San Francisco geography. Several innovations that helped the post office sort the volumes of mail were described by Randy Stehle. First, "burned out" was used as an "auxiliary marking," meaning a stamp that might be placed on an envelope to indicate the address no longer existed.[61] There was also a "Camp Ingleside" stamp used to forward mail to the refugee camp of that name. It was a camp for the elderly and infirm, who were without people to care for them; built in former horse stables, it was apparently an undesirable place to end up.[62] Lastly, photographic evidence of a Post Office branch, "substation Q" in Hamilton Park (an official refugee camp from June 3, 1906 to August 31, 1907), indicates that the post office moved into refugee camps to reach those that had been displaced.[63]

The innovations by the post office also included new methods of keeping track of addresses for forwarding. Initially, the Post Office used a system of re-forwarding, which meant that a letter might be re-forwarded several times; eventually a system of short cuts was devised. The post office's mandate for universal service meant that it would include those who were displaced by the earthquake. The evidence suggests that they had devised methods for reaching into the refugee camps to enable the most disenfranchised people to participate in America's oldest information system. Still, it is important not to overstate that notions of equality motivated the service of the post office. Many of the actions taken after the earthquake were *ad hoc*, with an eye to universal service, but these *ad hoc* actions were tempered

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61 Stehle, "Auxiliary Markings—'Burned Out' in the 1906 San Francisco Earthquake and Fire," 8; Stehle, "Auxiliary Markings: 'Burned Out' in the 1906 San Francisco Earthquake and Fire—Recent Discoveries & a Re-examination of the Resumption of Normal Postal Service," 13 & 15.

62 Joanna Leslie Dyl, "Urban Disaster: An Environmental History of the San Francisco After the 1906 Earthquake" (PhD Dissertation, Princeton University, 2006).

63 Randy Stehle, "The 1906 San Francisco Earthquake and Fire—Recent Discoveries (Part 3)" [originally published in *La Posta* 33, no. 1 (February-March 2002), pp. 47-50], in Stehle. *Postal History of the 1906 San Francisco Earthquake and Fire* (La Posta Publications, 2010): 34.

Pictures from a refugee tent at Lobos Square refugee camp show a post office: "Sewing class in session at 'Forward Movement' tent. Refugee camp, Lobos Square." [Photo from collection of Jesse B. Cook.] Photograph, local call number FN-34241, California Historical Society. Accessed online February 12, 2012: http://content.cdlib.org/ark:/13030/hb5n39p151/?order=1. Also: "Group portrait of sewing class at 'Forward Movement' tent. Harbor View refugee camp." Photograph, local call number FN-19909, California Historical Society. Accessed online February 12, 2012: http://content.cdlib.org/ark:/13030/hb109nb1c8/?order=1.

by the same bureaucratic restrictions as before the earthquake. People apparently wrote to the post office in large numbers inquiring about the whereabouts of their contacts, yet despite the unprecedented nature of the disaster, the post office adhered to regulations that declared, "no information shall be given by the Post Office regarding addresses." Thus, those asking for the addresses of "obscure parties" might not get a prompt reply.[64]

Burke reflected on why they had not instituted these short cuts immediately; his answer reveals a lot about practices at the post office, but also why the system was so stable and reliable when all other "lines of information," as Greely referred to them, failed:

> It might naturally be asked why this was not done at once. Because it was impossible, and because it was inadvisable and dangerous in the conditions in which the service was just after the catastrophe. It was impossible, because no one had ever met such a situation before; and it may be said, as soon as we got used to the problem we found a solution for it. It was inadvisable and dangerous because our only hope of maintaining service lay in handling the situation in the way in which we were accustomed to handle the mail, inadequate for the time being though it might be. Our only safety lay in creeping along by known methods until we had grasped the full significance of the complicated task before us, and could risk experimenting with it. Until the service could be restored to what might be called normal in such a state of affairs, any new plan that might break down—and any innovation was certain to break down—would have let [sic] to hopeless confusion, and discredit."[65]

It is not to say that the post office was independently functional; it surely relied on telegraphic capabilities to communicate between offices. But the very human, very physical system ended up being the one that was most malleable and most functional when technical infrastructure was not, because it had a well-honed work practice that it could use and improve on in creative ways. It was the post office that eventually delivered the news from Sarah and George when the telegraph wires became inoperable.

Registration Bureaus/Information Bureaus

The fire that followed the earthquake destroyed the residences of about half of the population of San Francisco—approximately 200,000 people. Those people dispersed throughout the Bay Area, and free train service from Southern Pacific facilitated people traveling to other areas around

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[64] Burke, "How the Post Office Rose Superior to the Disaster,"
[65] Burke, "How the Post Office Rose superior to the Disaster."

the country.[66] Generally, refugees dispersed in a manner that followed the contours of class lines. Wealthier San Franciscans retreated to summer homes in Marin County; working-class refugees went south from San Francisco to what is now "Daly City"; and middle- and working-class people went to the East Bay.[67] The disaster meant that many families were separated as they fled the fire. A tragic consequence of hasty goodbyes was that people did not know where their loved ones had gone. Furthermore, employees and employers had no notion of each other's whereabouts if business was burned. An individual's entire social geography would have radically shifted along with their house.

As described above, the post office and telegraph were inundated with people trying to get into contact with each other. Registration bureaus run by newspapers, relief groups, fraternal organizations, and the police appeared throughout San Francisco and Oakland to help people locate each other. The idea was that if people wanted to be found, they could go to the registration bureaus, where they would give their old and new addresses. People then could inquire as to the whereabouts of their family, friends, or work contacts using their names and old addresses. Indeed, people inquired about the well being of loved ones in letters to the post office with limited success as mentioned previously, and in the registration bureaus. Adverts in the newspapers said that people should also use the registration bureaus for documenting information about the deceased. In this way, the registration bureau assisted people in locating social contacts through the publication of advertisements for the missing, and in notifying friends of new (whether temporary or permanent) residence.

According to the newspapers, these registration bureaus were organized "to relieve the terrible mental strain of those parted from relatives and friends."[68] The existence and purpose of these bureaus was publicized far away; The *Washington Times* noted that the "bureau of registration . . . is bringing many families together."[69] The task was Herculean. Newspapers begged that the over 200,000 people displaced by the earthquake and subsequent fire let the registration bureaus know of their whereabouts in the "briefest possible manner" and the "concisest fashion possible," such that "lists may be prepared and published in the morning papers."[70] The *New York*

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[66] The earthquake corresponded with growth in some of the towns that surrounded San Francisco—communities such as Berkeley grew 200 percent from 1900 to 1919—yet it did not adversely affect the population of San Francisco.

[67] Andrea Davies Henderson, "Reconstructing Home: Gender, Disaster Relief, and Social Life After the San Francisco Earthquake and Fire, 1906-1915" (PhD dissertation, Stanford University, 2005): 120.

[68] "Hope Springs Eternal," *San Francisco Chronicle,* April 21, 1906.

[69] "Parents and Children Separated," *Washington Times*, April 21, 1906.

[70] "Registry Bureaus Throughout City," *San Francisco Call*, April 21, 1906; "Hope Springs Eternal," *San Francisco Chronicle,* April 21, 1906.

Tribune called the task "illimitable and almost impossible" saying that is was "occupying hundreds of persons to-night."[71] The *Los Angeles Herald* called the registration "an important piece of work" for which in Oakland, "forty-five clerks engaged in this work alone."[72] The success of the registration bureau was quite obviously mixed, one paper reporting, "Even with the registration bureaus many persons are still unable to find relatives or friends"[73]; however, the bureaus maintained that "[r]egistration is the only systematic method of bringing together separated families."[74]

Given the magnitude of the disaster and the possibility of death or disappearance, the registration bureaus were information systems that helped people at their most emotionally desperate and vulnerable moments. The registration bureaus that developed were information systems that helped people reorient their personal geography and were also laden with the incredible emotions associated with the possibilities individuals faced. Over the next two sections, I describe the way that registration bureaus worked and argue that the registration bureaus reflected the way that social groups were organized, and, furthermore, that they were organized by the most powerful entity in the public sphere—the newspaper companies.

Newspapers and Registration

The publishers of newspapers had built the grandest buildings in downtown San Francisco before the earthquake to house their publications, and they didn't intend for their presence to disappear, even though their monuments had been badly shaken and burned. During the 1906 earthquake and fire, all of the printing facilities for daily newspapers in San Francisco were destroyed. With a public hungry for news, the *Call*, *Chronicle,* and *Examiner*, three of San Francisco's four major newspapers, shared the *Oakland Tribune's* presses for one day following the earthquake. After that one issue, the four newspapers (including the *Bulletin*) found temporary homes on different Oakland presses.[75]

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[71] "Many Families Divided—Bureaus of Registry in Oakland Crowded by Anxious Persons," *New York Tribune*, April 23, 1906; "illimitable and almost impossible" is also from an AP article appearing in other newspapers such as the *Los Angeles Times* of April 22, 1906.

[72] "Oakland Houses 75,000 Refugees," *Los Angeles Herald*, April 23, 1906.

[73] "Many Families Divided—Bureaus of Registry in Oakland Crowded by Anxious Persons," *New York Tribune*, April 23, 1906.

[74] "Where to Register on Either Side," *San Francisco Chronicle*, April 22, 1906.

[75] The *Call-Chronicle-Examiner* collaboration of April 19 would not continue. The *Examiner* bribed the *Tribune* to have sole access to the presses, and it was another day before the other newspapers could publish. April 21, 1906 was really the first day that was "back to business" for the major San Francisco newspapers. The *Bulletin*, meanwhile, negotiated using the press of the Oakland *Herald* in the afternoons, while

Impressively, the organization of the newspaper businesses was such that even with entirely different facilities, the various news companies were able to produce their own newspapers just three days after the earthquake. The quick improvisatory action by the newspaper companies in moving to Oakland was important for them to retain their position in the public information infrastructure. In fact, one could argue that these improvisations, and the fact they could afford to keep paying employees after the earthquake and fire, reinforced their position. As Lemeiux makes clear in her analysis of print culture in San Francisco following the earthquake, "The publishers and writers who had spent decades cultivating the city's dependence on print as a means of public communication were the same ones who were in power during the emergency."[76] Despite all of the daily San Francisco newspapers losing their printing facilities, the newspapers remained the best way to contact loved ones or promote civic messages. Furthermore, the earthquake and fire made it clear that the facilities and printing apparatus in San Francisco were not necessary for newspapers to retain their power.

The newspaper companies, dominant in the public sphere at this time, were a useful place to broadcast messages.[77] Because the newspapers were circulated widely, they would have been a recognizable place to publish or find traces of people's movements. On April 21, city newspapers started printing advertisements giving the whereabouts of people and businesses, or seeking information about others. The *Call* set up a registration bureau where refugees were located. They started registering refugees at the Baker Street entrance to the Panhandle, and printing the messages in the April 21 issue.[78] Across the Bay, the *Chronicle* published lists of refugees who registered at its Oakland office.[79] William Randolph Hearst ran his own relief effort, and published lists of refugees registered with the *Examiner* newspaper.[80] The "good work" done

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the *Call* also made use of the *Herald* presses. The *Chronicle* eventually went to the Oakland *Examiner*. R. Quinn, *The San Francisco Press and the 1906 Fire. History of San Francisco Journalism Project, Vol. V,* Edited by E. L. Daggett (San Francisco, CA: W.P.A Northern California, 1940): 15-19.

[76] Jessica Lemieux, "Phoenix Rising: Effects of the 1906 Earthquake on California Print Culture," (MLIS Thesis, San Jose State University, 2006): 72.

[77] Philip Ethington, *The Public City: The Political Construction of Urban Life in San Francisco, 1850-1900* (Berkeley, CA: University of California Press, 1994).

[78] "Many Register at Park Station," *San Francisco Call*, April 21, 1906.

[79] "The following San Franciscans and others have registered at the 'Chronicle' business office, 1236 Broadway, Oakland, giving their Oakland or San Francisco address." "Registered at 'Chronicle:' List of San Franciscans and Others Who Give Their Addresses at the Present Time" *San Francisco Chronicle,* April 23, 1906.

[80] "Wants Addresses Requests Names—Lost Ones Are Being Found," *San Francisco Examiner*, April 26, 1906. The Examiner said that "Through the personals being published in 'The Examiner' wives are being restored to husbands, sons and daughters to mothers and fathers, cousins to cousins and friends to friends. 'The

in the columns of the newspaper, according to the *Examiner*, did reunite people. A photograph shows a tent with a sign proclaiming "The Examiner Registration Bureau," and a woman writing in a large bound book.[81] Each newspaper company printed articles that listed the people who had "registered with" a particular newspaper.

The newspapers had lists of the names of those who were giving new whereabouts, the names of missing persons, the names of patients in hospitals, and the names of deceased. As people scattered about the state in the days immediately following the earthquake, on April 21-23 the newspapers devoted the most space to these kinds of personal advertisements. In a single issue of the *San Francisco Bulletin*, on April 21, 1906, the newspaper listed the ways for people to locate each other: via registration bureaus hosted by a different institutions, the relief committee, the *Bulletin* itself, fraternal organizations, or, if they had any connections outside of San Francisco, the newspaper from their hometown.[82] The space dedicated to printing lists of "registered" people dwindled in the issues of the *Bulletin* on April 24 and 25, although there were still personal advertisements or listing of "missing

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Examiner' has received many letters of gratitude from the hundreds made happy. These are the columns that are doing the good work."

[81] Eric Saul and Donald P. DeNevi. *The Great San Francisco Earthquake and Fire, 1906* (Millbrae, CA: Celestial Arts, 1981): 103.

[82] "List of Homeless San Francisco People Who Are Now Being Sheltered in Oakland" included the names and addresses of the people who had registered at the Chamber of Commerce in Oakland, the "headquarters of the Oakland relief committee." Although this would later be listed as one of the official places to register in Oakland (to be on the centralized register), the advertisement in the newspaper directed that this location was the "Business Men's Headquarters in Oakland," where businessmen could "register and obtain information." The *Bulletin* printed another "official" register, "Where to Find Your Missing Friends" from Berkeley, which included "the names of all refugees who have sought shelter at the [Berkeley Relief] committee headquarters." This role included names, new address if available, and, "Interspersed with these names and addresses are to be found occasional queries and requests for person to call at certain places or make their whereabouts known." The *Bulletin* also advertised "Lost Relatives Scan This Column," where they listed "notices . . . handed to the Oakland office of The Bulletin." Besides the *Bulletin's* own private newspaper register, they advertised an office for "The Portland Oregonian" for "Oregon, Washington, and Idaho survivors" and that "St. Louis Post-Dispatch requests all St. Louis people . . . to register at the post office of the "Oakland Herald" immediately" such that "The names will be telegraphed at once to St. Louis." Lastly, there were club or fraternal organization registries. The *Bulletin* printed a list of names under the declaration that, "A registration bulletin has been established at Odd Fellows' Hall, and to noon the following names had enrolled." San Francisco *Bulletin*, April 21, 1906.

friends" until mid-May.[83] The decrease may indicate that people were locating each other, or that along with the rise in notifications about other places to register, that people were finding themselves less inclined to publish their data in newspapers.

Outside of the Bay Area, refugees were encouraged by the newspapers to register to facilitate notification of well being. The *Los Angeles Herald*, like many of the Bay Area newspapers, set up a registration system to enable people to find refugees who had fled to Los Angeles.[84] The *Herald* advertised, "[E]xperienced newspaper men have been detailed to devote their entire time to the directory and the names and present addresses of thousands of those who were made homeless."[85] The next day, the *Herald* reported on the success of their enterprise, declaring that "Hundreds of names of the San Francisco refugees and of those seeking news of friends and relatives known to have been in the devastated city or in the earthquake and the terrible scenes that followed were added to The Herald's directory yesterday."[86] The paper lauded

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[83] For example, the *Bulletin* devoted over 2.5 pages to the list of persons trying to locate each other on April 21. By April 23, it was only 1.5 pages of the *Bulletin*. The *San Francisco Call*, which was six or eight pages in length from April 21-23, devoted nearly a page to listing those who had registered with the *Call*, listing information about people in hospitals, and personal advertisements in the classified section on April 21. On April 22, the *Call* devoted even more space to giving information about people who were looking for others or looking for people themselves—almost a page. Another half page of personals indicates that people must have thought the newspaper would be extraordinarily valuable in which to put information for broadcast. By April 23, the *Call* had only one page of personals, and April 24 and 25 saw the space decrease, and advertising came to dominate half of the newspaper. Details about the *Bulletin* are from Quinn, *The San Francisco Press and the 1906 Fire,* 26.

[84] Although the *Herald* seemed to be quite obviously promoting itself, they also published names and whereabouts of San Franciscans in Los Angeles so family members might be able to find them as well as "Want Information" ads for people who were sought. The Herald's registration bureau "ended the terrible suspense of hundreds those who, since the awful catastrophe of Wednesday, have been anxiously waiting for news of dear ones."
"Herald's Lists Reunite Many—Refugees and Friends Find Bureau Serviceable—Trained Men are Bending their Energies Towards Bringing Loved Ones Together in These Days of Confusion," *Los Angeles Herald*, April 24, 1906.

[85] "Herald's Lists Reunite Many," *Los Angeles Herald*, April 24, 1906.

[86] "Herald Bureau Reunites Scores, Hundreds of Refugees are Registered—Anxious Men and Women Delighted to Find Friends and Relatives by Applying to Newspaper Bureau," *Los Angeles Herald*, April 25, 1906. In a remarkably progressive move (San Francisco newspapers frequently directed Chinese or Japanese Californians to the embassy of their respective countries), the *Herald* said, "All nationalities are represented on the lists in the directory department, and scores of anxious men, women and children have been made happy through the ability of The Herald to inform them not only of the safety of loved ones but also their whereabouts." The

itself, saying, "Many letters of thanks for aid extended have been received by the bureau."[87] The blunt self-promotion makes it clear that newspapers were not running the registration bureaus for purely humanitarian reasons. It was an opportunity for newspapers to insert themselves into the personal lives of those affected by the earthquake. It seems that a registry of Los Angeles was eventually incorporated into that of Northern California, although it is not clear whether this included the *Herald*'s registry.[88]

The advertisements printed in newspapers were largely focused on those who found themselves in a residence with an address, knew people with an address they could use for communication, or had a permanent residence before the earthquake. As historian Joanna Dyl makes clear, it was "transience that defined poverty in early-twentieth century San Francisco."[89] Those living in refugee camps, or those who had no permanent residence before the earthquake did not necessarily fit into the conventions of registration; they had no pre- or post-earthquake address. Correspondingly, these people are harder to locate within the lists of registrants that the newspaper printed. Although there was a short post-earthquake moment where class and color seemed to disappear, this was short lived. On May 13, there were apparently 50,000 people in refugee camps (official and unofficial). In July, the numbers were closer to 17,000 people in official camps, and 15,000 people in unofficial camps.[90] According to historians Andrea Davies Henderson and Dyl, the camps were chiefly occupied by Irish and Italian immigrants—the working class of San Francisco. Dyl and Henderson argued that it was the working class who ended up in refugee camps for the long term, and these people were subject to a much less voluntary registration. It allowed for people to be located, not to friends and loved ones, but to the relief apparatus.

Herald reported increasing requests from April 25 to April 26, and then on April 27 noted "A marked decrease in the number of inquiries." This trend continued in the reporting of April 28 but said, "there are still many who are anxious to hear of missing friends . . . Until requests for assistance cease The Herald will continue to publish lists daily." "Herald Bureau Keeps Up Work—Refugee Reunions Brought About Daily—Daily Registration are Made in Order to Establish Communication Between Those Separated by the Earthquake," *Los Angeles Herald*, April 29, 1906.

[87] "Bureau Locates Parted Friends—Herald Registration Lists Prove Effective—Through Publication of Names Many Happy Reunions are Brought About Among Those Separated," *Los Angeles Herald*, April 27, 1906.

[88] "The Oakland chamber of commerce requests that refugees from San Francisco send their names and both former and present address to it for registration. Many inquiries are made in the north for friends who have gone to other cities and cannot be located." "Oakland Makes [registration] Request," *Los Angeles Herald*, May 1, 1906.

[89] Dyl, "Urban Disaster," 245-247. Dyl argues that the specter of transience critically shaped attitudes toward labor in San Francisco after the earthquake. [Is this a journal article, or some other type of publication?]

[90] Dyl, "Urban Disaster," 101-102.

This speaks to a multiplicity of infrastructures, some of which are visible in the archive, and some of which are not. The same services were not available to all Californians affected by the earthquake. Chinese, Korean, and Japanese San Francisco residents occupied separate camps with different relief organizations in charge.[91] The marginalized groups within San Francisco may not have had access to the same infrastructure as everyone else.[92]Many San Francisco businesses used the English newspapers to notify people of new business locations; Chinese-run businesses used Chinese-language newspapers for the same purpose. Furthermore, the handwritten issues of *Chung Sai Yat Po* advertised a separate system by which Chinese people could locate their friends and contacts: bulletin boards for people to put messages for friends and relatives.[93]

Official Bureaus

It is clear that there was a multiplicity of these registration bureaus, and they were works in progress: "This work was under the special supervision

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[91] Fradkin, *The Great Earthquake and Firestorms of 1906*, 289-304; Shwartz, *Earthquake Exodus,* 60-65.

[92] The Chinese, in the shadow of racist "exclusion" policies, had developed a robust Chinese-language press. The Chinese-language newspaper *Chung Sai Yat Po (China West Daily)* was instrumental in supporting, even motivating, the Chinese-American community as they contested the Progressive elite in San Francisco who wished to "move" Chinatown. That the Chinese press existed at all is, however, remarkable. The harrowing stories of the English-speaking press fleeing San Francisco to print newspapers in Oakland seems relatively simple considering that the English character set was available. The Chinese newspapers were handwritten for many months after the earthquake while new character sets were ordered. This is perhaps yet another example that it is not the technology that made the press. Erica Pan, *The Impact of the 1906 Earthquake on San Francisco's Chinatown* (New York, NY: P. Lang, 1995); Yumei Sun, "From Isolation to Participation: Chung Sai Yat Oo [China West Daily] and San Francisco's Chinatown, 1900-1920" (PhD Dissertation, University of Maryland, College Park, 1999)

[93] The April 28 issue said: "many people who survived the earthquake and fire and they're temporarily housed in Berkeley, so friends and relatives can come to Fook Wah 1561 Spring St Berkeley to look at the bulletin or to leave a message." The April 26 issue said that people might find out about friends in Berkeley, but also included other messages: "Chinese women and children may move to 13th Street at the lakefront where there is a tall building for drink, food, and shelter; Chinese males may take up temporary lodgings on 13th Street at the lakefront in the tents that will become available tomorrow; Chinese may freely enter the city but may not congregate and give rise to disease. When it comes to pestilence, it is every man for himself." (Many thanks to Elisa Oreglia for help with translation.)

of the Red Cross, and is expected to be in thorough working order to-day."[94] Other sources say that the Red Cross and the military set up a place for people to register, and that it was widely used.[95] The newspapers had set up their own registration bureaus and advertised others, including non-governmental fraternal and relief organizations, but it also seems that there was an "official" registration bureau.

The official registration bureau in San Francisco was set up in the police headquarters and initially located on Fillmore Street (or at the mayor's office on Fillmore and Bush; different names and functions existed for this temporary building). By the time the fire had stopped burning, other registration bureaus were set up in San Francisco to accommodate all of the people trying to make their personal information available and to locate others. Apparently, the registration lists were to be forwarded to the main mayor's office bureau. Newspapers advertised the locations of these registration bureaus in the few days after the fire stopped. In San Francisco, the main registration building was at the mayor's office, but the rest were clustered in unburned areas of the city where the homeless were gathering. It seems that there was some effort to set up "official" registration bureaus. The *Call* registry may have turned into one of the branch registration offices of the official registry, as the location of the original *Call* registration bureau was subsequently listed as a branch location of the official registration bureau (also, it stopped advertising registrants as its own).[96]

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[94] "Hope Springs Eternal—About Registration and Information Bureaus," *San Francisco Chronicle,* April 21, 1906; images from Golden Gate Park make it clear that registration was co-located with Red Cross tents, and shows opportunities for free transportation on the Southern Pacific: "Information Bureau. Refugee camp, Golden Gate Park. No. 32." Photograph, local call number BANC PIC 1994.022--ALB v.1:02, Bancroft Library. Last accessed via Online Archive of California on April 27, 2012: http://content.cdlib.org/ark:/13030/hb3g500744/?order=1.

[95] "The Red Cross Association established an information bureau immediately after the earthquake, where people were requested to leave their names and addresses; at the present time 120,000 names have been recorded." Lucy B. Fisher, "A Nurse's Earthquake Experience," *The American Journal of Nursing* 7, issue 2 (November 1906): 93; Harold French, "How the Red Cross Society Systematized Relief Work in San Francisco," *Overland Monthly*, October 1906, 199.

