

10-1-2014

## Cold, Drought, and Disaster: The Little Ice Age and the Spanish Conquest of New Mexico

Sam White

Follow this and additional works at: <https://digitalrepository.unm.edu/nmhr>

---

### Recommended Citation

White, Sam. "Cold, Drought, and Disaster: The Little Ice Age and the Spanish Conquest of New Mexico." *New Mexico Historical Review* 89, 4 (2014). <https://digitalrepository.unm.edu/nmhr/vol89/iss4/2>

This Article is brought to you for free and open access by UNM Digital Repository. It has been accepted for inclusion in *New Mexico Historical Review* by an authorized editor of UNM Digital Repository. For more information, please contact [amywinter@unm.edu](mailto:amywinter@unm.edu), [lsloane@salud.unm.edu](mailto:lsloane@salud.unm.edu), [sarahrk@unm.edu](mailto:sarahrk@unm.edu).

## Cold, Drought, and Disaster

The Little Ice Age and the Spanish Conquest of New Mexico

---

SAM WHITE



Between 1538 and 1610, Spanish agents entered, invaded, and at last resolved to colonize and convert the distant northwestern outpost of New Spain that would become New Mexico. These soldiers and settlers faced severe hardships and significant obstacles on the road to conquest and settlement. The journey was long, the geography was rugged, supplies ran short, and relations with local Indians repeatedly broke down in violence. Ignorance, outsized ambitions, erratic leadership, aggression, and cultural insensitivity have all received—and may all deserve—their share of blame. Yet lying behind many of the conquest’s disasters, and shaping the course of New Mexico’s history, stood the pervasive influence of natural forces, particularly cold and drought.

Climate played a complex, at times subtle, and at times profound and unappreciated role in early *entradas* (invasions) up the Rio Grande. This article will explore how cold and drought strongly influenced key events from the earliest Spanish explorations and Francisco Vázquez de Coronado’s failures in 1540–1542, through the massacre of Acoma Puebloans in 1599, to the desertion of

---

SAM WHITE is assistant professor of environmental history at the Ohio State University, author of *The Climate of Rebellion in the Early Modern Ottoman Empire* (Cambridge University Press, 2011), and website editor of [climatehistorynetwork.com](http://climatehistorynetwork.com). His current book manuscript explores the role of climate and extreme weather in the early European exploration and colonization of North America. Research for this project was supported by the Huntington Library, the John Carter Brown Library, and Oberlin College. The author would like to thank the Sky City Cultural Center for the opportunity to visit Acoma Pueblo and ask questions; and Charles Cutter, Stanley Hordes, John Brooke, Richard Flint, Shirley Cushing Flint, and the *NMHR* editors for comments and corrections on the article manuscript. Any remaining errors are entirely my own.

the first settlers in 1601 and to the downfall of New Mexico's first *adelantado* (conquering governor) don Juan de Oñate. Both the challenging environment of New Mexico itself and particular climatic events of the sixteenth century repeatedly derailed Spanish plans and hastened Pueblo resistance. Previous historians have acknowledged the impact of cold and drought in parts of this historical narrative, but the full role of climate has yet to receive due consideration.

In this story, climate posed three challenges. First, the Spanish invaders had to anticipate the climate in an unfamiliar land where geographical knowledge was tenuous at best during an age when theories about weather and seasons were still nascent. Second, these explorers and colonists had to accomplish their mission during the climatic disruptions of the Little Ice Age. The Southwest experienced greater droughts and colder winters during the sixteenth and seventeenth centuries than any known in recent times. Third, both Spaniards and Pueblos had to deal with particular extremes of weather that arrived at critical moments, in which both parties were profoundly unlucky.

Recognizing the role of climate takes nothing away from human agency—or the human drama—in the history of early Southwest exploration and settlement. Yet it does remind us that there is much more to this story than Spanish bravery and cruelty or Native resistance and persistence in a remote outpost of empire. The conquest of New Mexico forms part of a much longer saga of climate change, impacts, and adaptation in the arid Southwest. It shares a wider history of environmental confusions, disasters, and conflicts that defined the first European colonies in America, including Santa Fe's nearly exact contemporary, Jamestown, Virginia. Finally, it represents an early microcosm of the "global crisis" of the Little Ice Age, which contributed to the decline of Spanish hegemony and reshaped history in the Old World and New.

### The Puzzle of Colonial Climates

To modern Americans, New Mexico presents a familiar southwestern desert climate—sunny and arid. Air descending from the tropics settles over the region, bringing heat and high pressure; while the Rocky Mountains capture moisture from the Pacific. Over the past century, yearly precipitation has averaged around ten to fifteen inches in most of the state and up to twice that in the mountains, with mean annual temperatures averaging in the mid-60s and low 40s, respectively. Also typical for the region, these averages hide wide variation from season to season and year to year. Following the intense heat of early June, when temperatures in much of the state regularly top 100 degrees, hot rising air and advection from the Gulf of Mexico bring summer thunderstorms with most of the year's rain—an amount that can vary from a few inches to a few feet.

Winter comes surprisingly fast with extreme cold, particularly in the uplands, where daily temperatures average in the 30s and can fall below zero at night.<sup>1</sup>

Much about this climate proved disorienting to the Spanish and their Native auxiliaries as they pushed north through Sonora and along the Rio Grande. The confusion arose not only from unfamiliarity with the land itself but from deeply misguided notions of American geography and climate, which decades of experience did little to correct. As historian Karen Kupperman has argued, European arrivals to the New World faced a “puzzle of the American climate.” Early modern notions of geography continued to draw on classical theories of “climes,” or bands of similar environments along similar latitudes. The basic differences between continental climates, such as America’s, and more moderate maritime climates, such as Europe’s, were still unknown. The present lands of the United States were often assumed to have seasons like those of Southern Europe. When early settlers arrived in Virginia and even Maine they hoped to raise olives, oranges, and silk. Only generations of failure and disappointment forced English colonial promoters to revise their expectations.<sup>2</sup>

Spaniards proved equally unprepared for the climate of North America despite their longer presence in the New World. Many Spanish writers came to reject simplistic classical notions of climes, and some such as José de Acosta even began to reconsider theories of weather and climate in light of their experience. Working from Aristotelian geocentric theories of physics and meteorology, however, they were unable to puzzle out basic patterns of atmospheric circulation that would have helped them understand American seasons.<sup>3</sup> Well into the eighteenth century, most educated Spaniards continued to view the world through classical notions of geography, which celebrated the “temperate zones” (middle latitudes) as inherently better for Spanish bodies than tropical climates. Gaspar Pérez de Villagrà, a captain in the Oñate Expedition of 1598, still praised New Mexico for lying at the same parallel as Jerusalem, and described the journey from Mexico to New Mexico as leading “into the temperate zone and the fourth clime.”<sup>4</sup> Moreover, common knowledge of North America’s geography could be slight or faulty. Well into the seventeenth century, some Spaniards continued to make fundamental errors about the location of New Mexico on the North American continent.<sup>5</sup>

In dealing with the North American climate, Spanish expeditions faced two additional hurdles. First, soldiers and settlers coming from Spain itself (*peninsulares*) were inclined to make misleading and sometimes disastrous analogies to the seasons of their Mediterranean homeland. Far from representing a universal clime among the lower midlatitudes, Mediterranean seasons are highly atypical. In these regions, high-pressure cells block moisture during the summer months then dissolve in the autumn; almost all precipitation comes from October to

April. In most other lands at the same parallel, including in most of Spanish North America, it rains more in the summer. This basic confusion about seasons led the first settlers in Spanish Florida to complain that the land “has not the [right] climate” as they watched their winter wheat rot in sodden fields.<sup>6</sup> In New Mexico, the same mistake led new arrivals to overlook summer droughts and their impact on maize crops, or to assume that the unusually snowy winters of the 1540s or late 1590s might represent normal seasonal precipitation.

Second, the great majority of the largest expeditions consisted of *criollos* (Spaniards born in New Spain) and especially Native allies who had little or no experience with the harsh cold that they encountered in New Mexico. Immigrants from Europe sometimes dismissed winters in North America as only a little worse than the coldest parts of Spain, which was also experiencing Little Ice Age conditions. As one Spanish expeditionary put it, New Mexico was “land that tends to be a little cold, but not too much; it is a climate like that of Castile.”<sup>7</sup> However, exaggerated depictions of cold on some North American journeys suggest that arrivals from Mexico or the Caribbean found the winters, even in today’s southern states, incomparably harsh.<sup>8</sup> The Spanish record of New Mexico expeditions, which focuses overwhelmingly on the role of *criollos* and *peninsulares*, once left the impression that these *entradas* consisted of small bands of Europeans vastly outnumbered at each Native pueblo. As historian Richard Flint has recently emphasized, the Spaniards’ *indios amigos* constituted most of the settlers, workers, and even fighters on imperial expeditions and performed most vital tasks. At the same time, these Natives were equipped with the poorest food, clothing, and lodging, and although Spanish sources rarely acknowledge the fact, they suffered more than any other participants in the extreme weather encountered on these expeditions.<sup>9</sup> Their desperation for adequate provisions, warmth, and shelter drove much of the conflict with local Pueblos.

