

## Endnotes

- 1 Emergency management professionals and disaster scholars define *catastrophe* as a very large event that surpasses local and regional capabilities for response or recovery and *disaster* as a less severe event, although it, too, might require outside (i.e., federal government) assistance; see E. L. Quarantelli, "Emergencies, Disaster and Catastrophes Are Different Phenomena," Preliminary Paper 304 (Newark: Disaster Research Center, University of Delaware, 2000). Note: This definition needs to be moved to an earlier chapter, where terms are first used.
- 2 Rutherford H. Platt, *Disasters and Democracy: The Politics of Extreme Natural Disasters* (Washington, D.C.: Island Press, 1999).
- 3 Erik Larson, *Isaac's Storm: A Man, a Time, and the Deadliest Hurricane in History* (New York: Random House/Vintage Books, 1999); John M. Barry, *Rising Tide: The Great Mississippi Flood of 1927 and How It Changed America* (New York: Simon and Schuster, 1997).
- 4 Examples include Platt, *Disasters and Democracy*; William Waugh, *Living With Hazards, Dealing With Disasters* (New York: M. E. Sharpe, 2000); and Richard Sykes *Disaster Management in the U.S. and Canada: The Politics, Policymaking, Administration and Analysis of Emergency Management* (New York: Charles C. Thomas, 1996).
- 5 See the timelines developed by Claire B. Rubin and Associates at disaster-timeline.com.
- 6 In his 1997 book *After Disaster: Agenda Setting, Public Policy, and Focusing Events* (Washington, D.C.: Georgetown University Press), Thomas Birkland was among the first people to use the term *focusing events* to refer to disasters that had an impact on emergency management policy or practice; the term has been further developed in the time-line charts and related reports developed by Claire B. Rubin and Associates.
- 7 Claire B. Rubin and Judith Colle, *Major Terrorism Events and Their U.S. Outcomes (1988–2005)* (Fairfax, Va.: Public Entity Risk Institute, 2006).
- 8 In his analysis of industrial disasters, James K. Mitchell defines *surprise* as "unprecedented" and writes, "Nothing quite like [the surprise has] ever occurred before in the same or similar contexts"; see James K. Mitchell, *Long Road to Recovery: Community Responses to Industrial Disaster* (New York: United Nations Press, 1996), 11.
- 9 See the glossary for more details about the presidential declaration process. Recent changes in the declaration process have been brought about by new enabling legislation for the Federal Emergency Management Agency and the National Response Plan.
- 10 Claire B. Rubin, Imrak Renda-Tanali, and William Cumming, *Disaster Time Line: Major Focusing Events and U.S. Outcomes (1979–2005)* (Arlington, Va.: Claire B. Rubin and Associates, 2006), disaster-timeline.com; Claire B. Rubin, Imrak Renda-Tanali, and William Cumming, *Terrorism Time Line: Major Focusing Events and U.S. Outcomes (2001–2005)* (Arlington, Va.: Claire B. Rubin and Associates, 2006), disaster-timeline.com; and Claire B. Rubin and Judith Colle, *Major Terrorism Events and Their U.S. Outcome, (1988–2005)* (Fairfax, Va.: Public Entity Risk Institute, 2006). See also *Birkland, After Disaster*.
- 11 See Michele Landis Dauber, *The War of 1812, September 11th, and the Politics of Compensation*, Public Law Working Paper No. 74 (Palo Alto, Calif.: Stanford Law School, 2003), papers.ssrn.com/sol3/papers.cfm?abstract\_id=480703, and David Moss, "Courting Disaster? The Transformation of Federal Disaster Policy since 1803," in *The Financing of Catastrophe Risk*, ed. Kenneth A. Froot (Chicago: University of Chicago Press, 1999).
- 12 There also are other federal response plans, such as the national contingency plan for dealing with oil spills, industrial accidents, and hazardous materials incidents; these are beyond the scope of this book.

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**Chapter 2**

**Focusing Events in the Early Twentieth Century: A Hurricane, Two Earthquakes, and a Pandemic**

Prior to World War II, there was no overarching legislation or policy at any level of government driving emergency and disaster management in the United States. Rather, policy, legislation, and practice typically were created in response to individual disasters. The federal government's involvement was almost always disaster specific, usually delayed, and varied in the services provided. Sociologist Gary Kreps writes that prior to 1950 "there was no permanent federal program of disaster assistance to states and localities in the United States. Private voluntary agencies, such as the American National Red Cross, the Salvation Army, and many others, bore the primary responsibility for disaster relief, and state and local governments coped as best they could with disaster impacts."<sup>1</sup>

Federal disaster relief also was inconsistent. Political scientist Peter May writes, "The guiding criterion for deciding an appropriate [federal] relief level was the precedent established by previous disaster relief provisions."<sup>2</sup> Indeed, "between 1803 [when Congress first provided any kind of disaster relief] and 1947, Congress enacted 128 pieces of special disaster-specific legislation. . . . When army (or beginning in the 1880s, Red Cross) representatives arrived on the scene of a disaster, they generally found ad hoc local or regional relief committees collecting funds and relief supplies, and performing recovery efforts."<sup>3</sup> May provides an analysis of the 128 pieces of legislation prior to 1947 and notes that their aims and approaches changed over time, with disaster assistance becoming increasingly generous.<sup>4</sup>

Despite the frequency of event-specific federal legislation, the government did not view disaster response and relief as a federal responsibility. "More often than not, the federal government provided no assistance at all in the aftermath of disaster," concludes David Moss in his analysis of the federal government's disaster policy.<sup>5</sup> Like other domestic social needs, disaster assistance was considered the responsibility of the states or, more often, local governments, charities, and other social institutions such as churches. Geographer and legal scholar Rutherford Platt also notes that the "reduction of vulnerability to natural hazards ('mitigation') was accomplished, if at all, through actions taken individually or at the local level prior to the 1930s."<sup>6</sup>

Platt further comments that government was not involved in providing direct assistance to disaster victims. "Before 1950, disaster assistance was

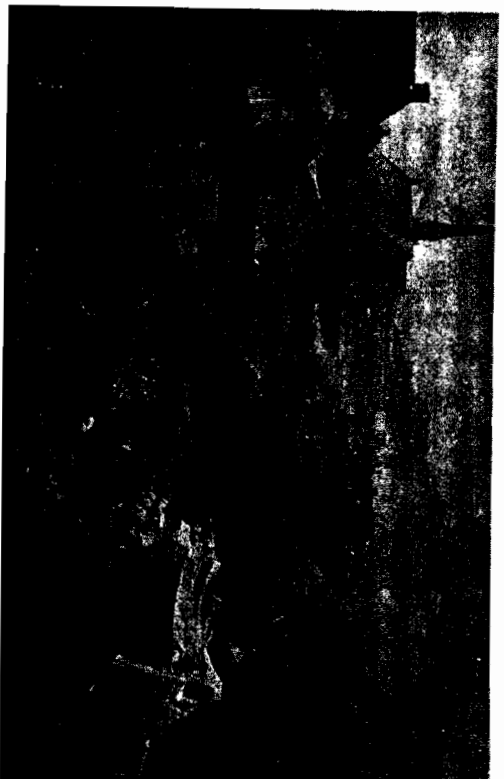
viewed as the moral responsibility of neighbors, churches, charities, and communities—not the federal government,” writes Platt.<sup>7</sup> “Furthermore, disasters tended to be viewed as unavoidable ‘acts of God,’ which, by definition, transcended the power of government to prevent.” Federal legislation was enacted and programs created for mitigation of only one type of hazard—floods (especially on the Mississippi River). As early as the mid-eighteenth century, the federal government, through the U.S. Army Corps of Engineers, was involved in flood control and the maintenance of navigable waterways.

Given the lack of any overriding federal mandates in the first half of the twentieth century, studying the evolution of emergency management during this period requires examining landmark incidents rather than surveying federal legislation or policy. Specifically, such an examination should look at (1) the precipitating physical event, prior planning and preparedness (if any), response, and recovery; (2) the long-term effects on society, policy, and practice; and (3) the resulting changes in American consciousness and attitudes toward disasters and their management. This includes examining the questions and lessons each disaster poses for modern emergency management.

While there were numerous disasters in the early twentieth century, only a few stand out as historical events affecting the course of American emergency management—or, as discussed in Chapter 1, as *focusing events*. These include the 1900 Galveston Hurricane, the 1906 San Francisco and 1933 Long Beach earthquakes, and the 1918–1919 flu pandemic, which are the topic of this chapter. The Great Mississippi Flood of 1927, the dust storms of the 1930s, and the 1947 Texas City explosions are discussed in Chapter 3. Careful study of these events reveals issues, successes, mistakes, and lessons to be learned, which are elucidated for the benefit of current and future emergency managers, as well as researchers and consultants who share their concerns. Collectively, the studies of these disasters could comprise their own textbook in emergency management.

### Nineteenth Century Disaster Response

Of course, the United States experienced many natural disasters prior to 1900.<sup>8</sup> Perhaps most common were floods along the major waterways that formed the backbone of the nation’s transportation network. As the country became increasingly urban and the populace more concentrated, floods and other natural occurrences became more destructive to both people and the built environment. The two best-known disasters of the late nineteenth century were urban catastrophes: the Chicago Fire of 1871, in which approximately 300 people died and 90,000 were rendered homeless, and the Johnstown (Pennsylvania) Flood of 1889, which resulted in more than



The sheer magnitude of events, such as the 1889 flood of Johnstown, Pennsylvania, shown here, raised awareness of the potential devastation to communities and influenced some government officials to begin to reconsider the ad hoc approach to disaster response. Photo courtesy of the National Oceanic and Atmospheric Administration.

2,000 deaths.<sup>9</sup> Another notable event, the Great Peshtigo Fire of October 1871, raged across northeastern Wisconsin and upper Michigan at the same time as the Chicago fire. Both fires resulted in part from the same meteorological conditions—heat and dryness—that pervaded the upper Midwest at the time, but the Peshtigo fire took an estimated 1,500 lives—five times as many as the more famous Chicago conflagration. Additional notable disasters of the late nineteenth century include the forest fires that raged through Michigan in 1881,<sup>10</sup> the Ohio and Mississippi river floods of 1884; the hurricane that hit the Sea Islands, South Carolina, in 1893; and the Great Blizzard of 1888, which left between two and five feet of snow across much of northern New Jersey, eastern New York, and western New England and resulted in roughly 400 deaths.<sup>11</sup>

All of these disasters are historically important for at least three reasons. First, these natural disasters marked the first American Red Cross response, resulting in a formal charter by the federal government to provide disaster response and recovery.<sup>12</sup>

A second reason that these major catastrophes are significant is, quite simply, because they have become a prominent part of American history and cultural lore. As such, they inform modern American thought and attitudes regarding disasters. For example, modern fire suppression systems and urban design reflect lessons learned and fears reinforced by the Chicago Fire of 1871; current dam safety laws can be traced in part to the Johnstown Flood of 1889.