[96] "Thousands of Helping Hands Relieve Plight of City," *San Francisco Call*, April 23, 1906. "The congestion at the information bureau at Police Headquarters on Fillmore street, near Bush, is being relieved by the following branch information bureaus: Lombard street and Presidio entrance, Baker and Fell streets, Jefferson square, Twenty-fifth and Mission streets. Those who have lost friends or homes in the city should register at the nearest bureau." Also see steoreoptic card, "A Temporary Relief Camp, Police Headquarters and Registration Bureau on Van Ness Ave., San Francisco,." Photograph, local call number BANC PIC 1989.018:35--STER, Bancroft

The information bureaus located in Oakland were frequently cited as the locations to register, as many people had fled the fire by taking boats across the bay. The organization of the bureaus was such that the branch bureaus were to submit registrations to the main bureau. One newspaper described the system thus: "Branch registries have been established at all points to which people have fled for refuge and their lists will be sent to the San Francisco main office as promptly as possible, and from these lists a general list will be prepared which will be printed in the papers as soon as possible."[97] This was entirely sensible, as many San Franciscans passed through Oakland or even settled there. The registration stations in Oakland were at city institutions such as the Chamber of Commerce. Registration bureau outposts were also in Alameda and Berkeley at the Relief Centers.[98]

The relationship between the various newspaper, fraternal organization, and "official" registration bureaus is quite fuzzy. Despite being widely advertised, the lack of recognition by at least one official indicates that the "official" bureau being run out of the offices on Fillmore and Bush did not seem to have gained much traction. When General Greely reached San Francisco, he made an initial report to the Secretary of War in Washington, D.C. about the state of the city. The report was published in various forms in a number of newspapers. Apparently, Greely was asked to set up an Official Registry to deal with the large volume of requests that the Department of War was getting for people trying to locate others. One newspaper said that Greely was "evidently depending on the newspapers himself. He says there are 300,000 persons homeless, that the city covers an area of twenty-five miles with no means of getting about except by walking, and he suggests that telegrams of inquiry be sent to the *Call, Chronicle* or *Examiner*."[99] Thus, although the official bureau had been set up, it was not necessarily in use in the days after the earthquake.

To my knowledge, the records of these registration bureaus have not been located, but in the records of the Berkeley Relief Committee there are a few communications that appear to come from the "Official Information Bureau."[100] The location of the official registration bureau eventually moved to

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Library. Last accessed via Online Archive of California on April 27, 2012: http://www.oac.cdlib.org/ark:/13030/hb7m3nb65c/?order=1.

97 "Registry Bureaus Throughout City - Persons Seeking or in Possession of Information Should Make Themselves Known," San Francisco *Call*, April 23, 1906.

98 "Registrations at Local Headquarters," Sausalito *News*, April 28, 1906.

99 "New Relief Plan Adopted," *New York Sun*, April 26, 1906.

100 The records of the Berkeley Relief Committee show several carbon copies slips of paper with the address "2329 Sacramento St., San Francisco" on the top and "OFFICIAL INFORMATION BUREAU" on the bottom. The slips of paper have the following fields: "Report In Re; Old Address; Inquirer; Address; Registered New Address; Registered Dead; Registered Injured." A space for "Remarks" is given, as is a

2329 Sacramento Street, and although most of the notices about the registration process, and particularly locating people, had ceased. The imagined need, however, had not: "All persons looking for missing friends are requested to register with the bureau, giving the names and if possible, the former addresses of the persons sought. Those present in the city at the time of the disaster are also asked to register, in order that their present whereabouts may be known by those desiring to communicate with them."[101]

Eventually, the Official Information Bureau would provide "Free Information and Registration to the World at Large," requesting that everyone who had changed addresses report "name in full and former residence, occupation or business, which addresses of persons you wish to hear from, and we will be give you full information." The advertisement requested that, "Newspaper all over the world please copy."[102] The shift from "registration" to "information" is a seemingly small one. While at first the bureaus were places that were asking people to come forth and give their new whereabouts, the new bureaus were ones that had actual details about people.

Design of Red Cross Registration

Once the first week after the earthquake had passed, notices about registering became less about the registration of people for the purposes of locating one another and more about how to register for the purpose of receiving relief or unemployment benefits. This second wave of registration bureaus was not *ad hoc*; it was designed. In addition, while the first set of registration bureaus focused on connecting people, the next set of registration bureaus were about distributing resources. While the registration bureaus for locating people were run by institutions that were highly visible in the public sphere (such as newspaper companies), institutions already involved in bringing people together (such as fraternal organizations), or institutions seen as officially trying to help (such as the registration bureau at the police headquarters, or the relief offices), the registration for food was run by the Red Cross, an organization not involved in the day-to-day lives of most aid recipients pre-earthquake.

The registration bureaus for notifying and locating others relied on individuals coming to the bureau, whereas the registration process for distributing food had volunteers canvassing refugee camps. Starting as early as April 25, 1906, San Francisco newspapers began reporting on the development of a food distribution system run by the Red Cross Society. Some of the ideas

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space at the bottom where it said "By.[Blank]." Berkeley Relief Committee Files; Box 1 Folder 1. Bancroft Library.

[101] "Information Bureau Moves headquarters," *San Francisco Chronicle*, May 11, 1906.

[102] "Official Information Bureau," *San Francisco Chronicle*, June 8, 1906.

behind the organization of the registration system were to locate distribution centers in the appropriate locations, ensure that no substation was serving more than 1,000 people to avoid long lines, and ensure that the stations had enough food (at least, this is what was initially advertised in the newspapers).[103] Ultimately, the goal of the vast registration system was to reduce what the Red Cross perceived as waste in the system—that is, people receiving more than their fair share. This was accomplished by doing almost the opposite of what was initially discussed. It centralized the effort so that there were fewer stations, resulting in more people waiting in line. There were other purposes as well, however—namely, to "furnish general statistical information of the progress of relief."[104]

Registration was designed by Edward Devine, who was sent to represent the Red Cross on the San Francisco Relief Committee, and Carl Copping Plehn, a Professor of Commerce at UC Berkeley. Devine was working from precedent; he had analyzed the Chicago relief program following the fire of 1871. He was ready to apply the lessons he had learned from Chicago to the situation in San Francisco.[105] After the Chicago fire, relief workers came up with a system whereby the city was divided up and cases registered. Centralizing registration had been an effective way to systematize relief work and identify those who needed aid from impostors; this system would be imitated in San Francisco.[106] Plehn had experience working on the census in California in 1900 as the supervisor of the first district, including San Francisco, Alameda, and Contra Costa Counties. Plehn described how his census enumerators doggedly tracked down every single San Franciscan, calling in the police when they thought it would help their case.[107]

Devine, an analyst of charity work, and Plehn, an experienced supervisor of the census in San Francisco, collaborated to run the registration department. Devine, however, gave much credit to Plehn.[108] Their goal was to

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103 "Devine and Red Cross to Distribute Supplies," *San Francisco Bulletin,* April 26, 1906.

104 "New Plans to Supply Food," *San Francisco Bulletin*, April 28, 1906

105 Marian Moser Jones, "Confronting Calamity: The American Red Cross and the Politics of Disaster Relief, 1881-1939" (PhD dissertation, Columbia University, 2008): 255-256.

106 Jones, "Confronting Calamity," 255; Kevin Rozario, "Nature's Evil Dreams: Disaster and America, 1871-1906" (PhD dissertation, Yale University, 1996): 44.

107 "Census Returns Coming in Well, Greatest Trouble in Lodging-House. Sometimes the Police are Called in," *San Francisco Chronicle*, June 8, 1900.

108 Edward T. Devine, "The Situation in San Francisco" *Charities and The Commons: A Weekly Journal of Philanthropy and Social Advance* XVI, No. 9. (June 2, 1906): 304. (Publication Committee: Charity Organization of the City of New York.)
The system for registration in San Francisco after the earthquake apparently took several days to develop, as Plehn apparently "had not finally perfected his scheme" on

design, "The complete system of registration now organized in connection with the issuing of supplies." The registration system was described in a five-page typed document called "The plan for Registration" and reproduced elsewhere in briefer forms in the *Red Cross Bulletin*.[109] The document began with a straightforward explanation of the goal of registration: "The purpose: In order to unify the meods [sic] of relief, to regulate the issue of food, to keep a record of the work done at the various Relief Stations, and to facilitate the centralization of the relief work, it is necessary to enroll all applicants in a general register."[110] The idea was to divide the city into different districts, each with identical procedures managed by a "Central Registration Bureau of the National Red Cross."[111] Each family would get a registration card with would be filled out "by an executive official at the Station" or "by a canvasser of the Associated Charities."[112] The information on the registration card would have to be verified with a "visit to the place where the applicant" was living to prevent duplication of registration.[113] The final registration guide appeared in the Red Cross Bulletin. It said: "More than nine out of every ten of the applicants will be self-supporting in a few weeks. The few lazy imposters will

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April 29. By May 7, it was reported that "In order to bring system and harmony into the work a uniform registration has been inaugurated throughout the city, and a large corps of school teachers is giving valuable aid to the workers at the relief stations." "Professor Plehn Plans the Registration Bureau," *San Francisco Call*, April 29, 1906; "Excellent Progress in the Organization of Relief Stations, Uniform Registration Through," *San Francisco Call*, May 7, 1906.

[109] A letter from Wm. W. Morrow. letter to Charles L. Magee, Secretary, American Red Cross, dated May 12, 1906: "we think a system [for distributing food] has been adopted that will make the distribution as nearly perfect as possible, and as the subject may be of some interest to the National Society, I enclose herewith the plan of registering of persons desiring food, the directions of registering applicants at relief station; also a registration card and a food card... You may, perhaps, find it interesting, and I would suggest that you show it to Mr. President Taft. The plan was devised by Professor C. C. Plehn of our State University, and we think it would be well to have it made a matter of record for future reference. The plan goes into effect immediately." "California Relief," *Red Cross Bulletin* 3 (July 1906): 19.

[110] "The plan for Registration," Record Group 200, Records of the American National Red Cross 1881-1916, Box 55, Folder 815.6, "California, San Francisco Earthquake and Fire 4/18/06—Relief other than Health." National Archives, College Park, Maryland.

[111] "The plan for Registration," 1.

[112] "The plan for Registration," 1. The version formally printed in the *Bulletin of the Red Cross* clarified that there were three types of people who could fill out cards: "(1) officers of the Relief Station; (2) workers of the Associated Charities; (3) representatives of the Central Registration Bureau." "Instructions for Registering Applicants at Relief Stations," *Red Cross Bulletin* 3 (July 1906): 23.

[113] "The plan for Registration," 2.

be speedily detected and dealt with separately. Assume every one to be entitled to relief until clearly proven unworthy."[114] This reminder appeared many times in instructions to relief workers, and is indicative of an attitude that many types of people in San Francisco were receiving aid—not simply the poor.

The "system" of registration seems relatively straightforward: divide the city into districts, centralize relief in those districts, and canvass them. Before this organization, the relief work around San Francisco had been uneven, or at least difficult to manage in a top-down system. For example, wealthy men such as William Randolph Hearst set up their own relief stations, as did working-class civilians.[115] The centralization, Greely argued, "enabled each applicant to get food and supplies at a sub-station without flocking promiscuously either to headquarters or to the central store-houses . . ."[116] A further goal of centralized distribution within different districts to a few stations was to make sure that every person was only receiving one portion of aid.[117]

Reception of Red Cross Registration System

While the registration system was met with contempt from some, Red Cross Workers' enthusiasm for it can hardly be understated. The system was suggested as a potential model for the future and kept on file at National Red Cross headquarters.[118] Greely suggested that the San Francisco model became immediately influential.[119] On the surface, the registration system may have seemed laudable to the charity workers, but they found that implementation

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[114] "Instructions for Registering Applicants at Relief Stations," 24. Photographs show that signs in front of relief tents "In G.G. Park [i.e. Golden Gate Park], 1906. [Relief office tent.]." Photograph, Bancroft Library. last accessed February 12, 2012: http://content.cdlib.org/ark:/13030/hb438nb3tj/?order=1.

[115] See Solnit, *A Paradise Built in Hell*, "Mizvah cafe"; Henderson, "Reconstructing Home," 148.

[116] Adolphus W. Greely, "Army Report by Maj. Gen. A. W. Greely," RG200 National Archive Gift Collection, Records of the American National Red Cross 1881-1916, box 54, folder 815.02, "California, San Francisco Earthquake & Fire 4/18/1906" (not dated, but written after 1908): 31.

[117] Mary Roberts Smith, "Relief Work in its Social Bearings." *Charities and The Commons: A Weekly Journal of Philanthropy and Social Advance* XVI, No. 9. (June 2, 1906): 308-310. Publication Committee: Charity Organization of the City of New York.

[118] Wm. W. Morrow, letter to Charles L. Magee, 19.

[119] Adolphus W. Greely, "Army Report by Maj. Gen. A. W. Greely," 58-59. A fire in a suburb of Boston in 1908 destroyed half of the city. Greely was sent as the Governor's representative. "Then he appointed a committee to manage the relief work, the principal member being largely identical with those on the California relief committee. So far as possible the adopted as their standard the methods and even the phraseology of the San Francisco relief givers."

was difficult. With a census, this work took place over months with a trained workforce in a mapped area. The group performing the registration was largely untrained, however, and working on unfamiliar terrain. One relief worker wrote, "It can hardly be imagined what a colossal task it has been to merely register the persons receiving relief."[120] Still, the registration did what it was intended to do: decrease the amount of relief distributed. "Before the registration it had been the custom for the refugee families to send as many children to the bread lines as possible, thus securing excessive relief."[121]

The first registration was considered incomplete, and so a second registration began in June.[122] Dyl describes how, "as San Francisco's recovery dragged on through the summer, the distribution of relief became increasingly institutionalized based on a charitable model."[123] Henderson explains how this model was based on the idea of "rehabilitation," restoring people to their pre-earthquake circumstances, provided that those circumstances fit into the Progressive understanding of what middle class life looked like. The second registration process was supposed to give data that was needed "as a basis of intelligent rehabilitation work."[124]

The system of subdividing, centralizing, and registering by the Red Cross inflamed some San Franciscans.[125] Physician Margaret Mahoney wrote in a pamphlet, "It never semed [sic] to occur to those who undertook the function of distribution that it was their duty to get the goods to the people . . . They could have opened many stations where supplies could easily served, or better still, each camp might have been outfitted."[126] By centralizing the relief, ostensibly to prevent fraud and give everyone access to similar service, the system of registration forced people to spend long hours in line. Mahoney added, "The cry of fraud; the cry of famine; the hours of standing in line; the

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120 Mary Roberts Smith, "Relief Work in its Social Bearings," 308-310.

121 Mary Roberts Smith, "Relief Work in its Social Bearings." 308-310.

122 Russell Sage Foundation, *San Francisco Relief Survey* (New York, NY: Survey Associates, 1913): 49, 115.

123 Dyl, "Urban Disaster," 121.

124 Russel Sage Foundation, *San Francisco Relief Survey,* 49

125 Henderson, "Reconstructing Home," 100.

126 Mahoney's pamphlet is quoted in almost all of the dissertations I read that outlined how the people of San Francisco felt about the Progressive-era relief system. Mahoney's sentiments were also echoed by Mary Kelly. Debates revealed "fissures in Progressive Era social goals." Henderson, "Reconstructing Home," 63-64. It was not just Mary Kelly, the United Refugees, and the Socialist Voice who protested the treatment of the refugees; it was also people on the Relief Committee. Barnett suggested just giving the refugees cash "removing any competition between private operators and the Finance Committee." Father Yorke, "the most prominent representative of the Irish-Catholic working class . . . emphasized the need to avoid the "serpent of red tape" and the importance of distributing the money as quickly as possible . . ." Dyl, "Urban Disaster," 118.

endless circuit from one relief station to another in search of the necessaries of life, which were often never obtained; all these were systematic means of conserving the supplies."[127] Furthermore, Mahoney described the process of filling out registration cards: "The only way to obtain supplies was to fill out cards containing humiliating and impertinent questions."[128] It was not Mahoney's imagination that the system was made to reduce the number of applicants, forcing them into endless lines. This experience seems to have been, by design. Marian Moser Jones, in her analysis of the Red Cross activities argues, "the disaster and the relief had created a new class of 'paupers.'"[129]

The registration material was supposed to be used by relief workers who would determine how much aid, beyond food aid, that people would get. Kevin Rozario, Dyl, and Henderson have documented the resistance to the progressive character of the paternalistic charitable systems via the actions of the United Refugees, incorporated in July 1906.[130] San Francisco was a "labor stronghold," making radical organizational approaches familiar.[131]

The post-earthquake information order established by some relief organizations reflected the ideological orientation of those groups, and in some cases abstracted the experiences of the refugees in a manner that some refugees felt was unfair.[132] But while the institutions that produced the information order were enacting familiar information practices, for San Franciscans it was unfamiliar and, for some, unwanted. The United Refugees attempted to set up an alternate information order, but ultimately failed.[133] The complaints of the refugees, along with the general suspicions about the

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127 Margaret Mahoney M. D., pamphlet, *The Earthquake, the Fire, the Relief* (July 28 1906).

128 Mahoney, *The Earthquake, the Fire, the Relief,* 7.

129 Jones, "Confronting Calamity," 296.

130 The United Refugees organized to resist the manner in which these camps were run. This quasi-socialist group was run by a group of women who resisted the manner in which aid was distributed. Henderson characterized the resistance to the methods of scientific charity specifically, and documents how lawyers within the United Refugees sought to create an alternate order by encouraging refugees to pool their resources using a series of contracts and forms. Although the United Refugees failed to gain traction for their movement, they and other groups resisting the order established by the Relief Committee did prompt visits from the American National Red Cross and the Massachusetts Red Cross groups. These groups presumably shared an ideological orientation with the Relief Committee, and thus found that there had been no wrongdoing by the Relief Committee.

131 Dyl, "Urban Disaster," 95.

132 Bayley uses the abstraction "information order" to describe the formal and informal communication and knowledge patterns in colonial India.C A. Bayly, *Empire and Information: Intelligence Gathering and Social Communication in India, 1780-1870* (New York, NY: Cambridge University Press, 1996).

133 Henderson, "Reconstructing Home," 103.

fiduciary trustworthiness of San Francisco politicians, did, however, succeed in attracting national attention to their cause. Two investigations concluded that there was no wrongdoing by the Relief Committee, and "modern methods prevented the misappropriation of relief funds."[134] Although the protests were mostly unsuccessful, it is clear that everyone did not share the progressive vision of rehabilitating the social order that was being implemented by the Relief Committee.

Counting the Dead

Many seem to recognize, from the moment the fire had gone out and people began to look for loved ones, that figuring out who had died would be a difficult task. Initially, registration bureaus advertised that they sought names of the deceased.[135] The newspapers were quick to print names under bold headlines as they were released to the public. The day of the earthquake, the *News*, the only San Francisco newspaper to print an edition after the seismic activity and before fire struck, printed a list of the dead. The *Chronicle* declared, "Facts will never be known as many lie in unnamed graves."[136] Furthermore, bodies started decomposing as they were dug up from the ruins, making it necessary to bury them quickly.[137] On April 28, newspapers all over the country printed something like, "Greely's Death Roll."[138] While newspapers

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134 Henderson, "Reconstructing Home," 105.

135 "Hope Springs Eternal—About Registration and Information Bureaus," *San Francisco Chronicle,* April 21, 1906; "Registry Bureaus Throughout City—Persons Seeking or in Possession of Information Should Make Themselves Known," *San Francisco Call*, April 23, 1906.

136 "Five Hundred Die in Great Disaster, Search of the Ruins Begun, Facts Will Never be Known as Many Lie in Unnamed Graves; Health Office—500 bodies; The first systematic search for bodies started yesterday," *San Francisco Chronicle*, April 23, 1906.

137 "Death List Placed at a Thousand, Bodies Taken from Graves, Spectators to Handle Remains Removed from North Beach Trenches," *San Francisco Chronicle*, April 25, 1906; Deanna Paoli Gumina, "Who Perished? A list of persons who died as a result of the great earthquake and fire in San Francisco on April 18, 1906," compiled by Gladys Hansen, Archives Publication No. 2; San Francisco Archives, Main Library, Civic Center San Francisco, 2-3.

138 On April 27, a request by Greely was printed widely that seemed to indicate that he endeavored to make a systematic count of the dead: "All hospitals, doctors, coroners, and others concerned," were to report information about the deceased and injured to Captain Winn at Fort Mason "for the purpose of making a correct list . . . so that it may be published broadcast to satisfy the inquiries of thousands all over the United States." "Send Lists of Killed and Wounded," *San Francisco Chronicle*, April 27, 1906. "Greely's 'Death Roll' was only additions to the lists of dead—this was the sixth list of dead." "Greely's Death Roll," *Washington Post*, April 28, 1906.

pronounced in bold headlines, the "List of Dead is Increasing," they also seemed cap their expectations: "the likelihood of the total number of fatalities exceeding 500 diminishes."[139] The official report by Greely said, "304 known; 194 unknown (largely bodies recovered from the ruins in the burned district)" died in San Francisco alone. Greely reports 166 dead outside of San Francisco.[140] The "Report [of] the Sub-Committee on Statistics to the chairman and Committee on Reconstruction" contains a letter signed by six people that gives 322 "Killed outright and accounted for at the Coroner's office" and 352 "Reported missing and not accounted for" for a total of 674 dead in San Francisco.[141] These numbers were surprisingly low, even to those doing the counting. The Sub-Committee on Statistics remarked that the number who died was "comparatively slight" owing "to the spirit of the people and to the directing forces brought to bear upon the catastrophe."[142] The desire to carefully register refugees makes the inaccurate counting of the dead all the more puzzling, since it seemed that accurate reporting was the Progressive spirit.

Gladys Hansen, an archivist in San Francisco, believed that the number of dead was too low for a number of reasons. Some accounts described the collapse of large hotels and buildings occupied by the working-class poor south of Market, an area particularly vulnerable to devastation. These buildings would have sunk into the earth, trapping people inside before burning. Furthermore, buildings burned at a temperature that left little in the way of identifiable remains. Other anecdotal evidence suggested that dead people's bodies that were in a temporary morgue were incinerated when the fire swept through, leaving only time for the living to escape.[143] Hansen reasoned that one way to get a more accurate count of the dead would be to document the names of the deceased using a variety of methods.

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139 "List of Dead is Increasing," *San Francisco Call*, April 28, 1906: "Captain Winn of General Greely's staff, who has charge of the work, last evening reported that less than 800 bodies have thus far been recovered and that 290 seriously injured are in hospitals."

140 Major General Adolphus W. Greely, *Special Report on the Relief Operations Conducted by the Military Authorities of the United States at San Francisco* (Washington, D.C.: Government Printing Office, 1906): 95.

141 *Report [of] the Sub-Committee on Statistics to the chairman and Committee on Reconstruction. Committee of Forty on Reconstruction,* 1907. April 24th. Last accessed online October 1, 2011: http://content.cdlib.org/view?docId=hb996nb6vc&brand=oac4.

142 *Report [of] the Sub-Committee on Statistics to the chairman and Committee on Reconstruction. Committee of Forty on Reconstruction.*

143 Gladys Hansen, "Who Perished? A list of persons who died as a result of the great earthquake and fire in San Francisco on April 18, 1906," Compiled by Gladys Hansen, introduction by Deanna Paoli Gumina. Archives Publication No. 2, San Francisco Archives, Main Library, San Francisco, CA.

Hansen's exploration of the archives divulges what records were available. Her initial studies examined newspaper reports of missing people against city directories.[144] She added a number of other public records, including Death Certificates, Coroner's Reports, Edwards' Abstracts, McEnerney cases, Inheritance Tax Records, City and County Record of Orphans, Presidio National Cemetery Records, and Presidio, Harbor, Park and Central Emergency Hospital Records.[145] Private records of the mortuary J. C. O'Connor & Co. were also donated. Along with her associates, Hansen found that there were at least 992 namable deceased and 75 unknowns.[146] Authors extrapolating from Hansen's work suggest that the death toll could be in the thousands, considering her count included only deaths reported in newspapers and other official sources.

It seemed that with the newspapers releasing lists of dead daily, and the Army making an effort to contact many institutions, the original death count would not have been entirely inaccurate. The registration and information bureaus would have had ample data from which to start, as they were initially advertising for people to report names of the dead. Drew Gilpin Faust makes the argument that the naming and counting of dead following the Civil War was a complex political effort undertaken by a multitude of organizations. Efforts to count the dead were not unheard of after massive destruction, but there had to have been either personal or political will involved. One could reason that every single person in San Francisco was so concerned with relief and moving on (or overcome by sadness and fear), that no one had the resources or the will to name and count the dead. Rozario points out that American fascination with the spectacle meant that the most horrific and sensational stories were spread widely.[147] But Rozario also argues that the "catastrophic logics of capital" means that there has to be destruction, followed by renewal—ultimately made more difficult with vast numbers of dead.[148]

Hansen and others have charged that Southern Pacific Railroad and the press made a deliberate effort to deny that the earthquake was destructive to promote the idea that damage was caused by fire.[149] This seemed to be

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144 Hansen, "Who perished?"
145 Gladys Hansen and Frank R. Quinn, "The 1906 'Numbers' Game," 1985.
146 http://www.sfmuseum.org/hist11/list.html—last accessed September 16, 2011; site reports to be last updated on July 22, 2010 but "We will be adding names quarterly."
147 Rozario, *Confronting Calamity*. .
148 Rozario, *Confronting Calamity*, 24.
149 Gladys Hansen and Emmet Condon. *Denial of Disaster: The Untold Story and Photographs of the San Francisco Earthquake of 1906* (San Francisco: Cameron and Co., 1989).

optimal for two reasons. First, many Californians had fire insurance, but not earthquake insurance; thus, they could be compensated if their property was thought to have been destroyed by fire. Second, fire prevention was being addressed in other American cities, so that commercial investment in San Francisco could continue as long as fire codes were observed.