Finally, early modern Europeans still overwhelmingly viewed extreme weather in religious terms. Harsh winters, destructive droughts, and untimely storms were, literally and figuratively, acts of God. English, French, and Spanish ridiculed Indian weather ceremonies and magic, but they too viewed changes in the weather as divine favor or punishment. They might exploit coincidental changes in the weather to impress Natives and win converts, or interpret unfavorable outcomes as God’s judgment on the Natives or their own expedition.<sup>10</sup> Recalling the coldest winter of the Oñate *entrada*, for example, Villagr  wrote: “All are frozen and to such extent/ That, for our sins, we have already seen/ Some give up life and soul at once/ To the great rigor of this freezing winter.”<sup>11</sup> This religiously tinged viewpoint may help explain why settlers and soldiers in New Mexico were at times so strongly divided in their reactions to climatic adversity and how some seemingly blamed their leaders or the Indians for misfortunes of weather.

Prepared or not, the Spanish and other European colonists certainly faced a harsher climate in the New World than that of recent times. A growing body of research, drawing on sources such as tree rings and ice cores, demonstrates that the early modern Little Ice Age brought lower average global temperatures during the fifteenth through early nineteenth centuries, with the most pronounced cold from about 1560–1660. Climatological and archaeological evidence confirm that this cooling affected sixteenth-century North America, with significant consequences for its inhabitants.<sup>12</sup> In the mountain West, the most detailed and reliable climate reconstructions usually come from the measure of moisture-sensitive tree rings. These reconstructions reveal rather wet years in New Mexico during the Coronado Expedition but serious droughts during subsequent entradas, including a regional “megadrought” in the late sixteenth century. Recent studies of tree rings at high altitudes, where width is sensitive to growing-season temperature, indicate that although regional climate was not always cold, the Southwest underwent significant cold spells during the Little Ice Age, particularly at the turn of the seventeenth century, probably as a consequence of tropical volcanic eruptions and dust veils.<sup>13</sup> The Southwest has never had stable and predictable weather, but both the late sixteenth-century drought and the exceptional cold around 1600 were major climate anomalies. This evidence demonstrates that Spanish descriptions of extreme weather recounted in this article were not simply exaggerations to cover up the failure of the expeditions but were relatively accurate descriptions of the region.

#### Climate, Pueblos, and Vulnerabilities at Contact

In contrast to the new arrivals, Pueblo Indians had centuries of experience with New Mexico’s difficult climate. They developed ways of coping with cold and drought, but their livelihoods were by no means immune to the vicissitudes of seasons. The long history of Pueblo cultures reveals a complicated picture of climate impacts and adaptations. This story, in brief, highlights some of the particular vulnerabilities Pueblos faced with a cooling Little Ice Age climate and Spanish intrusions during the sixteenth century.

Indians of the Southwest adopted maize agriculture by the first millennium AD. By the early second millennium, Ancestral Pueblos (formerly called “Anasazi”) established major population centers at Chaco Canyon and elsewhere in the San Juan Basin. These sites display common themes: centralization, social and political stratification, and intensive agriculture including irrigated maize fields. In essence Ancestral Pueblo communities faced three main climatic vulnerabilities: heavy rainfall and sudden flooding that undercut or washed away irrigation channels; drought that withered dry rain-fed fields; and cold or

untimely frost that killed crops, particularly at higher elevations. Archaeologists have inferred that Chacoan communities coped by storing food and expanding their spheres of trade and tribute to see them through bad years. Yet these short-term buffering strategies likely came at the cost of long-term resilience, contributing to the sudden abandonment of these sites during major droughts of the late twelfth through thirteenth centuries.<sup>14</sup>

Discussions of “Anasazi collapse” have proven controversial, particularly when presented as a cautionary tale for global warming. Nevertheless, the region’s detailed and extensive tree-ring studies do reveal severe drought during a chaotic transition in precipitation patterns over the Four Corners region in the mid-1100s to late 1200s. Archaeological finds also indicate an abrupt, violent end to Chacoan settlements, including traces of cannibalism. Most Ancestral Pueblos, however, did not simply die out but rather migrated away from the San Juan Basin, eventually founding a Pueblo “classical age” in the fourteenth-century Rio Grande Valley.<sup>15</sup>

In relocating the Pueblos found a more stable but generally drier climate, with rains coming almost all in the summer. Rio Grande Pueblo populations may have peaked at around 100,000 in the 1300s, falling off slightly in subsequent centuries. Archaeological surveys demonstrate a gradual aggregation or “clustering” of settlements, although the causes remain debated. Some studies argue for “pull” factors such as ceremonial centers or “push” factors including centralization and specialization as coping strategies for drought.<sup>16</sup> Others have made a strong case that intergroup conflict forced Pueblos into ever-fewer, more defensible locations.<sup>17</sup> Nomads, including the ancestors of the Apaches and Diné (Navajo), made inroads into New Mexico at this time, creating new avenues for trade as well as raiding and warfare. In any case, Spanish expeditions arrived in a dynamic and likely violent Pueblo world, not one that was precisely adapted to or readily prepared for unpredictable climate fluctuations—much less the unexpected arrival of thousands of mysterious invaders demanding provisions.

A combination of early Spanish observations and protohistoric archaeology point to specific Pueblo vulnerabilities and coping strategies at contact. From descriptions during the Oñate entrada, it is clear that while some Native pueblos made use of irrigated crops, many still relied on the dry farming of maize supplemented by hunting. Their agriculture remained vulnerable both to summer droughts, and critically during this period of climatic cooling, to early or late frosts.<sup>18</sup> Observers having some familiarity with the Pueblos mentioned that they stored reserves of food for two or three years, possibly more. Some communities traded limited supplies of cotton and feather blankets to nomadic Indians in exchange for bison hides and meat.<sup>19</sup>

Although the Spanish often described the Pueblos as clean and healthy, modern bioarchaeological research reveals underlying problems with indigenous health. As shown by stable isotope ratios in Pueblo remains, diets were heavily reliant on maize, contributing to tooth decay. Skeletal anomalies include high rates of enamel hypoplasia suggesting episodes of acute malnutrition, and porotic hyperostosis suggesting anemia. From such evidence, researchers have argued that Pueblos in the protohistoric period suffered from endemic parasitic infections and syphilis. Moreover, the age composition of skeletons analyzed at particular sites points to high infant mortality and short life expectancy.<sup>20</sup> The overall findings imply that Pueblos might have been especially vulnerable to hunger or exposure created by Spanish requisitions of food, blankets, and clothing.

There is no proof, however, that Old World epidemics had an impact on New Mexico populations before Spanish missionization in the seventeenth century. Influenced by the seminal work of historian Alfred Crosby and anthropologist Henry Dobyns, historians have often assumed that Eurasian microbes decimated Amerindian populations ahead of European settlement. However, significant recent studies have called this view into question, emphasizing how only sustained interaction could spread the deadliest infections.<sup>21</sup> For New Mexico, archaeologists have presented theories of how Old World pathogens might have worked their way into New Mexico during the sixteenth century, but without finding any evidence that they actually did. Anthropologist Daniel Reff's study of epidemics along New Spain's northwestern frontier finds European epidemics erupting locally along with the advance of missions, with no suggestion that any of these crossed the Rio Grande. Moreover, the severity of New Mexico's epidemics later in the seventeenth century and the slow pace of population recovery together suggest a previously unexposed population.<sup>22</sup> Overall, there is little to indicate that even the Coronado entrada had any lasting influence on the settlement patterns, daily health, or material culture of Pueblos. Various observations from the Coronado and Oñate expeditions placed Rio Grande Pueblo populations at anywhere from 40,000 to 100,000 during the sixteenth century; and modern researchers using textual evidence and archaeological surveys have come up with similar estimates. The number may suggest a slight decline during the sixteenth century, but not the major decimation expected from Old World epidemics. Instead, as archaeologist Carroll Riley has suggested, any fall in population could have been the consequence of a changing climate.<sup>23</sup>

### Climate and the Coronado Expedition

In 1542 the Coronado Expedition returned to present-day central Mexico from the upper Rio Grande after two years of hardship, casualties, and conflict, without

finding anything the Spanish considered valuable. Although historians have traditionally portrayed the Spanish entrada as a romantic quest for cities of gold, recent research has revealed a sizeable invasion of Pueblo lands by around two thousand people, which included hundreds of European officers and volunteers, but was mostly comprised of allied Indians, servants, and slaves.<sup>24</sup> Coronado and his associates, who staked their personal fortunes on the venture, went in search of wealthy, populous lands to parcel out as *encomiendas* (estates). Given the geography and Native demography of the region, their mission was destined to fail. Nevertheless, accidents of climate and weather proved instrumental in turning mere failure into disaster, especially for Pueblos along the middle Rio Grande. The gap between climate expectations and reality, and fundamental geographical errors left the expedition poorly prepared, mentally and materially, for the rigors its personnel endured in New Spain's far northern frontier. The entrada also encountered extreme Little Ice Age winters, which often proved deadly and demoralizing, especially for *indios amigos* and *criollos* unfamiliar with freezing weather. Most significantly, unexpectedly harsh weather contributed to a violent struggle between the intruders and Pueblos over basic resources.