### The American Red Cross

Founded by Clara Barton in 1881, the American Red Cross (ARC) was chartered by Congress in 1900 and again in 1905 to carry out responsibilities delegated by the federal government. Among other things the original charter called for the ARC to manage a system of national and international relief in time of peace; to apply the same system in mitigating the sufferings caused by pestilence, famine, fire, floods, and other great national calamities; and to devise means for preventing disasters and "to promote measures of humanity and welfare of mankind." At the time, these mandates for domestic aid and disaster prevention were unique to the ARC. Red Cross organizations in other nations were typically concerned only with aid to victims of combat.

The ARC's early work included aiding victims and workers in the floods of the Mississippi and Ohio rivers in 1882 and 1884, the Texas famine of 1886, the Florida yellow fever epidemic in 1887, an earthquake in Illinois in 1888, and the 1889 Johnstown flood.

The relationship between the government and the American Red Cross is unique. The ARC is an independent, nonprofit, tax-exempt, charitable institution, but unlike other congressionally chartered organizations, it has the legal status of "a federal instrumentality"; that is, it is bound by its charter to carry out responsibilities delegated to it by the federal government. These responsibilities presently include

- Fulfilling the provisions of the Geneva Conventions, to which the United States is a signatory, assigned to national societies for the protection of victims of conflict
- Providing family communications and other forms of support to the U.S. military
- Maintaining a system of domestic and international disaster relief, including mandated responsibilities under the National Response Plan coordinated by the Federal Emergency Management Agency.

On the national level, in the first half of the twentieth century the Red Cross—not the federal government—had the lead responsibility for emergency relief operations. The formal relationship between that organization and the federal government may have given Americans the impression that the federal government had responsibility for managing all phases of disaster, from pre-disaster mitigation to post-disaster recovery, but the ARC is not a federal agency, nor does it receive regular federal appropriations. It relies on public contributions and cost-recovery charges for most of its services, but seeks federal funding when extreme costs surpass charitable contributions. According to former Red Cross official Roy Popkin, in recent years, "as government programs have expanded, the Red Cross role in individual family assistance has diminished, particularly in larger disasters receiving a presidential declaration and federal funds."<sup>1</sup> Today, the ARC remains the only nonprofit organization identified in federal disaster legislation.

<sup>1</sup> Roy S. Popkin, "The History and Politics of Disaster Management in the United States," in *Nothing to Fear: Risks and Hazards in American Society*, ed. Andrew Kirby (Tucson: University of Arizona Press, 1990), 105.

Source: American Red Cross Website, [redcross.org/museum/history/](http://redcross.org/museum/history/)

The third reason that these disasters have been singled out is that, when examined closely, each demonstrates, implicitly or explicitly, areas in which disaster management could be improved—in preparedness, warning, response, recovery, and/or long-term mitigation. Moreover, each demonstrates the many dimensions that combine to create a disaster: local geography, human settlement and activity patterns, political and cultural characteristics, and planning and response systems. Thus, these early disasters can help us to identify the corresponding areas of understanding that might enable us to better deal with disasters: physical science (e.g., hydrology, meteorology, and geology), engineering, organizational management, public administration, social structure and human behavior, and psychology.

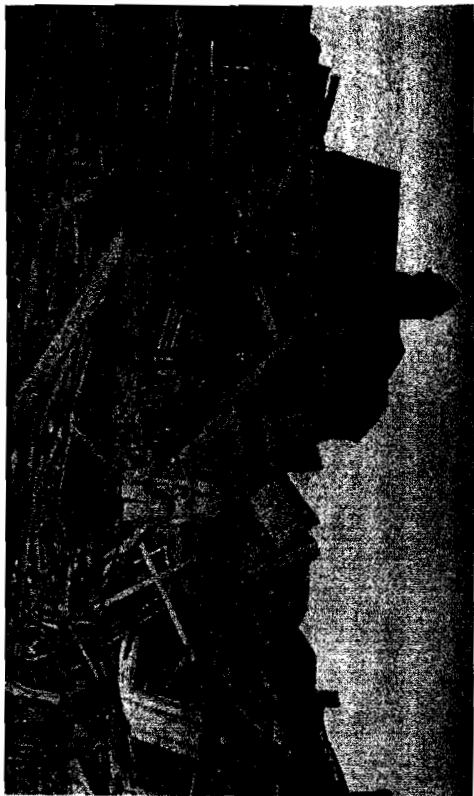
The great catastrophes of the early twentieth century have shaped our cultural and governmental attitudes toward disaster even further. Beginning with the Galveston Hurricane of 1900, these events have demonstrated many ways and means of dealing with disasters—including experimentation, innovation, and improvisation—and draw attention to specific problems and areas on which government and society could focus resources and efforts to lessen their toll.

### The Galveston Hurricane of 1900

The 1900 Galveston Hurricane, which made landfall on September 8, remains the deadliest disaster in U.S. history. The exact number of deaths was never determined, in part because bodies were buried on land and at sea or cremated en masse immediately following the storm. But at least 6,000 people and perhaps as many as 12,000—one of every six Galveston citizens—lost their lives in the disaster.<sup>13</sup>

The U.S. Weather Bureau in Washington, D.C., began sending to its Galveston office warnings of an approaching storm as early as September 4. Although the precise evolution of the storm is unknown, apparently the less severe tropical storm that swept over Cuba on September 4 and 5 exploded into a major hurricane as it passed over the warm water of the Gulf of Mexico. The storm moved north of Key West on September 6 and then, rather than turning to the northeast as the U.S. Weather Bureau had predicted, it continued on its westward path, gaining strength as it went. By the evening of September 7, large, slow swells were creating huge surf along the beaches in and near Galveston. The next morning, people gathered to watch the sea. The early morning skies remained only partly cloudy and winds were not yet strong, so few people took heed of the storm warnings issued by the local weather bureau.

Floodwaters began to creep into Galveston early in the day on September 8, and by midmorning the train tracks into town were flooded. The rain began in earnest in the early afternoon, and a steady northeasterly wind



The lack of a seawall and proper warning system contributed to the devastation caused by the hurricane and storm surge that hit Galveston in 1900. Photo courtesy of the National Oceanic and Atmospheric Administration.

was blowing. By 5:00 p.m., the Galveston weather bureau was recording sustained hurricane force winds. But it was water, not wind, that presented the greatest problem. The low-lying island of Galveston was inundated by a storm surge of over 15 feet. At one point, the sea rose four feet in just four seconds. The encroaching waters acted like a riverine or flash flood, compelling and pushing debris inland, each row of structures adding more mass to the mountain of wreckage as buildings were pushed off their foundations. By the end of the surge, more than 3,600 homes were destroyed. Although the actual magnitude of the storm is not known, the damage and a storm surge of 15.5 feet has led the National Oceanic and Atmospheric Administration to estimate that it was a Category 4 hurricane (defined as a storm with winds of 131 to 155 mph and a storm surge of 13 to 18 feet).

#### **Prior History, Preparedness, Response, Reconstruction, and Mitigation**

Prior to the hurricane, Galveston was a thriving city of more than 40,000, one of the wealthiest cities in the country and the most important seaport in Texas. More than 70 percent of the U.S. cotton crop passed through Galveston, and some 1,000 ships called on the port annually.<sup>14</sup>

The 1900 storm should not have been unexpected. Prior to the Galveston disaster “hurricanes had periodically raked the Gulf of Mexico coast—at least eleven times in the nineteenth century. Yet the inhabitants [of Galveston] denied the threat to their island community.”<sup>15</sup> Indeed, since its founding in 1839, Galveston had weathered numerous storms and dodged many others, but in no case had it faced a direct hit. The result was widespread complacency among the city’s leaders and residents.

#### **A Note from Galveston**

John D. Blagden was a U.S. Weather Bureau meteorologist on temporary assignment in Galveston when the hurricane hit. This excerpt from a letter to his family in Duluth, Minnesota, was written one day after the storm.

“There is not a building in town that is uninjured. Hundreds are busy day and night clearing away the debris and recovering the dead. It is awful. Every few minutes a wagon load of corpses passes by on the street.

“The more fortunate are doing all they can to aid the sufferers but it is impossible to care for all. There is not room in the buildings standing to shelter them all and hundreds pass the night on the street. . . . The City is under military rule and the streets are patrolled by armed guards. . . . I understand four men have been shot today for robbing the dead. I do not know how true it is for all kind of rumors are afloat and many of them are false. We have neither light, fuel or water. I have gone back to candles. I am now writing by candlelight.

“A famine is feared, as nearly all the provisions were ruined by the water which stood from six to fifteen feet in the streets and all communication to the outside is cut off. . . . We had warning of the storm and many saved themselves by seeking safety before the storm reached here. We were busy all day Thursday answering telephone calls about it and advising people to prepare for danger. But the storm was more severe than we expected.”

Source: Casey Edward Greene and Shelly Henley Kelly, *Through a Night of Horrors: Voices from the 1900 Galveston Storm* (College Station: Texas A&M University Press, 2000), 15–19.

Erik Larson points out that in 1875 and 1886, through wind and storm surge, hurricanes destroyed the thriving port of Indianola on Matagorda Bay, approximately 120 miles southwest of Galveston.<sup>16</sup> The first hurricane killed 176 people; the second compelled survivors to abandon the town.

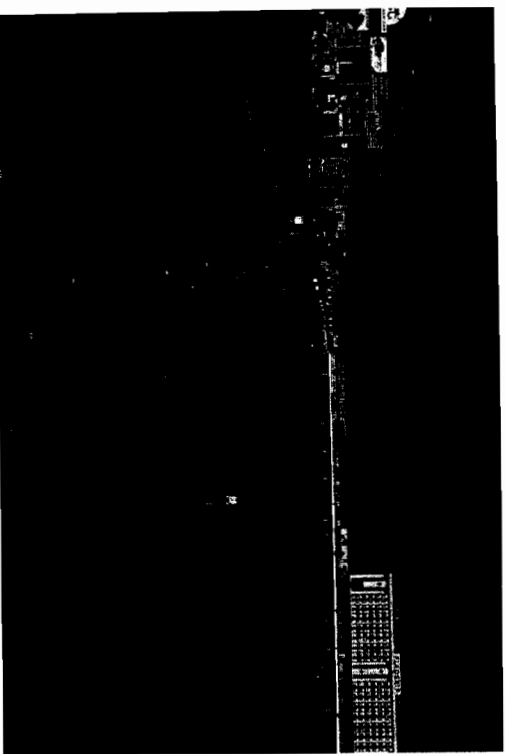
The Indianola situation should have informed Galveston’s leaders. Whereas Indianola was in the corner of a protective bay and shielded by barrier islands, Galveston—an unprotected island with its highest point only 8.7 feet above sea level—was clearly more vulnerable. Indeed, Galveston’s leading citizens perceived Indianola as an object lesson and launched an effort to construct a seawall to protect the island, but the campaign languished. Soon, development increased Galveston’s vulnerability to storms as sand dunes along the shore were removed to fill low-lying areas in the city, removing what little barrier there was between the Gulf of Mexico and downtown Galveston. By 1900 Galveston was completely unprepared for a hurricane—both psychologically and physically.