San Francisco newspapers stayed on point, belittling horrific stories as exaggeration and focusing on recovery. One newspaper argued that people should participate in the California PR campaign. A letter appearing in a California newspaper suggested people write cheery letters to correct sensational stories appearing in East Coast newspapers and to assure readers that San Francisco was rebounding.[150] Rozario argues that the narratives of renewal were encouraged because they fit into a Progressive vision of society: the disaster meant a clean slate for improvement.[151] Newspapers and other "boosters" denied that seismic hazards were serious and urged the rapid rebuilding of San Francisco.[152] Lastly, Hansen and Condon have argued that many of those who died lived in a district of San Francisco built on manmade land populated by poor immigrants.[153] Hansen and Quinn also pointed out that, in their effort, they could identify the names of only 22 Chinese and 6 Japanese—extraordinarily low numbers considering that they lived in densely populated areas where buildings were in disrepair.[154] Many of San Francisco's poorest, marginalized, and those living in the worst buildings, were not in the forefront of political consciousness before the earthquake, nor were they afterward. These people were unknown to the institutions that might have identified them before the earthquake, and thus disappeared forever. Even an effort to count the dead now might leave out those who were marginalized

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Scholars have argued that the economic impact of the insurance payments from the fire damage was so great that it caused a depression in the United States in 1907. However, efforts to mitigate damage to the Bay Area economy downplayed the impact of the earthquake. Kerry A. Odell, and Marc D. Weidenmeir. "Real Shock, Monetary Aftershock: The 1906 San Francisco Earthquake and the Panic of 1907." *The Journal of Economic History* 64, no. 04 (December 1, 2004): 1002-1027.

150 "To Correct False Reports," *Oakland Herald*, May 2, 1906. "The realty men throughout the state are to make and effort to set the Easterners right so far as the results of the recent earthquake are concerned . . ." The letter is signed by "executive secretary" Herbert Burdette of Los Angeles and includes a sample six-paragraph letter that tries to minimize damage and pinpoint most of it in "the Chinese quarter, which were a discredit,"

151 Kevin Rozario, *The Culture of Calamity: Disaster and the Making of Modern America* (Chicago, IL: University of Chicago Press, 2007): 23. Furthermore, he says that accounts that focus on the feelings of euphoria after the earthquake were primarily those of the middle class, who had various types of safety nets.

152 Geschwind, *California Earthquakes*, 20.

153 Hansen and Condon, *Denial of Disaster.*

154 Hansen and Quinn, "The 1906 'Numbers' Game," 4.

then.

Whether or not there was a deliberate attempt to downplay the effects of the earthquake, there was certainly reason to underestimate the number of deceased. This seems rational from the perspective of redevelopment interests in San Francisco, but seems deceitful when weighed against ideals insisting that the dead should be recognized and accurately accounted for. While the disaster did mean that many reports and accounts of the disaster were produced, that a system of finding others was developed, and that a system of registering people receiving benefits was designed and executed—all documentary trappings of a reflexive modern society—the dead were not systematically recognized. Counting and naming the dead was simply not an activity that the military, the local government, or any of the relief organizations found politically advantageous.

Conclusions

As George attempted to find out about the well being of Sarah, and Sarah tried to notify George as to her personal status via telegrams, the few operating telegraph lines were overwhelmed. The dispersal of half the city's population, the sudden need to contact loved ones, and the destruction of the city's physical newspaper and telegraph infrastructure were hugely disruptive, but the manner in which the information infrastructure was reconstituted reflected the practices of the participants. The commercial telegraph business worked quickly to get cables working again, but so many had filed for telegrams to be sent that the telegrams had to be sent by mail. The post office reconstituted mail service quickly and delivered many of the telegrams. While the physical infrastructure was burned and destroyed, the way that people organized and worked was not, and that helped the information infrastructure recover. The "old" (pre-earthquake) information infrastructure was not sufficient for helping people get in touch. "New" information systems in the form of registration bureaus appeared to help people get in touch with others. Although the registration bureaus appear to be a novel innovation, sometimes it was old newspaper companies that supported them. Relief organizations also registered people to track their use of resources, and were met with resistance by some San Franciscans. While displaced persons were accounted for by relief organizations, the dead were not counted publicly until more than 50 years after the earthquake.

Stories about the operability of the telegraph, the post office, and the registration bureaus, and the enumeration of the deceased implicitly suggest a narrative of institutional continuity. The post-earthquake information infrastructure for accounting for people reflected pre-disaster methods and systems for gathering and sharing information. I argue that the deep-pocketed

institutions (such as the newspaper companies) were able to recover quickly and because of the pressing need for news after a disaster, reinforced their centrality in the public information infrastructure.

But there is another narrative of continuity, and that one is less hopeful. Other researchers have argued that the disaster did not strip away lines of class and race, as many believed in the days after the earthquake, but exacerbated and reified them. This can be seen in the stories of the alternative infrastructures serving the Chinese citizenry. The documentary practices of so many institutions at one point might set out to illuminate the existence of the poor, as in the case of the relief registration, but at the same time might obscure their existence. I have tried to incorporate the voices of others, when they were authentic, but these voices are harder to find in the mainstream public sphere or the records of institutions.[155] It is certainly a shortcoming of this chapter, but that different people experience different infrastructures should not be overlooked. An important starting point for this dissertation was that anthropologists' ideas about differential vulnerability led me to questions about different information infrastructures. Thus, the question of whether information infrastructure shapes an individual's experience in a disaster is going to have an inconclusive answer: it depends on who the person is. There was no universal information infrastructure for accounting for people. The next chapter addresses the questions of multiple institutions in more depth.

[155] This chapter mostly represented the view of a San Franciscan who was probably male, English-speaking, and middle-to-working class.

Chapter 5: 1989 Loma Prieta Earthquake

This chapter examines the 1989 earthquake, formally called the Loma Prieta earthquake. The earthquake was a magnitude of 6.9 on the Richter scale and occurred approximately 60 miles south of San Francisco.[1] It was estimated to have caused $10 billion in damage and the loss of 63 lives. Forty-three of those lives were lost in the collapse of a highway in Oakland.[2] At the time, Loma Prieta was the most costly natural disaster in U. S. history.

In this chapter, I focus on the role of state institutions, particularly those explicitly given the responsibility to respond to earthquakes, and their relationship with the information infrastructure. I use government disaster plans, described in the first section below, and the post-disaster reports issued by various government groups as guides to understanding the government response.[3] Disaster response organizations saw part of their purpose as providing "public information" which was supposed to shape the overall informational experience of Californians after Loma Prieta. This represents a significant shift in the public information infrastructure from 1906. Also notable, but not the focus of this chapter, is that public information infrastructure in 1989 included technologies not widely used or invented in 1906, such as the phone, television, and radio.

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1 "October 19, 1989 Loma Prieta Earthquake." USGS. Last accessed May 16, 2012: http://earthquake.usgs.gov/regional/nca/1989/.

2 Robert A. Page, Peter H. Stauffer, and James W. Hendley II, "Progress Toward a Safer Future Since the 1989 Loma Prieta Earthquake." USGS Fact Sheet-151-99, 1999. Last accessed May 16, 2012: http://pubs.usgs.gov/fs/1999/fs151-99/fs151-99.pdf.

3 After the earthquake, many different government organizations put together reports about what happened. Although these were not produced in the period immediately after the disaster, during which people were making sense of what happened, these reports not only serve as sources for this chapter, but also (and importantly) can be looked at as evidence of the government's role in producing narrative about the disaster for historical purposes. Academic work that analyzes "the media"—mainstream television, radio, and newspapers augments this evidence. The "Essay on Sources" in the Appendices examines these plans in more detail.

Unlike the 1906 and 1868 earthquakes, the government had prepared for Loma Prieta. This preparation was reflected by state disaster plans, which, in turn, reflected the state's understanding of what the people of California might do. This vision did not, however, correspond with what actually happened after Loma Prieta. The plans did not take into account that television, radio, and newspaper companies might suffer damage from the earthquake and have difficulty operating. Furthermore, the plans did not anticipate that the media might follow their own story, focusing on the most damaged areas of San Francisco (the Marina) and Oakland (the collapsed highway, known as the Nimitz Freeway or the Cypress Viaduct). The government officials who were supposed to provide public information did not have the reports they expected from the field, and they were often reliant on the media to get a sense of what happened. Still, the media frequently cited the professional disaster responders.

Although what actually happened did not resemble what was planned for, the state and the media reinforced the centrality of each other's informational role in disaster response: the media sought out the disaster responders as official sources and the disaster response organization sought out the media to put forth "emergency public information." Lastly, because the media did not provide an unproblematic conduit between the public and government officials, the public contacted public information personnel directly when available. The disaster response plans failed to take into account a realistic version of public information. Further, the plans were not realistic about who might be most adversely affected—marginalized groups such as non-English speakers and the very poor, as examples—who were most in need of public information. The disaster response public information infrastructure was embedded in state organizations that did not consider the needs of non-English speakers in either the public information at the time of the earthquake or in the post-earthquake shelter and recovery services made available. The Spanish-language media provided translations of government information and focused on stories about Latinos.

This chapter examines two of the themes in this dissertation. Picking up from the 1906 chapter, I build up the idea of multiple infrastructures, using the case of the Spanish-speaking community. In the 1906 chapter, I briefly discussed Chinese language newspapers and how the transient would have been left out of many of the different schemes for accounting for people, because they relied on "former" addresses. Second, I revisit the idea of informational authority. Loma Prieta represents a historical moment quite different in *who* claimed the authority to tell the public what to think about earthquakes. In 1868 and 1906, the newspaper owners and business elites (in San Francisco, these individuals were often members of government)

attempted to dominate the narrative of what happened after the earthquake.[4] The 1989 earthquake prompted a large response from the Federal Emergency Management Association (FEMA) at the national level, from the California State Office of Emergency Services at the state level, and from local municipalities. Furthermore, a number of government organizations had thought *ahead of time* about how to respond to the earthquake. The next section examines three different plans from three different disaster response organizations.

Disaster Planning in 1989

The Loma Prieta earthquake put a well-developed state disaster response apparatus into action. The disaster responders included federal organizations dedicated to disaster response such as FEMA, and California State agencies, such as the Office of Emergency Services. In addition to these agencies, government employees from city and county management, police, public works, and fire departments activated disaster plans and served as earthquake response organizations. Professional disaster responders in organizations dedicated to responding to major disasters worked on and sometimes used disaster response plans.

These plans are important because they were "activated" at different levels after the Loma Prieta earthquake. FEMA "declared a 'limited activation' of the *Plan for Federal Response to a Catastrophic Emergency* (the Plan) to assist California with any requested emergency response assistance."[5] In this sense, Loma Prieta was not "catastrophic," but still a major disaster.[6] This limited activation apparently set up significant apparatus for coordination at the federal level: "The Catastrophic Disaster Response Group, representing twenty-five Federal Agencies, convened in Washington, D.C. during the evening of October 17. A temporary disaster field office was immediately

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[4] Ted Steinberg, "Smoke and Mirrors: The San Francisco Earthquake and Seismic Denial," in *American Disasters*, edited by Steven Biel, (New York, NY: New York University Press, 2001): 103-128; Carl-Henry Geschwind, *California Earthquakes: Science, Risk, and the Politics of Hazard Mitigation* (Baltimore, MD: The Johns Hopkins University Press, 2001).

[5] State/Federal Hazard Mitigation Survey Team, *Hazard mitigation opportunities for California: State and Federal Hazard Mitigation Survey Team report for the October 17, 1989 Loma Prieta Earthquake, California*, FEMA, 845-DR-CA, (California, Office of Emergency Services; United States. Federal Emergency Management Agency, January, 1990): 21.

[6] Federal Emergency Management Response (FEMA), *Federal Response to a Catastrophic Earthquake* (Washington, D.C.: U.S. Government Printing Office, 1987-720-298/60105, April 15, 1987): xii-xiii.

established at FEMA Region IX office on the Presidio of San Francisco."[7] The Loma Prieta earthquake occurred only six weeks after Hurricane Hugo devastated parts of the East Coast, and the two disasters occurring so close together overwhelmed FEMA's capabilities.[8] As a result, FEMA's response to Loma Prieta was widely criticized at the time. In hindsight, many agree that the government was entirely unprepared for a natural disaster that included poor people: "FEMA failed to help those least able to withstand the trauma of a natural disaster."[9] At the state level, after Loma Prieta, an emergency was declared, the state's State Operations Center and the Region 2 Emergency Operations Center in Pleasant Hill was activated, and "the decision was made to follow normal emergency operating procedures, rather than activate the recently completed and tested *Draft Plan for a Catastrophic Earthquake in the San Francisco Bay Region."*[10] Ten counties were eventually considered part of the disaster area.[11] Cities within the disaster area also enacted their own disaster plans.

The disaster plans had previously been practiced in drills. A few months before Loma Prieta, there was a drill to practice the "Federal Response to a Catastrophic Earthquake" plan, along with California's Office of Emergency Service's latest earthquake plan with scenarios developed by experts based on recent earthquakes in Mexico City and Armenia.[12] The drill was called RESPONSE-89 and included emergency professionals in Sacramento and cost at least $500,000.[13] This drill imagined that 5,000 East Bay residents died after the Hayward Fault ruptured.[14] Hundreds of federal and state emergency response officials went to a building in Sacramento and

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[7] State/Federal Hazard Mitigation Survey Team, *Hazard mitigation opportunities for California*, 21.

[8] U. S. Government Accounting Office (GAO), *Disaster Assistance: Federal, State, and Local Responses to Natural Disasters Needs Improvement,* Report No. GAO/RCED-91-43 (Washington, D.C.: U.S. General Accounting Office, March 1991).

[9] Ted Steinberg, *Acts of God: The Unnatural History of Natural Disaster in America*, 2nd Edition (New York, NY: Oxford University Press, 2000): 187.

[10] State/Federal Hazard Mitigation Survey Team, *Hazard mitigation opportunities for California*, 21.

[11] State/Federal Hazard Mitigation Survey Team, *Hazard mitigation opportunities for California*, 1.

[12] In fact, the plan says, "Many aspects of the National Plan have been developed as a result of lessons learned from response operations after the catastrophic earthquake in Mexico in September 1985," State/Federal Hazard Mitigation Survey Team, *Hazard mitigation opportunities for California*, iv.

[13] Ted Bell, "Disaster Drill Gets a Jolt of Reality," *Sacramento Bee*, August 9, 1989. Dave O'Brian, "Quake Prompts California to Come to Grips with its Faults," *San Jose Mercury News*, August 9, 1989, Newsbank.

[14] "East Bay To Rehearse For Earthquake," *San Francisco Chronicle,* August 7, 1989, Newsbank.

pretended to manage the emergency response in front of reporters, who were supposed to quietly observe.[15] A report from the U.S. Government Accounting Office (GAO) asserted that spending on preparedness activities such as the one held on August 9, 1989 did help with the Loma Prieta response, but other reports suggested that the lessons learned from this activity had not been published, let alone implemented, when the earthquake struck.[16] A 5.2 earthquake hit San Jose on August 9, 1989—the same day as the earthquake drills—and was accompanied by public warnings by "officials" that another, stronger 6.2 earthquake would follow "within seven days."[17]

The disaster response plans envisioned that government would play a central role in "public information." Here is a high-level description of what most of the plans envisioned: the government would gather details about a disaster from other government officials and tell the media what had happened, and the media would relay these details to the public. The visions of public information in these disaster response plans were sometimes explicitly given. The San Francisco Multihazard Functional Plan explains that Emergency Public Information is "Information disseminated to the public by official sources during an emergency, using broadcast and print media."[18] The

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[15] "Teams of specialists, ranging from procurement experts to construction managers, huddled quietly around computers, printers and TV screens in a sprawling building on the south side of Sacramento, shuttling notes and memos to each other. Others marked up chalkboards with the latest county-by- county victim totals, products of a computer's imagination . . . Reporters were cautioned not to bother the 'players' with questions, but some paid no heed, much to the irritation of the organizers." "Earthquakes on Paper Help With the Real Ones," *San Jose Mercury News*, August 9, 1989.

[16] GAO, *Disaster Assistance: Federal, State, and Local Responses to Natural Disasters Needs Improvement,* 23; There are a number of references to the benefit of having done "RESPONSE-89," as it was called by participants, in terms of identifying shortcomings and practicing communication between various parties involved with disaster response. William M. Brown III and Carl E. Mortensen, "Earth Science, Earthquake Response, and Hazard Mitigation: Lessons from the Loma Prieta Earthquake," in *The Loma Prieta, California, Earthquake of October 17, 1989—Recovery, Mitigation, and Reconstruction.* Joanne M. Nigg, ed., U.S. Geological Survey Professional Paper 1533-D (Washington, D.C.: United States Government Printing Office, 1998): D81-D90.

[17] Pamela Kramer,, "'The Building was Swinging Really Bad' a 5.1 Jolt—and Counting Experts Say 6.2 Quake is Possible Within 7 Days," *San Jose Mercury News*, August 9, 1989, Newsbank. The earthquake and the drill prompted at least one Bay Area to publish earthquake preparedness guidelines. Dave O'Brian, "Quake Prompts California to Come to Grips with its Faults," *San Jose Mercury News*, August 9, 1989, Newsbank.

[18] City and County of San Francisco Office of Emergency Services, *Multi-hazard Functional Plan* (San Francisco Office of Emergency Services, 1988): 79; Enclosure 1-5,

next several paragraphs examine how public information was supposed to be gathered and disseminated according to the plans in place: at the Federal level, "Federal Response to a Catastrophic Earthquake"; at the State Level, the "State Emergency Plan" and the "Multi-Hazard Functional Planning Guidance," which was influential for both state and local disaster plans; and, at the local level, San Francisco's "San Francisco Multi-hazard Functional Plan."[19]

The Federal Plan

The "Federal Response to a Catastrophic Earthquake" plan, practiced during RESPONSE-89 and described below, was designed for use when state and local capabilities to respond to a disaster were overwhelmed and federal intervention was required. For the most part, within "the Plan" (as it called

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page 5. Several "earthquake planning guidelines" gave definitions of "public information." For example, in Northern California, The Bay Area Regional Earthquake Preparedness Project (BAREPP) put out earthquake planning guidelines for counties and cities. BAREPP defined the "function" of "Public Information" as:"continuous communications with the public through all available media to provide hazard warnings, official instructions and announcements, status of critical lifeline and emergency services, and damage information. This includes the operation of an emergency information center as part of an EOC [Emergency Operations Center], as well as provisions for meeting the needs of the press and public inquiries." Bay Area Regional Earthquake Preparedness Project (BAREPP), *County Comprehensive Earthquake Preparedness Planning Guidelines,* BAREPP 85-8 (October 1985): 29. Institute of Government Study. 90 00759. (This definition appears almost verbatim in Federal Emergency Management Agency (developed by the Southern California Earthquake Preparedness Project), *Comprehensive Earthquake Preparedness Planning Guidelines: City* (Earthquake Hazards Reduction Series 2, FEM1.25:2, FEMA 73/May 1985): 54.

The "Workbook for State Governments" recommended that "the emergency public information (EPI)" section of the disaster plan address: "An authoritative source for public information in an emergency," and "use of a Joint Information Center (JIC) as a central location to coordinate the release of Emergency Public Information materials in an emergency. Definitions of terms: "Emergency Public Information—Information which is disseminated primarily in anticipation of an emergency or at the actual time of an emergency in addition to providing information as such, frequently directs action, instructs, and transmits direct orders." Federal Emergency Management Agency (FEMA), *Integrated Emergency Management System: Capability Assessment and Multi-Year Development Plan for State Governments: Workbook for State Governments*, FEMA CPG 1-36 (October 31, 1988): 3-39. Authorities-PL 96-511, as amended; 44 U.S.C 3507 and 5 CFR 1320, p A-2.

[19] I chose to examine San Francisco's plan because it was the only local disaster plan that I was able to access in its entirety and that I knew had been updated before 1988; it was in use during Loma Prieta. I appreciate the assistance of the staff at the Institute for Government Study Library at Berkeley for their help in accessing this information.

itself) there were three areas concerned with informing the public.[20] The first is through the work of FEMA Public Affairs Officers, who coordinate with Joint Information Centers, and report to the Field Coordinating Officer, the person appointed to manage the disaster response.[21] The Joint Information Centerss "ensure the coordinated, timely release of accurate information to the news media and the public . . . and coordinate with State public information programs."[22] Secondly, Emergency Support Function #5, called the "Damage Information Annex," said that its "purpose . . . is to gather, collate, and disseminate information on damages (including casualties) following a catastrophic earthquake."[23]

The State Plan

The "Multihazard Functional Planning Guidance" was published by the State Office of Emergency Services and intended to guide disaster planning at "all levels of government."[24] In the "Multihazard Functional Planning Guidance," "the Jurisdiction Emergency Public Information (EPI) Organization" would "prescribe procedures for… dissemination of accurate instructions and information to the public" and "response to media inquiries."[25] According to the planning guidance, the "information" would be primarily gathered through the network of Public Information Officers (PIOs) at the local and regional organizations throughout the state.[26] "Status boards" were supposed to facilitate communication between different response functions and the Public Information Officer, or between the Public Information Officer and the media. Templates of status boards had tables with headings such as "damage summary" or "resources committed."[27] Although the Public Information Officers were supposed to respond to inquiries from the public, the only direct instructions and templates for communicating directly to the public (as opposed to through the media) were embodied by

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[20] Although there were many federal plans in development at the time of the Loma Prieta earthquake, I focus on this federal plan because it was actually activated during the earthquake on a "limited" basis.

[21] FEMA, *Federal Response to a Catastrophic Earthquake*, A-13, B-4, 5-1.

[22] FEMA, *Federal Response to a Catastrophic Earthquake*, A-13.

[23] FEMA, *Federal Response to a Catastrophic Earthquake*, 5-1.

[24] State of California, Governor's Office of Emergency Services (OES), "Introduction to Guidance," in *Multihazard Functional Planning Guidance* (State of California, Governor's Office of Emergency Services, 1985): vii.

[25] Office of Emergency Services, *Multihazard Functional Planning Guidance*, 153; Enclosure A-6.

[26] Office of Emergency Services, *Multihazard Functional Planning Guidance*, 155; Enclosure A-6.

[27] Office of Emergency Services, *Multihazard Functional Planning Guidance*, 180-184. Exhibit 7, attachment A-6-C, Status boards.

several sample radio scripts, which described hypothetical earthquakes.[28] The California "State Emergency Plan," which fills a binder approximately three inches thick, reflected much of the Multihazard Functional Planning Guidance in the area of public information.[29] According to the State Emergency Plan, the Public Information Officer was supposed to "inform" the media and "at the local level, to respond to inquiries from the public."[30]

The San Francisco Plan

The California State Plan indicated that the local governments should be in charge of direct communication with the public, not just the media. San Francisco's "Multihazard Functional Plan" replicated much of the Multihazard Functional Planning Guidance, however, and, following that guidance, established that public communication should be driven by the media.[31] The city also had a very specific view of the media as a "[m]eans of providing

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[28] Office of Emergency Services, *Multihazard Functional Planning Guidance*, "Public Information Officer Checklist," Attachment A-6-A, Enclosure A-6. The radio messages are for different scenarios: when there is "no information available," "update on earthquake" which give deaths, homes damaged, magnitude, area affected, and epicenter, the last script is a "summary statement for the media." Office of Emergency Services, *Multihazard Functional Planning Guidance*, 217-220, Attachment A-1-A, pages 1-4.

[29] State of California Office of Emergency Services (OES), *State Emergency Plan,* 1989. The plan was prepared and edited by Thomas M. Fante, Senior Emergency Operations Planner, Planning Division, State Office of Emergency Services. The Plan was reviewed by Staff and Members of the: California Emergency Council, Governor's Emergency Operations Executive Council, Office of Emergency Services Local Government Advisory Committee, and the State Office of Emergency Services. Note: The plan has pages with different dates on them, but all are before the October 17, 1989 earthquake. With these large state plans, the idea is that there is a basic plan. Specific "functions," such as "Emergency Public Information," have their own much smaller "Annex" such that most people would only need to fully read relevant documents rather than the entire plan.

[30] The *State Emergency Plan* suggests a more restricted in the view of how the PIO communicates with the public than *Multihazard Functional Planning Guidance*. It doesn't include radio scripts for communicating directly with the public, or a Joint Information Center as suggested by the federal assessment guidelines. The job of the PIO is to "Enlist the cooperation of local, statewide, national, and international media in relaying emergency guidance to the affected public and providing status information to their audiences." Furthermore, communicating with the public is restricted: "Public information officers use the telephone to inform the media and, primarily at the local level, to respond to inquiries from the public." Office of Emergency Services, *State Emergency Plan,* "Annex L: Emergency Public Information," L2, L7.