Although ongoing research has continued to flesh out details, the outlines of the expedition are now well known.<sup>25</sup> Inspired by rumors of rich cities after the return of Álvar Nuñez Cabeza de Vaca from northern New Spain in 1536, and encouraged by exaggerated reports of wealth from fray Marcos de Niza's journey in 1539 to near Cíbola (the Zuni towns of western New Mexico), Coronado prepared the entrada in early 1540. That spring the conquistador took an advanced party in a long overland journey to Cíbola. Arriving in July, they immediately provoked a battle at the pueblo of Hawikku. From there, Coronado sent scouting parties west and east. Once the main body of the expedition arrived more than two months later, Coronado decided to winter at the Tiguex pueblos on the middle Rio Grande. Meanwhile, in a sign of tremendous geographical confusion and ignorance, relief supplies sent by sea sailed up the lower Colorado and Gila rivers in search of the expedition, which now lay hundreds of miles away overland.

The invasion party arrived in the area north of present-day Albuquerque, New Mexico, in December 1540 and soon provoked local Pueblos into a conflict that came to be known as the Tiguex War. After a winter of fighting, many Tiguex were scattered and their pueblos burned and looted. In April 1541, Coronado took a party to Pecos Pueblo and then onward into the Great Plains in search of Quivira, reputedly a fabulously wealthy Native kingdom. Finding nothing worth conquering, he returned in September to the main body of the expedition at Tiguex, where violence with local Indians continued. Hearing of the outbreak of new hostilities (the Mixtón War) with Natives in the recently

established province of Nueva Galicia, Coronado abandoned further plans for exploration and in early 1542 returned to New Spain.

Climatic conditions played a significant role in all stages of the entrada. Coronado originally planned the expedition based on wildly overoptimistic depictions of Cíbola by fray Marcos, whom the viceroy sent to report on the region in 1539 but who probably never saw the pueblos himself.<sup>26</sup> The conquistador received his first indication of actual conditions in spring 1540, when a follow-up party to the Niza expedition returned to New Spain. Those explorers set out the previous November but met impassable freezing winter weather around the present-day U.S.-Mexico border. Viceroy Antonio de Mendoza explained their hardships: “They say that since it was a bad year they suffered hunger in many parts, and having passed 100 leagues from Culiacán the land turned cold and icy. And the farther they went the colder it got until some Indians in their company were frozen and two Spanish were at great risk.” One leader of the party wrote, “It was impossible to pass the desert between here and Cíbola on account of the great cold and snow.” Forced to wait out the winter in southeastern Arizona, the Spanish party gathered information about the Zuni pueblos and found the descriptions far less inviting than fray Marcos’s rapturous accounts.<sup>27</sup> This grim report prompted Coronado to set off with his smaller advanced party, leaving the main body of the entrada to follow slowly. In a letter to the viceroy that August, he confided that he “guessed right in not engaging all the combined force in this undertaking. [That is] because there have been such great difficulties and shortages that I believe the entire enterprise could not have been carried out during this entire year.”<sup>28</sup>

Even this lightly equipped advanced party took eighty days to reach Cíbola from Culiacán. Separated from the main baggage train, the hungry expedition resorted to raiding unfriendly Indians in the Mexican frontier region north of Culiacán “in order to seize supplies of food,” as Pedro Castañeda de Nájera recalled.<sup>29</sup> Traveling north near the modern Arizona–New Mexico border, the party went almost entirely without provisions. Expeditionary Cristóbal de Escobar later described going weeks without food and “eating frozen sand in order to bear the thirst.” He recounted that over sixty men, mostly blacks and Native allies, died of hunger on the way.<sup>30</sup>

The survivors’ condition undoubtedly contributed to the invasion’s violent first encounter at Hawikku. According to one eyewitness, the Indians initiated hostilities, firing arrows as the Spanish read out a *requerimiento* (order) demanding obedience to the Catholic Church and Spanish Crown (surely an incomprehensible and threatening display). However, the same witness confided that Coronado’s party was already determined to take the town at any cost to gain its stores of food.<sup>31</sup> Coronado himself explained to the viceroy: “Because

the hunger we were suffering did not permit delay, I dismounted with some of those gentlemen and men-at-arms. And I ordered that the crossbowmen and arquebusiers make an assault and remove [our] enemies from the defensive structures, so that they could not do us injury.”<sup>32</sup>

Once the main body of the expedition arrived that autumn in Cíbola, the subsequent move to the Rio Grande Valley was driven by the need for provisions. The first reconnaissance of the valley praised its fertility but noted, “It is a very cold land.”<sup>33</sup> The warning proved prescient when the expedition made its ten day journey from Cíbola to the pueblos around present-day Bernalillo, New Mexico, in mid-December.<sup>34</sup> Castañeda de Nájera stated, “It did not stop snowing in the late afternoons and almost every night, so that in order to establish quarters wherever they reached, they had to pry up a cubit of snow and more.” “When it fell all night,” he added, “it covered the baggage and the men-at-arms in their bed[roll]s in such a way that if someone had come upon the camp unexpectedly, he would not have seen anything other than mounds of snow and horses.”<sup>35</sup>

The winter turned even more severe once Coronado’s men reached their destination. The Rio Grande at Tiguex froze solid for more than a month, according to one account, or possibly four months, according to another. Both witnesses agreed the ice was so thick that loaded horses could cross the river safely.<sup>36</sup> Such extremes, inconceivable in New Mexico’s present climate, recurred several times during the sixteenth and seventeenth centuries.<sup>37</sup> To judge from accounts of the contemporary Hernando de Soto Expedition, it may have been a time of anomalous cold all across the present-day United States.<sup>38</sup>

The Tiguex War, which broke out that winter, later became the subject of a *pesquisa* (royal inquiry) into abuses by the expedition, which has left historians an extensive record of events.<sup>39</sup> Testimonies for both the prosecution and defense suggest that incidents of brutality, including rape and torture, provoked the worst violence. However, numerous witnesses also testified to the underlying role of climate and extreme weather in the outbreak of hostilities, as Pueblos and invaders struggled over basic resources to survive the bitterly cold winter. One witness recalled: “While the army was overwintering in the province of Tiguex, some Spaniards fell ill and were dying because of the great cold and many hardships they endured and because they had few medicines and little clothing. And many horses died. Also the food was running out, without anywhere to get more.”<sup>40</sup>

Shelter became the first bone of contention. Even before the expedition arrived in the Rio Grande Valley, the Spanish *maestre de campo* (master of the field) was sent ahead to establish winter quarters. Realizing the weather was too cold to overwinter in a campsite, the officer expelled the residents of a pueblo to make room for the Spanish. According to Nájera, “They did not take [with

them] more than their persons and clothing.”<sup>41</sup> Yet this pueblo was only large enough for the Spanish soldiers. Archaeological finds indicate that the *indios amigos*, already the worst-clothed and worst-fed members of the expedition and the least-prepared for the cold, at least initially made do with light makeshift shelters.<sup>42</sup> There are indications that in subsequent encounters the Native allies provoked fighting or chased away the Pueblos to seize their shelters or burn their timbers for warmth. One testimony claimed that they burned pueblos “to provide insurance against the cold, which was extreme, especially for people without clothing, [as] everyone in the camp usually was.”<sup>43</sup> Coronado himself declared that his men were “dying of cold” and sought abandoned pueblos and “would have burned them and the wood to save themselves.”<sup>44</sup>

As these testimonies emphasize, the invasion also suffered from a constant shortage of fuel to keep warm in a frigid winter. As Riley has argued, the Pueblos already put considerable strains on local woods. It would have been difficult, if not impossible, to find supplies for an invasion force of over a thousand or more underdressed, hungry men. The expedition aggravated the shortages—and tensions with the Tiguex—by grazing their livestock in harvested maize fields, the stalks being an important supplemental fuel source for the Pueblos.<sup>45</sup>

However, the most serious problem facing the expedition, and the most persistent source of hostilities, was the need for clothing and blankets. As described in the foregoing quotations, much of the expedition—especially its Native allies—arrived with little or no winter clothing. Access to the Pueblos’ limited supplies of *mantas* (cotton blankets) was one of the invaders’ first priorities and a leading cause of conflict. As Flint has argued, “The clothing shortage became a decisive factor in relations between the indigenous people and the new arrivals.” Spanish extortion “put incredible strains on the Native population which simply did not have a surplus sufficient to clothe the huge group.”<sup>46</sup> Nájera’s account traced the first fighting to an attempt to take blankets from a pueblo shortly after the expedition’s arrival. In the confrontation, a soldier raped an Indian woman, and the Tiguex responded by killing Spanish horses.<sup>47</sup> The violence spiraled from there. At the *pesquisa*, one witness for the prosecution largely blamed the Tiguex War on the need for clothes. “The uprising occurred,” he testified, “because the general sent [individuals] to the pueblos of the province of Tiguex to gather clothing for the men-at-arms, and it was done very clumsily and against the will of the natives.”<sup>48</sup>

When the expedition eventually departed empty-handed in early 1542, the immediate reason was the Mixtón War. However, clear from later testimonies is that the frigid climate proved to be a significant factor. Demoralizing the Spanish, the bitter cold convinced them that the land was both unworthy of conquering and unsuitable even as a base for further exploration in the Far North.