By all accounts, the immediate aftermath of the hurricane was horrific. During the storm and immediately after, victims had only each other to rely on for medical care, shelter, food and clothing, search and rescue, and locating and burying the dead. There were many, many bodies amid the debris.<sup>17</sup>

Help soon arrived. The U.S. Army sent soldiers, tents, and food. Larson writes, "The train-ferry *Charlotte Allen* brought a thousand loaves of bread from Houston. The steamer *Lawrence* brought one hundred thousand gallons of fresh water." When Clara Barton, the president of the American Red Cross, arrived on the scene, she telegraphed home, "Situation not exaggerated."<sup>18</sup> The recovery operations, particularly the recovery and disposal of bodies, continued for weeks.

As with disasters even today, the outpouring of donations sometimes proved as much a burden as a blessing. "The Red Cross gave out food and clothing, but found much of its supply of donated clothing unusable, either too warm for the climate or too shabby; clearly the discards of distant souls who believed survivors were in no position to be picky," writes Larson. "Someone donated a case of fancy women's shoes, but all 144 shoes were for the left foot, samples once carried by a shoe-company traveler."<sup>19</sup>

Unlike Indianola's leaders, Galveston officials decided to rebuild after the hurricane. Just a decade earlier, the city had rejected the construction of a seawall, but it now adopted the idea. Considered a modern engineering marvel, the wall took almost sixty years to complete. It rises 15.5 feet above sea level and is constructed with an advance barrier of granite boulders 27 feet wide. Beyond constructing a barrier, Galveston's engineers physically elevated the city, using dredged sand to raise the city by as much as 17 feet. More than 2,100 buildings were raised in the process.<sup>20</sup>



Following the 1900 hurricane, Galveston officials approved the construction of a seawall to protect the city—an idea that had been rejected ten years earlier. Today the Galveston coast is protected by a 7-mile long, 17-foot-high seawall. Photo courtesy of the Federal Emergency Management Agency/BobMcMillan.

There are limits to what can be achieved with such structural mitigation measures, however. In 1915, another hurricane struck Galveston. Its wind and twelve-foot storm surge resulted in the deaths of 275 people. Although the death toll was significantly lower than it was in 1900, in dollar terms, the 1915 hurricane resulted in almost as much damage as the 1900 storm.<sup>21</sup>

### **Hubris, Denial, and Complacency**

One way to study emergency management is to look at disaster events and learn what went right and what went wrong. Each of the disasters discussed here holds many lessons for modern emergency management. Galveston, as much as any of the other tragedies, demonstrates what is, perhaps, the most fundamental lesson of emergency management: the danger of hubris, denial, and complacency.

As already discussed, there was much evidence indicating that Galveston could be struck by a severe hurricane. For various reasons—psychological, social, and economic—the people of Galveston, and particularly those responsible for the city's welfare and safety, ignored the warning signs. Erik Larson is particularly critical of the U.S. Weather Bureau: he cites the agency's territorial jealousies, the centralized command and control in the Washington headquarters office, the inability of the agency to recognize its own shortcomings and gaps in knowledge, and a reluctance to issue warnings and share information. His book about the hurricane, *Isaac's Storm*, recounts the response of Isaac Cline, head of Galveston's weather bureau at the time, who personified many of his agency's faults. According to Larson, Cline was a scientist who "believed he understood weather in ways others did not." He adds, "Hubris infused the text just as it infused the age," and cites an 1891 *Galveston News* article in which Cline argued, "[H]urricanes could not as a rule strike Texas [and] no greater damage may be expected here from meteorological disturbances than in any other portions of the country."<sup>22</sup>

According to Larson's account, Cline rejected the need for a protective seawall and dismissed the storms that had struck Indianola earlier. Cline "belittled hurricane fears as the artifacts of 'an absurd delusion.' He was especially confident about storm surges. 'It would be impossible,' [Cline] wrote, 'for any cyclone to create a storm wave which could materially injure the city.'"<sup>23</sup>

Other accounts are less critical of Cline.<sup>24</sup> They, and Cline's own report, say that he issued a hurricane warning without authorization from Washington. He is also credited with personally going to the Galveston beach on the morning of September 8 to warn the people gathered there to leave the beach and evacuate the city.



Cline was not alone in minimizing the threat of a hurricane. Although there was a civic movement in Galveston to construct a protective seawall after the 1886 Indianola hurricane, the idea eventually died out as complicity quickly returned. Even following the 1900 hurricane, the editor of the *Galveston Tribune* called the belief that Galveston is subject to severe storms a "mistake."<sup>25</sup> Willis Moore, the head of the U.S. Weather Bureau, similarly believed the Galveston hurricane to be a "freak of nature": "'Galveston should take heart,' he wrote, 'as the chances are that not once in a thousand years would she be so terribly stricken.'<sup>26</sup> Nature proved him wrong. The city was hit by another powerful hurricane just fifteen years later.

It is easy in hindsight to see that Galveston was in danger in 1900, but even today Galveston remains one of the major population areas on the Gulf Coast endangered by hurricanes. Many climatologists argue that global warming and the consequent increases in water temperature and sea level have put the region at greater risk than ever before. But regardless of climate changes, the risk is greater simply because many more people live there today than in 1900. Hazard experts Roger Pielke and Daniel Sarewitz explain, "[T]he number and scale of disasters worldwide has been rising rapidly in recent decades because of changes in society, not global warming. In the case of hurricanes, the continuing development and urbanization of coastal regions around the world accounts for all of the increases in economic and human losses that we have experienced."<sup>27</sup>

Since 1900, at least fifty-five storms Category 3 or stronger have struck the continental United States. As more and more people settle along coastal areas, the risk of serious loss of life increases. More than 13 million people live in counties bordering the Gulf Coast, and millions more are immediately inland. In 1900 there were fewer than a million. Are the people there today aware of the how often hurricanes strike and the dangers they face? Are the communities along the Coast better prepared for a hurricane than they were in 1900? Is the United States adequately prepared with its satellite technologies, modern communications, better construction, and improved transportation? Do people assume that because we have recently been struck by major hurricanes (Katrina and Rita), another must be decades away? As Galveston—and many of the other disasters of the early twentieth century—demonstrates, such hubris, denial, and complacency seem to be the heralds of disaster.

### The San Francisco Earthquake and Fires of 1906

Shortly before dawn on April 18, 1906, almost 300 miles of the northern end of the San Andreas Fault ruptured, resulting in an earthquake later estimated to be magnitude 7.8.<sup>28</sup> The epicenter was along the coast near

Daly City, just southwest of San Francisco, but the earthquake was felt from southern Oregon to south of Los Angeles and inland as far as central Nevada. In just 45 to 60 seconds, the quake inflicted damage throughout Northern California. Santa Rosa, a community to the north of San Francisco, was particularly affected, as were San José's and Stanford University to the south, but the event became known in American culture as the Great San Francisco Earthquake.<sup>29</sup>

Fires caused by ruptured gas lines, broken electrical lines, damaged and fallen chimneys, spilled lanterns, and other incendiary hazards (including arson by property owners to secure insurance payments) erupted immediately. In an eyewitness account, Jack London describes the scene:

On Wednesday morning at a quarter past five came the earthquake. A minute later the flames were leaping upward. In a dozen different quarters south of Market Street, in the working-class ghetto, and in the factories, fires started. There was no opposing the flames. There was no organization, no communication. All the cunning adjustments of a twentieth-century city had been smashed by the earthquake. The streets were humped into ridges and depressions and piled with debris of fallen walls. The steel rails were twisted into perpendicular and horizontal angles. The telephone and telegraph systems were disrupted. And the great water mains had burst. All the shrewd contrivances and safeguards of man had been thrown out of gear by thirty seconds' twitching of the earth crust.<sup>30</sup>

With many burst water lines and the fire alarm system knocked out by the quake, emergency responders were unable to quench the fires that erupted. The San Francisco Earthquake became the Great San Francisco Fire. Over the next three days, many smaller fires, feeding on the debris of structures dynamited in a failed effort to form firebreaks, joined in one great firestorm. The flames raged for three days, obliterating 4.7 square miles of the central city and destroying more than twenty-eight thousand buildings.<sup>31</sup>

#### Prior Events

Earthquakes and fires were not new to San Francisco. Native Americans in the area shared stories of earthquakes with early European explorers. In 1812, half of the missions in Southern California were damaged by an earthquake and the state's first earthquake deaths were recorded.<sup>32</sup> Subsequent quakes of magnitude 6.5 or greater occurred in or near San Francisco in 1836, 1838, 1865, and 1868. Then a period of relative calm ensued, with minor quakes becoming a common and therefore less alarming occurrence. Several major conflagrations also had destroyed parts of the city during its early days as a gold rush boomtown: San Francisco had one devastating fire in 1849, three in 1850, and two more in 1851. Decades later the city remained highly vulnerable to fire. One writer describes the structures in the city as "shacks and lean-tos and hastily cobbled together cuboids likely to burn or fall down at the slightest excuse. . . . The houses on Telegraph

Hill and Russian Hill and where the Italians gathered in North Beach were almost all made entirely of wood."<sup>35</sup>

Many people warned that the situation in San Francisco was dire. Dennis Sullivan, the city's fire chief, argued for years "that the city was a tinderbox waiting to be struck."<sup>34</sup> (Sullivan's recommendations for an improved water distribution system and fire service were not implemented, and the Great Fire of 1906 proved him correct in his dire predictions. He died four days after the conflagration from injuries sustained in the earthquake.) In October 1905, the National Board of Fire Underwriters rated the probability of a major fire in San Francisco (even without an earthquake) as "alarmingly severe" and declared that the city's water supply system was structurally in such poor shape that the hydrants would be unable to extinguish a fire. The report went on to say that "San Francisco has violated all underwriting traditions and precedent by not burning up."<sup>35</sup>

### The Devastation

For financial reasons, powerful and moneyed residents of San Francisco tried to have the 1906 disaster identified as a fire, not an earthquake. Insurance companies and potential investors were more likely to perceive fire as a manageable hazard, whereas an earthquake was seen as a capricious "act of God." At the time, the federal government estimated that only between 3 percent and 10 percent of the damage in San Francisco was directly attributable to the earthquake.<sup>36</sup> Subsequent studies have revised this estimate,<sup>37</sup> but researchers continue to attribute the primary cause of property damage in San Francisco to the fires.<sup>38</sup>

In addition, 225,000 of San Francisco's residents were rendered homeless. "[T]he great majority of these last were men, women, and children . . . seeking refuge from the calamity," writes Simon Winchester in his account of the event, "and thus they were American *refugees*. Not until the migrations enforced by the midwestern miseries of the Dust Bowl would such wretchedness be seen again."<sup>39</sup> And perhaps not again until 2005, when Hurricane Katrina devastated New Orleans and its environs.

In some areas, including Stanford University, the shaking from the 1906 earthquake did cause substantial damage. The most dramatic damage due to shaking occurred among poorly built brick and wood-frame structures on wetlands and tidewater areas that had been filled in to create new ground.<sup>40</sup> Earthquake engineers now recognize such "unconsolidated soils" as prone to liquefaction, making it particularly hazardous ground on which to build. In the 1989 Loma Prieta earthquake, for instance, the most heavily damaged areas of San Francisco were in the Marina District, built in part on refuse from the 1906 quake.



Fires raged throughout the city following the 1906 San Francisco Earthquake. Photo courtesy of the Karl V. Steinbrugge Collection, Earthquake Engineering Research Center, University of California, Berkeley/Arnold Genhe.