[31] City and County of San Francisco, *Multi-hazard Functional Plan* (San Francisco Office of Emergency Services, 1988): 315-317 Attachment A-6-C, page 1-3.

information and instructions to the public, including radio, television, and newspapers."[32] The guidelines for Emergency Public Information after a disaster include "release emergency instructions/information to the public as necessary through the media using Media Contact list," setting up "media only" telephone numbers, and having recorded messages for the public.[33]

Plans in Action

The entire model of public information has a Shannon-and-Weaver-esque aura to it in the sense that the public has been cast in the role of receiver, the government as the authority with the official message, and the media as the willing transmitter of whatever the government envisioned. There were many flaws in this vision. First, the media were portrayed as an uncomplicated conduit who will not have their operations affected by the earthquake or a story to tell that is different or conflicting with the government's. Second, none of these plans accounted for the possibility of the network of Public Information Officers getting its public information from the media—presumably the source of "rumor" that they are attempting to control.[34] Third, also absent was the idea that the public might have experiences that would be of interest to Public Information Officers who are supposed to be getting all of their public information from other Public Information Officer officials. There was no sense that the public might be the first responders to disaster because they were the people actually affected by what happened; with this in mind, the public would be in the ideal position to provide immediate details.[35] Fourth, and bizarrely, the U.S. Geological Survey (USGS), the agency which housed and funded many seismologists, was not included in the plan as group that would communicate with the public, or even included explicitly in the Federal Response to a Catastrophic Earthquake.[36]

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[32] City and County of San Francisco, *Multi-hazard Functional Plan*, 82, Enclosure 1-5, page 8.

[33] City and County of San Francisco, *Multi-hazard Functional Plan*, 311. Attachment A-6-A, page 3.

[34] All of the the plans direct the persons in charge of public information in the government disaster response organization (be it public affairs or PIO) work on rumor control.

[35] Of course, people who experience a disaster do not necessarily have technical expertise about seismic safety, so they may not be in the position to provide instructions about what to do next, or they might not be able to see specific kinds of geological hazards. This is discussed in more detain in the Conclusion.

[36] This was particularly ironic because the USGS seemed to fill many public communication roles after Loma Prieta—they systematically gathered data about the earthquake, meeting daily to share it with each other and with the public. William M. Brown III and Carl E. Mortensen, "Earth Science, Earthquake Response, and Hazard Mitigation: Lessons from the Loma Prieta Earthquake," in *The Loma Prieta, California, Earthquake of October 17, 1989—Recovery, Mitigation, and Reconstruction.* Joanne M. Nigg,

Needless to say, the Loma Prieta response did not follow this model, but there were important ways in which this vision of the government as authority did shape people's information practices, the information infrastructure, and how Californians made sense of the Loma Prieta Earthquake.

The Media

The government emphasized the importance of the media post-earthquake in disaster plans, but the media did not behave like the perfect conduit for the government to the public. First, the media were injured by the earthquake and had to scramble to find electric power to continue to broadcast or to print newspapers. Second, the media focused on the most damaged areas in San Francisco and Oakland, to the exclusion of some of the areas closest to the epicenter. In part, this is was because so many media people were in San Francisco at the time of the earthquake, but also because reporters identified with people in San Francisco.

In general, power failures and the lack of backup generators made it difficult for some radio, television, and newspaper companies to get back in action immediately after the earthquake, but most used limited generator or battery power to muddle through.[37] The dependence on electricity for so much of the information infrastructure in 1989 represents a key shift from the information infrastructure in 1906 or 1868. The information infrastructure in 1989 required a robust electricity infrastructure that was not controlled by any of the news-making (e.g., the media companies) or news-circulating entities (e.g., the post office or the telephone companies). Generators and battery power helped the information infrastructure operate off of the electric grid. Not all of the media companies followed the advice of preparedness guides, however, and as a result went without power for several hours.

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ed., U. S. Geological Survey Professional Paper 1533-D (Washington, D.C.: United States Government Printing Office, 1998): D81-D90.

[37] Federico Subervi-Valez, M Denney, C Ozuna, C Quintero, and J-V. Palerm, *Communicating with California's Spanish-Speaking Populations: Assessing the Role of the Spanish-Language Broadcast Media and Selected Agencies in Providing Emergency Services*, California Policy Seminar, (Berkeley, CA: University of California, 1992); Richard J. Rapaport, "Lifelines: The Media: Radio, Television and Newspapers" in *The Loma Prieta, California Earthquake of October 17, 1989: Performance of the Built Environment - Lifelines*, edited by Anshel J. Schiff, United States Geological Survey Professional Paper 1552-A, (Washington, D.C.: United States Government Printing Office, 1998): A43-46. (A very similar, but slightly more provocative, article appeared in the BAREPP publication *Networks* 5, no. 1, Winter 1990, pp. 12-14; According to *Networks,* this article was excerpted from an article by Rapaport in the December 1989 issue of *San Francisco Focus.*)

Although there was a greater variety of broadcast media available after the 1989 earthquake compared to the 1906 earthquake, this didn't necessarily correspond to a greater variety of stories, as there was interdependence between newspaper and television organizations. Television and radio used national wire services such as the Associated Press, television network feeds, and personal stories.[38] Non-local newspapers in 1989 benefited from the work of television stations leading them to stories, especially the local television stations that reportedly had more accurate coverage.[39]

After the loss of printing equipment in the 1906 quake, dominant newspapers had managed to cross the bay to Oakland and collaborate on an issue before they all settled at different Oakland presses. This scenario was not unlike the fate of San Francisco newspapers after the Loma Prieta earthquake. Most of the dailies outside of San Francisco, such as the *Oakland Tribune* and the *San Jose Mercury-News*, had backup power and were able to print full editions the day after the earthquake. Newspapers that were near the epicenter experienced damage that required a number of workarounds, but they were able to deliver issues.[40] While a few of the San Francisco newspapers made use of some of the facilities offered by non-San Francisco newspapers, the two main San Francisco dailies, the *Chronicle* and the *Examiner*, could not arrive at an arrangement to share emergency power generators and delivered their papers late. Despite this, "The lateness of delivery and the hunger for news about the earthquake had created an almost-insatiable demand for newspapers."[41] The *San Jose Mercury-News* "printed more than 100,000 extra copies of the newspaper," and the *Oakland Tribune* sold 150,000 extra newspapers.[42] The great interest in news aside, however, the San Francisco newspapers were not as dominant as in 1906—not just because of the diversity

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[38] Everett M. Rogers, Matthew Berndt, John Harris, and John Minzer, "Accuracy in Mass Media Coverage," in *The Loma Prieta Earthquake: Studies of Short-Term Impacts* Edited by Robert Bolin, Program on Environment and Behavior Monograph #50. (Boulder, CO: University of Colorado Institute of Behavioral Science, 1990): 48.

[39] Conrad Smith, *Media and Apocalypse: News Coverage of the Yellowstone Forest Fires, Exxon Valdez Oil Spill, and Loma Prieta Earthquake* (Westport, CT: Greenwood Publishing Group, 1992): 126, 128. Cynthia Gorney, *Covering the Quake: A transcript of a Symposium held on December 9, 1989 on the Media's Coverage of the 1989 Bay Area Earthquake* (Berkeley, CA: University of California Graduate School of Journalism): 8. (Cynthia Gorney was listed as a reporter for the *Washington Post*).

[40] Alexandra Hayne, *Covering the Quake,* 14 (Hayne was City Editor for the *Watsonville Register-Pajaronian*).

[41] Rapaport, "Lifelines: The Media: Radio, Television and Newspapers," A45

[42] Eric Newton, *Covering the Quake,* 5. (Newton was Assistant Managing Editor for the *Oakland Tribune*); Rapaport, "Lifelines: The Media: Radio, Television and Newspapers," A45.

of broadcast media that also included radio and television, but because other community newspapers were serving equally large and growing populations.

While the dependence on an electrical network shaped the use of the information infrastructure and was, to a great extent, made visible by the earthquake, the centrality of San Francisco in terms of reporting and media presence was not new. The earthquake struck just before a game of the nationally televised Major League Baseball World Series at the ballpark of the San Francisco Giants. The "live" aspect of the earthquake and the fact that so many of the media were at the Giants game made it seem as if the earthquake was situated solely in San Francisco to those watching the telecast of the baseball game, because they didn't know what other areas were damaged.[43] The reports initially focused on San Francisco and then Oakland, and the earthquake was called "The San Francisco Earthquake."[44] It wasn't until an hour after the earthquake that television media outlets began to report that the epicenter was near Santa Cruz, and three hours after the earthquake reports started to surface of how much damage had been done in the city of Santa Cruz.[45]

The focus on San Francisco persisted, however, even after the initial hour. A study of the three major national television news programs by Conrad Smith found that the night of the earthquake, the television shots were overwhelmingly of the Marina.[46] Smith suggests that journalists' education and class made it easier for them to identify with residents of San Francisco's Marina than the poorer people from Oakland who were displaced by the earthquake or with similarly marginalized people in other areas.[47] Members of the media gave a number of reasons for the focus on San Francisco, including the following: "all of the earthquake mythology has to do with San Francisco"; more people had traveled to San Francisco than anywhere else in the Bay Area and Santa Cruz County; the name of San Francisco was more recognizable worldwide; the World Series was happening in San Francisco at the time; and

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[43] Other earthquakes in this dissertation were reported on immediately via telegraph, and thus immediately "visible" to Americans far away, but none were actually watched.

[44] Smith, *Media and Apocalypse:*. The proceedings of a conference about the media coverage of the earthquake called this "The San Francisco Syndrome." *Covering the Quake.*

[45] "Transcription of television news from Channel 3 and other sources," Notes taken by Martha Savage, Seismologist; typed by Rovert Sydnor, Geologist. "Earthquake Notes," Tuesday, October 17, 1989. From: California State Archives, Governor-Planning and Research - Admin; Loma Prieta Earthquake Files, 1989.

[46] There were 102 shots of the Marina, 69 shots of the freeway in Oakland, and 27 from Santa Cruz. In the days that followed, there were 13 stories that focused on San Francisco, 10 on Oakland, and 5 on Santa Cruz. Smith, *Media and Apocalypse,* 127-129.

[47] Smith, *Media and Apocalypse,* 120.

many non-California media outlets with representation in the Bay Area had their branch offices located in San Francisco.[48]

The national media were criticized for alarmist reporting of the earthquake. According to some city managers, however, media attention also resulted in pledges or donations.[49] Although promises in aid by government officials often fail to materialize, the American Red Cross received $76 million in donations. This was an "unprecedented" amount; it was three times the amount required to do the work that American Red Cross usually did after an earthquake—namely, providing shelter, food, and basic medical services.[50] At the same time, though, the media attention and public donation created difficulties: "The public responded to media releases and literally dumped tons of clothing at the park and brought prepared foods, some of which spoiled without refrigeration. Conditions became a major concern to public heath and safety officials."[51]

Public Information Officers and the Media

The disaster response plan went into effect. According to the State/Federal hazard mitigation team, the California Office of Emergency Services set up an "Emergency News Center . . . staffed around the clock . . . by 50 public information officers from various State agencies."[52] The role of the Office of Emergency Services Regional Office in Pleasant Hill for the State of California was to monitor disaster response and coordinate the different agencies. As described by researcher Louise Comfort, the difficulty for state-level Public

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[48] Newton, and Jane Gross, *Covering the Quake,* 11-12. (Gross was a reporter for the *New York Times*).

[49] R.C. Wilson, *The Loma Prieta Quake: What One City Learned,* International City Management Association, 1991, 41.

[50] The Red Cross tried to take the funds that were donated to Loma Prieta relief and give them to the general relief fund, but "in deference to donors' requests, the Red Cross determined that all donations designated for northern California would stay in northern California." This was not ideal, however: "[T]he Red Cross has reaffirmed the importance of encouraging donations to the national Disaster Relief Fund, rather than for specific disasters, to assure adequate response to all disasters." American Red Cross, *Meeting the Loma Prieta Challenge: An Interim Report of the Northern California Earthquake Relief and Preparedness Project*, 1991.

[51] City of Watsonville (Office of the City Manager, in cooperation with the Department of Recreation and the Office of the Fire Chief in Seismic Safety Commission), "Report on the City of Watsonville," in California Seismic Safety Commission, *Loma Prieta's Call to Action* (Sacramento, CA: California Seismic Safety Commission, 1991): 95.

[52] State/Federal Hazard Mitigation Survey Team, *Hazard mitigation opportunities for California*, 25

Information Officers centered on waiting for the regional operations center report; the regional centers, meanwhile, were waiting for counties to report, who were in turn waiting for cities to report—and the cities were too busy responding to the earthquake to make any reports.[53] The regional Office of Emergency Services was, therefore, not able to do its job because there were no updates available regarding what was happening on the ground.[54] The solution for this was more computers: "The regional coordinator requested and received permission to purchase computers to facilitate this work but had to improvise an interactive communications system to carry out the essential processes of communication."[55] At a local disaster site such as the Cypress Expressway collapse there was increasing coordination over time, but initially the disaster responders at the Cypress collapse relied on runners—making it easier to understand why municipalities were not able to provide a succinct report to the next regional level.[56]

Communication between different levels of the disaster response apparatus was challenging. Later assessment of the communication systems underscored that the telephone systems had issues because of the call volume, but that backup radio and cellular communication systems performed well.[57] The huge numbers of people were trying to get in touch with each other simultaneously. Many people thought the phone lines were broken even when they were working, because people didn't know that they could wait for a dial

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[53] Louise K. Comfort, *Shared Risk: Complex Systems in Seismic Response* (Amsterdam: Pergamon Inc., 1999) 172; According to Comfort, all jurisdictional levels of disaster response (federal, state, and local) are responsible for informing the public: "communication of information regarding the event and restatement of the goal of disaster operations," but there is also the opportunity for the public to inform the disaster response professionals in the process of: "assessment of needs and status of the affected community." Lousie K. Comfort, "Reconnaissance Report: The Loma Prieta Earthquake, October 17, 1989—Communication and Coordination in Emergency Respons and Recovery." Submitted to Robert Olson, Team Leader, Social Sciences, Reconnaissance Team, Loma Prieta Earthquake of October 17, 1989 (Earthquake Engineering Research Institute and National Science Foundation, January 2, 1990): 2. Accessed at Institute for Government Study, UC Berkeley (90 00462).

[54] Comfort, "Reconnaissance Report," 7.

[55] Robert A. Olson et al., "Socioeconomic Impacts and Emergency Response," *Earthquake Spectra* 6 (1990): 411 (an Earthquake Engineering Research Institute publication).

[56] Comfort, "Reconnaissance Report," 2-7. Olson et al, "Socioeconomic Impacts and Emergency Response," 409.

[57] Seismic Safety Commission, *Loma Prieta's Call to Action*, 22; State/Federal Hazard Mitigation Survey Team, *Hazard mitigation opportunities for California,* 25.

tone.[58] Emergency measures taken to influence line load—blocking incoming calls from outside the 415 and 408 area codes so that outgoing calls could be made—had unintended consequences, as this meant that regions in Santa Cruz County could not get through to the Office of Emergency Services Region II Office in Pleasant Hill.[59] Those who had access to cellular telephones had much better luck because the system had far fewer users relative to its capacity, so even though it was not in service in some locations, it was able to be used for emergency communication.[60] Although problems did exist with the technical communication infrastructure, it is instructive to consider them in light of a preliminary engineering report: "In general, telephone systems performed better than expected, especially considering the seismic forces that equipment in the epicentral area had to withstand."[61] This suggests that the issues that Comfort identified in her research were likely problems with organizational communication, exacerbated by the need to adopt workarounds to ordinary communication practices.

The disaster plans envisioned that the Public Information Officers would dictate the story to the media. In fact, the media played a role in shaping the disaster response by dictating the story to the disaster responders. The media's focus on the Bay Area, and the lack of attention to Santa Cruz County, led officials in Watsonville, Santa Cruz, and Los Gatos to believe that the damage was so bad elsewhere that they were "on their own."[62] Medical professional responders were equally reliant on the popular media to get an idea about what had happened.[63] Emergency workers voluntarily reported to duty in great numbers, and, in general, there were enough, perhaps even too

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[58] Anshel J. Schiff, Alex Tang, Lawrence F. Wond, and Luis Cusa, "Lifelines: Communication Systems." In *The Loma Prieta, California Earthquake of October 17, 1989: Performance of the Built Environment—Lifelines,* edited by Anshel J. Schiff, United States Geological Survey Professional Paper 1552-A, (Washington, D.C.: United States Government Printing Office, 1998): A24-25.

[59] Seismic Safety Commission, *Loma Prieta's Call to Action*, 21; Schiff et al., "Lifelines: Communication Systems," A24; State/Federal Hazard Mitigation Survey Team, *Hazard mitigation opportunities for California,* 25.

[60] Schiff et al., "Lifelines: Communication Systems,"A27-28; Kathleen J. Tierney, "Emergency Medical Care Aspects of the Loma Prieta Earthquake," University of Delaware Research Center Article #234, printed from *International Symposium on Building Technology and Earthquake Hazard Mitigation* (Buffalo, NY: NCEER, 1992): 230.

[61] EQE Engineering, *The October 17, 1989 Loma Prieta Earthquake* (1989): 24.

[62] Deborah Acosta, Town Manager, Town of Los Gatos quoted in Seismic Safety Commission, "Loma Prieta's Call to Action," 19.

[63] "Overview, Lessons and Recommendations from the committee for the symposium on practical lessons from the Loma Prieta Earthquake," *Practical Lessons From the Loma Prieta Earthquake: Report from a Symposium by the Geotechnical Board and the Board on Natural Disasters of the National Research Council*, National Research Council, (Washington, D.C.: National Academy Press, 1994): 4.

many, medical experts on hand to handle the relatively few injured patients.[64] The unrelenting national television focus on the collapse of the Bay Bridge or the fire in the Marina misrepresented the overall impact of the earthquake. Understanding what had happened in areas that were not being covered by the media was difficult, and the lack of details about the areas not covered by the media further contributed to the focus on the Marina district and the Cypress Expressway.[65]

The Public Information Officers often did not have anything new to tell the press about the earthquake because they were getting updates from people who were getting updates from the media. The person in charge of public information in San Francisco was not able to obtain the most critical updates about what was happening from the emergency responders "to feed to the horde of press people."[66] In some cases, the San Francisco public information person was getting his/her stories from city workers who were relying on television.[67] One summary of the socioeconomic aspects of the earthquake by the Earthquake Engineering Research Institute said the following: "It appears that most organizations depended on the media to find out what was happening."[68] Planning documents described California's state-level emergency responders as pushing public information out, as well as handling inquiries from the media and the public. After Loma Prieta, however, the State/Federal Hazard Mitigation Survey Team said that the most time was spent responding to the media rather than "using the media to communicated important information."[69] The Santa Cruz city manager reported that after Loma Prieta, "the media" had its own agenda.[70] The Public Information Officers were supposed to do "rumor control." That Public Information Officers could simultaneously know what was rumor versus reality and control the media now seems a bit far-fetched. From the perspective of disaster

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[64] Kathleen J. Tierney, "Emergency Medical Care Aspects of the Loma Prieta Earthquake," University of Delaware Research Center Article #234, printed from *International Symposium on Building Technology and Earthquake Hazard Mitigation* (Buffalo, NY: NCEER, 1992): 225-250.

[65] State/Federal Hazard Mitigation Survey Team, *Hazard mitigation opportunities for California*, 21-22.

[66] Eileen Cahill Maloney, "San Francisco Departmental Debriefing" following the October 17, 1989 Earthquake Held November 1, 1989. Last Accessed May 2, 2012: http://www.sfmuseum.net/quake/debrief.html. (Mahoney was Press Secretary to the Mayor; she would have fulfilled the PIO role in San Francisco.)

[67] *Maloney, "San Francisco Departmental Debriefing."*

[68] Olson et al, "Socioeconomic Impacts and Emergency Response," 407.

[69] State/Federal Hazard Mitigation Survey Team, *Hazard mitigation opportunities for California*, 25.

[70] Wilson, *The Loma Prieta Quake, What One City Learned,* 33.

professionals in Oakland, who were closer to the earthquake, the media—and particularly the national media—were difficult to control.[71]

News organizations and disaster response officials had an odd symbiotic relationship when it came to telling the public what had happened. In post-earthquake reports, disaster response officials complained that the media distorted the earthquake. Nonetheless, it was not as if the media had not repeated the messages from disaster response officials. The media and government officials reinforced each other's importance: The disaster responders set up venues for the Public Information Officers to work with the media and the media also frequently used government officials as sources.[72] The media were integral in bringing the voices of disaster response professionals to ordinary people, but the media didn't always do what was expected of them.

The media relied on the disaster response professionals for the "official" story, and pressured disaster responders for details about the earthquake. For example, very inaccurate figures circulated after Loma Prieta that hundreds of people had died. Disaster response officials blamed the media for pressuring them to provide figures about the number of dead and extent of damage; the media, in turn, blamed disaster officials for providing incorrect figures. The inaccurate death counts published by the newspapers and television stations was a source of anxiety and regret for the media.[73] The front page of a number of newspapers proclaimed that hundreds were dead,

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[71] Report on City of Oakland, submitted by the City of Oakland, Office of Emergency Services, in Seismic Safety Commission, *Loma Prieta's Call to Action*," 68.

[72] Through an analysis of the *San Francisco Chronicle, San Francisco Examiner, Oakland Tribune*, and the *San Jose Mercury,* Louise Comfort identified 623 organizations "that were actively engaged in response actions," and 261 of which were public. Comfort examined "information processes" of NGOs, governments, and private organizations. In her analysis of the different types of transactions that the organizations were involved in, she looked at activities such as "donations," "medical care," and "transportation." Two types of transaction types that are most closely related to this dissertation are "emergency response" and "disaster relief." Sixty-three different organizations were reportedly involved with emergency response; of those, 47 were public organizations. Similarly, of the 73 organizations involved with disaster relief, 36 were public organizations, and 22 were nonprofits. Comfort, *Shared Risk,* 174, 176-177.

Conrad Smith analyzed earthquake-related newspaper stories in the *New York Times*, *Washington Post*, *Los Angeles Times*, and *San Jose Mercury News* for 6 months after the earthquake, as well as the national television news stations, CBS, NBC, and ABC. Of the 240 sources that were used in multiple stories, 50.1% were government officials. Of all the newspaper stories analyzed, 36.3% of all of the 2,256 sources that were cited were from government agencies, elected officials, or safety officials. Smith, *Media and Apocalypse,* 135-137

[73] This is discussed extensively in the *Covering the Quake* symposium.

including the *San Francisco Chronicle* and the *San Jose Mercury News*. The number "273 dead" circulated widely on Wednesday, October 18, the day after the earthquake as a confirmed number when it was an estimate.[74]

Reflecting on the variation in numbers of the people who died, the Santa Cruz post-earthquake report suggested that the decision "whether or not to estimate casualties or damage" rested with the Public Information Officer.[75] The source of the high numbers was apparently both disaster response officials at Cypress Expressway and the California Office of Emergency Services; however, the California Office of Emergency Services Public Information Officers were likely repeating the number that they had heard from the Public Information Officers at the Cypress Expressway.[76] The design of the emergency plan—that all "information" would flow up from local offices to the state office—implied that the field office should give the same report as the Sacramento office. This conflicted with journalistic efforts at fact-checking that might have dictated that journalists had to get sources from two separate offices. Thus, even as journalists sought to confirm statistics from a variety of Public Information Officers, the Public Information Officers were all sharing a single story. Furthermore, because of the interdependence of the different media, "extremely high severity estimates," such as the number of people dead as 273, were perpetuated.[77] Even four months after the earthquake, earthquake related deaths were reported as between 62 and 66, rather than a single agreed-on number.[78]

As the section above shows, many official disaster responders relied on the media themselves. While government officials were sought after by the media to explain what happened, they had difficulty getting an idea of what had happened in a large number of cities and counties on the day of the earthquake because of reliance on the media. In turn, the media relied on the disaster response professionals for the official story, but also pressured the disaster responders for details that the disaster responders might not have had.

Informing the Public

In San Francisco's Emergency Plan, the Emergency Broadcast System is the only radio communication system with frequencies specifically meant to be used to communicate with the public—all other radio systems help emergency

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[74] Rogers et al., "Accuracy in Mass Media Coverage," 46-47.
[75] Wilson, *The Loma Prieta Quake, What One City Learned*, 32.
[76] *Covering the Quake*; Rogers et al., "Accuracy in Mass Media Coverage," 47.
[77] Rogers et al., "Accuracy in Mass Media Coverage," 48, 50.
[78] Rogers et al., "Accuracy in Mass Media Coverage," 53.

responders communicate with each other.[79] The Emergency Broadcasting System, for the most part, did not fulfill what many people expected it would do, and it was particularly disappointing for non-English speakers. Media researchers summarized their experience with Emergency Broadcasting System: "In the case of an emergency, we expect that the Emergency Broadcasting System (EBS) will inform the public where to turn for necessary information. Unfortunately, the Emergency Broadcasting System failed to do so in the case of the Loma Prieta earthquake." The Emergency Broadcasting System was used locally in San Francisco and Santa Cruz counties to broadcast post-earthquake announcements almost entirely in English.[80] The San Francisco Mayor had his Emergency Broadcasting System messages translated into other languages, but they were not broadcast.[81] The utility of Emergency Broadcasting System was therefore questioned. First, the Emergency Broadcasting System message that went out was not particularly useful—noting that there was an earthquake after the fact seems beside the point. Second, the Common Program Control Stations were not operating immediately after the earthquake, because they didn't have electricity or because of other technical problems. Third, many stations chose not to monitor the Emergency Broadcasting System.[82]

The Emergency Broadcasting System was barely used, so citizens found other ways of finding out public emergency information—namely, by contacting government officials directly. The disaster plans had a great emphasis on the Public Information Officers communicating with the media, who would then tell the public what had happened. In Santa Cruz, however, the overlooked role of "providing information to the public" was assumed by the library staff.[83] The California Library Association was emphatic about the attention that citizens needed after the earthquake in a "recommendations" document:

> ". . . the State-mandated (from the Office of Emergency Services) Emergency Management Plans (which every jurisdiction in the State is supposed to develop) <u>do not contain adequate provision for citizen information.</u> [Emphasis in original] Instead, a Public Information Officer is designated. This person is supposed to handle inquiries form

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[79] City and County of San Francisco, *Multi-hazard Functional Plan*, 253-279, Enclosure A-3.