No less galvanizing was a mysterious sickness that began to kill men and horses during the second winter. From the experience of a couple of exceptional years, many Spanish and Mexicans concluded that the climate was always and irredeemably cold and unhealthy, “a perception of which the Tiguex themselves probably had no interest in disabusing them.”<sup>49</sup>

The Coronado Expedition’s experience of severe weather, privation, and violence set a pattern for later Spanish entradas into New Mexico. Yet for the next half-century, the lessons of 1540–1542 were almost entirely lost, leaving subsequent invaders to repeat many of the same mistakes and suffer many of the same hardships. The only advantage of later entradas is that they were substantially smaller enterprises. However, they faced a further serious challenge—a severe recurring drought in the Southwest during the late sixteenth century.

### Drought and the Rediscovery of New Mexico

For roughly a generation following the Coronado disaster, New Mexico was largely forgotten in New Spain. Yet the same decades witnessed a silver boom in central and northern Mexico and the rapid expansion of missions and mining towns in the northern frontier region. By the 1570s, attention turned again to the upper Rio Grande Valley, this time in hopes of finding new mines of precious metals. This “rediscovery” led to several small entradas to the Rio Grande pueblos during the 1580s and 1590s. Although the documentary record remains limited, it sheds some light on conditions in New Mexico and the ongoing challenges posed by climate and extreme weather in the years leading up to Oñate’s invasion.<sup>50</sup>

Spanish expansion into Mexico’s far northwest and the rediscovery of New Mexico took place during possibly the worst drought in that region for the past millennium. As detailed tree-ring records reveal, the drought persisted from the 1560s through the 1580s (an interesting parallel to droughts that helped undermine the contemporaneous Santa Elena and Roanoke colonies in the Carolinas).<sup>51</sup> The drought centered over the present-day Mexican state of Durango, at times extending south into central Mexico and north into Arizona and New Mexico. Remarkable not only for its extent and duration, the drought was also unusual in that it often affected both summer rains and winter snows.<sup>52</sup>

Despite its tremendous severity, it is remarkable how little the drought has featured in the history of the period. One study has tied the run of dry years to a deadly epidemic in Mexico in 1576, but the evidence remains circumstantial.<sup>53</sup> The drought may have figured indirectly in the so-called Chichimeca Wars (ca. 1550–1590), that is, hostilities with indigenous nomads and semi-nomads in the northern mining frontier. Although accounts do not emphasize climatic factors, they suggest attacks on Spanish food convoys were a major source of conflict, and

Spanish food distributions proved instrumental in pacifying the region.<sup>54</sup> Faced with a novel environment in northern Mexico—and one already undergoing such profound impacts from migration, missionization, and introduced epidemics—the Spanish may not have recognized the drought at the time.

Most surviving accounts of the “rediscovery” expeditions offer only hints of climatic impacts in New Mexico. The first, the Chamuscado-Rodríguez party of 1581, was chronically short of supplies but usually managed to intimidate or extort sufficient food from pueblos along their route.<sup>55</sup> An account of the expedition described Pueblos’ “*mitotes*, or ceremonial dances, which they perform to bring rain when there is a lack of rainwater for their cornfields.”<sup>56</sup> Yet it is unclear whether this ritual was a particular response to drought or a regular seasonal occurrence. Some accounts also described heavy snowfalls during December and January in parts of central New Mexico.<sup>57</sup>

The Antonio de Espejo Expedition the following year has left more direct evidence of cold and drought. Traveling north through the El Paso area in January 1583, the party encountered freezing weather, which persisted throughout their journey.<sup>58</sup> As Pueblos along the Rio Grande fled at their approach, some apparently suffered from exposure to the cold. That March while in Zuni country, Espejo’s party met heavy snows.<sup>59</sup> During the summer, as the group turned back from a long excursion into present-day Arizona, the expedition began to face stronger resistance from Pueblos. The party skirmished with the Acomas. The people of Tiwa were “in revolt.” That July, at the Pueblo of “Pocos” (perhaps San Cristóbal), a witness recalled: “The inhabitants did not wish to give any provisions to four men who went to ask for them. They said they did not have any, that there was a lack of rain, and they were not certain they would gather any corn.” Spanish soldiers escalated their threats and violence to obtain food as the expedition turned back to Mexico.<sup>60</sup>

The last significant foray into New Mexico before Oñate’s entrada arrived after the worst of the drought but during exceptional cold. The party of fugitive governor Gaspar Castaño de Sosa set off from New Almaden in the summer of 1590, traveling up the Pecos River to its northern reaches before turning southwest down the Rio Grande, until Spanish authorities arrested them near present-day Albuquerque in late March.<sup>61</sup> Sosa’s memorial suggests the expedition was hounded as much by a severe winter as by Spanish officials. By the time the party crossed the present-day border between Texas and New Mexico in late November, “the weather was beginning to get very cold.” Two days before Christmas, above the confluence of the Gallinas River with the Pecos, the party was forced to take shelter “because the weather was so bitterly cold and the land was covered in snow.” Strong winds and heavy snow continued and the rivers froze. A fortnight later, the party cut westward to the Santa Fe River. “It was

bitterly cold and snowing,” Sosa’s people recalled. “When we emerged from the sierra we came to a river, frozen so hard that the horses crossed the ice without breaking through.” The severe winter and heavy snow followed them that January and February through the Galisteo Basin past the site of present-day Santa Fe, until at some point near present-day San Marcos, New Mexico, “the cold was so intense that our people were freezing and unable to travel this one league with the wagons; and so we left them in an arroyo.” Much as with the Espejo Expedition, the Spanish received supplies from the pueblos of northern New Mexico. Yet by the time the party reached the middle Rio Grande, where Sosa and his followers were arrested, the Pueblos apparently had turned more hostile and fearful. The cold and scarcity of food may explain the failure of the Sosa Expedition to begin a settlement in the Rio Grande Valley.<sup>62</sup>

These brief forays have left only fragmentary glimpses into Pueblo life on the eve of conquest. They emphasize, however, the demoralizing effects of cold on the Spanish and their Native allies, and the role of drought in aggravating resource scarcities and violent conflicts with Pueblos over food and winter supplies. Oñate’s party encountered all the same difficulties, and others. No historical evidence suggests that the adelantado heeded warnings from these previous failures or learned from their mistakes.

#### Oñate’s Entrada and the Acoma Disaster

Like Coronado before him, don Juan de Oñate led an ambitious invasion of New Mexico, only to see his plans unravel due to hunger, conflict, and dissension. His initiative ultimately established a permanent Spanish colony in New Mexico but only at the cost of hundreds or thousands of Pueblo lives, the desertion of more than half the expedition, and the ruin of Oñate’s personal fortune and reputation. Climate and untimely weather were again instrumental in producing a disastrous outcome for both invaders and the invaded. Through a combination of poor luck and poor planning, the expedition was inadequately provisioned for New Mexico’s difficult climate and limited agriculture. The first fateful years of the conquest overlapped with both a long drought and severe winters that fueled more conflict over resources between settlers and Pueblos and undercut settler morale at a crucial moment in the expedition. Throughout the disaster, Oñate refused to compromise with his settlers or admit mistakes, including his own overoptimistic depiction of the climate, and thereby contributed to the crisis in the colony.

Oñate’s troubles began with years of delay that depleted his resources and left his forces undermanned and undersupplied. The scion of a wealthy mining family, Oñate had obtained patents and investments for the expedition by autumn 1595, but the arrival of a new viceroy, political intrigues in Spain, and rival claims to

New Mexico temporarily derailed his plans. Men deserted and provisions were consumed or wasted while the party was detained over two years in Nueva Vizcaya and subjected to two long rounds of official inspections.<sup>63</sup>

The official inspections left a detailed roster of the Oñate Expedition and its inventory of supplies by the time the column finally departed in February 1598. More than half the men who signed on in 1596 failed to show up in the rolls, leaving only 560 individuals: a mixed group of peninsulares, criollos, blacks, Indians of diverse nations, and over a hundred women.<sup>64</sup> The expedition also departed with less livestock and grain than Oñate had promised to supply. As the viceroy later explained to the king, he agreed to overlook the shortages because “the frontier provinces are wearied and even exhausted by the long detention of the governor’s army there and because most of the people who go on new discoveries are troublesome.” He added presciently, “In truth the initial success of the expedition will not depend so much on their number as on their discipline and on being so well provisioned that they can support themselves for some time.”<sup>65</sup>

Oñate’s invasion set out almost due north across the desert, meeting the Rio Grande near modern El Paso on 20 April 1598. After ten more days traveling north along its banks, they crossed the river and in an elaborate ceremony claimed formal possession of New Mexico for Church and Crown. The situation took a turn for the worse in May as the expedition detoured from the Rio Grande along a path that came to be known as the “jornada del muerto.” Alerted to the Spanish presence, Indians began to abandon their pueblos ahead of the lumbering expedition, which faced increasing shortages and thirst. “We were exploring and feeling our way along this entire route for the first time,” a friar later recalled, “and we suffered a great deal because of not knowing it.”<sup>66</sup>