Although fire was responsible for most of the property damage in San Francisco, the earthquake and falling structures were responsible for a far greater proportion of deaths and injuries. Initially, the commander of the U.S. Army relief operations reported 498 deaths in San Francisco, but a city subcommittee formed to determine the death toll increased this number to 674. Years later, San Francisco archivist Gladys Hansen began to question these figures because her research showed that many deaths had not been counted. Although Chinatown had been virtually obliterated, for example, only twelve Asian names appeared on the subcommittee's list of deaths. After extensive research, Hansen concluded that at least 3,000 people had died, making it by far the deadliest earthquake in U.S. history.<sup>41</sup>

### Response and Recovery

As in any large disaster, the ability of government and the military to improvise solutions to problems and establish mechanisms of response and control where none had previously existed was a key element of the response. Although martial law was never officially declared, military from local bases were either asked to take on or simply assumed the role of keepers of the social order and protectors of property. Without standing orders regarding how the military should respond to what was essentially a civil matter, Brigadier General Frederick Funston, interim commander of the U.S. Army's Pacific Division based in the San Francisco Presidio at the time of the quake, quickly contacted the mayor and committed his soldiers to help maintain civil order.

Soldiers, police, “special police,” and vigilantes were instructed to tolerate no civil disobedience or unrest and to shoot “looters” on sight. The incidence of such shootings has been debated and remains unclear; estimates range from single digits to more than 500.<sup>42</sup>

Equally improvisational were the actions of Lieutenant Frederick Freeman of the U.S. Navy. Also acting without orders and supervision, he organized his men to protect the city’s dock areas from fire, actions which many people believe saved the waterfront. This not only enabled victims to evacuate by ferry, but also made it possible for goods and supplies to be shipped into the city.

The earthquake disabled the city’s water supply (which, according to the National Board of Fire Underwriters, would have been inadequate anyway). Lacking water, but feeling that something had to be done, city leaders and the military decided to use explosives to blast firebreaks.

Immediately following the disaster, San Francisco’s Mayor Eugene Schmitz established a “committee of fifty” to oversee the recovery and rebuilding of the city. The extragovernmental committee was composed of prominent, wealthy citizens, and ultimately it usurped the power of the city’s elected board of supervisors. The committee was replaced a month later by a “committee on reconstruction,” but the original subcommittee on finance and its chairman, James Phelan, retained control of all relief and redevelopment funds.

As the fires abated, three players—the Red Cross, the U.S. military, and the committee of fifty—emerged to take care of the displaced. Author Philip L. Fradkin notes that “the Red Cross had the expertise, the army had the manpower, and Phelan had the money [because he was president of Relief and Red Cross Funds].”<sup>43</sup> A vast relief effort was mounted almost immediately and lasted more than three years. Within two weeks, an estimated 267,967 persons were fed in a single day. Refugees were initially housed in army tents or makeshift shelters and then in semi-permanent camps constructed by the U.S. Army.

The citizens of San Francisco—particularly the wealthy and the powerful—moved quickly (perhaps too quickly) to rebuild the city. San Francisco was essentially reconstructed by 1910 and hosted the Panama-Pacific International Exposition just five years later to celebrate both the opening of the Panama Canal and the revival of San Francisco.

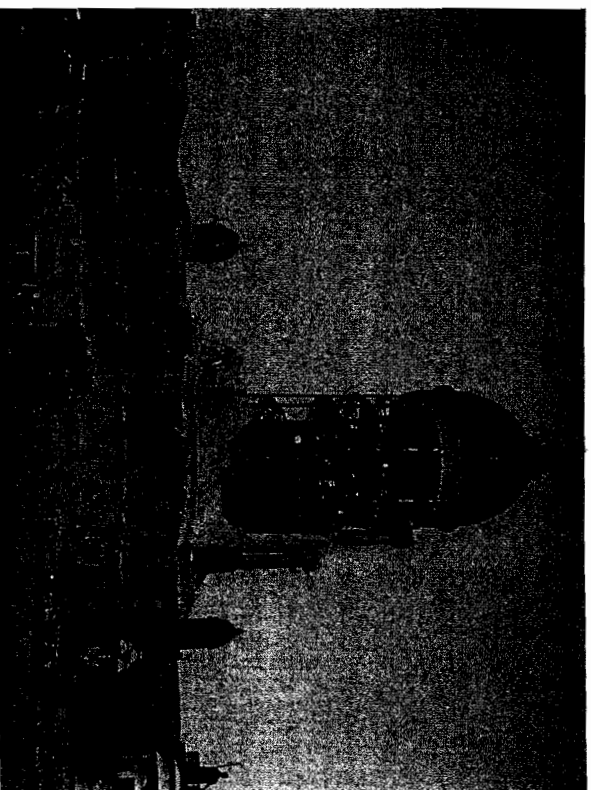
### **Mistakes Made and Lessons Learned**

As much as any other disaster in the twentieth century, the 1906 earthquake revealed the problems and mistakes that often surround a major catastrophe.<sup>44</sup> The lessons learned relate to the following issues:

- **Denial of risk and vulnerability.** There was ample historical evidence that northern California was at risk for both earthquakes and fires, but local leaders ignored or denied the risk.<sup>45</sup>

- **Shoddy construction.** At the time of the earthquake, San Francisco was evolving from a shoddily built boomtown and industrial city to a well-constructed and better organized community. Although some of the new buildings in the financial district and wealthy areas were strong enough to withstand earthquakes, others were not.<sup>46</sup> The reinforced brick and masonry walls of San Francisco’s new city hall—the grandest structure in the city—crumbled when the earthquake hit, leaving a dome precariously perched on the remaining skeleton of the structure. In a subsequent report, the U.S. Geological Survey called the city hall “a monument of bad design and poor materials and workmanship.”<sup>47</sup> This was but one of thousands of structures that proved vulnerable to fire and earthquake.

- **Poor planning.** Beyond the vulnerability of individual structures, the city itself, with its narrow streets, crowded buildings, and inadequate infrastructure, was a disaster waiting to happen, particularly in the poorer neighborhoods. Ironically, Daniel Burnham, the renowned Chicago archi-



San Francisco City Hall, April, 1906. The U.S. Geological Survey called the San Francisco City Hall “a monument of bad design and poor materials and workmanship.” This was but one of the thousands of structures that crumbled during the 1906 earthquake. Photo courtesy of the National Geophysical Data Center/W.C. Mendenhall, U.S. Geological Survey.



rect and planner who had been retained prior to the earthquake to develop a plan for the city, had presented his plan to the San Francisco Board of Supervisors in the fall of 1905. The freshly printed final edition was delivered to the city hall on the afternoon of April 17, 1906, but all copies burned in the fires of the next three days.<sup>48</sup>

- **Ineffective fire control.** Despite advice in 1905 from Fire Chief Sullivan and others, San Francisco failed to upgrade its firefighting capabilities, including its water distribution system. The result, according to Scawthorn and colleagues, was "the greatest single fire loss in U.S. history. . . . The National Board of Fire Underwriters concluded that even under normal conditions the multiple simultaneous fires would probably have overwhelmed a much larger department, such as New York's, which had three times the apparatus."<sup>49</sup>

- **Law enforcement and the military response.** Immediately following the earthquake the mayor and other local leaders made law enforcement a priority. The city mobilized to prevent anarchy and looting. In addition to the San Francisco police, the U.S. military, the national guard and state militia, special police, vigilantes, and others joined in local law enforcement efforts. (Similar circumstances prevailed in Galveston after the hurricane.)<sup>50</sup> "This plethora of armed groups with no central coordination and little supervision, each reporting to a separate command structure, created a considerable amount of confusion and led to tragedy," writes Lucien Canton in a 2006 discussion of the 1906 disaster. "There are numerous reports, some anecdotal, of men in uniform being drunk, looting, forcing others into labor, and even committing murder."<sup>51</sup> Although martial law was not officially imposed, most citizens assumed it to be in effect.

In the end, the wave of lawlessness feared by the mayor and his advisers failed to materialize. There were some incidences of looting, and several people assumed to be looters were shot by authorities, but some researchers argue that many of these people may have been trying to salvage their own possessions.<sup>52</sup>

Beyond the question of the legality (not to mention the morality) of the mayor's actions lies a larger issue regarding the imposition of martial law and role of the military in disaster response. Canton observes:

The use of military personnel to maintain public order is always fraught with peril. The Posse Comitatus Act of 1878 prohibits the use of military personnel for law enforcement functions without the specific authorization of Congress. . . . [Military personnel are neither trained nor permitted by the law to perform law enforcement functions, and most local authorities would prefer not to see the military in this role. Absent the use of the military, how would San Francisco deal with such a situation in 2006?]<sup>53</sup>

### Looting and Lawlessness in a Disaster

Modern social scientists have questioned the fear of looting following a disaster, citing it as one of several disaster myths (along with other behaviors and fears, such as panic, post-event shock that renders survivors unable to act, and the need to quickly bury the dead to prevent contagion). Careful analysis of disasters demonstrates that looting does happen in some cases, depending on several factors including the affected population's social and economic circumstances prior to the disaster. Moreover, what constitutes *looting*, as opposed to simple survival actions or the protection of one's own property, remains a question.

Philip Fradkin is particularly critical of this aspect of the city's response to the 1906 earthquake and fires:

"The exaggerated concern about looting led to the extreme solution: to summarily kill suspects of any crime. It was one of the principal tragedies of the disaster. [Mayor] Schmitt set in motion one of the most infamous and illegal orders ever issued by a civil authority in the country's history.

"All later accounts by both officials and private citizens emphasized that looting was minor or nonexistent. . . . In any case, how was looting to be defined? Citizens pillaging drugstores for medical supplies for the injured? Others seeking food for hungry families from stores that were about to be burned? Well-dressed residents sitting through the ruins of the mansions and Chinatown? Or army troops pawing through boxes of shoes in the middle of the street? . . . The determination was subjective and made in a moment. No one publicly questioned the order that substantially infringed upon the few civil liberties that existed at the time and cost the lives of an undetermined number of innocent citizens.

One resident of San Francisco observed, "The division of authority between army and municipality brought some terrible results. . . . The military was called in to take partial command; the citizens did not know whom they were to obey, and certainly the military, subordinates and guards were not made to understand the limits of their authority. The consequences were tragic. . . . Preserve us from our preservers was the cry of many of us."<sup>1</sup>

<sup>1</sup> Quoted in Philip L. Fradkin, *The Great Earthquake and Firestorms of 1906: How San Francisco Nearly Destroyed Itself* (Berkeley: University of California Press, 2005), 65, 67-68.

The Posse Comitatus Act and the use of the military in disaster response are discussed further in Chapter 8.

- **Disaster relief.** Recovery efforts in San Francisco demonstrated the problems inherent in getting supplies to victims. "As in the tale of the Sorcerer's Apprentice, for a time there was no turning off the flood of material goods and cash," writes Fradkin. He adds, "As with any large-scale, hastily organized relief effort, this one was plagued by too much of one thing (four), not enough of another (suitable clothes), and delays in getting food and clothing into the hands of needy refugees." He further notes that a survey of the relief effort determined that much of the donated clothing and other donated goods were of very poor quality, simply unacceptable, and "more or less of a burden on the Red Cross."<sup>54</sup> Still, in the 1906 disas-

the way and in which the military was particularly effective was providing aid to victims. The organization and efficiency of the military proved crucial in establishing temporary shelter and managing supplies.