[80] KNBR broadcast Mayor Agnos's emergency speech as well as translations (provided by the mayor's aides) in Spanish, Chinese, Vietnamese, and Tagalog. Subervi-Velez, *Communication with California's Spanish-Speaking Populations,* 51-52

[81] Maloney, "San Francisco Departmental Debriefing."

[82] Subervi-Velez, *Communication with California's Spanish-Speaking Populations,* 14; 47-48.

[83] Wilson, *The Loma Prieta Quake: What One City Learned*, 35.

> the press and other media and answer questions on behalf of the Incident Commander."[84]

The Santa Cruz Library, on request from the Police Department, set up and staffed a citizen information phone line starting on October 18, the day after the earthquake, which functioned for at least two weeks afterward. The phone number was broadcast on the radio, so they received calls from all over Santa Cruz County. Ideally, this service was meant to lighten the load on other city departments, such as the Water Department, who could only respond to questions in their domain and were already occupied with disaster recovery activities. According to the libraries, there were two different principal inquiries to which they responded. The first were "welfare checks," in which people were calling from a faraway place to inquire about the well being of a particular person: "staff responded to [this] by locating the person (sometimes using a reverse phone directory to check with neighbors) and calling the person or the neighbor to send a message."[85] Most of the calls on the first three days of the emergency were welfare checks, and it is estimated that there were approximately 200 of these calls.[86] The second type of inquiries was described as follows:

> Emergency Related Information: who to call for a building inspection, where to volunteer, where to send money, where the shelters were, when water would be restored, was the water safe, where to get meals, were the banks open, could a building on the Mall be entered, was there really a tidal wave coming, which schools were open, etc., etc., etc., etc. . . . The Library staff began compiling County-wide (as well as City) information, using all the resources at a librarian's command. The hardcopy data compilation was updated daily an staff soon discovered that other agencies were copying the material on their letterhead.[87]

Because the Library staff was doing the work of responding to inquiries on an *ad hoc* basis, they didn't have recognition in the official plan. Many people involved in the planned response did not know about the services the Library staff was providing: "the library staff sometimes had trouble getting accurate information for use at the Service and several times got left out of the 'information loop' when conditions changed."[88] That the press would not inform citizens was not acknowledged the disaster plan. The Santa Cruz city manager reflected that "[O]ur library took the initiative to provide these

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[84] The California Library Association (CLA) Earthquake Relief Grant Ad Hoc Committee, *Earthquake Preparedness Manual for California Libraries* (California Library Association, 1990): 25.

[85] CLA, *Earthquake Preparedness Manual for California Libraries*, 25.

[86] CLA, *Earthquake Preparedness Manual for California Libraries*, 25.

[87] CLA, *Earthquake Preparedness Manual for California Libraries*, 25.

[88] CLA, *Earthquake Preparedness Manual for California Libraries*, 25.

community information services, and they met a critically important, and unforeseen, need."[89]

Other city managers didn't see the need to create a separate function for non–media-oriented public information, and put the responsibility of communicating directly with the public with the Public Information Officer, as originally envisioned. Oakland framed communicating with the media and the public as related, but different activities.[90] The city of Oakland said that the public initially called 911 until phone numbers for Oakland's Emergency Operation Center were broadcast "that could be called to obtain current disaster information," adding that "the demands for 'public information' cannot be underestimated."[91] San Francisco's attitude was that the Emergency Command Center was a space for people who were professional responders. Even receiving calls from the public was unexpected. Without the Library or another city organization assuming the role of taking calls from the public, there was a lot of confusion as to whom the public could reach out in this situation.[92]

The idea that people on the ground had some contribution to make to the ongoing narrative of what happened was almost never discussed in plans, and rarely discussed in reports. Nonetheless there were instances in which the people who actually experienced the earthquake had worthwhile experience to contribute to responders. The media did not simply air the stories that the disaster response professionals provided—in some cases, reporters treated this as an opportunity to hear from people on the ground what their experiences were and to get a broad idea of the story. One reporter even claimed that he identified the area near Santa Cruz as the epicenter of the earthquake based on the lack of phone calls coming out of Santa Cruz County.[93] A broad understanding of what happened was precisely the problem which professional responders had difficulty with. People on the ground, the first first responders helped make the overall damage knowable for others far away. Radio, the medium that many people turned to, found phone calls from the audience particularly useful. Some researchers described the stories from eyewitnesses as

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89 Wilson, *The Loma Prieta Quake: What One City Learned*, 35.

90 Oakland Office of Emergency Services, "City of Oakland, Loma Prieta Earthquake, After Action Report," October 1990. Last accessed March 20, 2012: http://www.sfmuseum.net/oakquake/1.0.html.

91 Oakland Office of Emergency Services, "City of Oakland, Loma Prieta Earthquake, After Action Report." October 1990. Available online: http://www.sfmuseum.net/oakquake/1.0.html.

92 Art Jenson, San Francisco Departmental Debriefing.

93 Newton, Gross, Tony Russomanno and Peter Laufer, *Covering the Quake*, 2-3, 10. (Russomanno was a Reporter, KGO-TV; Laufer was a Reporter for KCBS.)

a last resort alternative to official narratives.[94] These descriptions, along with the emergency plans, give the impression that the descriptions by people who had experienced the earthquake were somehow less valid. The *San Jose Mercury News*, which won the Pulitzer Prize for its reporting about the Loma Prieta earthquake; a study said that the *Mercury News* sources were, "much more likely to be scientists… more likely to be eyewitnesses and less likely to be elected officials or representatives of government agencies."[95] Perhaps the scientists and eyewitnesses were the unique voices in the earthquake reporting otherwise dominated by Public Information Officers.

Spanish Speakers in Loma Prieta

The Loma Prieta earthquake illustrated for many researchers that "Public education programs are paying off. At the same time, the programs aren't reaching everyone who needs them, and some people continue to take unnecessary risks."[96] It seemed that the programs had limited reach among the non–English-speaking communities. The experience of Spanish speakers, and especially Spanish-only speakers is examined next. The pubic information infrastructure for Spanish speakers, like the Chinese speakers in 1906, is another example of the multiplicity of infrastructures.[97] The existence of alternative information infrastructures provided the Spanish-speaking population access to resources in a manner different than for the white English-speaking population.

Santa Cruz County was the location of the epicenter of the earthquake. Its second largest city, Watsonville, lost 8% of its housing (642 of its 8100 housing units).[98] The loss was significant: there was less than 1% of housing

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[94] "With little or no information coming from these official sources, reporters during the first hours after the earthquake turned to the various unofficial sources for a great deal of their information. . . . In the absence of more concrete information, reporters used the accounts of eyewitnesses to create an imprecise image of the disaster's severity for their audience." Rogers et al., "Accuracy in Mass Media Coverage," 48.

[95] Smith, *Media and Apocalypse,* 138.

[96] Kathleen J. Tierney, "Emergency Preparedness and Response," in *Practical Lessons From the Loma Prieta Earthquake: Report from a Symposium by the Geotechnical Board and the Board on Natural Disasters of the National Research Council* (Washington, D.C.: National Research Council, National Academy Press, 1994): 108.

[97] Obviously, these infrastructures served to compensate for linguistic differences, as they did in 1906. Like the Chinese in 1906, members of the Spanish-only speaking population were believed to have dubious citizenship status, and thus were not included in aspects of American life.

[98] Mary C. Comerio, "Hazard mitigation and housing recovery: Watsonville and San Francisco one year later," in ed. Joanne M. Nigg, *The Loma Prieta, California, Earthquake of October 17, 1989—Recovery, Mitigation, and Reconstruction*," U.S. Geological

available before the earthquake.[99] Some of the most dramatic stories from Loma Prieta were from Watsonville. At the time Watsonville had a population of about 30,000, of which 61% were Hispanic; however, these numbers might be low because migrant workers also worked in the area.[100]

Watsonville was historically a location of rights advocacy by Latino farm workers. A few months before the Loma Prieta earthquake, Latinos had won a court case about equal representation in city elections. Scholars argued that the Latino community's history of resistance helped contribute to making Watsonville was a site of "contentious collective action" after the earthquake; those who were left homeless fought at various times with the city, Red Cross, and FEMA.[101]

Because Watsonville experienced such a great loss of housing, with little available slack, shelter was a major issue after the disaster. In some cases, the difficulties of emergency sheltering were compounded by the relationship between Latinos and the city of Watsonville, and the citizenship status of undocumented Latinos. Most people who could no longer live in their houses lived in sanctioned Red Cross shelters, where food and medical help were available. Initially, two unsanctioned parks became home for several hundred, mostly Latino, refugees. According to many sources, some services and parks were preferable because people were afraid that federal or quasi-federal organizations would work with the Immigration and Naturalization Services. Some Latinos feared the Immigration and Naturalization Services because they were undocumented aliens; others feared them because they were documented but thought that they were not allowed to solicit welfare services.[102] The availability of government services was not clear after the earthquake. FEMA finally formally announced that all residents could apply for aid, regardless of

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Survey Professional paper 1553-D (Washington, D.C.: United State Government Printing Office, 1998): D.31.

[99] Catherine M. Simile, "Disaster Settings and Mobilization for Contentious Collective Action: Case Studies of Hurricane Hugo and the Loma Prieta Earthquake" (PhD Dissertation, University of Delaware, 1995): 107.

[100] Ruth Marie Laird, "Ethnography of a Disaster: Loma Prieta Earthquake" (Thesis, San Francisco State University, 1991).

[101] Simile, "Disaster Settings and Mobilization for Contentious Collective Action," 82-84.

[102] Subervi-Velez et al., *Communication with California's Spanish-Speaking Populations,* 61. "According to the regulations established by the 1986 Immigration Reform and Control Act, people requesting amnesty for obtaining legal residence in the United States may not solicit any social welfare benefits prior to being granted legal status. Receiving such assistance is no considered a welfare benefit and would not disqualify the recipient from proceeding with his/her naturalization or amnesty process."

immigration status.[103] One of the parks for refugees became a Red Cross–run park on October 21 and 22; the other eventually had Red Cross food service.

This section examines how members of Latino community navigated the information infrastructure set up by disaster response organizations. In particular, I look at research about aid forms which were not set up with the population of Watsonville in mind. For example, building inspectors tagged buildings with green (safe to enter and occupy), red (not safe to enter), and yellow (entry limited to authorized personnel) tags to indicate structural safety assessments. The tags were in English only, however, and "even the meaning of green-tagged buildings can be disputed given a context in which residents do not necessarily trust the opinion of those who have the authority to assess the habitability of buildings."[104]

Spanish-Language Media

The Spanish-speaking population, and particularly the Spanish-only-speaking population, was left out of mainstream Loma Prieta disaster communication. Indeed, for Spanish-only-speakers, making sense of the earthquake using the broadcast media was challenging. One Bay Area newspaper ran the following headline: "Earthquake night news: For English speakers only."[105] In a report I draw heavily from, called "Communicating with California's Spanish-Speaking Populations: Assessing the Role of the Spanish-Language Broadcast Media and Selected Agencies in Providing Emergency Services," there was special attention paid to Spanish-language radio and television stations.[106] It described the television and radio components of the information infrastructure that Spanish-only-speakers might have had access to as they made sense of the earthquake.[107] The focus on radio and television was warranted. On the day of the earthquake, 62.5% of Hispanics found the radio to be the best source of information, and 36.1% found the television to be the "best source of information."[108] "Hispanic Californians" were more likely to "turn on or find

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[103] David Tuller, "Illegal Immigrants Can Get Aid," *San Francisco Chronicle,* October, 24, 1989.

[104] Simile, "Disaster Settings and Mobilization for Contentious Collective Action," 174-175.

[105] George Cathron, "Earthquake night news: for English speakers only," *Bay Guardian*, November 1, 1989 quoted from Subervi-Velez et al., *Communication with California's Spanish-Speaking Populations,* 49.

[106] Subervi-Velez et al., *Communication with California's Spanish-Speaking Populations.*

[107] Subervi-Velez et al*., Communication with California's Spanish-Speaking Populations,* 9-11.

[108] For the whole population, on the day of the earthquake, 49.6% of people found that radio was the best source of information and 42.4% found that television was the best source of information. In the days following the earthquake, almost 60% of people found television to be the best source of information. "After the earthquake,

a/another television or radio to get more information" suggesting that there may have been accessibility issues.[109]

While Spanish-speaking communities in large cities such as San Francisco or San Jose had multiple Spanish-language media options, in a smaller town such as Watsonville, there was only one local radio station that broadcast Spanish-language content, and they did this for only a few hours per day.[110] Furthermore, stations in San Jose and San Francisco had more resources: they had reporters out in the field with cellular phones, and they were able to field calls from distressed Spanish speakers to answer questions about "specific roads, schools, water conditions, and places to go for governmental assistance."[111] On the day of the earthquake, the part-time Spanish-language Watsonville station, KOMY-AM, had "English-language news and information… transmitted along with brief translations into Spanish."[112] Many Spanish-language stations translated the English-language media, and Red Cross and government announcements. Furthermore, FEMA used Spanish-language radio stations to tell Spanish speakers about their right to apply for aid.[113]

The Spanish-language stations did spent time translating material from English-language sources and monitoring English-language stations, but did not run exactly the same translated content as the English-language stations. Sometimes, Spanish-language radio ran different stories than the English-language media. A Latino community-based organization leader used the Spanish media to draw attention to Watsonville, because she felt that the city of Watsonville was downplaying the damage and ignoring the welfare of Latinos.[114] This media attention was not welcome in some cases, however. For

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this almost reverses and 67.6% of Hispanics found television to be the best source of information, 16.7% found radio, and 9.4% looked to newspapers the best source of information." William E. Lovekamp, "Gender, Race/Ethnicity and Social Class Differences in Disaster Preparedness, Risk and Recovery in Three Earthquake-Stricken Communities," (PhD Dissertation, Southern Illinois University Carbondale, 2006): 155-156. The data used in this dissertation is discussed more in the "Essay on Sources."

109 Lovekamp, "Gender, Race/Ethnicity and Social Class Differences in Disaster Preparedness, Risk and Recovery in Three Earthquake-Stricken Communities," 125; 140.

110 Subervi-Velez et al., *Communication with California's Spanish-Speaking Populations,* 43.

111 Subervi-Velez et al., *Communication with California's Spanish-Speaking Populations,* 53.

112 Subervi-Velez et al., *Communication with California's Spanish-Speaking Populations,* 56..

113 Steve Twomey, "Immigrants Afraid to Ask for Help; Many Hispanic Workers Have Seen Their World Collapse," *Washington Post*, October 23, 1989.

114 "We quickly started talking to every major Spanish-speaking media that we could get our hands on, and all the media that we could regarding the area. So we contributed to the press coverage . . . there. The Latino community was just basically ignored. Most of the politicians that came to town ignored the Latino community,

employees of the City of Watsonville, the media was a nuisance because it pushed the agenda of those who had fled their homes and settled in public parks without sanction from the formal relief apparatus: "Media attention fueled the demands and encouraged entrenchment rather than relocation to Red Cross shelters."[115]

Spanish-language stations focused on the effects of the earthquake on the local Latino communities: "Calls from the audience provided invaluable information about particular experiences and problems. For example, people told us about local gas leaks, broken water pipes and structures that had collapsed or been damaged."[116] A few Spanish-language radio stations and both of the Spanish-language television stations ran call-in shows during which people could ask questions of Spanish-speaking emergency professionals, geologists, or psychologists.[117] A few Spanish-language stations also facilitated sending messages about their well being to friends and family far away. For instance, KIQI-AM in San Francisco, working with its affiliates in Latin American countries, was able to record messages from those who were in areas affected by the earthquake, and play them in the South American countries.[118] This was a creative use of Spanish-language public information infrastructure to serve the needs of a specific community.

Spanish-language radio stations acted to help translate government public information for Spanish speaking communities because government information was mostly in English. Even the most public facing government information system was only in English. The Emergency Broadcasting System had symbolic importance as it was dedicated to government agencies communicating with the public (whereas people such as the Public Information Officer or the Joint Information Center were dedicated to the media and the public). However, as described in the section above, the Emergency Broadcasting System was not used to its fullest potential during the Loma Prieta earthquake. Furthermore messages were only put out in English.

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because we were ignored by the public officials. We don't have any representation there, and they were not bringing people to come to look at the epicenter of the earthquake. So the city of Watsonville contributed to the lack of press coverage, as far as I was concerned." Barbara Garcia, interview by Jennifer Jordan for Regional History Project at University of California, Santa Cruz, June 12, 1990, in *The Loma Prieta Earthquake of October 17, 1989: A UCSC Student Oral History Documentary Project*, edited by Irene Reti (University of California, Santa Cruz, 2006): 25-26.

115 City of Watsonville, "Report on the City of Watsonville," 96.

116 Subervi-Velez et al., *Communication with California's Spanish-Speaking Populations,* 56.

117 Subervi-Velez et al., *Communication with California's Spanish-Speaking Populations,* 52-56.

118 Frank Viviano, "How Relatives Overseas Kept Informed," *San Francisco Chronicle*, October 23, 1989; Subervi-Velez et al., *Communication with California's Spanish-Speaking Populations,* 54-55.

According to San Francisco's emergency plan, "The Emergency Broadcast System (EBS) will be used, to the maximum extent possible, for the dissemination of emergency information, advice, and action instructions to the general public."[119] The design of the infrastructure for the deployment of Emergency Broadcasting System messages did not accommodate non-English messages, however. Common Program Control Stations would, in theory, receive the Emergency Broadcasting System messages and send out a tone signal to other stations, who would then rebroadcast the messages. Common Program Control Stations were all English-language stations, and the messages were to be sent out in English. The Emergency Broadcasting System represents the government's most concerted effort to put out emergency public information directly to the people, and the lack of consideration for non–English speakers is notable, as it essentially requires that an alternate network of organizations make the material accessible.

That disaster response organizations would need to or would have trouble communicating with non-English speaking communities after Loma Prieta was not surprising. Reports before Loma Prieta on other California earthquakes in the 1980s had identified that the government had difficulty communicating with the Spanish-speaking population.[120] The vision of the "response" to the earthquake in disaster response planning documents theoretically included non-English speakers. For example, the State of California's Multihazard Planning Guidance instructed that the state should, "Provide EPI [Emergency Public Information] in foreign languages as required."[121] A blank form that was meant to be filled in with "Emergency Public Information Staff" giving name, office, work and home telephone numbers provided the following designation: "* (S) following name denotes Spanish speaking."[122] Furthermore, blank tables were provided for "translator services," to be filled in with names and contact phone numbers and addresses. Although the contact phone numbers for people who speak other languages were demanded, the "sample radio message" was given only in English. Occasionally there were indications in disaster preparedness materials

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119 City and County of San Francisco, *Multi-hazard Functional Plan,* 263.

120 The Southern California Earthquake Preparedness Project (SCEPP), "The Coalinga Earthquake Initial Steps Toward Recovery," SCEPP assessment Team Report. May 25, 1983. "DRAFT." Page 8. Department of Conservation, Records of the Division of Mines and Geology. Box 52 of 73. Folder: R118.109. California State Archives.

121 Office of Emergency Services, *Multihazard Functional Planning Guidance*, 162.

122 Office of Emergency Services, *Multihazard Functional Planning Guidance*, 171. Attachment A-6-C page 5. This annotation is also on the "Media Contact List," blank pages 191-195

that translations should be made available in other languages.[123] Examining plans to see whether there were provisions for non–English speakers makes it clear that although the intentions were good in the planning guidance, the follow-through for access to non–English speaking Americans did not exist in the State or San Francisco plans that I examined.[124]

Government Information Infrastructure for Latinos

An existing network of Latino organizations was an important resource for those who were living in the parks.[125] Whereas the organizations that supported the Latino community in Watsonville were utilized before the earthquake, unfamiliar government disaster aid programs were not. Salud Para La Gente, a community-based health organization, worked to translate English media and set up a clinic and "information booth" at the central Watsonville plaza where translation services were available to help with documents such as colored building tags.[126] The director of Salud, Barbara Garcia, said that the group set up an emergency treatment center near their office on the Watsonville city plaza within minutes of the earthquake to assist the injured. They were open 24 hours a day after that to assist people who were staying in Callahan Park, one of the unsanctioned parks, with medical and translation issues.[127] People in the shelters were not helpless— they assisted the people who ran shelters when they were allowed to, organized and supported each other.[128] Three days after the earthquake, Latino leaders held a rally in

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123 The Governor's Office of Emergency Services, SCEPP, BAREPP, "Campaign Plan for California Earthquake Preparedness Month," April 1988.

124 The instruction that the Public Information function includes "Ensuring emergency information is translated for special populations (non-English speaking, persons with disabilities)" appears in numerous BAREPP publications. "Comprehensive Earthquake Preparedness Planning Guidelines: City," Federal Emergency Management Agency, FEMA 73/May 1985. Earthquake Hazards Reduction Series 2. Developed by the Southern California Earthquake Preparedness Project. FEM1.25:2 p55; also BAREPP, "County Comprehensive Earthquake Preparedness Planning Guidelines."

125 Brenda Phillips and Mindy Ephraim, "Living in the Aftermath: Blaming Processes in the Loma Prieta Earthquake," Working Paper #80, Natural Hazards Research and Applications Information Center, Institute of Behavioral Science, University of Colorado, p. 10.

126 Subervi-Velez et al., *Communication with California's Spanish-Speaking Populations,* 62.

127 Barbara Garcia, Oral History.

128 Laird, "Ethnography of a Disaster"; Brenda D. Phillips, "Sheltering and Housing Low-Income and Minority Groups in Santa Cruz County After the Loma Prieta Earthquake," in *The Loma Prieta, California, Earthquake of October 17, 1989—Recovery, Mitigation, and Reconstruction*, ed. Joanne M. Nigg, United States Geological Survey

Watsonville's City Plaza. Based on an analysis of newspapers and interviews, a researcher wrote the following: "Our data suggest that this rally was, for many Latino residents, the first opportunity to learn of aid sources. The media indicated varying perceptions of Latino needs on the part of city officials. Community groups set up information tables at the rally, while the city did not provide any."[129] Barbara Garcia pointed out that FEMA and the Red Cross planned to work with the city and the county. This was a problem because the city government of Watsonville was not representative of the people who lived there. Despite having over 60% Latinos in the Watsonville population, the city had no Latinos on the city council. The city had been sued and was ordered by Supreme Court judges to redistrict—after the redistricting, all of the city council members lived in the same district. Garcia summed up the position of Salud within the Latino community: "We're a major player in this community in providing services to the Latino community. We are the power representation of it. We don't have it in the city council. We don't have it in the county. We don't have it anywhere. And so community-based organizations, Latino-based are the power brokers within the community."[130] Community groups were crucial for reaching out to the Latino community, because the city and county seemed to have little involvement with Latinos prior to the earthquake.

One of the authors of Watsonville's disaster plans acknowledged after the earthquake that groups such as Salud Para La Gente were integral to disaster response: "I only wish we had coordinated that prior to the disaster so we would have had a better handle on the capabilities our community had in dealing with those kinds of issues."[131] The City of Watsonville report also reflected the importance of coordination with local groups: "The coordination of services between government and community service agencies is very important."[132] The report went on to recommend the creation of community response groups that "need to include representatives who reflect the socioeconomic and cultural makeup of the community so that a variety of service needs are planned for."[133] Watsonville's post-disaster report fully

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Professional Paper 1553-D, (Washington, D.C.: United States Government Printing Office, 1998): D24.

[129] Brenda Phillips and Mindy Ephraim, "Living in the Aftermath," 4.

[130] Barbara Garcia, Oral History, 35.

[131] Gary Smith, Selby Mohr, Eileen Baumgardner, and Tom Struthers, "Watsonville's Ready with New Disaster Plan," *Western City* LXII, No. 8 (August 1986): 4-6. Gary Smith, Chief, Watsonville Fire Department and Emergency Services Director, quoted in Seismic Safety Commission, *Loma Prieta's Call to Action*, 18.

[132] City of Watsonville, "Report on the City of Watsonville," 89.