The expedition found relief on 14 June 1598, at a pueblo the Spanish would call “Socorro” for the food it finally offered them.<sup>67</sup> Although the supplies saved the party from starvation, Spanish provisions were now exhausted, and the expedition became dependent on Pueblos to supply them with ever-increasing quantities of food, clothing, and blankets. In 1601 a defector from the colony emphasized the significance of this development: “The first and foremost difficulty, from which have sprung all the evils and ruin of this land, is the fact that this conquest was entrusted to a man of such limited resources as don Juan de Oñate. The result was that soon after he entered the land, his people began to perpetrate many offenses against the natives and to plunder their pueblos of the corn they had gathered for their own sustenance. Here corn is God, for they have nothing else with which to support themselves.”<sup>68</sup> The expedition pressed on for another month through central New Mexico, until the advanced guard stopped in July to establish the initial permanent colony at San Juan. There they waited for the main body of wagons, which were crawling along more than

a month behind. The settlers immediately began work on a new church and then a limited irrigation system for wheat fields. By August simmering resentment over the hardships of the journey and persistent shortages threatened to boil over into mutiny, which Oñate stopped with a few arrests and pardons in August, and then by hunting down a couple of deserters in September 1598.<sup>69</sup>

Unclear from the historical record is whether at this point the leaders of the expedition realized they had established their colony in the midst of another serious regional drought. Tree-ring evidence indicates that 1598 marked the start of five years of significantly below-average rainfall.<sup>70</sup> By the time the colony began to unravel in 1601, the settlers had come to understand the yearly cycle of Pueblo harvests. Yet in late 1598, not only was the land unfamiliar, but the Spanish may not have understood that New Mexico's precipitation should fall mainly in summer, rather than in winter, as was characteristic of the Mediterranean climate at the same latitude.<sup>71</sup> Moreover, Spanish accounts suggest that they still viewed the Pueblos' stores of food as a sign of abundance rather than a prudent safeguard against the uncertainties of agriculture in the arid Southwest. Captain Villagr  narrated an episode, supposedly taking place that summer, when Indians wept for rain and Spanish prayers miraculously brought on a storm.<sup>72</sup>

Crucially, Oñate invested little time and effort into establishing a safe or well-fed agricultural base, turning his attention instead to the pacification of the Indians and the search for precious metals. Throughout the late summer and autumn of 1598, Spanish forces traveled around New Mexico to receive tribute and record "acts of obedience" at various pueblos, including Acoma.<sup>73</sup> Oñate's nephew, Vicente de Zaldívar, led an expedition eastward to the plains in a futile effort to capture bison and harvest meat for the hungry colony. Meanwhile, Oñate himself organized another expedition to head west through Cibola in search of mines and the South Sea, departing in early October. He ordered his other nephew, Juan de Zaldívar, to wait at San Juan until Vicente returned and then to ride west to help resupply Oñate's detachment. The plans proved dangerous in two ways: Oñate divided his forces into vulnerable units; and he diverted his men from the irrigated fields along the Rio Grande to outlying regions, some of which were more dependent on rain-fed agriculture, heightening the potential for conflict over provisions. Both factors contributed to the invasion's first and most brutal outbreak of hostilities at Acoma Pueblo that winter.

Located about sixty miles west of modern Albuquerque, Acoma commands the surrounding countryside from atop a prominent mesa. Dating back to around 1200 AD, Acoma was the only pueblo in the immediate area to survive the conflict and consolidation of settlements that marked the protohistoric period. Probably unknown to Oñate and his officers, Acoma had met and resisted forces under Coronado and Espejo during previous Spanish invasions.<sup>74</sup> Nevertheless, the

pueblo apparently gave its oath of obedience to Oñate's soldiers in October; and it proved the obvious place for Juan de Zaldívar and his men to requisition supplies as they traveled west from San Juan to join Oñate's detachment in November 1598.

The incident that followed has been narrated many times in a variety of versions, often blended with questionable details from Captain Villagrás's fictionalized epic verse. The basic narrative is clear. Juan de Zaldívar's party came to the pueblo demanding supplies in early December. The Acomas sent them away for a time, stating that they needed to gather the provisions. The soldiers returned to and entered the pueblo, and then split up to gather supplies in different rooms. Suddenly, fighting broke out, leaving several Spanish soldiers dead, including Juan de Zaldívar himself. Learning of the disaster, the Spanish returned a month later with a larger force led by Vicente de Zaldívar. Boldly assaulting the pueblo, they massacred scores of its inhabitants and captured the rest. At a subsequent show trial, the Acomas were found guilty of rebellion. The Spanish cut off one hand and one foot from each Acoma man, and forced all the Acomas into servitude.<sup>75</sup>

Accounts differ on how and why the fighting first began. Spanish soldiers swore the attack was "premeditated treachery" and entirely unprovoked. Some Acomas at the trial and later sympathetic friars claimed that the Spanish began the attack by assaulting or killing Indians.<sup>76</sup> Yet the most plausible version, which also highlights the role of climate and the growing struggle over resources, is simply that the fighting broke out when a soldier tried to take away an Acoma woman's turkey.

This version finds support in both a contemporary letter from New Mexico to New Spain and in details of testimonies at the trial. The letter in question came from an official, Alonso Sánchez, just three months after the event. He stated:

When the *maestre de campo* reached the pueblo of Acoma and asked for provisions and water so that he could go on, they furnished them at first. The next day, before setting out, he asked for more provisions and water, as there was no other place to get them. At this time there arose a minor incident when a soldier named Vivero [Martín de Biberos] took two turkeys from the Indians, and they killed him from one of the terraces. The entire pueblo then rose in arms and killed the *maestre de campo*, don Juan de Zaldívar, and ten soldiers and captains.<sup>77</sup>

The author was clearly a supporter of Oñate and the expedition, and he lost his own son in the fighting, so his letter was in no way making light of the situation. A close reading of trial testimonies backs this version in several ways and undermines Spanish claims of premeditated treachery by the Acomas. The officers' eyewitness accounts make clear that Juan de Zaldívar had despaired

of compelling the Acomas to deliver enough supplies collectively. His response was to divide his men and send them house to house to barter for more food.<sup>78</sup> In this tense situation, fighting broke out in the pueblo. Violence was likely unplanned since at first only a few Indians were armed, and many, including women, threw sticks and stones.<sup>79</sup> Moreover, certain accounts state that Biberos himself or the men around him were the first to fall in the fighting.<sup>80</sup>

Most importantly, one key testimony departs from the soldiers' narrative of Indian treachery. It comes from a Mexican boy of eighteen, who may not have been privy to the soldiers' rehearsed account of events or who may have caved under the pressure of interrogation at the trial. He testified "that all he saw was that one soldier, whose name was Martín de Viveros, held a chicken in his hand, and that an Indian woman was complaining about him because of the said chicken, which was at the time that the Indians were shouting."<sup>81</sup> An Acoma witness later gave much the same story, as did a second-hand Spanish account, while later testimonies mention Spanish taking blankets and turkeys by force.<sup>82</sup> At the same time, little evidence supports accusations that the Spanish initiated violence with an unprovoked killing of Indians. That version of events only comes from Acoma witnesses who were not present when the fighting began, and were later repeated by disgruntled settlers who were clearly interested in casting aspersion on Oñate and the expedition.

A fight over a turkey may seem too insignificant a cause in light of the momentous events that followed. The Battle of Acoma Pueblo and the cruel punishment of Indians not only influenced the fate of the expedition then, but continues to resonate in the region even now, as seen in the polemics surrounding El Paso's 2006 dedication of a monumental statue of Oñate. Yet acknowledging the most likely cause of the conflict does not take away from its meaning, but rather puts it in proper context. As archaeological evidence and historical accounts confirm, turkeys were the single most significant animal to the Pueblos.<sup>83</sup> They raised them not for food but for their feathers to make cloaks. By December the weather in Acoma was turning cold. When Spanish troops returned in January to avenge their losses, one witness recalled, the Indians pelted them with "sheets of ice."<sup>84</sup> When the Acoma woman held onto her turkey, she was in an important sense resuming a conflict that started with Coronado's men in Tiguex almost six decades prior over precious blankets to keep themselves alive and warm through Little Ice Age winters.

### The Desertion of the Colonists and the Fall of Oñate

The winter of 1598–1599 was only the beginning of several years of intense cold and drought, which ended with the defection of half the colonists and eventually

with the disgrace of Oñate himself. In this final phase of the conquest, events simultaneously happened on two levels: severe weather and conflicts buffeted the Spanish colony on the ground in New Mexico; and an agonizing process of official information-gathering and decision-making slowly transpired as correspondence journeyed between New Mexico, New Spain, the Council of the Indies, and King Philip III. The first story concluded by 1602, at which point the region's worst drought and cold had already lifted. The second dragged on for more than a decade, ending with the trial of Oñate and the decision to place New Mexico mainly under the care of Franciscan missionaries.