The time and expense involved in sorting “in-kind” donations and the influx of unsolicited goods to a disaster site remain problems that sometimes hinder, rather than help, recovery. As a result, in recent years the Red Cross and other nonprofit agencies, the government, and emergency managers have increasingly stressed money as the preferred form of donation.

- **Poor and ethnic populations.** At the time of the earthquake, San Francisco was an industrial, commercial port city with a large working class and many impoverished residents. One-third of the population had been born outside the United States; another third were first-generation Americans.

It has long been noted that less affluent groups are differentially affected in disasters. Poor residents often can afford to live only in the most vulnerable locations and in less sturdy structures. In San Francisco at the turn of the nineteenth century, for instance, new immigrants, crowded into wood-frame buildings prone to fire in areas of filled land prone to liquefaction. In addition, poorer populations invariably have fewer resources, and therefore fewer choices, both to respond to and to recover from a disaster than do more affluent counterparts.

Institutions established to aid recovery have been designed (albeit inadvertently) to assist white, middle-class individuals. In some cases, overt racism has exacerbated obstacles to recovery. All of these factors affected response efforts in San Francisco. Fradkin states simply that “who would suffer most was preordained.” He also notes that poorer segments of the community were at a disadvantage in dealing with insurance companies: “Those people who needed cash immediately did not know how the system worked and were unable to exert political and legal pressure received the lowest returns on their policies.”<sup>56</sup>

As today, the San Francisco, of a century ago was home to large ethnic populations, particularly Chinese and Japanese immigrants. An estimated 14,000 to 25,000 Chinese Americans lived in the city, and almost all were forced to flee after the earthquake and fires decimated Chinatown. Although most moved to other parts of California or back to China, “a few hundred made the unwise choice of remaining in San Francisco.”<sup>57</sup> This was unwise because those who remained faced additional hardships and racial discrimination. Whites objected to the presence of Asians in the refugee camps, forcing the latter to move to ever more remote camps and leaving their property vulnerable to being ransacked. Because the oligar-

chy of the city perceived Chinatown as a blight on the city and as coveted real estate, the city’s leaders devised a plan to permanently relocate the population. *The San Francisco Call* issued a proclamation:

Strike while the iron is hot. Preserve this fine hill for the architecture and occupancy of the clean and moderate Caucasian. We now hold the situation in the hollow of our hand. We have but to say the word and fine edifices will in the future grace that commanding slope, fished from us by the insidious, gradual occupation of the Mongol!<sup>58</sup>

“There was still a powerfully racist element to San Francisco,” explains Winchester, “and not a few thought the fires a blessing. Now many residents breathed quietly, the Chinese could push off elsewhere, and the slums . . . could be replaced by office buildings or houses for more respectable folks.”<sup>59</sup> However, the effort to relocate the Chinese population failed because of political and economic pressure from Washington, the Chinese government, and local Chinese businesses and property owners. Nearly two years after the disaster, an estimated 15,000 Chinese residents had returned to the city.

The San Francisco catastrophe underscores an important lesson reiterated in the analysis of almost every other disaster in this chapter: In the multi-ethnic culture that is the United States, emergency management—in preparedness, warning, response, recovery, and long-term mitigation—must take into account the language, culture, desires, and fears of the many and diverse populations it serves.

- **Reconstruction and rebuilding.** San Francisco moved quickly to rebuild after the 1906 fires but continued to do so without a plan. The plan that had been developed by Burnham a few years earlier was reprinted, but the city never adopted this—or any other—comprehensive building plan. To the powerful of San Francisco, it was more important to resume business and reestablish the tax base as quickly as possible. As a result, the city was allowed to rebuild and grow much in the same haphazard way that it had developed prior to the devastation of 1906. Fradkin writes,

The “unbuilding,” as the physical reconstruction of San Francisco was called, proceeded with great speed, without any plan, and with only slight regard for the congestion and shoddy building practices that magnified the scale of the natural disaster. Recovery was eventually gained, but at great cost to forests, horses [scores were literally worked to death in the recovery and reconstruction], people, democracy, and future public safety. . . . In the end . . . San Francisco [remained] highly vulnerable to natural disasters.<sup>60</sup>

Efforts to strengthen building codes were mostly defeated, although the city did pass a new ordinance in 1909, after most of the rebuilding was complete.<sup>61</sup> In addition, in the summer of 1906, the city of San Francisco passed legislation requiring new buildings to be able to withstand a wind force of 30 pounds per square foot, but as the impact of the disaster faded

in the following decades, this standard was cut in half. It would take additional earthquakes—Santa Barbara in 1925 and Long Beach in 1933—to prompt the state of California to pass laws mandating safe construction based on standards related to earthquakes.<sup>62</sup>

The city made more progress addressing water distribution needs. It might have disregarded the need for a more effective water distribution system had it not been for economic pressure from interests beyond the city. The insurance industry demanded that a high-pressure system be implemented, as Sullivan had called for prior to the earthquake. As a result, in 1908 the San Francisco city engineer proposed the construction of an auxiliary water supply system, which was funded through a \$5.2 million bond issue and was largely completed by 1912.<sup>63</sup> In their discussion of lessons learned from the event, the earthquake experts C. Scawthorn, T. D. O'Rourke, and F. T. Blackburn detail the much-improved water distribution system, but their conclusions regarding the city's ability to fight fires are sobering:

The building stock west of Van Ness, to and including Pacific Heights, is mainly wood frame and is virtually intact, as it was in 1906—large wood-frame buildings of three to four stories in height, a conflagration hazard. The area east of Van Ness Avenue, to Stockton Street, including Telegraph Hill, was completely burned off in 1906. In the rush to rebuild, it was reconstructed virtually as it was, recreating the conflagration hazard that previously existed. With occasional high winds, narrow streets and densely built wood-frame buildings of three to four stories in height, this section of San Francisco today is as significant a conflagration hazard as it was in 1906.<sup>64</sup>

- **Denial following the quake.** Those who were in charge of the reconstruction of San Francisco denied, or at least minimized, the effects of the earthquake. As mentioned earlier, local financial and real estate interests felt that portraying the disaster as an earthquake would deter outside investment in the city and hinder the availability of insurance. Reporter Charles Smith writes, "Realizing that the vast destruction cast a pall on both prospects and property values, business leaders quickly grasped the wisdom of exciting 'earthquake' from their pronouncements, replacing it with the less frightening (and more insurance-worthy) 'Great Fire' of 1906."<sup>65</sup> Hence, for years, the San Francisco disaster was referred to as the Great San Francisco Fire, with no reference to the earthquake that was at its root.

### **San Francisco—the Archetype, the Reality and the Risk**

A small number of American catastrophes have become legendary, a part of the country's collective cultural lore. In this regard, the 1906 San Francisco Earthquake surpasses the Johnstown Flood and rivals the Dust Bowl as a national event etched in memory, evoking images of the human struggle

against catastrophe. As Ted Steinberg says, "The 1906 San Francisco earthquake is arguably the event that defines calamity in the popular imagination. It is the Big One that lurks in the back of the American mind."<sup>66</sup> (It has now certainly been joined by the events of September 11, 2001, and Hurricane Katrina.)

Becoming legend has both negative and positive consequences. On the one hand, it can mean that reality is supplanted by anecdote and myth. On the other, it means that the event, and therefore similar events, becomes part of public awareness. In their analysis of the impact of the 1906 earthquake on public policy, Jeanne Perkins and her colleagues point out that the San Francisco earthquake set the stage for research and subsequent state and federal measures to reduce seismic hazards. It provided both a historical example and concrete data to support mitigation efforts. As they state:

Because of the 1906 earthquake, California state and local governments no longer consider earthquakes and their effects as acts of God, beyond human control. These events are considered inevitable; impacts are compared to other natural disasters and understood through targeted scientific investigations.<sup>67</sup>

Indeed, only two years after the earthquake, University of California geologist Andrew Lawson and his colleagues published the *Report of the State Earthquake Investigation Commission on the California Earthquake of April 18, 1906*, which remains perhaps the most comprehensive study of a seismic event in the United States and a baseline for post-earthquake analysis. The quake also led to the formation of the Seismological Society of America in 1906 "for the acquisition and diffusion of knowledge concerning earthquakes and allied phenomena, and to enlist the support of the people and the government in the attainment of these ends."<sup>68</sup>

In terms of legislation, California did not act until three decades later, following the Long Beach earthquake of 1933. However, although intervening earthquakes were often the precipitating events and more proximal causes of change, researchers suggest that virtually all later California programs and legislation can be traced in part to information and insights derived from the Great San Francisco Earthquake of 1906.<sup>69</sup> Perkins and her colleagues cite not only the Seismological Society of America, but also the first Uniform Building Code seismic provisions, the Field and Riley acts (discussed below), the Association of Bay Area Governments' Earthquake Program, California's Joint Legislative Committee on Seismic Safety, the Alquist-Priolo Earthquake Fault Zoning Act, the 1973 Hospital Seismic Safety Act, the California Seismic Safety Commission, and the National Earthquake Hazards Reduction Program, which was established more than seventy years later (discussed further in Chapter 4). Robert Reiherman traces an entire lineage of earth scientists and earthquake engineers whose progenitors first became involved in these fields following the 1906 earth-

quake: he further posits that the Great San Francisco Earthquake established the credibility of the study of earthquakes in the United States.<sup>70</sup>

Analyses of San Francisco's vulnerability today are sobering. In 2003, a report of the U.S. Geological Survey and other scientists concluded that "there is a 62 percent probability of at least one magnitude 6.7 or greater quake, capable of causing widespread damage, striking somewhere in the San Francisco Bay region before 2032."<sup>71</sup> In 2006, in preparation for the centennial commemoration of the Great San Francisco Earthquake, a report was published outlining the present-day consequences of an earthquake of the magnitude of the 1906 event:

The current population of this Northern California region is about ten times what it was in 1906, and the replacement value of buildings is about 500 times greater. Despite improvements in building codes and construction practices, the growth of the region over the past 100 years causes the range of estimated fatalities, approximately 800–3,400 depending on time of day and other variables, to be comparable to what it was in 1906. The forecast property loss to buildings for a repeat of the 1906 earthquake is in the range of approximately \$90–120 billion; 7,000–10,000 commercial buildings in the region are estimated to be closed due to serious damage; and about 160,000–250,000 households calculated to be displaced from damaged residences. Losses due to fire following earthquake, as well as losses to utility and transportation systems, would be in addition to these estimates.<sup>72</sup>