[133] City of Watsonville, "Report on the City of Watsonville," 94.

acknowledged that leaving out representatives of the Latino community had precipitated the struggles at Callaghan Park.[134]

FEMA opened Disaster Assistance Centers in Santa Cruz County where people could go and apply for disaster relief on October 22, 1989—five days after the earthquake.[135] Unfortunately for those located in Watsonville, the DAC "was located on the outskirts of the city. . . . The City had to organize a special transportation network form the Red Cross shelters to the center."[136] As people were trying or forced to move out of temporary shelters, they could apply to FEMA for rental assistance, but forms were often not available in English.[137] One kind of aid available was rental assistance. After the earthquake, homeowners were able to apply for three months of rent from FEMA, and renters were able to apply for two months of rent.[138] Forms were in English, and people required translators.[139] Spanish and English media both brought attention to the linguistic issues for aid seekers. Ultimately the Red Cross had to adopt more culturally appropriate services and employ a bilingual caseworker, and the city of Watsonville diversified their appointments for earthquake relief groups.[140] According to one anthropologist, "Spanish language instructions and assistance had not been readily provided by City Hall or by FEMA or by the Red Cross in the first days. Signs, from 'red tags' on houses to traffic changes, directions to FEMA and assistance, were not posted in Spanish."[141] According to the Federal/State Hazard Team report, the Office of Emergency Services and FEMA, did eventually provide equal access to all.[142]

Language was not the only factor causing difficulty in the ability of Latinos to access the system of FEMA aid because in some cases forms were not available in Spanish; in other cases, household composition was different

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134 City of Watsonville, "Report on the City of Watsonville," 96.
135 Robert C. Bolin and Lois M. Stanford, "Emergency Sheltering and Housing of Earthquake Victims: The Case of Santa Cruz County," in ed. Patricia Bolton,*The Loma Prieta, California, Earthquake of October 17, 1989 - Public Response*, United State Geological Survey Professional Paper 1553-B, (Washington D.C.: United States Government Printing Office, 1993): B46.
136 City of Watsonville, "Report on the City of Watsonville," 91.
137 Tuller, "Illegal Immigrants Can Get Aid"; John H. Cushman, "The California Quake; Tangle of Paperwork Snarls Path to Aid For Farm Workers and Shop Owners," *The New York Times*, October 25, 1989.
138 Bolin and Stanford, "Emergency Sheltering and Housing of Earthquake Victims," B46.
139 Phillips, "Sheltering and Housing Low-Income and Minority Groups in Santa Cruz County After the Loma Prieta Earthquake," D24.
140 Phillips and Ephraim, "Living in the Aftermath," 11.
141 Laird, "Ethnography of a Disaster," 58.
142 State/Federal Hazard Mitigation Survey Team, "Hazard mitigation opportunities for California," 25.

than what FEMA envisioned. The records required by FEMA to apply for certain kinds of aid were impossible for many people to obtain. "[M]ainstream definitions abounded in the eligibility components and in agencies' action to separate combined or extended families or households into separate nuclear families for processing."[143] The forms required proof of residence for 30 days before the earthquake; however, many people had been living in houses with other families because they couldn't afford to lease their own house, or because they lived with multi-family or multi-generational families under one roof.[144] This meant that many Latinos lacked the proof of residence necessary to obtain aid from FEMA.[145] These forms constituted part of the public information infrastructure implemented by government and quasi-government organizations.

Thus, Latinos were excluded of the formal response apparatus that was set up by the state not only because of linguistic reasons, but also because of culture and class. In theory, the disaster response apparatus is meant to help those who are affected by disasters (who are usually people from the poorest and most marginalized communities), but as with the 1906 earthquake, the disaster response was shaped by progressive ideology about who should be helped, and how they should be helped. Furthermore, as with the 1906 disaster, the job of the recovery experts was to restore people to their pre-disaster circumstances. Rather than divide aid equally between all of those affected by the earthquake, members of the middle class were restored to their pre-earthquake living conditions, whreas the very poor or transient were returned to the difficult conditions in which they lived, with little help from the government. In some cases in 1906, the housing provided by the government to individuals after the earthquake, even if it was only a tent, was the first residence of their own. In 1989, many of the same phenomena happened, where people who were eventually settled in FEMA trailers found themselves in their very first "homes."[146] Historian Ted Steinberg has referred to the "the federal disaster bureaucracy" as "the secret benefactor of the middle-class."[147]

It was clear that the way that FEMA defined an aid recipient often did not describe the people who needed actual housing aid from FEMA.[148] These

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143 Laird, "Ethnography of a Disaster," 118.

144 Laird, "Ethnography of a Disaster," 98-99.

145 Bolin and Sanford, "Emergency Sheltering and Housing of Earthquake Victims," B47.

146 Bolin and Stanford, "Emergency Sheltering and Housing of Earthquake Victims," B48.

147 Steinberg, *Acts of God,* 178.

148 "After the Loma Prieta earthquake, FEMA required victims seeking eligibility for temporary housing assistance to document the fact that they had lived at a particular location for at least 30 days. Victims who shared housing and those living in single

people, the elderly who lived on a fixed income, those who lived in units but were not on leases, and those at risk of being homeless by occupying some of the oldest and least well-kept buildings in the Bay Area, were left homeless by the earthquake and unable to get aid. Furthermore, because the cost of repairing the buildings they lived in would require the building owners to charge more for rent, the owners opted not to repair them. The Director of Emergency Services of Oakland described the sheltering system as

> a very middle-class system — never did anybody [think] that Mr and Mrs. Jones would be residents of a Single-Room Occupancy hotel. Like I told one reporter, 'This is not 'Ozzie and Harriet Go to the Shelter.' These are some real borderline people with some big problems.' I'm the first to admit that these people had social problems while they were residents of these hotels, but there *were* residents of dwellings in Oakland that were destroyed by the earthquake, so why should they not qualify for the same benefits as anybody else?[149]

These marginalized people essentially didn't fit the category of people needing housing that FEMA was trying to address—they didn't have the paperwork that was needed and were not helped initially. Advocates for the people affected by these policies eventually filed a lawsuit against FEMA and won $23.04 million to replace low-income housing (75% of which was to be paid by FEMA, the rest by the state).[150] This is one example of how the public information infrastructure for long-term recovery excluded the very poor. The pre-earthquake homeless population was also almost entirely excluded from the disaster response process. If the issue for the very poor was restoration of affordable housing after they left earthquake shelters, there was a question of whether pre-disaster homeless should even *be* in earthquake shelters. In Leigh

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room occupancy (SRO) units had problems meeting this residency requirement. According to local officials, (1) SRO residents often could not afford to stay in an SRO building for an entire month; (2) owners of SRO buildings often did not allow residents to stay longer than a full month, to prevent them from gaining tenancy rights; (3) residents sometimes shared a room with another resident and could not document their own tenancy; or (4) residents had difficulty getting documents from damaged buildings or former landlords. FEMA officials said that only 363 victims qualified for and received temporary housing assistance, out of 869 living units in 8 of the severely damaged SRO buildings in Oakland." GAO, *Federal, State, and Local Responses to Natural Disasters Need Improvement*, 55-56.

[149] Henry Renteria, Director of Emergency Services, City of Oakland, interview, "When the Going Got Tough," BAREPP, *Networks* 5, no. 1 (Winter 1990): 17.

[150] Seismic Safety Commission, *Loma Prieta's Call to Action*, 55.

Star's terms, these were the orphans of the information infrastructure, made invisible.[151]

After Loma Prieta, commentary about earthquake planning praised California for its preparedness, but identified problems with the long-term plans for restoring shelter and livelihood in the months after the disaster: "The lack of recovery planning in all jurisdictions is glaringly obvious. There are no preplanned programs, and all decisions appear ad hoc and characterized by linear thinking rather than systematic approaches."[152] Even when long-term recovery had been addressed in plans, they were not successful. San Francisco had conceived "One-stop disaster assistance" for disaster recovery, but this program was not successful in facilitating quick rebuilding.[153] The GAO report attests to this—FEMA had staffing problems because it didn't have enough people available to work, and also because the people that they had were rotated out too quickly.[154] Many of these reports echoed the idea that the most marginal and vulnerable members of society were the ones who suffered the most. The poorest people had the least resources to fall back on when aid was delayed, and were often the most reliant on public housing and shelter after a disaster.[155] The public information infrastructure constituted by aid forms reified the exclusion of Latinos and the very poor.

Conclusions

This chapter looked at the information infrastructure Californians made use of as an make sense of the Loma Prieta earthquake. I focused on the government's claim to informational authority. The government built notions of the public into the plans involving "public information." The public was assumed to be English speaking and living with a single family in a residence. The imagined public was revealed during the earthquake response.

The Loma Prieta earthquake showed that the government's vision of how the dissemination of public information would work was flawed. First,

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151 Paul N. Edwards, Steven J. Jackson, Geoffrey C. Bowker, and Cory P. Knobel, "Understanding Infrastructure: Dynamics, Tensions, and Design," Report of a Workshop on "History & Theory of Infrastructure: Lessons for New Scientific Cyberinfrastructures, " Ann Arbor, MI, (2007): 25.

152 Olson et al., "Socioeconomic Impacts and Emergency Response," 423.

153 City and County of San Francisco, *Multi-hazard Functional Plan*, 345 Enclosure A-8, "One Stop Disaster Assistance Center"; Comerio, "Hazard mitigation and housing recovery."

154 GAO, *Earthquake Recovery: Staffing and Other Improvements Made Following Loma Prieta*, Report No. GAO/RCED-92-141(Washington, D.C.: U.S. General Accounting Office, 1992).

155 Tierney, "Emergency Preparedness and Response," 112.

the government itself learned about the earthquake from the media, and did little to dictate to the media what the story should be. The media was in some cases looking for the best story, which meant providing a vision of the earthquake for a national audience. The reach of the information infrastructure meant that the audience that some media outlets envisioned was all of the United States, even the world. This led to a focus on San Francisco. The government's response was therefore shaped by the media's focus on San Francisco—and, once again, the nature of reach of infrastructure meant that the story that got told about the earthquake was not for people who were actually affected by it. Furthermore, the government's vision of how they would collect information didn't work because at the local level, people were focused on the work in front of them, and didn't have the resources to spend time reporting to higher levels of government. The disconnect between the regional and state levels of government and the municipalities who were trying to respond to what was happening on the ground was further reinforced by the technical infrastructure that didn't allow the receipt of incoming calls from Santa Cruz County. Still, the media frequently used the government as a source for the stories.

The disaster response apparatus and the media had a symbiotic relationship in which they both reinforced each other's centrality. The public information infrastructure in 1989 appears more diverse than in 1906 because there are available technologies such as television and radio, but in fact the mainstream media and the government in the days after the earthquake seemed to reinforce a singular narrative; in some cases, the diversity of sources almost reinforced the similarity of narrative. When all the sources were saying the same thing, it looked like assertions were verified using methods intended to root out truth. Meanwhile, some communities came up with creative workarounds to get past the shortcomings of the plan to channel information to the public through the media. Santa Cruz librarians staffed a "community information" phone line for the public. In Watsonville, Latinos relied on Spanish-language media and community-based organizations to provide an alternate information infrastructure to that of the mainstream media. In the conclusion, I considered how documents created by the public might be increasingly circulated by the public information infrastructure.

Conclusion

In 1857, where this dissertation began, printing was flourishing in California. People could obtain a printing press, and with relatively little skill, print just a few issues before shutting down. Furthermore, without professional disaster responders or scientists to explain the phenomena underlying earthquakes, many people could put forth their ideas about why an earthquake had happened. It was, to use a twenty-first-century phrase, "participatory media." Today, it is tempting to characterize the ability for many people to put forth their narrative of an event novel, but this is not the case. Sometimes people romanticize participatory practices, but the 1868 case should make it clear that having private citizens define events (in their own interest) is not optimal, either. Analysis of public information infrastructure suggests that there may be issues with a simplistic characterization of "participatory media." The four themes that I address in this dissertation seek to enrich ideas about participatory media and establish and elaborate on the idea of public information infrastructure, described below.

This dissertation advances public information infrastructure through an analysis of three different earthquakes in the San Francisco Bay Area. Researchers have developed the framework of information infrastructure to study scientists. Public information infrastructure theoretically includes all of the public, whereas information infrastructure has traditionally been used to analyze members of a group with commonalities that cannot be assumed in the public. Furthermore, research on information infrastructure has traditionally focused on the design of information infrastructure where this work on public information infrastructure attempts to understand more about how public information infrastructure works. Information infrastructure is said to have a number of attributes, which I introduced in chapter one, and discuss in my analysis below. For example, information infrastructure becomes *visible upon breakdown*, is built on *an installed base*, is *embedded* in institutions and social relations, embodied in *conventions of practice*, and has *reach*.

Throughout the dissertation, I identified four themes that advance the idea of public information infrastructure: continuity, reach, informational authority, and multiple infrastructures. Each theme has different implications for conceiving of a public information infrastructure, and in some cases for distinguishing a public information infrastructure from other information infrastructures. The theme of continuity grounds the idea of public

information infrastructure in the framework set up by information infrastructure researchers looking at scientists; it helps to justify information infrastructure as an appropriate and fruitful theoretical orientation. Findings about reach distinguish public information infrastructure from scientific information infrastructure. The themes of informational authority and multiple infrastructures point towards attributes of public information infrastructure that make *public* information infrastructure importantly different than the framework that is traditionally used to study information infrastructure for scientists. The four themes are not autonomous. They interweave, so, for example, aspects of informational authority help explain the implications of the reach of public information infrastructure.

(dis) Continuity

I look at whether disaster events can be understood as breaks in information infrastructure. I argue that people attempted to reconstitute aspects of infrastructure to ensure continuity; however, people had to improvise in interesting ways to reproduce the public information infrastructure. This question of continuity highlights how the information infrastructure framework is appropriate for the public (as opposed to groups of scientists) because it calls attention to stability and improvisation on information infrastructure's installed base. The idea of information infrastructure becoming visible upon breakdown is supported by my analysis of the 1906 earthquake and other disaster research which says that disasters are research sites where the "normal" becomes apparent.

Information infrastructure is made visible when it breaks down. The 1906 earthquake is a useful research site for looking at breakdown because there was so much physical destruction. The movement of the earth in 1906 and resulting fire injured obvious and visible aspects of the information infrastructure in San Francisco, making telegraph lines inoperable, ruining telephone exchanges, and burning printing presses and paper, city records, and libraries. Many people quickly mobilized to ensure the continuity of the information infrastructure. I argue that while there was great physical damage done to the information infrastructure, the work practices that enabled the information infrastructure endured. I used the example of the post office delivering telegrams to illustrate that the way people organized and labored. The post office endured the destruction of much of San Francisco, when the telegraph cables did not. San Francisco newspapers quickly improvised workarounds and found presses on which to print their newspapers. It is important to note that it was not just any organization that was able to establish continuous operation — the large San Francisco daily newspapers had deep pockets.

With people scattered all over the Bay Area, part of the way that

information infrastructure "works" was made visible: the way that infrastructures "know" where people are in time and space. People who were burned out of their houses advertised their new locations with signs, at registration bureaus, and in newspapers. These actions, particularly registering, enabled people to become visible within the information infrastructure. Maintaining information practices, such as being able to locate others, was a social imperative despite the rupture in physical technology.

The idea of an installed base has been used in information infrastructure research to describe infrastructure in the context of change—as a way to explain that a new technology cannot be simply dropped into an existing arrangement and have a desired effect. The installed base, understood as the information infrastructure before a disaster, shapes the manner in which people make use of information infrastructure after a disaster. Yet in 1989, the disaster plans did not seem to take into account the media's pre-earthquake practices—they expected the media to be channels for government information after the disaster, not that the media would do its own reporting. From the perspective of disaster response planners, the public information infrastructure's installed base limits and shapes what people do after an earthquake. In 1989, plans prescribing new practices were not instantly enacted for a specified effect.

The installed base provided opportunities for improvisation by those who used and made information infrastructure everyday. There are many examples of post-earthquake improvisations throughout the dissertation. In the 1906 earthquake people improvised on top of an installed base of technologies (material as well as organizational)—people, using the pen and paper available posted signs on walls looking for one other, a practice that is common in many modern disasters as well. The installed base of pen and paper made it possible for people to make signs attempting to search for each other. Another example of improvisation on an installed base is when the San Francisco newspaper companies printed newspapers in Oakland. The installed base includes technology such as the telegraph, printing press, or pen and paper; but as the work on information infrastructure makes clear, the installed base is also importantly the people, institutions and practice in relation with these technologies. After the 1906 earthquake, the post office sorted mail in the same way that it had before the earthquake even though many of the buildings were no longer there and the residents had moved. As the postmaster explained, they innovated new sorting techniques and auxiliary markings such as "burned out" on top of their old mail sorting system. After the 1906 earthquake, the the Red Cross refugee camp registration was based on the system used in the Chicago Fires in 1871 and the U.S. Census in San Francisco. Employing techniques from these earlier information infrastructures, the Red Cross was able to innovate and make a system that served the needs of the Red Cross in administering aid. In the 1989

earthquake, the installed base of the Emergency Broadcasting System did little to accommodate people who were not English speakers explicitly, but in San Francisco, the mayor's message was translated into a number of different languages—an improvisation on the Emergency Broadcasting System installed base. The librarians in Santa Cruz improvised a community information phone line. Some newspaper companies had to improvise to get their newspapers printed.

Considering the theme of continuity in this dissertation illustrates how ideas about information infrastructure that were used to analyze information infrastructure for scientists can also helpfully describe public information infrastructure in a post disaster environment. Examining public information infrastructure during times of disaster points to a narrative of continuity and stability of during events like earthquakes which might break physical infrastructure, as well as emphasizing what information infrastructure researchers have long known. Infrastructure is institutions and social practices – the source of much continuity in the face of physical discontinuity.

Reach

Reach is considered one of the defining qualities of scientific information infrastructure, but I argue that the implications of spatial reach should be reconsidered in a theory of public information infrastructure. Scientific information infrastructure describes people who generally have some commonality in purpose and educational background – not so when we consider the public Information infrastructure researchers say that infrastructure is learned as a part of membership. In the context of scientific work, reach is generally understood as an attribute of information infrastructure that facilitates collaboration between dispersed scientists or collation of data from disparate sources. I assume that public information infrastructure is used by a broad group of people – a wider audience than the public. Different communities can become visible to each other through the post, telegraph, radio and television—in some arguments information infrastructure facilitates a public. The public is sometimes defined by the nature of their access to the public information infrastructure. Benedict Anderson and Richard John have argued that the eighteenth- and early nineteenth-century newspapers and postal system allowed Americans to imagine that they were a community.

In 1868, people in San Francisco were thinking about how the earthquake would be received by people far away. The powerful San Francisco Chamber of Commerce put forth their narrative of what happened in a telegram. The Chamber of Commerce's telegram was ridiculed by some outside of San Francisco as transparently trying to underestimate the damage done in order to protect San Francisco's image for investors. Newspapers, in

some cases, fell in line with the Chamber of Commerce, publishing figures to support the Chamber of Commerce estimates. Other newspapers complicated the narrative by publishing sketches of the worst damaged buildings to be sent to friends in the eastern United States. The desire to dominate the narrative of what happened was importantly shaped by a faraway audience.

In addition to politics, the technical affordances of different information infrastructures are important for understanding the implications of reach. While the mail in 1868 had, in a sense, unlimited bandwidth, and was affordable to most people, the same was not true of the telegraph. Not everyone could afford to send a telegram; furthermore, not everyone could send a telegram because the telegraph operators and telegraph lines could not handle the traffic. Because only a limited number of telegrams could be sent, and these were received well before the letters and newspapers, which filled in details the Chamber of Commerce might have understood that the few telegrams sent immediately after the earthquake were likely to have great impact. I don't want to overstate the importance of speed of the telegraph because the telegraph was embedded in a set of social relations—the Chamber of Commerce was essentially given the green light by the local government to send the "correct" story – but the cost, speediness of the telegraph, and limitations of the telegraph bandwidth may have contributed to the Chamber of Commerce claims to informational authority. Similarly, in 1906, the telegraphic infrastructure could not handle the volume of telegrams. With the telegraphic infrastructure overloaded, people far away knew about the earthquake, but were unable to account for their loved ones because press companies were given priority to send telegrams. Furthermore, newspaper companies who published telegrams were able to be a central point for public information about the earthquake. Public news stories reached people before private accounts, was probably a configuration that continued through the 1906 earthquake.

The reach of infrastructure has implications for the documents that circulate, and potentially for how the event is portrayed. In 1868, elites downplayed the effect of the earthquake ostensibly for business reasons. In 1989, however, it might have been advantageous to do the opposite. The 1989 earthquake yielded unprecedented volume of donations to Red Cross relief funds. Furthermore, the federal government declared a state of emergency that made low cost loans available to people for reconstruction. The attention and empathy of people far away had benefits in 1989 that may not have existed in 1868. When earthquakes were less understood, however, the reach of infrastructure allowed people to ignore, and even deny, the earthquake. Attention from elsewhere made it more difficult for the federal and local government to let people suffer—they were forced to take action. The reach of public information infrastructure, and the type of infrastructure has an impact on how people make sense of an earthquake locally.

Informational Authority

The reach of infrastructure shaped claims to informational authority to explain the earthquakes. Claims to informational authority should be considered an important dimension of public information infrastructure. In traditional analysis of information infrastructure in the scientific realm, claims to informational authority are within the scientific community. In this dissertation, very diverse institutions make claims to be informational authorities—from the business elites in 1868 to the government professional disaster responders in 1989.

The production of documents about the earthquake was embedded in social relations. In 1868, the Chamber of Commerce endeavored to send out the "correct" story to their colleagues in the eastern United States with a telegram that downplayed the damage. Then the Chamber of Commerce set up the "Earthquake Committee," ostensibly to produce documents about the earthquake. Historians have explained that the relationship of the Chamber of Commerce and the San Francisco city and county government was such that private organizations (such as the Chamber of Commerce) would take charge of aspects of municipal affairs. In this way, the Chamber of Commerce claimed the authority to explain the earthquake. The assertion of power by the Chamber of Commerce does not mean that the people of San Francisco were dupes. While some newspapers conspired with the Chamber of Commerce, such as the influential *Bulletin*, many did not, especially the upstart *Chronicle*. Scholars suggest that when elites seek to dominate discourse, this can also be read as an indication that the public discourse was not what the elites hoped for.

After the 1906 earthquake, the newspapers had the resources to set up operations elsewhere and quickly ordered replacement presses and found space in San Francisco. The newspapers were a central place for people to advertise for missing friends, relatives, employees, or businesses. Large newspapers from other cities set up bureaus in the Bay Area where people who were affected by the earthquake could register for the sake of those in the hometown newspapers. In this sense, the centrality of the press was only reinforced by the earthquake; newspaper companies mediated private contact through personal ads and registration bureaus. To the extent that the earthquake precipitated new needs—for finding whereabouts of others, or just for descriptions of what had happened in other places—the crisis enabled the newspaper companies to assert themselves as informational authorities in the sense that they wanted to be a central place where people looked for people's personal information. Untangling the informational authority of different presses is a subject of future work.

In the 1989 Loma Prieta earthquake, government disaster officials claimed informational authority to put forth "public information" in disaster plans. This is a shift from earlier disasters in this dissertation, where the

government did not play a planned role in disaster response. The disaster plans said that the government would dictate "public information," and that the media would transmit these ideas to the public. After Loma Prieta, disaster response professionals communicated with and instructed the public using the television and print media, but the disaster professionals were often themselves relying on the media to understand the impact of the earthquake. In the context of this dissertation, it seems that those who claim the informational authority to describe earthquakes shifted from the private institutions, such as the Chamber of Commerce or newspapers of 1906, to public organizations, such as the government. However, claims to informational authority did not always work as planned.

This shift in who claims authority seems appropriate. People in 1868 looked to the local government for guidance about building practices, and the government in 1868 did not claim that authority. In terms of some kinds of "public information," however, perhaps there is another shift on the horizon—to those with mobile devices who can easily document their experiences, and with a working network, circulate their records. The public, the people on the ground who are affected by a disaster, are the first "first responders." Researchers have explained that survivors are most likely to carry out immediate search and rescue activities.[1] Similarly, "public information" about what has happened may be in the hands of the public. Although members of the public may not have the resources that many disaster responders have or the expertise of scientists, survivors are likely to have a good understanding of what the situation is on the ground and can claim informational authority.

The reach and affordances of the infrastructure raise epistemological questions about events. In a sense, there were many more ways of knowing about the 1989 earthquake than the 1868 earthquake. In 1906 telegrams that were broadcast by the newspapers told everyone of the horrible earthquake, there were also movies taken of San Francisco after the earthquake as well as plays reenacting what happened. In 1989, people far away from California watched the earthquake on the television. Today the quickest information technologies, such as mobile phones, are in the hands of whoever can afford them. If we push the argument about reach, it is tempting to say that all of the mobile devices in the hands of many people might make for a new infrastructural epistemology. My research cautions, however, that people in the 1860s also thought the reach and speed of the early telegraphic infrastructure would enable sharing of intelligence, and more peace and brotherhood amongst men. Unfortunately, the physical telegraphic infrastructure made no

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[1] James D, Goltz and Dennis S Mileti. "Public Response to a Catastrophic Southern California Earthquake: A Sociological Perspective." *Earthquake Spectra* 27, no. 2 (2011): 487-504.

guarantees for the quality of telegrams nor the identity or motives of the users. Furthermore, the desire to claim informational authority is embedded in complex social relations. Thus, even though it is possible for many people to claim the informational authority to tell about earthquakes using technologies like mobile phones, and the technical infrastructure in theory supports their ability to circulate stories, institutions may still claim authority. My research suggests that these institutions might be government officials.