In a letter to the viceroy dated March 1599, his first communication since the Acoma disaster, Oñate dismissed the significance of the incident and sent hyperbolic praise of New Mexico's abundance and fertility.<sup>85</sup> Viceroy Monterrey apparently took Oñate at his word. Even as he and the adelantado quarreled over the terms of Oñate's contract, Monterrey reported to Madrid in October that New Mexico had "wealth and substance." He received word of a "great cruelty" perpetrated at Acoma but "thought it would be better not to proceed" against Oñate or his officers "in order not to discourage the soldiers and the people."<sup>86</sup> That year and the following, only good news apparently reached Mexico City, including supposed finds of rich silver ores, and Oñate's plans for new expeditions to the South Sea and Quivira. In the summer of 1600, Monterrey approved Oñate's request for reinforcements and fresh supplies.

However, the arrival of several hundred new settlers, soldiers, and officers in New Mexico that autumn clearly tipped the balance in a situation that had already been going from bad to worse. In the documentary record, the first signs of trouble appeared in a letter from Capt. Luis Gasco de Velasco to a friar in Mexico City in March 1601.<sup>87</sup> Gasco clearly exaggerated the situation to cast aspersion on Oñate (he claimed the governor told newly arrived officers they could "wipe themselves" with the viceroy's commissions), but others echoed his complaints over the following year: scarcity of food, abuse of Indians, extortion of their stored provisions and blankets, and above all horrendous weather. Gasco further noted that the governor censored criticism in letters sent to Mexico, suggesting that the problems had been festering for some time. The letter must have reached the viceroy quickly; that July he detained and questioned the next men to come back from New Mexico, two officers and two resigning officials carrying a message from Oñate. The resulting interrogatory revealed a rift between Oñate loyalists and detractors. The former testified that Spanish settlements were growing enough irrigated wheat and raising enough livestock to get by, leaving the Indians mostly in peace; the latter testified that the colony devoured its few resources and brutally took others from Indians to survive.<sup>88</sup> Meanwhile in New Mexico, this rift widened to the point that more than half

the settlers took advantage of Oñate's absence exploring Quivira that autumn to defect back to Mexico. Both the deserters and the loyalists delivered testimonies and official statements, and several returning friars sent letters about their experiences, leaving a remarkable record of conditions in the struggling colony.<sup>89</sup>

As with the Acoma disaster, the historian is faced with several competing descriptions from different interested parties. Yet again, details in the testimonies indicate a likely scenario—one that once more implicates climate and severe weather in the colony's unraveling. First, drought was undoubtedly creating hardship for the Pueblos. As described above, tree-ring records indicate dry summers from 1598 to 1602 and nearly all eyewitness accounts emphasized a dry climate or drought. One defecting officer claimed in autumn 1601, "This country has now reached the point at which there is no sustenance, because there has been no rain this year."<sup>90</sup> Even loyal officers questioned in Mexico in summer 1601 mentioned scarce rainfall and few summer storms.<sup>91</sup> Detractors described horrendous drought conditions and withering crops.<sup>92</sup>

The two parties differed over how much of the crops were irrigated. Disparagers insisted that nearly all the fields were rain-fed.<sup>93</sup> The distinction is important because, by all accounts, the snows were heavy during those winters, leaving plenty of meltwater to fill rivers and acequias. Plentiful snowmelt irrigated the colony's own wheat fields, which evidently fared well.<sup>94</sup> Oñate had paid far less attention to San Juan's fields and acequias, however, than to Native pacification and regional exploration. Even optimistic estimates of the wheat and maize harvest in 1601 were only 3,000 *fanegas* (about 5,000–6,000 bushels): perhaps enough once half the colony departed, but not nearly sufficient for all the colonists in summer 1601, as the deserters emphasized.<sup>95</sup>

Moreover, the loyalists exaggerated their estimates of livestock, which seriously undermined their credibility regarding the food supplies in San Juan. Some claimed for the colony more than three thousand sheep and goats and one thousand cattle and oxen, all multiplying rapidly.<sup>96</sup> Yet Ginés de Herrera Horta, a resigning official questioned in summer 1601, estimated no more than a thousand sheep and goats and perhaps four hundred cattle, their numbers falling fast as the hungry colony ate through the herd.<sup>97</sup> Another officer noted "that with the snow and freezing weather and miserable pasture available at the time, many of these animals died."<sup>98</sup> Deserters subsequently testified that Indians were deliberately killing livestock, possibly because the animals damaged maize fields.<sup>99</sup> Archaeological research on the San Juan settlement confirms the colonists had little success with hunting or fishing, and they were slaughtering their livestock before the animals reached maturity. The authors of the study conclude, "There is no question that the very real and drastic two season drought of 1600–1601 was an unexpected and very forceful factor."<sup>100</sup>

Finally, even irrigated maize crops may have failed in 1600 and 1601. In much of New Mexico, the frost-free season could only just accommodate the full ripening of maize. Given its higher elevation and more northerly latitude, the area around San Juan was especially vulnerable. Details among Spanish testimonies suggest early or late frosts may have killed corn spared by drought. In a letter dated 1 October 1601, fray Juan de Escalona noted, “As I was writing this letter, a frost scorched the fields of the Indians.”<sup>101</sup> A soldier on Oñate’s expedition to Quivira later testified, “There are years of abundance and years of barrenness because of the frequent frost.”<sup>102</sup>

Added to these natural disasters, colonists’ demands for tribute forced the Pueblos to hand over much or all of their stores of provisions. Even loyal officers testified that soldiers took as much as 5,000 fanegas (around 8,000–10,000 bushels) of maize and beans from Indians.<sup>103</sup> Defectors gave dramatic accounts of Indian poverty and suffering at the hands of Spanish extortion. Horta described how “the said Indians give it to them very reluctantly and tearfully, more by force than of their free will, according to what the soldiers themselves told this witness. And if they drop a few kernels of the said maize, the said Indians go about collecting them one by one.” Testimonies from defecting friars described soldiers torturing Pueblos to reveal hidden food and warned of imminent starvation and death from exposure and destitution. Fray Lope Izquierdo testified that the expedition only survived through autumn 1601 by extorting Pueblos’ reserves, and now even these were gone—a claim repeated by several deserters.<sup>104</sup> Some Indians survived by parching wild plant seeds and stems in charcoal and hot sands.<sup>105</sup>

Yet the struggle for warmth, even more than food, likely created the worst hardships. In the winter of 1600–1601, the Rio Grande iced over at San Juan, and communion wine froze in the church.<sup>106</sup> Again, the intense cold generated an insatiable demand for cloaks and blankets. The Spanish soldiers evidently demanded tribute of a blanket each year from each Pueblo household, and “if they said that they had no blankets to give, the said soldiers took them from the women, who were left naked.” Several defectors gave tearful descriptions of shivering women and children bereft of their last cloak or blanket.<sup>107</sup> Ginés de Herrera Horta recalled how the Pueblos fled from the Spanish, taking only their turkeys and “leaving the other supplies behind. And the reason they take the said chickens rather than anything else is that they raise them so as to make blankets with their feathers for protection in winter.” His description suggests a meager cotton harvest in 1600 or 1601 as well, perhaps another victim of untimely frost. By the time the colonists deserted, it was widely reported that conflict over food and blankets were the real cause of hostilities at Acoma and later with the Jumanos.<sup>108</sup>

Finally, Horta’s account emphasizes how ill-prepared the reinforcements arrived, both morally and materially, for the intense cold:

Because they said that they had been sent reports and words and letters about many great things and riches, and they found themselves to have been deceived, with their property spent, deprived of the quiet life they had led in New Spain, and fearing they would lack food and clothing for themselves and their wives and children and relatives . . . and the reason for this is the harshness of the said country, with the cold that lasts for eight months of winter, to the point, as he has stated, that the rivers freeze over, and people are always shivering by the fire and there is little firewood. . . . And this witness has heard that after the said winter come four months of summer, when the heat is almost worse than the cold in winter; and so the saying there is, winter for eight months and hell for four.<sup>109</sup>

These accusations launched the slow-motion investigation of the Spanish colony and the unraveling of Oñate's governorship. Given the glacial pace of communications and decision making in the Spanish empire, it took another four years to decide on the recall of Oñate, and seven to remove him from the province, and not until 1613 did he go on trial for misconduct. Nevertheless, a close examination of official correspondence makes clear that the Acoma disaster and the harsh winter of 1600–1601 were the adelantado's undoing. Information from Velasco's letter and the deserting friars and soldiers reached Madrid in 1602. These particular "excesses, disturbances, and crimes" remained the foundation for the Council of the Indies decision to recall Oñate in January 1606; and the Council's pronouncement provided the basis for subsequent legal action.<sup>110</sup> Later reports from New Mexico were mostly lost or ignored due to miscommunication and bureaucratic delay.<sup>111</sup> When the adelantado and his associates were finally tried in 1613, most of the charges against them, including cruelty at Acoma, came from the accusations made by friars and deserters in 1601.