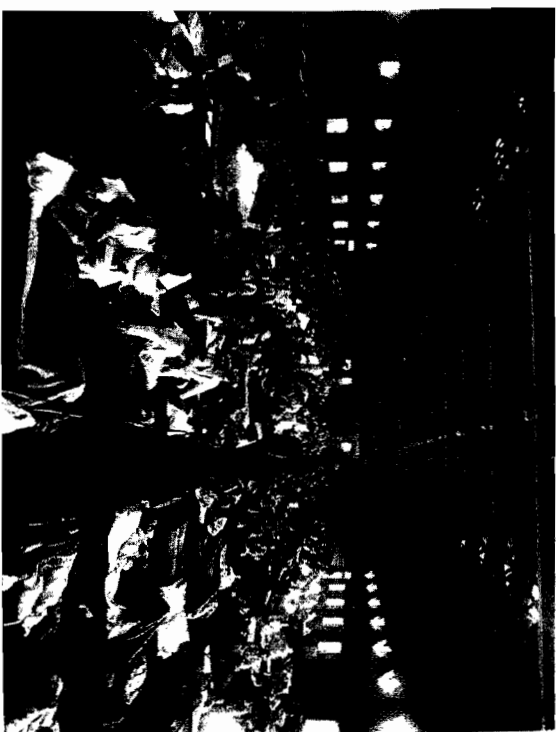
"A major quake can occur in any part of this densely populated region," warned the U.S. Geological Survey in 2003. "Therefore, there is an ongoing need for all communities in the Bay region to continue preparing for the quakes that will strike in the future."<sup>73</sup>

### The Great Influenza Pandemic of 1918

Experts do not agree on the origins of the Great Influenza Pandemic of 1918, but many people suspect that it began with an outbreak of flu in southwestern Kansas. Initially, the influenza virus may have been passed from birds to humans directly or through an intermediary host, such as pigs. But the virus became deadly when it mutated into a form directly transmissible from human to human.<sup>74</sup>

The influenza progressed in waves over the next several years, but the second outbreak continued through the fall and winter of 1918–1919. By then, the virus had mutated into a virulent form. The explosive and deadly outbreak was unlike anything the world had seen in more than five centuries. At the time, *Science* magazine reported, "The epidemics now occurring appear with electric suddenness, and, acting like powerful, uncontrolled currents, produce violent and eccentric effects. The disease never spreads slowly and insidiously. Wherever it occurs, its presence is startling."<sup>75</sup>

The historical setting for the disease made its transmission almost impossible to control. Specifically, the entry of the United States into World War I



Camp Funston, Kansas, was the site of one of the first major flu epidemics. Photo courtesy of the National Museum of Health and Medicine, Armed Forces Institute of Pathology, Washington, D.C.

resulted in young men from around the country being concentrated in large training facilities, where they were housed in proximity to one another and then transported to other parts of the country and, ultimately, overseas. In a sense, the war created a system for distributing the disease across the country and around the world—and later, bringing it back to the United States once again.

The disease spread in three waves over twelve months. During the fall and early winter of 1918–1919, the most brutal wave was over in less than four months. A somewhat less severe strain appeared a few months later and then faded.

The disease was unusual not only in its virulence, but also in its sudden onset and the rapid course of the disease. It could incapacitate and kill a victim within hours, and it could blanket an entire city in only a few days. It was also unique in the pattern of its morbidity: Besides infants and elderly—the usual victims of flu—the 1918–1919 flu was particularly deadly for young adults. The high mortality rate was due in large part to its alarming tendency to produce fatal secondary bacterial pneumonia.<sup>76</sup>

In 1918 and 1919, the influenza pandemic caused more deaths than had been lost during the previous four years in World War I. Once the virulent strain spread across the world, it killed at least 25 million people in just six months. An estimated 5 percent of India's population died. The death rate

**An Eyewitness Account**

The following excerpt from a letter written by an unknown soldier in Camp Devens, near Boston, demonstrates the deadly grip the pandemic had on the 50,000 men living there:

"These men start with what appears to be an ordinary attack of La Grippe or Influenza, and when brought to the Hospital, they very rapidly develop the most vicious type of Pneumonia that has ever been seen. Two hours after admission they have the mahogany spots over the cheek bones, and a few hours later you can begin to see the Cyanosis extending from their ears and spreading all over the face, until it is hard to distinguish the coloured men from the white. It is only a matter of a few hours then until death comes, and it is simply a struggle for air until they suffocate. It is horrible. One can stand it to see one, two or twenty men die, but to see these poor devils dropping like flies sort of gets on your nerves. We have been averaging about 100 deaths per day...."

"It takes special trains to carry away the dead. For several days there were no coffins and the bodies piled up something fierce, we used to go down to the morgue (which is just back of my ward) and look at the boys laid out in long rows. It beats any sight they ever had in France after a battle. An extra long barracks has been vacated for the use of the Morgue, and it would make any man sit up and take notice to walk down the long lines of dead soldiers all dressed and laid out in double rows."

Source: N. R. Gist, *British Medical Journal* (22-29 December 1919): 1632.

was especially high for indigenous peoples in areas such as Alaska, southern Africa, and the South Pacific, where entire villages perished.

The disease also spread through Europe. In May 1918, one of the more severe early outbreaks of the disease hit Spain, where an estimated 8 million people contracted the disease. While other countries discouraged or even censored mention of the disease because leaders feared that it would incite panic or hurt morale and/or wartime production, it was widely publicized in Spain. As a result, the pandemic became popularly known as the "Spanish flu."<sup>76</sup>

By the time the disease had subsided, an estimated 500 million people—one-third of the world's population—had been infected and an estimated 2.5 to 5 percent of the world's population had died.<sup>77</sup> In absolute numbers, more lives were lost to the 1918–1919 pandemic than to any other disease. In terms of percentages, it was the worst health disaster since the Black Death of the fourteenth century.

Between 500,000 and 675,000 Americans lost their lives to the pandemic—ten times more than died on the World War I battlefields. The virus killed 195,000 in October 1918 alone, making that month the deadliest in U.S. history. The average lifespan in the United States declined by ten years as a result.<sup>78</sup>

Researchers Jeffery Taubenberger and David Morens note that the impact of the pandemic went beyond 1918–1919: "All influenza A pandemics since that time, and indeed almost all cases of influenza A worldwide . . . have been caused by descendants of the 1918 virus . . . making the 1918 virus indeed the 'mother' of all pandemics."<sup>79</sup> According to these researchers, variants of the disease still survive today.

**Preparedness and Response**

At the time of the 1918 influenza outbreak, the United States had a broad and competent health infrastructure that included national and local public health agencies as well as a seemingly adequate supply of doctors, nurses, and hospitals. Nevertheless, the system was soon overwhelmed by the Great Influenza Pandemic. Hospitals, particularly those in military camps, had far too few beds to accommodate the massive numbers of sick in the fall of 1918. Furthermore, the war had depleted the number of available doctors and nurses.

Initially public health agencies reacted by denying the threat. U.S. Surgeon General Rupert Blue, for instance, "did, literally, less than nothing: he blocked relevant research." Although Blue published warnings about the flu, "he made no preparations whatsoever to try to contain it. Even after it began to show evidence of lethality . . . neither he nor his office attempted to gather information about the disease anywhere in the world. And he made no effort whatsoever to prepare the Public Health Service for a crisis."<sup>80</sup> Only when the crisis could not be denied did Blue finally react, asking for money from Congress to hire 5,000 doctors for emergency duty for a month.

Although the disease was first manifest in military installations, the military seemingly also failed to recognize the scope of the problem. It ignored the need to curtail troop movements or quarantine the sick, contributing to the rapid spread of the disease.

Compounding poor preparedness and a reluctance to address the problem was the fact that there was neither a vaccine to prevent the disease nor a serum to treat it. When the epidemic broke out, a great deal of effort was spent to determine the origin. The etiological agent was unknown, but it was thought to be airborne bacteria. Although early on some researchers suspected a virus (the true cause), that agent was only determined conclusively years later.<sup>81</sup>

As the epidemic spread and leaders were forced to acknowledge the scope of the disease, the U.S. response was multifaceted, involving both public health measures and medical and scientific efforts to treat, understand, and develop medicines to counteract the disease. The public health measures undertaken in cities and towns throughout the nation as well as within military



installations were directed toward inhibiting the transmission of the pathogen, whatever it might be. Since the microbe was thought to be airborne, these measures sometimes involved prohibiting or limiting public assembly by closing theaters, saloons, restaurants, and sometimes schools and by limiting attendance at places of worship.

Some state and local health agencies mandated the quarantine of infected individuals. To the extent possible, hospitals separated patients from one another. Authorities also recommended various measures that individuals should take to prevent infection. For example, many health authorities advocated wearing gauze masks, which local Red Cross volunteers spent much time making, and San Francisco issued a trial ordinance requiring the entire population to wear the masks. All these measures required a major public information campaign. Both federal and local health agencies, as well as the American Red Cross, launched education campaigns using leaflets and posters to inform the public of recommended practices.

Many of the public health measures had some basis in science, but many were just commonsense notions regarding personal health and hygiene. In the end, it is questionable whether any of the measures did much to control the spread of the disease. An article in the December 1918 *British Medical Journal* lamented the inability to stem its tide: "Every town-dweller who is susceptible must sooner or later contract influenza whatever the public health authorities may do; and that the more schools and public meetings are banned and the general life of the community dislocated the greater will be the unemployment and depression."<sup>82</sup>

Across the United States, the Red Cross became the lead organization at the local level to deal with the epidemic. The organization had grown tremendously as a result of the war effort. The number of local chapters increased from 107 in 1914 to 3,864 in 1918; during these years, membership grew from 17,000 to more than 20 million Americans. The Red Cross was involved in everything from making gauze masks to locating and recruiting nurses to provide home care.

The Red Cross responded to the outbreak by recruiting and supplying nurses: "15,000 Red Cross nurses, dietitians, and others were recruited to work in military camps, hospitals, coal fields, munitions plants, and shipyards, where they remained until the epidemic finally subsided in the spring of 1919."<sup>83</sup> But it became increasingly difficult to meet the domestic need for doctors and nurses during a time of war:

Since the medical practitioners were away with the troops, only the medical students were left to care for the sick. Third- and fourth-year classes were closed and the students assigned jobs as interns or nurses. . . . The shortage was further compounded by the added loss of physicians to the epidemic. In the U.S., the Red Cross had to recruit more volunteers to contribute to the new cause at home of fighting the

influenza epidemic. To respond with the fullest utilization of nurses, volunteers and medical supplies, the Red Cross created a National Committee on Influenza. It was involved in both military and civilian sectors to mobilize all forces to fight Spanish influenza."<sup>84</sup>

It is unrealistic to think that the medical researchers of the day could have developed medicines in time to control the pandemic or diminish its devastating effects. If an outbreak as ferocious as the 1918 epidemic were to break out today, many experts say that it is unlikely that scientists would be able to develop a vaccine and the pharmaceutical industry to mass-produce it quickly enough to control the disease. Furthermore, because of the virulence and explosiveness of the 1918 disease, research had to proceed faster than most scientists would have liked. Controls could not always be established, results confirmed or conclusions verified. Nevertheless, researchers worked furiously to develop a vaccine that would inhibit the bacterial causes of secondary pneumonia, seen as the proximal cause of death. The resulting vaccines had some prophylactic efficacy, but they had no effect once infection had set in. Ultimately, scientists found neither a palliative to relieve the symptoms of the disease nor a cure to prevent its deadly consequences.<sup>85</sup>

#### Current Concerns, Future Threats, and the Role of the Emergency Manager

The Great Influenza Pandemic of 1918–1919 is significant because, like the San Francisco Earthquake, it has become part of American history, culture, and consciousness. Like the other disasters discussed in this chapter, it was an archetype and baseline for events that followed.