Multiple Infrastructures

Those who claim to be informational authorities also implicitly define the public. The vulnerability approach asks researchers to notice how a person's ethnicity, class, or gender might shape their experience of disaster—implying a narrative of continuity and raising questions about the ability of infrastructure to reach across social class and linguistic groups. I suggested that the narrative of continuity prompts an information infrastructure researcher to consider how information infrastructure might shape people's differential vulnerability to a disaster. From the vulnerability perspective, the 1989 and the 1906 earthquakes both suggest that those who were transient, or didn't have housing (as defined by government officials) were often excluded from relief processes. In 1906, relief applications used addresses from before the earthquake to determine eligibility for aid.

Taking a vulnerability approach to analysis of information infrastructure draws attention to who is not included, or "orphaned" from information infrastructure. Analysis of the 1989 Loma Prieta Earthquake makes this point most clearly. Those who were not eligible for aid included those who lived in multi-family housing, and thus did not have their name on a lease; those who lived in temporary housing; or those who did not speak English. The vulnerability of certain groups was made visible when their status did not conform to what was expected from an earthquake aid recipient. The assumptions of the information infrastructure were embedded in the government institutions of the era. In the framing of disaster researchers, the breakdown (not necessarily of the information infrastructure) caused by the earthquake clarified this idea of "normal": those excluded from welfare initiatives before the earthquake continued to be excluded. In the framework of information infrastructure research, the 1989 example bends the definition of breakdown slightly—it was not just that the earthquake caused the infrastructure to literally break; aspects of the government's response were actually made visible when they were employed, because the planned response was broken.

Because some people were not included in the information infrastructure made by dominant institutions does not necessarily imply that there was no information infrastructure that underpinned the Spanish-speaking

public. A network of community-based activist organizations and the Spanish-language media supported Spanish speakers in Watsonville. These organizations served as intermediaries between the government response to the Loma Prieta earthquake and the Spanish-only-speaking population. The Spanish-language media and the community-based organizations did not simply translate, they also bought issues to the fore that were specific to the people they worked with. For example, the Spanish language radio stations enabled families from Central and South American diasporas to connect with people in their countries of origin, and the community health organization Salud Para La Gente drew Spanish-language media attention to the plight of people in Watsonville.

The perspectives of people in organizations such as Salud are in Oral Histories held in the archives of the University of California Libraries. Archives are also places where there are visibility issues. The fact that I am able to do any analysis about non-dominant groups fared after the earthquake reflects that people in the position to make stories visible (in this case community activists, journalists and researchers) actually did so. It may be tempting to conclude that the 1989 earthquake marks the first appearance of these multiple infrastructures. In 1868, there were possibly people who suffered disproportionately because of the earthquake but who were not included in the dominant narrative. The documentation practices in 1868 were different—there weren't researchers investigating the social implications of the earthquake as there were in 1989. The values of the people who were making records of the earthquakes in 1989 dictated that the experiences of all should be represented, not just that of the elites.

When I consider the sensemaking epistemology of events today, it is impossible not to take note of the remarkable ability for anyone in the United States with an internet-enabled cameraphone to circulate an image of an event globally. Although, as most researchers have found, audiences for an image or narrative of a disaster very much follows "old media" models where very few people have a large audience, and many social structures tend to be replicated online. As in the 1868 case, the promise of the new infrastructure does not ensure quality of the story being told. But the prevalence of internet-enabled cameraphones to document events could have serious implications for the idea of informational authority. In 1989, those who claimed informational authority, the government and the media, reinforced each other, but also were reinforced by the information infrastructure. Not everyone could broadcast images on a television station—this required expensive equipment, technical knowledge, broadcasting licenses and a number of other things. Examining the promises of new technical information infrastructure in light of the public information infrastructure approach brings important issues to light such as how people claim the informational authority to tell stories, and who is

included in the public.

The themes of informational authority and multiple infrastructures also point to interesting research problems going forward. First, the question of multiple infrastructures; interest in the experience of non-dominant groups has helped to promote research about these groups. Archival collections do not always reflect the diversity of experiences, however. Researchers have noted that the Internet has enabled multiple publics to exist online. Going forward, my research suggests that it will be important to provide archiving resources to groups of people whose interests are not always represented by those who claim to be the informational authorities or favored by archival practices.

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Note about Reference list:

This section lists references only to published work and theses and dissertations cited in the dissertation. It does not include references to archival records or periodicals used as primary sources. Please see the first appendix, the "Essay on Sources," for more details about the works that I consulted.

Appendix: Essay on Sources

My research method was to follow the idea of "archive as field site."[1] This essay is intended to provide more background about the specific sources, libraries, and archives that informed the research for each of the chapters about earthquakes.[2] As with all research, many of my favorite archival finds ended up on the cutting room floor, so this section is focused on the research that most contributed to the dissertation, though in this essay I make note of archives and helpful materials that may not have made it into the dissertation.

1868

Most of my sources for the 1868 chapter were newspapers. I used the California Digital Newspaper Collection to gain access to San Francisco's *Daily Alta California* and Sacramento's *Daily Union.* I accessed San Francisco *Daily Alta California*, Chicago *Tribune*, and the New York *Times* via ProQuest's Historical Newspaper Collection. For each of these newspapers, I had the generous assistance of Sam Ryan in transcribing all of the articles related to the earthquake for the week after the earthquake. I followed the conversation about the earthquake in all of these papers beyond the week after the earthquake, until the end of 1868, transcribing relevant articles. I also followed the earthquake story in a number of other newspapers on microfilm at UC Berkeley's Newspaper and Microforms collection and reading room: for San Francisco, I read the *Evening Bulletin* and the *Golden Era;* in Oakland, I read the *Daily Transcript*, and the *Daily News;* in Alameda County, I read the *Alameda County Gazette* from San Leandro*,* and the Alameda *Democrat*; in San Jose, I read the *Argus, Mercury News*, and *Daily Patriot*. Outside of the Bay Area, I read the *Mariposa Gazette* and the *Grass Valley Daily National*. Many of the articles from the *San Francisco Daily Morning Call* were on the San Francisco Virtual Museum

[1] Mary Des Chene. "Locating the past." In *Anthropological Locations: Boundaries and Grounds of a Field Science*, edited by Akhil Gupta and James Ferguson. Berkeley, CA: University of California Press, 1997.

[2] This is not a list of all sources consulted or a complete historiography of each earthquake—it is merely my reflection on the primary and, in some cases, secondary sources that helped me.

website. I read the paper version of the *Commercial Herald and Market Review* at the San Francisco Public Library. I found helpful periodicals using finding aids from the San Francisco Public Library and Historical Newspapers Online (by Chadwyck-Healey). I accessed articles online via the Times Digital Archive and ProQuest's American Periodical Series Online. Some random articles were accessed from collections of clippings housed in the various archives. While I read the story of the earthquake in most newspapers until the end of 1868, for the work of the Earthquake Committee, I followed the stories in the Sacramento *Daily Union,* the *Daily Alta California* and the *Daily Morning Chronicle* until the results were presented to the Chamber of Commerce in 1870.

The newspapers of this era printed many different types of artifacts—they printed conventional articles and advertisements, but also notices from government officials, telegrams, letters (addressed to random people as well as to the editors), and reports from other newspapers. Newspapers of this era did not usually attribute the articles they published to reporters. Sometimes letters from correspondents were signed with initials, or "Observer." Frequently, reports from other towns were directly copied from the town's local newspaper; oftentimes these newspapers were acknowledged. In a few instances, I quote from newspapers quoting other newspapers—I made note this, and tried to find another source with a similar quote.

Newspapers from this era are notorious for interpreting stories in whatever manner they saw fit, and were enormously frustrating to work with at times. Wollenberg's analysis makes it clear that the San Francisco *Evening Bulletin* was the most pro-business.[3] On the other end, the San Francisco *Daily Morning Chronicle* was the most "sensational," having been started only a year earlier by the teenage de Young brothers.[4] The *Daily Morning Chronicle* also seemed the most willing to deviate from the story that the business elites espoused, be it in making a newspaper with illustrations of the most damaged areas, or printing damage estimates before the Chamber of Commerce came out with theirs. The *Daily Alta California* was the oldest California newspaper, and printed government notices, giving it an aura of stability and public interest. Of the newspapers that I examined closely, the *Sacramento Daily Union* presented the most distinctive story of the earthquake. This was quite helpful.

A number of papers and books informed my background understanding the telegraphic infrastructure in California and it's relationship to the press.[5]

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[3] Charles Wollenberg, "Life on the Seismic Frontier: The Great San Francisco Earthquake (Of 1868)." *California History* 71, no. 4: 494-509.

[4] John Bruce, *Gaudy Century: The Story of San Francisco's Hundred Years of Robust Journalism* (Random House: New York. 1948)

[5] Robert J. Chandler, "The California News-Telegraph Monopoly, 1860-1870," *Southern California Quarterly* LVIII, no. 4 (1976): 459-484; Richard B. Kielbowicz, "News Gathering by Mail in the Age of the Telegraph: Adapting to a New Technology," *Technology and Culture* 28, no. 1 (1987): 26-41; Richard B. Kielbowicz,

Almost a decade before the 1868 earthquake, the U.S. Congress passed the Pacific Telegraph Act of 1860, and the cross-country telegraph was completed in 1861.[6] The telegraphic infrastructure that had connected parts of California now was also connected with the rest of the United States. The local California press celebrated the new infrastructural addition to California, "the lightning has annihilated a continent as an obstacle to *intellectual communication*."[7] These declarations were not new or specific to California. Popular rhetoric imagined that the telegraphic infrastructural improvements would mean unconstrained public understanding and communication. In reality, the telegraph was expensive, monopolized, and fell short of the goal of facilitating a public sphere. By 1866 much of the cross continental telegraphic network was owned by the Western Union, which charged high prices to use the telegraph network, making it mostly useful to businesses. But, it was also extremely important to newspapers, particularly dailies, which thrived on national news. Western Union had a cozy relationship with the Associated Press, and gave members of this association a favorable rate.[8] In California, the *Sacramento Daily Union*, and in San Francisco, the *Daily Alta California* and the *Evening Bulletin*, were sharing news digests before the cross-country telegraph was even deployed, delivered from the edge of the telegraph network in St. Louis to San Francisco via the Pony express.[9] These newspapers became known as the California Associated Press and received dispatches from the Associated Press.[10] These three newspapers apparently enjoyed exclusive access to

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News in the Mail: The Press, Post Office, and Public Information, 1700-1860s (Westport, CT: Greenwood Press, 1989); John Denton Carter, "Before the Telegraph: The News Service of the San Francisco Bulletin, 1855-1861," *Pacific Historical Review* 11, no. 3 (1942): 317; John Denton Carter, *The San Francisco Bulletin, 1855-1865: A Study in the Beginnings of Pacific Coast Journalism* (PhD dissertation, University of California, 1941); Richard Schwarzlose, *The Nation's Newsbrokers: Vol. 2, The Rush to Institution, from 1865 to 1920* (Evanston IL: Northwestern University Press, 1990);

[6] Richard R. John, *Network Nation: Inventing American Telecommunications*, (Cambridge MA: Belknap Press of Harvard University Press, 2010): 98; William F. Zornow, "Jeptha H. Wade in California: Beginning the Transcontinental Telegraph," *California Historical Society Quarterly* 29, no. 4 (1950): 345-356.

[7] "The Work is Consummated," *Sacramento Daily Union*, October 25, 1861.

[8] Richard Schwarzlose, The Nation's Newsbrokers: Vol. 2, The Rush to Institution, from 1865 to 1920. Evanston IL: Northwestern University Press, 1990.

[9] Kielbowicz, *News in the Mail*, 174.

[10] Schwarzlose includes the *San Francisco Morning Call*, in the list of Associated Press newspapers because a controlling stake of the *Call* was owned by Simonton, the owner of the *Bulletin*, who also had a financial stake in the *New York Times*, but also by Fitch and Pickering, who acquired the Call in 1869. Schwarlose, *The Nation's Newsbrokers*; Carter, *The San Francisco Bulletin*, 1855-1865, 243.
Apparently, Western Union raised their prices for the non-Associated Press newspaper, the *Herald*, from 6.92 cents per word to 15.38 cents per word. Meanwhile,

Associated Press dispatches, but these dispatches were "stolen" by other newspapers such as the *San Francisco Daily Morning Chronicle*.[11] Many of the same telegrams appeared in different newspapers, regardless of affiliation with California's Associated Press. Still, the next year Henry George mounted an attack on Western Union for giving newspaper companies in the Associated Press favorable rates.[12] Although I found little evidence to suggest this in the course of my dissertation, I suspect that considering more newspapers throughout the United States might make the implications of these telegraph alliances for earthquake reporting more obvious.

Other than newspapers, the chapter about the 1868 earthquake chapter makes use of letters, imagery, and documents as well. I found letters about the earthquake at the San Francisco Public Library, the California Historical Society, The Society of California Pioneers, and at UC Berkeley's Bancroft Library, using the available finding aids, and assistance from many helpful librarians and archivists. I was surprised and grateful to find a number of visual resources related to the earthquake. In the process of digitizing thousands of documents and photographs related to the 1906 earthquake, the Bancroft Library and other participating organizations digitized much of the material they had available about the 1868 earthquake. Photographs of the damage from the 1868 earthquake are available at the Online Archive of California. The Society of California Pioneers had a number of resources related to lettersheets. Their copies of the illustrated newspaper editions were invaluable. Tobriner's *Bracing for Disaster* has a number of the photographs from Bancroft's collection, with his markups and analysis.[13] The California Historical Society had some useful documents related to the background of San Francisco's Chamber of Commerce that I didn't find reference to elsewhere, such as "One Hundred Years of Service: San Francisco Chamber of Commerce 1850-1950."

The California Academy of Sciences librarians were kind to let me work with the precious *Meeting Minutes* — most of the other records of the Academy were destroyed in the 1906 Earthquake and Fire. I used the *Proceedings of the California Academy of Sciences* in Berkeley's library. A book by Theodore Henry

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the California Associated Press newspapers (*Bulletin*, *Alta*, *Times*, and *Union*) went from 2.04 to 1.028 per word. "This is a conspiracy against a conservative paper to-day. To-morrow it will be against a Republican paper, if the California Associated Press desire and decree." The Herald Company included the *Times* in the list of the newspapers that were part of the California Associated Press. "The Postal Telegraph System," Daily Herald Postal Telegraph Series, Document No. 1, (San Francisco, CA: Herald Publishing Company, Aug., 1869): 4.

[11] Bruce, *Gaudy Century*, 132.

[12] Henry George, "The Western Union Telegraph Company and the California Press," Atlantic Bureau, *San Francisco Herald*, New York, April 21, 1869. Bancroft Library.

[13] Stephen Tobriner, *Bracing for Disaster: Earthquake-Resistant Architecture and Engineering 1838-1933* (Berkeley, CA: Heyday Books, 2006).

Hittell, *The California Academy of Sciences: A Narrative History 1853-1906*, gives much of the history of the Academy from the Proceedings and the meeting minutes. It was edited by California Academy of Science researchers Alan E Leviton and Michele L Aldrich and contains helpful notes.

There are huge limitations to the sources used. In some cases, the limitations are obvious—it seems that many of the records of the Earthquake Committee are lost. Unfortunately, other limitations are harder to even know. It is hard to find the complexities of multiethnic 1868 California in the newspaper stories about the earthquake. I am trying to use the archives to make sense of how people understood the earthquake bringing in my own twenty-first-century perspective, so it is with humility that I approach my subjects. Still, the attitude toward, for example, female Californians, was an enactment of the current cultural climate then that seems a bit repulsive now. The records are also limited by the collecting proclivities of the past, an artifact of the institution of archives. The documents available in the archives focus on the records of the dominant (generally English-speaking Caucasian) classes. While newspapers make mention of, for example, German-speaking newspapers, these non-English are harder to locate. Other chapters argue for a consideration of multiple infrastructures supporting multiple publics, but I didn't have the sources to investigate this argument in this chapter. The evidence available makes the fictional past monoculture easy to believe and perpetuate; that my dissertation does not provide a richer story is something for which I am sorry.

1906

The 1906 earthquake and fire are remembered in part because of the huge amount of damage, the number of people displaced, and a sensational press eager for a story. In the context of this dissertation, there is a question of whether the activities after the catastrophe were new, in the sense that they were different than other post-earthquake experiences in the State of California. There are certainly similarities—the sudden need to locate and notify loved ones was visible in the letters of 1868, and in the rush of Eastern Californians to San Francisco to see their friends and family. The scale of the 1906 disaster was so much larger than anything before it, however, and this is reflected in the historical record. In some sense, it was so much larger than anything imaginable that it is unfair to include it in a story about earthquakes in California. Still, even though the scale was different, there is a lot that is familiar in the case of 1906, and I make the case that when the information infrastructure was destroyed, the effort was to reproduce it.

Accordingly, many records of the disaster were accrued by all of the parties who were involved with the response. Perhaps the most impressive example of this modern institutional reflexivity is in the title of an official "Subcommittee on History and Statistics," which was appointed immediately after the earthquake. Although **they** are frequently referenced in 1906 records, the collection of materials assembled by **them** apparently disappeared. Some records were intentionally destroyed, such as that of the Red Cross and Associated Charities.[14] After the earthquake, many organizations published reports about their activities during the disasters including the major constituents involved with relief activities: military, the Red Cross, and the civilian elites in charge of the Finance Committee; many other fraternal or charitable organizations issued reports on the activities of their members. Some of these reports have been treated with suspicion by researchers in the twenty-first century—they are opportunities for institutional aggrandizement. A notable exception is *The California Earthquake of April 18, 1906. Report of the State Earthquake Investigation Commission in Two Volumes and Atlas* (what is now called "The Lawson Report") by a coalition of California seismologists, published by the Carnegie Institution. Today, it is remembered as the first in-depth American study of an earthquake, and an important landmark for California seismology. The volume of material produced by various institutions about the earthquake is illustrative of the massive number of people involved in the disaster response. This bibliographic insight tells us not just about the number of people involved, but as many scholars argue, it also tells us about the Progressive mood of the era—a focus on record-making. The crowning achievement of Progressive social ideals is the Russell Sage Foundation report called "The San Francisco Relief Survey: The Organization and Methods of Relief Used After the Earthquake and Fire of April 18, 1906." It is a comprehensive analysis of the relief project from the perspective of Progressive reformers.[15]

This chapter of the dissertation was also greatly aided by newspaper articles. From the perspective of the twenty-first-century researcher, newspapers provide an invaluable record, used in many popular and academic accounts. However, as my chapter described, some newspapers were involved with other Bay Area elites in re-branding the "San Francisco Earthquake and Fire" as the "San Francisco Fire" to protect their (and others') ability to collect on their fire insurance. Furthermore, newspapers during this period had a reputation for sensationalism and muckraking. The newspapers were not always reliable as sources for anything but documenting what newspapers said.

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[14] Andrea Davies Henderson, "Reconstructing Home: Gender, Disaster Relief, and Social Life After the San Francisco Earthquake and Fire, 1906-1915" (PhD Dissertation, Stanford University, 2005).

[15] Kevin Rozario, "Nature's Evil Dreams: Disaster and America, 1871-1906" (PhD Dissertation, Yale University, 1996): 209-210.

A distrust of the newspaper might lead one to focus on letters and personal accounts describing the disaster, but these also must be read with an eye to ideological and political campaigns, because ordinary citizens were invited to participate in the re-branding campaign. At UC Berkeley's Newspaper and Microforms collection and reading room, I read the *San Francisco Bulletin*, *Oakland Tribune*, and *Oakland Herald* from April 18, 1906, the day of the earthquake, through six weeks after the earthquake, or until reporting on the registration and listing of personals ceased. I again made use of the "Chronicling America" project by the Library of Congress for newspapers outside of California such as the *Washington Post*. California Digital Newspaper Collection (CDNC) provided access to the *San Francisco Call* and the *Los Angeles Herald*. I searched ProQuest to access the *San Francisco Chronicle* as well as the *Los Angeles Times*, *New York Times* and *Chicago Daily Tribune*. This meant that I read most of what two of the most popular San Francisco dailies wrote.[16] I used a combination of reading and search to find articles on topics of interest to me (I used search only when I became comfortable with the appropriate terminology to form search queries). The ProQuest database was better for search because I believe the articles were transcribed by people, as opposed to the CDNC, which used optical character recognition technology that was not always accurate. At Berkeley's East Asian Library, I found the microfilm of *Chung Si Yat Po* and my colleague Elisa Oreglia and her partner helped with translation.

For this chapter, I relied on a wide variety of documents such as photographs, reports and archival materials. I didn't favor one type of source over another—anything that gave evidence of registration or other means of accounting for other people. My somewhat narrow focus on notification about well being and registration helped narrow down the relevant documents. I made use of materials at many of the same archives as the 1868 earthquake including the Bancroft Library, California Historical Society, San Francisco Public Library, and the Society of California Pioneers Library. At the San Francisco Public Library, I used the records related to Gladys Hansen's efforts to count the dead. I also found the collection of scrapbooks from the era to be interesting—people kept wonderful sets of clippings related to their experience of the earthquake. Last, I looked at the McEnerney records to learn about how burned city records were dealt with—this did not make it into the dissertation. At the Bancroft Library, I was helped a great deal by the box of recollections of the earthquake by Berkeley students in 1919. The students' recall is certainly not perfect or reliable. However, their writing did give me a sense of how

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[16] "At the time of the great earthquake and fire in 1906 the reported circulation of the Examiner was 98,000 as opposed to 80,000 for the Chronicle and 62,000 for the Call." from: "About the San Francisco Call," Chronicling America, Library of Congress. Last accessed online May 1, 2012: http://chroniclingamerica.loc.gov/lccn/sn85066387/.

families experienced or found out about the earthquake. At the Bancroft Library, I also found the records related to the Berkeley Relief Committee to be particularly helpful. One folder of this collection contained many slips of paper with notes about people looking for others as well as correspondence about the well being of people or families. At the Society of California Pioneers, there was an excellent set of reports from after the earthquake. I was lucky to be able to examine ephemera such as scrapbooks of telegrams, relief station meal tickets, and pamphlets distributed after the earthquake. At the National Archives in Washington D.C., I examined the Army's records related to their response to the earthquake—unfortunately, much of this work was cut from the dissertation. At the National Archives in College Park, Maryland, I worked with the photographic records of the Signal Corps, and the correspondence about the 1906 earthquake to the Department of State. Also in College Park, I worked with records of the Red Cross and found these helpful.

My work at the libraries and archives was complemented by an online archive. The Bancroft Library, the Society of California Pioneers, the California State Library, and the California Historical Society put many of their artifacts related to the earthquake on the Online Archive of California.[17] Chris McDonald, Bancroft Library Pictorial Archivist, gave invaluable guidance in navigating the collection of over 8000 digitized photographs of the earthquake. Most of the work digitizing artifacts was done with the earthquake centennial in mind, and I feel fortunate that I have been able to use it in my work.[18]

Many secondary sources attempt to summarize the earthquake or mine it for profit. There were 82 popular books written about the 1906 earthquake for popular consumption immediately after the earthquake.[19] These books were generally more sensationalized and some people never actually visited the earthquake site.[20] The popular works have been used by twenty-first-century historians as examples of pop-culture renditions of the earthquake. A number of other popular accounts were published since the earthquake.

Books that are written today for a popular audience have mixed value for my work. Amongst scholars, it seems the most well regarded popular

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[17] "Bancroft Library Presents 1906 Earthquake and Fire" http://bancroft.berkeley.edu/collections/earthquakeandfire/.

[18] Many dissertations and books were published around the time of the centennial that would have benefited from the Online archive.

[19] Ted Steinberg, "Smoke and Mirrors: The San Francisco Earthquake and Seismic Denial," in *American Disasters*, edited by Steven Biel, (New York, NY: New York University Press, 2001): 103-128.

[20] Philip Fradkin, "The Culture of Disaster," in *The Great Earthquake and Firestorms of 1906: How San Francisco Nearly Destroyed Itself* (Berkeley, CA: University of California Press, 2005).

account is Gladys Hansen and Emmett Condon's *Denial of Disaster*.[21] For me, the popular books were initially helpful pointers to the existence of certain sources. Some books, such as Baker's *Three Fearful Days,* Schwartz' *Earthquake Exodus,* and Bronson's *The Earth Shook and the Sky Burned* are amazing compilations of resources. Postal enthusiast Randy Stehl's research describing artifacts related to the post office, and his analysis of post offices in the burnt districts was extremely helpful. It can be quite difficult to draw a hard line between "popular" accounts versus scholarly "historical" accounts. Philip Fradkin's book *The Great Earthquake and Firestorms of 1906: How San Francisco Nearly Destroyed Itself* was one of many published in anticipation of the earthquake centennial.[22] Fradkin examined politics of the elites in the earthquake response in San Francisco, and also summarized the impact of the earthquake on different ethic communities. Fradkin was a consultant on Bancroft Library's 1906 Centennial digitization project and clearly knowledgeable about the archival sources available. It is the most complete work that looks at politics in San Francisco, and served as a useful guide to the sources (particularly the digitized sources). The reception of the Fradkin book was mixed among historians—most complimented his sources and analysis of the experience of different races and classes, but criticized his analysis of Progressivism, and even characterized his work as populist muckraking.[23]

Two recent dissertations by Andrea Davies Henderson and Joanna Dyl were extremely helpful for the analysis of the experience of the poor during the earthquake, especially how the poor handled the relief system. In their

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[21] This book, and the work of Gladys Hansen on counting the dead, are cited by Ted Steinberg, Joanna Dyl, and Andrea Henderson.