Even the question of New Mexico's climate entered into the trial. Among Oñate's convictions the judges declared, "Whereas the land in the provinces of New Mexico entered by the adelantado with his army was really poor and sterile for his particular purposes, he informed his majesty and the viceroys of New Spain to the contrary . . . and threatened and ill-treated those who spoke truth in the matter." His captain, Villagr , was convicted "on the charge that, from that place he wrote a letter to the viceroy of New Spain, praising highly the quality, richness, and fertility of the provinces of New Mexico, when the opposite is true, as it is a sterile and poor land, sparsely populated."<sup>112</sup>

In the meantime, the returning Viceroy Velasco had all but decided on the abandonment of New Mexico in early 1608 "owing to the limitations and poverty of the land."<sup>113</sup> The colony was saved by a miraculous (or highly exaggerated) mass conversion of seven thousand Pueblos to Christianity in December that year.<sup>114</sup>

Undoubtedly a number of conversions took place, if for no other reason than that the missions still were stocked with food during a time of scarcity.<sup>115</sup> Reports of missionary progress before the viceroy threatened to recall the expedition, however, were not optimistic. Nevertheless, Philip III found it impossible to abandon even the promise of so many baptized souls. The reported miracle guaranteed that New Spain found a permanent governor for the colony in 1610 and a new capital at Santa Fe, but it would be a colony of Franciscan missions, not wealthy mines as Oñate once envisioned.

The appeal to religious duty might have been the only recourse to save the colony at this point. Indeed, an almost identical exchange took place between Philip III and the Franciscans of Spanish Florida during those same years.<sup>116</sup> Tribute from New Mexico never covered the costs of its garrisons and supplies, and the Spanish Empire was no longer in a position to financially support the frontier outpost.<sup>117</sup> In 1607 Madrid in effect declared another bankruptcy, the third in a generation. Here, too, the causes were bound up in the global crisis of the Little Ice Age. Between the first approval of Oñate's contract and his recall, Spain suffered from its worst agricultural and demographic crisis in over a century. Already experiencing problems of landlessness and inflation, a series of poor growing seasons and failed harvests triggered hunger and internal migration, contributing to a devastating outbreak of plague from 1596–1601. The only saving grace was that the empire's principal enemies—France, England, and particularly the Ottoman Empire—had suffered nearly as much, and none was in an immediate position to take advantage of Spanish weakness.<sup>118</sup>

Imperial, even global, conjunctures may have played their part in the decision as well. In these years, the output of silver from Potosí finally leveled off; and an ever-greater share of that wealth stayed in the New World or escaped across the Pacific in the Manila galleon trade.<sup>119</sup> Chronically short of funds and stretched over too many theaters of conflict, Spain was unable to intervene decisively on behalf of Catholics in the French Civil War or crush the Protestant rebellion in the United Provinces, which gained their *de facto* independence in 1609.<sup>120</sup> Holding onto Christian converts among New Mexico Pueblos may have been a small consolation for the apparent advance of heresy in Europe. Abandoning further expansion in a remote corner of New Spain represented just a small instance of Spain's imperial retreat at the start of its Little Ice Age crisis.<sup>121</sup>

## Conclusion

Misperceptions of climate, Little Ice Age extremes, and untimely severe weather form a recurring theme through the rough years of contact and conquest in New Mexico. As much as any other force, unexpected cold and drought drove

conflict between colonists and Pueblos, and fueled the demoralization of soldiers and settlers. These early disasters left an important legacy. They discouraged significant investment and migration, and prompted the decision to favor Catholic missionization over secular colonization. They embittered relations between Spanish and Natives decades before the Pueblo Revolt of the 1680s, in which drought and famine again played a crucial role.<sup>122</sup> Moreover, a focus on climate highlights the perennial challenge of the Southwest's aridity, a theme that has shaped its history from Pueblo times through the Spanish era, American expansion, and into the twenty-first century.

Recognizing the influence of climate revises not only a part of New Mexico's history but also its place in an American and even a global context. Despite the growing demographic and cultural significance of the Southwest, its early history has too often been a story set apart—a peculiar, sometimes romanticized, episode left to local specialists, carrying too little connection to the national narrative. Yet across colonial America, settlers of all nations shared common misperceptions of climate and faced a common struggle to survive and adapt to an unfamiliar environment. These episodes fell against the backdrop of a global Little Ice Age, whose climatic extremes challenged Indians and colonists alike, and contributed to conflict and crisis in both the Old World and the New. In all these ways, climate history presents both a novel and inclusive perspective on American origins—and one that may prove troublingly relevant for a region and a nation facing new risks from climate change.

## Notes

1. All temperatures are listed in Fahrenheit.

2. Karen Ordahl Kupperman, "The Puzzle of the American Climate in the Early Colonial Period," *American Historical Review* 87 (December 1982): 1262–89.

3. Craig Martin, *Renaissance Meteorology: Pomponazzi to Descartes* (Baltimore, Md.: Johns Hopkins University Press, 2011), 21–37, 151–55; José de Acosta, *Natural and Moral History of the Indies*, ed. Jane E. Mangan, trans. Frances López-Morillas (1590; repr., Durham, N.C.: Duke University Press, 2002), 88–89, bks. 2–3 passim; Juan de Cárdenas, *Primera parte de los problemas y secretos maravillosos de las Indias*, ed. Xavier Lozoya, 5th ed. (1591; repr., México D. F.: Academia Nacional de Medicina, 1980), 72–75, bk. 1 passim; P. Bernabé Cobo, *Obras del Padre Bernabé Cobo*, ed. Francisco Mateos (Madrid: Biblioteca de Autores Españoles, 1964), 23–27, 32–37, 55–62; and Bernardo de Vargas Machuca, *Milicia y descripción de las Indias* (1599; repr., Bogotá, Colombia: Fondo de Promoción de la Cultura, 2003), 228–30.

4. Rebecca Earle, *The Body of the Conquistador: Food, Race, and the Colonial Experience in Spanish America, 1492–1700* (New York: Cambridge University Press, 2012), 21–23, 32–41; and Gaspar Pérez de Villagrà, *Historia de la Nueva México*, ed. and trans. Miguel Encinias, Alfred Rodríguez, and Joseph P. Sánchez (1610; repr., Albuquerque: University of New Mexico Press, 1992), canto 1, lines 51–67.

5. For instance a proposal in 1630 to resupply New Mexico from the Gulf of Mexico is mentioned in Andrew L. Knaut, *The Pueblo Revolt of 1680: Conquest and Resistance in Seventeenth-Century New Mexico* (Norman: University of Oklahoma Press, 1995), 128.

6. aunque fuera la tierra fertil y larga no tiene temple ni se agosta la tierra sino es con los yelos y demaziados frios que en ella haze por ybierno. Jeannette M. Connor, ed., *Colonial Records of Spanish Florida*, vol. 1 (Deland: Florida State Historical Society, 1925), 148. For additional testimonies by Florida settlers in 1576, see Connor, *Colonial Records of Spanish Florida*, 1:144–85.

7. “Relación breve y verdadera del descubrimiento del Nuevo Méjico,” in *Colección de Documentos Inéditos* [hereafter *CDI*], vol. 15, eds. Joaquin Pacheco and Francisco Cárdenas (Madrid: M. B. de Quirós, 1871), 150. For a description of Spain’s Little Ice Age climate, see Inocencio Font Tullot, *Historia del clima de España: Cambios climáticos y sus causas* (Madrid: Instituto Nacional de Meteorología, 1988), 71–94.

8. See Gonzalo Fernández de Oviedo y Valdés’s account of the Vázquez de Ayllón’s expedition in *Historia general y natural de las Indias*, ed. Juan Pérez de Tudela y Bueso, vol. 4 (ca. 1557; repr., Madrid: Ediciones Atlas, 1992), 4:326, 328–29.

9. Richard Flint and Shirley Cushing Flint, “Catch as Catch Can: The Evolving History of the Contact Period Southwest, 1838–Present,” in *Native and Spanish New Worlds: Sixteenth-Century Entradas in the American Southwest and Southeast*, ed. Clay Mathers, Jeffrey M. Mitchem, and Charles M. Haecker (Tucson: University of Arizona Press, 2013), 53–54; and Richard Flint, *No Settlement, No Conquest: A History of the Coronado Entrada* (Albuquerque: University of New Mexico Press, 2008), 58–62.

10. Sam White, “‘Shewing the difference between their conjuration and our invocation on the name of God for raine’: Weather, Prayer, and Magic in Early Encounters,” *William and Mary Quarterly* (forthcoming). For examples of Europeans’ views on weather from a religious perspective, see Thomas Hariot, *Briefe and True Report of the New Found Land of Virginia* (Frankfurt: Theodor de Bry, 1590), 28; Jacques Cartier, *Brief recit, & succinte narration faicte es ysles de Canada* (Paris, 1545), fol. 19; Fidalgo d’Elvas, “True Relation [1557],” in *The De Soto Chronicles: The Expedition of Hernando de Soto to North America in 1539–1543*, ed. Lawrence A. Clayton, Vernon J. Knight, and Edward C. Moore (Tuscaloosa: University of Alabama Press, 1993), 1:120; and Gonzalo Solís de Merás, *Pedro Menéndez de Avilés* (1565; repr., Gainesville: University of Florida Press, 1964), 178–79.