The pandemic poses several critical questions for modern society and today's emergency managers:

- Could a similar epidemic occur today?
- What would be the likely consequences?
- What role should emergency managers play in responding to such an event?

Researchers agree that the answer to the first question—could a similar epidemic recur—is yes. "[S]ince it happened once, analogous conditions could lead to an equally devastating pandemic," conclude Taubenberger and Morens.<sup>86</sup> Much earlier, in an article published in the *British Medical Journal*, Grist wrote:

"Epidemic influenza remains the biggest and unconquered acute threat to human health, inflicting damage and death far beyond familiar notification data. The impact of influenza A is particularly severe during periodic pandemics owing to novel antigenic variants which override immunity from experience of earlier subtypes. It is salutary to remember that we do not really understand why the devastating

*pandemic of 1918-19 was so severe, and that we cannot therefore be confident that our modern medical measures would succeed against a similar future challenge [emphasis added].*<sup>87</sup>

Such fears inform current concerns about a possible bird flu epidemic. In *The Great Influenza: Story of the Deadliest Plague in History*, John M. Barry goes further, pointing out that we need to address the potential consequences not only of a pandemic, but also the effects of more moderate annual outbreaks of the flu:

The threat of H5N1 (bird flu) has . . . focused the minds of scientists and public health officials around the world. They are quietly, and sometimes not so quietly, warning those with the power to spend money that, if they do not prepare for a pandemic now, some time in the near future an investigative commission will write the equivalent of a 9/11 Commission Report, asking why they failed to act. Only this time, instead of a few thousand dead, the toll will be in the millions. . . . Influenza has to be seen as a lethal threat. A pandemic would prove more deadly than even a major bioterrorism attack, and it is more likely to occur. In addition according to the CDC [Centers for Disease Control and Prevention], every year influenza kills 36,000 Americans, almost triple the country's AIDS death tolls, and . . . despite medical advances influenza's annual death toll is trending up, not down.<sup>88</sup>

Similarly, experts Caroline Ash and Leslie Roberts regard research on the bird flu virus as essential not only for the current problem but for future outbreaks as well. "An energetic response to H5N1 does not have to be alarmist," they write. "We can marshal existing concern about this particular strain of avian influenza to build a long-lasting international infrastructure to monitor and thwart threats from such emerging infections."<sup>89</sup>

In fact, the specter of the Great Flu Pandemic of 1918 informs much of the current concern regarding the H5N1 bird flu virus that has spread across Asia and has entered Europe and Africa. While the bird flu has infected only about two hundred people, more than half of those affected have died from the disease.<sup>90</sup> So far, transmission has been almost entirely from birds to humans. Scientists worry that a human-to-human strain will evolve and a worldwide pandemic will follow.

Such an event could have devastating consequences. Despite the lack of understanding (or perhaps because of it) regarding the origins and evolution of the 1918 virus, Taubenberger and Morens conclude:

Even with modern antiviral and antibacterial drugs, vaccines, and prevention knowledge, the return of a pandemic virus equivalent in pathogenicity to the virus of 1918 would likely kill [more than] 100 million people worldwide. A pandemic virus with the (alleged) pathogenic potential of some recent H5N1 outbreaks could cause substantially more deaths.<sup>91</sup>

These researchers provide a partial answer to the second question posed earlier: What would be the likely consequences? Clearly, a virus like the 1918 virus would result in unprecedented loss of life but even a less severe strain of flu would likely have major consequences. The World Health

Organization estimates that a milder virus, (akin to a strain that appeared in 1968), would kill between 2 and 7.4 million people worldwide. The Centers for Disease Control and Prevention (CDC) estimates that a mild virus would result in 89,000 to 207,000 deaths in the United States.<sup>92</sup> Moreover, because of the global nature of our modern culture, a pandemic would affect the world economy and our transportation systems far more drastically than in 1918-1919. Researchers warn that a pandemic would quickly overwhelm national and international health care systems and severely disrupt the economy. (Some people speculate that the Internet could ameliorate some of these problems because it would enable many people to work and communicate in isolation.)

In many respects a massive quick-onset, virulent epidemic is similar to other disasters. It results in the death of large numbers of people with little warning. The resulting response requires planning, coordination, information sharing, and the management of large numbers of people. In this light, the answer to the last question regarding the role of an emergency manager is clear: Emergency managers have the experience, knowledge, and skills necessary to deal with the disruption that an outbreak would cause to the social structure. Emergency managers would be called on to share that expertise, but they would be part of a much larger team addressing the problem.

In the early 1900s, epidemics and other widespread health disasters were not included with natural disasters as phenomena that could be addressed by a common "emergency management system," primarily because such a system had not yet emerged. There was no person called a *professional emergency manager*. Today, however, an epidemic or other mass health problem is recognized as an emergency issue. Planning for such an eventuality involves the broad range of agencies and institutions that could contribute to their management, including hospitals, physicians, local health departments, the CDC, government officials and agencies at all levels, news media, and emergency management professionals. The National Response Plan (NRP), which outlines coordinated response to various kinds of disaster, expressly addresses this need for coordination to biological incidents and public health threats. The NRP's "Biological Incident Annex" states:

No single entity possesses the authority, expertise, and resources to act unilaterally on the many complex issues that may arise in response to a disease outbreak and loss of containment affecting a multijurisdictional area. The national response requires close coordination between numerous agencies at all levels of government and with the private sector.<sup>93</sup>

Various people and institutions are responsible for preventing outbreaks. Researchers at private companies have joined public health agencies to develop vaccines and to stockpile antiviral medications to contain an epidemic should one break out.<sup>94</sup> But researchers caution that it is "almost impossible to produce, distribute, and administer hundreds of millions of doses, and

possibly a billion or more, within six months after the emergence of a new pandemic virus.<sup>95</sup>

If an outbreak occurred, a wide range of individuals and organizations—emergency managers, Red Cross volunteers, media, and government officials and agencies at the federal, state, and local levels—would be needed to manage everything from triage, to feeding and sheltering victims, to the dissemination of public information. To address a coordinated management effort, the federal government has drafted a Health and Human Services Pandemic Influenza Plan and a National Strategy for Pandemic Influenza Implementation Plan.<sup>96</sup>

To a certain extent, the role of the modern emergency manager is clear: The emergency manager must prepare for systemic failure due to widespread illness and deaths from the flu. But until an actual outbreak occurs, the precise nature of the emergency manager's role will remain uncertain. Emergency managers, like other professionals, will have to work in concert to address previously unknown circumstances. This is almost always the case with disasters, and effective response requires prior planning, coordination, and communication among the many people and organizations involved in response. Unlike other disasters, however, the duration of a major health emergency could be months, with the impact spreading through communities throughout the nation or even the world. As a result, the network of professionals called upon to respond could be extensive.

### The Long Beach Earthquake of 1933

On March 20, 1933, at 5:54 pm, an earthquake of approximately 6.3 magnitude struck Southern California. "When the quake hit we all scrambled to get out the back door," recalls Arthur G. Porter, an Orange County resident. "I tried several times before I could get up off the sofa, and then as we stood (or, rather attempted to stand) near the rear kitchen door, our garage appeared to be shaking just as if it were on the end of a rug shaken by hand."<sup>97</sup>

Much smaller and more localized than the Great San Francisco Earthquake, the Long Beach quake killed approximately 120 people, making it the deadliest earthquake in Southern California history. The Southern California Earthquake Center reports that more than two-thirds of the deaths occurred "when people ran outside and were struck by falling bricks, cornices, parapets, and building ornaments."<sup>98</sup>

But things could have been worse. Records show that 75 percent of Long Beach's schools sustained extensive damage. "Brick buildings with unreinforced masonry walls, including many of the school buildings in Long Beach and surrounding areas, failed catastrophically," write Susan Fatemi and Charles James in their account of the Long Beach quake. "If the earth-



Many buildings with unreinforced masonry, like the Jefferson Junior High School, shown here, were severely damaged during the earthquake that struck Long Beach in 1933. This disaster led directly to state legislation mandating seismic safety in school construction. Photo courtesy of the National Geophysical Data Center/W.L. Huber.

quake had struck a few hours earlier, when school was in session, the loss of life would have been appalling."<sup>99</sup>

As in San Francisco twenty-seven years earlier, the military responded with troops, supplies, and food kitchens. Martial law was not declared, but the presence of soldiers led many Long Beach residents to think that the city was under martial law.

### The Consequences: California Recognizes Its Seismic Risk

The Long Beach quake is significant as the focusing event that led the state of California to adopt legislation addressing its seismic hazard. In 1933, just one month after the earthquake, California passed the Safety of Design and Construction of Public School Buildings Act (Known as the Field Act, because it was authored by state legislator Don C. Field). The Field Act regulates the construction or reconstruction of school buildings and the inspection of existing school buildings through a state agency independent of local political influence. Six years later, the Garrison Act strengthened the requirements by requiring that school buildings constructed prior to 1933 and found by inspectors to be unsafe be updated to the California Building Code.

In 1933, the California Assembly also adopted the Riley Act, which required all California local governments to have a building department and

inspect new construction, and mandated that all new structures be designed to withstand a horizontal acceleration of 0.02 times the acceleration due to gravity.

### Disaster Management as a Historical, Evolutionary Process

Although it was the proximal event, the Long Beach earthquake constituted just one of a series of events—social, political, and programmatic, as well as seismic—that ultimately increased and reshaped public awareness regarding the earthquake threat in California. In 1925 a moderate earthquake struck in Santa Barbara, killing 13 people. Robert Olson concludes that this event sustained, if not rekindled, interest in earthquake engineering and seismic building codes, in part because it alerted insurers to their potential liability. Perkins et al. agree that the “1925 earthquake also prompted the initial public recognition that earthquakes were a California problem, not a San Francisco problem.”<sup>100</sup>

Because the Long Beach earthquake occurred just eight years later, it renewed attention to the lessons learned in the Santa Barbara quake. Olson writes, “Above all, the [Long Beach] earthquake forever closed the ‘window of denial’ by forcing business and public recognition that California was seriously threatened by earthquakes.”<sup>101</sup> As a consequence,

in 1933, unlike in 1906, scientists and engineers were ready to use the earthquake to argue that Californians faced a serious threat from future seismic events. These seismologists and earthquake engineers embarked on a vigorous public relations campaign that succeeded in painting the Long Beach earthquake as a manifestation of a general hazard rather than an isolated occurrence.<sup>102</sup>

In an immediate sense, by building on the experience of the 1906 and 1925 quakes, the Long Beach earthquake helped engender a heightened awareness of and improved response to the problems posed by poorly designed, poorly constructed, unreinforced masonry structures in seismic areas. In a broader sense, the event ushered in the modern era of state and federal involvement in earthquake hazard mitigation.