[22] Popular centennial accounts of 1906 include Simon Winchester, *A Crack in the Edge of the World: America and the Great California Earthquake of 1906* (New York, NY: HarperCollins, 2005), and Dennis Smith, *San Francisco Is Burning: The Untold Story of the 1906 Earthquake and Fires* (New York, NY: Penguin Viking, 2005).

[23] Jeff Wiltse, "Review: The Shame of San Francisco," review of *The Great Earthquake and Firestorms of 1906: How San Francisco Nearly Destroyed Itself* by Philip Fradkin, *Reviews in American History* 33, no. 4 (2005): 545-552; James J. Rawls, "Review," review of *The Great Earthquake and Firestorms of 1906: How San Francisco Nearly Destroyed Itself*, by Philip Fradkin, *The Western History Association Review* 38, no. 1 (2007); Mary Ann Irwin, "Review," review of *The Great Earthquake and Firestorms of 1906: How San Francisco Nearly Destroyed Itself* by Philip Fradkin, *Pacific Historical Review* 75, no. 4 (2006): 679-680.

Joanna Dyl was largely complementary of Fradkin but rightly says that Fradkin, "begins from the premise that the earthquake demonstrates the ability of nature to 'significantly alter history and human destinies.' [quoting from Fradkin, page xvii]. However, nature largely drops out of Fradkin's history as he delves into the political manipulations of the relief, rebuilding, and graft trials . . . Fradkin's accounts of both the circumstances leading up to the earthquake and citizens' efforts to restore San Francisco to its former glory remain largely top-down." Dyl, "Urban Disaster," 13.

dissertations written in 2005 and 2006, these historians said that none of their own has published the definitive 1906 account, with the exception of Erica Pan's monograph *The Impact of the 1906 Earthquake on San Francisco's Chinatown*.[24]

Fradkin, Pan, Henderson, and Dyl provided much of the broad background on the earthquake for me. Additional journal articles, and book and dissertation chapters covered specific topics related to the earthquake.[25] Jones included chapters on the 1906 earthquake in her dissertation about the American Red Cross.[26] Sun wrote about *Chung Sai Yat Po*, the Chinese San Francisco daily newspaper that was produced after the earthquake.[27] She provided background on the newspaper company. Rozario also incorporated some of his dissertation into the book *Culture of Calamity.*[28] For example, scholars have explored different social groups in San Francisco, the economic impact of the earthquake on the local and American economy, seismic analysis of the San Andreas Fault, and policy.[29] Steinberg and Rozario have dealt with

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[24] Recent dissertations are helpful for reviews of literature, as these type of analyses rarely make it into books. I somewhat defer to the judgment of Dyl and Henderson on the historiography of the 1906 earthquake and fire in this review. Here is Dyl's assessment of books specifically about the 1906 earthquake: "However, none represent a scholarly analysis of the disaster from the perspective of an historian." Joanna Leslie Dyl, "Urban Disaster: An Environmental History of the San Francisco After the 1906 Earthquake" (PhD dissertation, Princeton University, 2006): 13.Henderson summarizes: "A full academic historical account of the 1906 catastrophe, however, has yet to be published. Instead, scholars have examined the disaster to address questions ranging from post-disaster urban development to popular conceptions of catastrophe." Henderson describes the "instant histories" produced after the earthquake, which promoted the narrative of a "thrilling tale of catastrophe with the prediction of resounding urban recovery," Henderson, "Reconstructing Home," 11-12.Both Henderson and Dyl note that Pan's work is an exception to the dearth of historical work on the earthquake. Erica Pan, *The Impact of the 1906 Earthquake on San Francisco's Chinatown* (New York, NY: P. Lang, 1995).

[25] Much like I do in this dissertation!

[26] Jones, Marian Moser, "Confronting Calamity: The American Red Cross and the Politics of Disaster Relief, 1881-1939" (PhD Dissertation, Columbia University, 2008).

[27] Yumei Sun, "From Isolation to Participation: Chung Sai Yat Oo [China West Daily] and San Francisco's Chinatown, 1900-1920" (PhD Dissertation, University of Maryland, College Park, 1999).

[28] Rozario, "Nature's Evil Dreams,"; Kevin Rozario, *The Culture of Calamity: Disaster and the Making of Modern America* (Chicago, IL: University of Chicago Press, 2007).

[29] Analysis of social groups: (e.g. Douglas Anderson, "'A True Revival of Religion': Protestants and the San Francisco Graft Prosecutions, 1906-1909." *Religion and American Culture* 4, no. 1 (1994); Pan, *The Impact of the 1906 Earthquake on San Francisco's Chinatown*; Sun, "From Isolation to Participation"; Henderson, "Reconstructing Home" ; economics (e.g., Kerry A. Odell, and Marc D. Weidenmeir, "Real Shock,

the 1906 earthquake in chapters of their own books, and an edited volume, "American Disasters."[30] A number of dissertations focus on aspects of the 1906 earthquake pertinent to this chapter. Last, Geschwind and Tobriner both address changes in the fields of seismology and architecture as a result of the earthquake. Geschwind examine how Californians have dealt with seismic risk in policy; Tobriner examines it from the perspective of engineers and architects.

1989

I centered my analysis of the 1989 Loma Prieta Earthquake on government documents. For that reason, the archives I visited were quite different than the archives I used for the 1906 and 1989 earthquakes. I used the Institute for Government Study at UC Berkeley, the Government Documents Library at Stanford, the California State Archives, and the California State Library extensively to access government related documents. At the California State Archives, I worked with the records from the Governors' Board of Inquiry, which was mostly concerned with structural engineering issues. I also looked at the records for the Seismic Safety Commission, to the extent that they were available, as well as the records from the Division of Mines and Geology.[31] Additionally, I could not have done this chapter without Inter-Library Loan. Although I started using it quite late in my dissertation work, the HathiTrust online document archive also had several documents that I needed to access.[32] I used LexisNexis and Newsbank to access newspaper articles related to Loma Prieta.

I looked as as many planning documents as I could get my hands on. I found plans that were in place: at the Federal level, "Federal Response to a Catastrophic Earthquake"; at the State level, the "State Emergency Plan," and the "Multi-Hazard Functional Planning Guidance," which was influential to

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Monetary Aftershock: The 1906 San Francisco Earthquake and the Panic of 1907," *The Journal of Economic History 64*, no. 04 (December 1, 2004): 1002-1027); Seismic analysis: (e.g. *Bulletin of the Seismological Society of America*, B.T. Aagaard and G.C. Beroza, eds. "The 1906 San Francisco Earthquake a Century Later: Introduction to the Special Section." *Bulletin of the Seismological Society of America* 98, no. 2 (April 1, 2008): 817-822.).

[30] Ted Steinberg, "Smoke and Mirrors: The San Francisco Earthquake and Seismic Denial" and Kevin Rozario, "What Goes Up Must Come Down," in *American Disasters*, Steven Biel, ed., 103-128. New York, NY: New York University Press, 2001; Ted Steinberg, *Acts of God: The Unnatural History of Natural Disaster in America*. 2nd Ed. New York, NY: Oxford University Press, 2000.

[31] The OES records from 1989 have not yet been accessioned.

[32] The HathiTrust "classification" system was not very useful; I used the library finding aids to find the names of documents, and then used the HathiTrust search.

state and local disaster plans; at the local level, I examine San Francisco's "San Francisco Multi-hazard Functional Plan."[33] I also worked with a number of documents from California's Seismic Safety Commission. The vision of "public information" in these disaster response plans that were used in the immediate aftermath of the Loma Prieta earthquake were a product of the civil defense-era plans and thinking with their emphasis on the public as receivers and the media as transmitters of the government's message. I did quite a bit of research on Civil Defense era planning at the National Archives in College Park, Maryland and at the California State Archives that was not included in this dissertation, but will hopefully be the subject of future work.

Major modern organizations whose purpose is to respond to disasters produced reports that not only sought to explain what happened, but also to examine their own performance. Ostensibly to satisfy demands for accountability and learn lessons, these reflective documents can also serve as promotional vehicles for these organizations, so it is unclear how objective the analysis contained in the documents is, although a "god-eye" [omniscient?] voice is often used. I used these reports produced by the government, to reflect on the official disaster response. The analysis of what did and didn't go well, from the perspective of the government officials, was useful in that it made their expectations about what "should" happen clear.

Different governments at the federal, state, and municipal levels produced reports about the earthquake. These reports focused on a range of government activities after the Loma Prieta earthquake. I selected a subset of documents for analysis, reading them with a specific focus on different aspects of public information infrastructure, especially on government information. At the local level, not every constituency completed reports, and in some constituencies, different agencies created reports. I focus here on reports from the local, state and federal levels that had the most details about the earthquake that might inform public information infrastructure analysis. The report from the California State agency, the Seismic Safety Commission, *Loma Prieta's Call to Action,* included results from six panels in California, also included reports from six municipal or county organizations. The local report from the city of Santa Cruz was the most complete, though I also used Watsonville, Oakland, and San Francisco reports, included in the Seismic Safety Commission report.[34] There were reports from San Francisco and Oakland online at the San Francisco Virtual Museum as well. Although no federal organizations attempted to generate a complete report of their activities after the Loma

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[33] I chose to examine San Francisco's plan because it was the only local disaster plan that I was able to access in its entirety that I thought had been updated before 1989, and was in use during Loma Prieta. I appreciated the staff at the Institute for Government Study Library at Berkeley for their help.

[34] Richard C. Wilson, "The Loma Prieta Quake: What one city learned," International City Management Association.

Prieta Earthquake, the Government Accounting Office (GAO) had three requests from congress to complete reports related to Loma Prieta. The first of the GAO reports looks at the collapse of the Cypress Expressway and the Bay Bridge, and determines that while Caltrans did not know about the structural flaws in the Bay Bridge, they did know about the Cypress Expressway and could have spent money to fix it.[35] The other two reports focus on the Federal response to the earthquake, with particular attention to the Federal Emergency Management Agency (FEMA) and the recovery of buildings and housing.[36] There was a report from the State/Federal Hazard Mitigation Survey Team that looks at the immediate aftermath of the earthquake, focusing on the geotechnical and structural aspects of the earthquake, that I examine.[37]

A second kind of report was produced by researchers, who were often employed at universities. Disaster response researchers were involved in producing reports and documentation, often funded by the federal agencies such as the U.S. Geological Survey (USGS), the National Science Foundation, or the National Research Council, describing what had happened after the earthquake. One researcher observed:

> Because of the large number of researchers involved, the comparatively large amount of funding that was provided, and the size and sophistication of many of the studies that were undertaken, there are probably more data available on the Loma Prieta earthquake than on any other disaster. Efforts such as the National Clearinghouse for Loma Prieta Earthquake Information, organized by the National Information Service for Earthquake Engineering, help ensure that these data are preserved and used.[38]

The online catalogue for the National Information Service for Earthquake Engineering has 726 items catalogued in its Loma Prieta Collection, and a

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[35] GAO, Loma Prieta Earthquake: Collapse of the Bay Bridge and the Cypress Viaduct. June 1990. Washington, D.C.: U.S. Accounting Office GAO/RCWS-90-177

[36] GAO. Disaster Assistance: Federal, State, and Local Responses to Natural Disasters Need Improvement. Washington, D.C.: U.S. General Accounting Office. Report No. GAO/RCED-91-43.

GAO. Earthquake Recovery: Staffing and Other Improvements Made Following Loma Prieta. Washington, D.C.: U.S. General Accounting Office. Report No. GAO/RCED-92-141.

[37] State/Federal Hazard Mitigation Survey Team. 1990. *Hazard Mitigation Opportunities for California: The State/Federal Hazard Mitigation Survey TEam Report for the October 17, 1989 Loma Prieta Earthquake, California*. Federal Emergency Management Agency Report No. FEMA-845-DR-CA.

[38] Kathleen J. Tierney, "Emergency Preparedness and Response," in *Practical Lessons From the Loma Prieta Earthquake: Report from a Symposium by the Geotechnical Board and the Board on Natural Disasters of the National Research Council*, National Research Council (Washington, D.C.: National Academy Press 1994): 106.

search for "Loma Prieta" in their database returns 1,211 records, 510 of which are texts, 85 data sets, and 615 images.[39] Most of these reports focus on earthquake and structural engineering, seismological or other geotechnical aspects of the Loma Prieta earthquake. Many government-sponsored reports scientific and engineering reports examined damaged structures, and proposing seismic retrofit projects. However, there was a smaller number of social scientists that studied the effects of the earthquake with government sponsorship. These reports are simultaneously evidence of what happened after the Loma Prieta earthquake, sources that can be evidence for what was interesting for different disciplines, and examples of a certain kind of information production. I attempt to be clear about how I use the reports as different kinds of evidence. As many researchers were flown into the Bay Area, their reconnaissance report and summaries of survey data provide a fascinating glimpse onto the earthquake. On the other hand, these reports are often written from contemporary research perspectives.

Some research addressed topics relevant to this dissertation, although from a very different epistemological point of view. Risk communication research about aftershocks and their effectiveness— essentially examining how well the media-communicated "instructions and information" changed attitudes and behavior. For example, a commonly held assumption was that people would "seek" "information about aftershocks and other dangers" following a disaster[40] Risk communication was described as a linear five-step process.[41] In this analysis, there was a normative focus on how to get people to change action based on the communication of risk. The question for these researchers was how to communicate risk such that the "receiver" would understand the "risk information." For the most part, in this model, the social world is represented by "attributes" of the receiver, and the following

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[39] National Information Service for Earthquake Engineering, http://nisee.berkeley.edu/elibrary/ (accessed 21 March 2011).

[40] Robert A. Olson et al, "Socioeconomic Impacts and Emergency Response," *Earthquake Spectra* 6, pp. 393-431 (1990) (an Earthquake Engineering Research Institute publication): 424.

[41] Dennis S. Mileti and Paul W. O'Brien, "Warning during Disaster: Normalizing Communicated Risk," *Social Problems* 39, No. 1, (1992): 41. "The process begins when someone hears the risk information that is communicated. Second, people then typically attempt to confirm the warning, for example, by checking with other people or seeking information from an alternative medium. Third, an understanding of risk is formed; individual meanings are attached to the information heard. The fourth stage is belief that the risk information received is accurate, and that it is germane to the receiver. Usually, an individual must believe and personalize a warning in order to act. Fifth, people then decide what to do, and perform that behavior. A person typically goes through the stages of the model each time that new warning or risk information is received. Response to communicated risk information thus follows from a series of perceptions."

characteristics for "communicated emergency risk information": "specific," "communicated over multiple channels," "frequently repeated," "confirmed," and, importantly for this dissertation, "from official sources."[42] Before the Loma Prieta earthquake, risk communication researchers believed they "understand the process whereby the public hears, understands, believes, personalizes, and responds to disaster warnings, and this contributes to emergency planning," however, this was all based on studies done before disasters, as opposed to after a disaster when there were aftershocks.[43] The analysis of Loma Prieta from this perspective found that "Citizens interviewed exhibited a general lack of information concerning the risk posed by secondary hazards induced by the earthquake."[44] This research has several normative assumptions about information. First, it assumed that it is something that someone can possess with the intended meaning, without their own embodied interpretation. Second, it assumes that the public *should* have this information in their heads. This perspective in part reflects a kind of infodeterminism, the idea that information determines action (discussed in the second chapter), does not understand information infrastructure as socially situated or materially constituted—cornerstones of this dissertation, as set forth in the introduction.

An influential data set on Loma Prieta focused on information practices and made fewer of the normative assumptions of the risk communication research.[45] Since this time, a number of other studies have re-examined the 1989 earthquake (often using the same data) from the perspective of collective action and social psychological processes such as "information seeking."[46] The topic of research was not the centrality of mass

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[42] Mileti and O'Brien, "Warning during Disaster," 42.

[43] Olson et al, "Socioeconomic Impacts and Emergency Response," 424.

[44] Colleen Fitzpatrick and Dennis S. Mileti, "Perception and Response to Aftershock Warnings During the Emergency Period," in *The Loma Prieta Earthquake: Studies of Short-Term Impacts*, Robert Bolin, ed., Program on Environment and Behavior Monograph #50. ([city?]Institute of Behavioral Science, University of Colorado 1990): 75-83.

[45] The data set, collected by Bourque and her collaborators six to ten months after the earthquake, consisted of 30-minute phone surveys with people from all five counties that experienced the earthquake. Six hundred fifty-six people participated in the survey. In the Bourque data set, 4.8% of the respondents were interviewed in Spanish, but Bourque identifies limitations to the data set, including that the groups most disproportionately dislocated by the earthquake were not or underrepresented in the data set. Linda B. Bourque, Lisa A Russell, and James D. Goltz, "Human behavior during and immediately after the earthquake," in ed. Patricia A. Bolton, *The Loma Prieta, California, Earthquake of October 17, 1989—Public Response*, U. S. Geological Survey Professional Paper 1553-B, (Washington, D.C.: United States Printing Office, 1993): B19.

[46] This same data set is used in two dissertations that do expanded analysis from the Bourque et al paper:

media per se, but the authors did importantly note the reinforcing relationship between media and "disaster preparedness" directives. Additionally, they critiqued the conduit metaphor implicit in some of the risk communication research.[47] Although the researchers did not analyze media content, they decided to look at media use. The data set found that after the earthquake, almost 70% of people who were affected by Loma Prieta were tuning into television or radio (although almost all of the people still cited radio or television as the "best source of information" on the day of the earthquake).[48] The day of the earthquake, radio was cited by about one-half to two-thirds as the best source of information (most of the rest of people preferred television); in the days following the earthquake almost 52% of people said television was the best source of information, and newspapers were the second best source, with 21.6%, and radio was cited as important by 14% of the sample.[49] Interestingly, the survey collected by risk communication researchers seemed to indicate even more media use. This mail survey included 1,652 respondents from San Francisco and Santa Cruz, said that 91.7% of Santa Cruz County and 85.7% of San Francisco respondents "reported they had a working radio and listened to reports about the earthquake."[50] Furthermore, 73.6% of Santa Cruz County and 76.8% of San Francisco respondents said they "used the media more than usual because of the earthquake."[51] While both of these data sets use well-regarded survey methodology, and are presented together in the same USGS report, they seem to have slightly

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William E. Lovekamp, *Gender, Race/Ethnicity and Social Class Differences in Disaster Preparedness, Risk and Recovery in Three Earthquake-Stricken Communities* (PhD Dissertation, Sociology, Southern Illinois University Carbondale, 2006);James Dennis Goltz, *Initial Behavioral Response to a Rapid Onset Disaster: A Social Psychological Study of Three California Earthquakes*, PhD dissertation, Sociology, UCLA, 2006

[47] Bourque et al, "Human behavior during and immediately after the earthquake," B18-B19.

[48] Bourque et al, "Human behavior during and immediately after the earthquake," B12-B13

[49] Bourque et al, "Human behavior during and immediately after the earthquake," B19.

[50] This survey has different limitations than the Bourque survey; it did not require a phone, but was only in English, and sent to people who had addresses in a research firm's list. Paul W. O'Brien and Dennis S. Mileti, "Citizen Participation in Emergency Response," in Patricia A. Bolton, ed., *The Loma Prieta, California, Earthquake of October 17, 1989—Public Response*, U. S. Geological Survey Professional Paper 1553-B, (Washington D. C.: United States Printing Office, 1993):. B25.

[51] This article makes use of the same data set. Mileti and O'Brien, "Public Response to Aftershock Warnings," B34.

different findings.[52] Still, both surveys indicate that people had radio accessible on the day of the earthquake, and, after the earthquake, media more generally. In a sense, the centrality of the media in the disaster plans, and the high levels of media usage after the earthquake indicate that the media and the government might have had a mutually reinforcing role, and that the plan to channel much of the "public information" though the media was appropriate.

Conclusions

My chapters on 1868 and 1906 open with letters about the earthquake. In 1989, I had no letters with which to open the chapter. In the numerous informal interviews I did about the 1989 earthquake, people told me stories about contacting loved ones via telephone, fax, even email. No one told me about sending or receiving letters. This banal observation provides some insight into these three historical moments, and also in the historical record available. This conclusion looks at the sources available comparatively across the three earthquakes.

All of the chapters gave me different challenges—where the 1868 chapter was difficult to find a wide variety of types of sources, the sources were multitudinous and abundant for the 1906 chapter, and the 1989 chapter. There are two other generalizations that I would venture to make about the sources that provide a window into the themes of my dissertation. First, there was a shift in the type of sources available that also signaled a shift in who claimed authority to talk about the earthquake. The sources available about the 1868 earthquake were almost entirely newspapers, with a few letters, photographs and other illustrations to augment the newspapers. Many libraries and archives were destroyed in the 1906 earthquake, which might have had more accounts of the 1868 earthquake. Still, newspapers were a central forum that did not have homogeneity in content or, as I hope my chapter makes clear, in points of view. In 1906, my sources were in newspapers, but also military and Red Cross reports. The military and the Red Cross were active participants in the response, and in defining the response later. In the chapter on the 1989, government organizations such as the Office of Emergency Services and FEMA claimed the authority to explain and respond to the earthquake. In both 1906 and 1989, the institutions participating in disaster response produced documents about their own activity in disaster response. A cousin to the idea of bureaucratic rationality is the idea that modern institutions produce documents about themselves—in the Giddensian idea of reflexivity. Beck and Giddens formulate a not-so-document focused version of

[52] Indicating that either the different instruments, with different phrasing yielded different result, or perhaps their population samples were different in a not obvious way.

this as "reflexive modernity." In Beck's "Risk Society" the modern institutions produce and use documents to help construct, manage and apprehend risk. How the rise of these reflexive institutions shaped information practices after disasters is an important topic that I would like analyze in present earthquakes in more detail in my future work.

The second trend I noticed as I looked back through my sources was that it was really difficult to find evidence of "multiple infrastructures" in 1868. It was far less difficult in 1906 because of the excellent research done the Chinese, much of which made use of the Chinese newspapers available. The sources were for the story of the Chinese did not seem to lie in the English newspapers, or the government reports. In 1989, it was not difficult at all to find evidence of the multiple infrastructures because the interests of the marginalized had been taken up by so many in the mainstream so that the plight of the poorest was noted in government documents, newspaper articles and research reports. It could be easy to infer that there were no multiple infrastructures supporting the marginalized in 1868, but my guess is that there were plenty of linguistic minorities who had their own presses, social clubs, and business organizations, which were thinking about the earthquake. We just don't have records of this, partially because the English-speaking press may not have paid notice at the time, but also because of the ideology of archivists. The interest of non-elites is now much more important to academics and archivist; my dissertation reflects this ideological shift. For me, this underscores the importance of creating historical records. In the future, I would like to work on creating community-based archives of events. Documents that are created at or near the time of disaster are invaluable and difficult to find.

Appendix: Bay Area Census

	Alameda	Contra Costa	Marin	Napa
1860	8,927	5,328	3,334	5,521
1870	24,237	8,461	6,903	7,163
1880	62,976	12,525	11,324	13,235
1890	93,864	13,515	13,072	16,411
1900	130,197	18,046	15,702	16,451
1910	246,131	31,674	25,114	19,800
1920	344,177	53,889	27,342	20,678
1930	474,883	78,608	41,648	22,897
1940	513,011	100,450	52,907	28,503
1950	740,315	298,984	85,619	46,603
1960	908,209	409,030	146,820	65,890
1970	1,071,446	556,116	208,652	79,140
1980	1,105,379	656,380	222,568	99,199
1990	1,279,182	803,732	230,096	110,765
2000	1,443,741	948,816	247,289	124,279

	San Francisco	San Mateo	Santa Clara	Solano	Sonoma
1860	56,802	3,214	11,912	7,169	11,867
1870	149,473	6,635	26,246	16,871	19,819
1880	233,959	8,669	35,039	18,475	25,926
1890	298,997	10,087	48,005	20,946	32,721
1900	342,782	12,094	60,216	24,143	38,480
1910	416,912	26,585	83,539	27,559	48,394
1920	506,676	36,781	100,676	40,602	52,090
1930	634,394	77,405	145,118	40,834	62,222
1940	634,536	111,782	174,949	49,118	69,052
1950	775,357	235,659	290,547	104,833	103,405
1960	740,316	444,387	642,315	134,597	147,375
1970	715,674	557,361	1,065,313	171,989	204,885
1980	678,974	587,329	1,295,071	235,203	299,681
1990	723,959	649,623	1,497,577	340,421	388,222
2000	776,733	707,161	1,682,585	394,542	458,614

Source: http://www.bayareacensus.ca.gov/historical/copop18602000.htm

Appendix: Map with Earthquake Locations