It is tempting to point to the 1933 earthquake as the event that launched California’s (and by extension the nation’s) concern with seismic safety, but this denies the historical, evolutionary process of disaster management. The Long Beach disaster would not have resulted in significant change had the San Francisco and Santa Barbara quakes not come before it. Those earlier disasters laid the groundwork—through research and innumerable smaller institutional and policy changes—for the major legislation passed by the state government following the Long Beach quake. This California legislation, in turn, laid the groundwork for national awareness and federal legislation many years later (as discussed in Chapters 3 and 4).

Policy makers and emergency managers work not only in a social, political, and geographical context, but also in a historical context. Their actions and concerns are part of a decades-long effort to safeguard the lives of people subject to disasters. Awareness of that history can help to facilitate both the formation of sound policy and the creation of effective practice in dealing with hazards. For instance, true to the evolutionary process of hazard management, the 1933 Field Act has been updated many times; as a result, no California school covered by the Field Act has failed in an earthquake.<sup>103</sup>

### Endnotes

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- 3 Roy S. Popkin, “The History and Politics of Disaster Management in the United States,” in *Nothing to Fear: Risks and Hazards in American Society*, ed. Andrew Kirby (Tucson: University of Arizona Press, 1990), 106. For more thorough surveys of early federal involvement, see also May, *Recovering from Catastrophes*; and David A. Moss, “Courting Disaster? The Transformation of Federal Disaster Policy,” in *The Financing of Catastrophe Risk*, ed. Kenneth A. Froot (Chicago: University of Chicago Press, 1999), 312 ff.
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- 7 *Ibid.*, 2.
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- 14 "The 1900 Storm," *Galveston County Daily News*, 2007, [1900storm.com/storm/storm2.lasso](http://1900storm.com/storm/storm2.lasso).
- 15 Philip L. Fradkin, *The Great Earthquake and Firesstorms of 1906: How San Francisco Nearly Destroyed Itself* (Berkeley: University of California Press, 2005), 19.
- 16 Erik Larson, *Isaac's Storm: A Man, a Time, and the Deadliest Hurricane in History* (New York: Random House/Vintage Books, 1999), 81–84.
- 17 Casey Edward Greene and Shelly Henley Kelly, *Through a Night of Horrors: Voices from the 1900 Galveston Storm* (College Station: Texas A&M University Press, 2000), 15–19.
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- 19 *Ibid.*, 256.
- 20 John H. Lienhard, "Raising Galveston. The Engines of Our Ingenuity, No. 385," [uh.edu/engines/ep1865.htm](http://uh.edu/engines/ep1865.htm).
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- 22 Larson, *Isaac's Storm*, 79–80.
- 23 *Ibid.*, 84.
- 24 See, for example, the "Handbook of Texas Online" article about the hurricane at [sha.utexas.edu/handbook/online/articles/GG/vdgg2.html](http://sha.utexas.edu/handbook/online/articles/GG/vdgg2.html). For Cline's official report, see [history.noaa.gov/stories\\_tales/cline2.html](http://history.noaa.gov/stories_tales/cline2.html).
- 25 Fradkin, *The Great Earthquake and Firesstorms of 1906*, 19.
- 26 Larson, *Isaac's Storm*, 272.
- 27 Roger A. Pielke Jr. and Daniel Sarewitz, "Managing the Next Disaster," *Los Angeles Times*, 23 September 2005, available at [espo.org/ourlibrary/articles/Managingthenextdisaster.htm](http://espo.org/ourlibrary/articles/Managingthenextdisaster.htm).
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- 29 The data in this paragraph are from [quake.wr.usgs.gov/info/1906/](http://quake.wr.usgs.gov/info/1906/); Fradkin, *The Great Earthquake and Firesstorms of 1906*; and Simon Winchester, *A Crack in the Edge of the World: America and the Great California Earthquake of 1906* (New York: HarperCollins Publishers, 2005). See also the website of the Virtual Museum of the City of San Francisco, [sfmuseum.org/1906/06.html](http://sfmuseum.org/1906/06.html).
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- 31 Throughout this book, the authors avoid citing dollar amounts for damage. Even using supposed scales and algorithms, it is virtually impossible, for example, to compare the

- destruction in San Francisco in 1906 with that in New Orleans in 2005. (In a sense, it also may be demeaning to disaster victims to call one event "more costly" than another.) For further discussion, see Fradkin, *The Great Earthquake and Firesstorms of 1906*, 346; and Winchester, *A Crack in the Edge of the World*, 288n.
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- 34 Quoted in *ibid.*, 229.
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- 39 Winchester, *A Crack in the Edge of the World*, 302.
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- 41 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" (San Francisco: San Francisco Archives, 1980), available at [sfmuseum.org/perished/index.html](http://sfmuseum.org/perished/index.html); and Gladys Hansen and Emmet Condon, *Denial of Disaster: The Untold Story and Photographs of the San Francisco Earthquake and Fire of 1906* (San Francisco: Robert A. Cameron, 1989). For further information regarding Hansen's analysis and a more general discussion concerning the number of lives lost because of the earthquake, see Fradkin, *The Great Earthquake and Firesstorms of 1906*, 190–191.
- 42 For different views and estimates, see Winchester, *A Crack in the Edge of the World*, 309; Fradkin, *The Great Earthquake and Firesstorms of 1906*, 140ff.; and Lucien G. Canton, "San Francisco 1906 and 2006: An Emergency Management Perspective," *Earthquake Spectra* 22, no. S2 (2006): S159–S182.
- 43 Fradkin, *The Great Earthquake and Firesstorms of 1906*, 205, 207.
- 44 For an excellent analysis of the response to this disaster and a summary of lessons learned, see Canton, "San Francisco 1906 and 2006," who draws parallels between the 1900 Galveston Hurricane and Hurricane Katrina in New Orleans in 2005.
- 45 New Orleans' vulnerability to a devastating hurricane and flooding was similarly identified prior to Hurricane Katrina. Disaster sociologist Shirley Laska wrote in November 2004 about a major hurricane striking New Orleans: "Should this disaster become a reality, it would undoubtedly be one of the greatest disasters, if not the greatest, to hit the United States, with estimated costs exceeding 100 billion dollars. According to the American Red Cross, such an event could be even more devastating than a major earthquake in California. Survivors would have to endure conditions never before experienced in a North American disaster." See Shirley Laska, "What if Hurricane Ivan Had Not Missed New Orleans?" *Natural Hazards Observer* 29, no. 2 (2004): 6.
- 46 See Tohrner, "An EERI Reconnaissance Report," for a thorough analysis of various kinds of structural failure due to the earthquake.
- 47 As cited in Winchester, *A Crack in the Edge of the World*, 285.
- 48 *Ibid.*, 357–358.
- 49 Scawthorn, O'Rourke, and Blackburn, "The 1906 San Francisco Earthquake and Fire," S135, S139.



- 50 Fradkin, *The Great Earthquake and Firestorms of 1906*, 19.
- 51 Canton, "San Francisco 1906 and 2006," S172.
- 52 Ibid., 172-173. Of the situation in New Orleans following Hurricane Katrina in 2005, Canton writes: "The impression given by the media was that there was wide-scale looting. But there is a significant difference between the criminal act of stealing for personal gain and the actions of a disaster victim seeking essential supplies or a property owner salvaging whatever he or she can. Many of the reports of looting in San Francisco following the 1906 catastrophe were later found to be unsubstantiated, as appears may now be the case in Hurricane Katrina."
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- 55 Larson, *Isaac's Storm*, 256.
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- 57 Ibid., 289.
- 58 Ibid., 295.
- 59 Winchester, *A Crack in the Edge of the World*, 330.
- 60 Fradkin, *The Great Earthquake and Firestorms of 1906*, 197.
- 61 Tohrner, "An EERI Reconnaissance Report"; and Jeanne B. Perkins et al., "A Retrospective on the 1906 Earthquake's Impact on Bay Area and California Public Policy," *Earthquake Spectra* 22, no. S2 (2006): S237-S259.
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- 63 Seawhorn, O'Rourke, and Blackburn, "The 1906 San Francisco Earthquake and Fire," S145.
- 64 Ibid., 146.
- 65 "Smith, "What San Francisco Didn't Learn."
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- 72 Charles A. Kircher et al., "When the Big One Strikes Again: Estimated Losses due to a Repeat of the 1906 San Francisco Earthquake," *Earthquake Spectra* 22, no. S2 (2006): S297.
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- 75 As cited in Barry, *The Great Influenza*, 313.
- 76 See "The Influenza Pandemic of 1918" at [virus.stanford.edu/uda/](http://virus.stanford.edu/uda/).
- 77 Taubenberger and Morens, "The Mother of All Pandemics." As with most large disasters, accurate numbers are difficult to determine. Early estimates indicated that the pandemic resulted in 21 million deaths worldwide, but experts today believe that it killed at least 50 million and perhaps as many as 100 million people. For further information about problems inherent in identifying the correct number, see Board on Global Health, *The Threat of Pandemic Influenza: Are We Ready? Workshop Summary*, ed. Stacey L. Knobler et al. (Washington, D.C.: National Academies Press, 2005), available at [www.nationalacademies.org/amazon/books/flu/threat-of-pandemic-influenza-are-we-ready-workshop-summary-0309095042.html](http://www.nationalacademies.org/amazon/books/flu/threat-of-pandemic-influenza-are-we-ready-workshop-summary-0309095042.html); and Barry, *The Great Influenza*, 396 ff. For statistics regarding deaths worldwide, see Barry, *The Great Influenza*, 359-365.
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## Chapter 3

### The Expanding Role of the Federal Government: 1927-1950

As communities in the United States recovered from one disaster after another, there was a growing body of knowledge about what response and recovery looked like. There was also a growing understanding that the needs of communities and their victims exceeded local capacity. The Great Mississippi Flood of 1927 and the drought that plagued the Dust Bowl for several years during the 1930s captured the attention of the nation. Each of these events demonstrated that disasters and their effects do not respect state boundaries; the financial effects of the drought that plagued the southern Great Plains during the Depression rippled throughout the nation.

Throughout this period, federal government response continued to be reactive and focus-driven, but it was becoming increasingly common. From 1933 to 1937, disaster relief legislation emerged as part of President Franklin D. Roosevelt’s New Deal administration. Beginning in 1934, Congress authorized the Reconstruction Finance Corporation to grant loans to rebuild public facilities damaged by disasters. Subsequent legislation in 1937 created the Disaster Loan Corporation. These programs eventually evolved into the Small Business Administration disaster loan program, which still exists today.

This chapter further explores three major disasters—the Great Mississippi Flood, the drought and storms that became known as the Dust Bowl, and the Texas City explosions, which occurred just after World War II. The explosions in Texas City captured the nation’s attention not only because of the sudden onset and immediate death toll, but also because the event vividly demonstrated the risk that accidents and other human-induced threats posed to communities. The chapter explores why and how these disasters became focusing events. In particular, the discussion focuses on the role of these events in prompting the federal government—as well as state and local governments—to take a greater role in disaster prevention, response, and recovery—a gradual transformation that resulted in the passage of major federal disaster legislation in 1950.

#### The Great Mississippi Flood of 1927

Communities along the Mississippi have been involved in flood control—primarily levee construction—since 1726, when residents of New Orleans began building levees to protect the city from the rising river. The federal government’s involvement dates back to 1824, when the U.S.