11. Villagrà, *Historia de Nueva México*, canto 20, lines 119–22.

12. For a general explanation of sources, see Sam White, “The Real Little Ice Age,” *Journal of Interdisciplinary History* 44 (winter 2014): 327–52. For an overview of North America, see William C. Foster, *Climate and Culture Change in North America, AD 900–1600*, Clifton and Shirley Caldwell Texas Heritage Series (Austin: University of Texas Press, 2012).

13. Carla R. Van West et al., “The Role of Climate in Early Spanish–Native American Interactions in the U.S. Southwest,” in *Native and Spanish New Worlds*, Mathers, Mitchem, and Haecker, 81–98; David Stahle et al., “Tree-Ring Reconstructed Megadroughts over North America Since AD 1300,” *Climatic Change* 83 (July 2007): 133–49; Henri D. Grissino-Mayer et al., *Multi-Century Trends in Past Climate for the Middle Rio Grande Basin* (Albuquerque, N.Mex.: U.S. Department of Agriculture, 2002); K. Briffa, P. D. Jones, and F. H. Schweingruber, “Tree-Ring Density Reconstructions of Summer Temperature Patterns across Western North America since 1600,” *Journal of Climate* 5

(July 1992): 735–54; Matthew W. Salzer and Kurt F. Kipfmüller, “Reconstructed Temperature and Precipitation on a Millennial Timescale from Tree-Rings in the Southern Colorado Plateau, U.S.A.,” *Climatic Change* 70 (June 2005): 465–87; Shanaka L. de Silva and Gregory A. Zielinski, “Global Influence of the AD 1600 Eruption of Huaynaputina, Peru,” *Nature* 393 (June 1998): 455–58; and Matthew W. Salzer et al., “Five Millennia of Paleotemperature from Tree-Rings in the Great Basin, U.S.A.,” *Climate Dynamics* 42 (March 2014): 1517–26.

14. John Schelberg, “Hierarchical Organization as a Short-Term Buffering Strategy in Chaco Canyon,” in *Anasazi Regional Organization and the Chaco System*, ed. David E. Doyel (Albuquerque, N.Mex.: Maxwell Museum of Anthropology, 2001), 59–71; and Larry Benson, Kenneth Petersen, and John Stein, “Anasazi (Pre-Columbian Native-American) Migrations during the Middle-12th and Late-13th Centuries—Were They Drought Induced?” *Climatic Change* 83 (July 2007): 187–213.

15. For the debate over “collapse,” see Jared Diamond, *Collapse: How Societies Choose to Fail or Succeed* (New York: Viking, 2005); and Michael Wilcox, “Marketing Conquest and the Vanishing Indian,” and other contributions in *Questioning Collapse: Human Resilience, Ecological Vulnerability, and the Aftermath of Empire*, ed. Patricia McAnany and Norman Yoffee (New York: Cambridge University Press, 2010). For a discussion of the climatology, see Linda Cordell, “Aftermath of Chaos in the Pueblo Southwest,” in *Environmental Disaster and the Archaeology of Human Response*, ed. Garth Bawdon and Richard Reyecraft (Albuquerque, N.Mex.: Maxwell Museum of Anthropology, 2000), 179–93. For migration to the Rio Grande Basin, see Michael A. Adler, Todd Van Pool, and Robert D. Leonard, “Ancestral Pueblo Population Aggregation and Abandonment in the North American Southwest,” *Journal of World Prehistory* 10 (September 1996): 375–438; and Carroll L. Riley, *Rio del Norte: People of the Rio Grande from Earliest Times to the Pueblo Revolt* (Salt Lake City: University of Utah Press, 1995), 91–118.

16. Adler et al., “Ancestral Pueblo Population Aggregation,” 375–438; Katherine A. Spielman, “Clusters Revisited,” in *The Protohistoric Pueblo World, A.D. 1275–1600*, ed. E. Charles Adams and Andrew I. Duff (Tucson: University of Arizona Press, 2004), 137–43.

17. David R. Wilcox and Jonathan Haas, “The Scream of the Butterfly: Competition and Conflict in the Prehistoric Southwest,” in *Themes in Southwest Prehistory*, ed. George J. Gumerman (Santa Fe, N.Mex.: School of American Research Press, 1994), 211–38; and Steven A. LeBlanc, *Prehistoric Warfare in the American Southwest* (Salt Lake City: University of Utah Press, 1999).

18. Elinore M. Barrett, *The Spanish Colonial Settlement Landscapes of New Mexico, 1598–1680* (Albuquerque: University of New Mexico Press, 2012), 10. Barrett points out that Santa Fe’s present climate has only 155 frost-free days and that maize requires 80–135 to reach maturity.

19. For the testimony of Jusepe Brondat, see A. Roberta Carlin et al., “The Desertion of the Colonists of New Mexico 1601: 3d Part,” Cíbola Project (Berkeley: Research Center for Romance Studies, University of California, 2009), <http://escholarship.org/uc/item/452289m6>, 5.

20. Charles F. Merbs, “Patterns of Health and Sickness in the Precontact Southwest,” in *Columbian Consequences*, vol. 1, *Archaeological and Historical Perspectives on the Spanish Borderlands West*, ed. David Hurst Thomas (Washington, D.C.: Smithsonian Institu-

tion Press, 1989), 41–55; Debra L. Martin, “Patterns of Diet and Disease: Health Profiles for the Prehistoric Southwest,” in *Themes in Southwest Prehistory*, ed. George J. Gumerman (Santa Fe, N.Mex.: School of American Research Press, 1994), 87–108; Ann L. W. Stodder, “Paleoepidemiology of Eastern and Western Pueblo Communities in Protohistoric and Early Historic New Mexico,” in *Bioarchaeology of Native American Adaptation in the Spanish Borderlands*, ed. Brenda J. Baker and Lisa Kealhofer (Gainesville: University Press of Florida, 1996), 148–76; Ann L. W. Stodder and Debra L. Martin, “Health and Disease in the Southwest before and after Spanish Contact,” in *Disease and Demography in the Americas*, ed. John W. Verano and Douglas H. Ubelaker (Washington, D.C.: Smithsonian Institution Press, 1992), 55–73; and Suzanne L. Eckert, “Zuni Demographic Structure, A.D. 1300–1680: A Case Study on Spanish Contact and Native Population Dynamics,” *Kiva* 70 (fall 2005): 207–26.

21. Alfred W. Crosby, *The Columbian Exchange: Biological and Cultural Consequences of 1492* (Westport, Conn.: Greenwood Press, 1972); Henry F. Dobyns, *Their Number Become Thinned: Native American Population Dynamics in Eastern North America* (Knoxville: University of Tennessee Press, 1983); and Paul Kelton, *Epidemics and Enslavement: Biological Catastrophe in the Native Southeast* (Lincoln: University of Nebraska Press, 2007).

22. Steadman Upham, “Smallpox and Climate in the American Southwest,” *American Anthropologist* 88 (March 1986): 115–28; Ann F. Ramenofsky, “The Problem of Introduced Infectious Diseases in New Mexico: A.D. 1540–1680,” *Journal of Anthropological Research* 52 (summer 1996): 161–84; Heidi Roberts and Richard V. N. Ahlstrom, “Malaria, Microbes, and Mechanisms of Change,” *Kiva* 63 (winter 1997): 117–35; and Daniel Reff, *Disease, Depopulation, and Cultural Change in Northwestern New Spain* (Salt Lake City: University of Utah Press, 1991), 228–30, 242.

23. Ann F. Ramenofsky and Jeremy Kulisheck, “Regarding Sixteenth-Century Native Population Change in the Northern Southwest,” in *Native and Spanish New Worlds*, Mathers, Mitchem, and Haecker, 123–39; Elinore M. Barrett, *Conquest and Catastrophe: Changing Rio Grande Pueblo Settlement Patterns in the Sixteenth and Seventeenth Centuries* (Albuquerque: University of New Mexico Press, 2002), 12–13, 50; Carroll L. Riley, *The Kachina and the Cross: Indians and Spaniards in the Early Southwest* (Salt Lake City: University of Utah Press, 1999), 52, 60; Ann M. Palkovitch, “Historic Population of the Eastern Pueblos: 1540–1910,” *Journal of Anthropological Research* 41 (winter 1985): 401–26; Reff, *Disease, Depopulation, and Cultural Change in Northwestern New Spain*, 228–30; and Eric Blinman, “2000 Years of Cultural Adaptation to Climate Change in the Southwestern United States,” *Ambio* (November 2008): 489–97.

24. Flint and Flint, “Catch as Catch Can,” 47–54; and Richard Flint and Shirley Cushing Flint, eds., *Documents of the Coronado Expedition, 1539–42* (Dallas, Tex.: Southern Methodist University Press, 2005), 136.

25. Richard Flint and Shirley Cushing Flint, eds., *The Coronado Expedition to Tierra Nueva: The 1540–1542 Route across the Southwest* (Niwot: University Press of Colorado, 1997); Richard Flint and Shirley Cushing Flint, eds., *The Coronado Expedition from the Distance of 460 Years* (Albuquerque: University of New Mexico Press, 2003); Richard Flint and Shirley Cushing Flint, eds., *The Latest Word from 1540: People, Places, and Portrayals of the Coronado Expedition* (Albuquerque: University of New Mexico Press, 2011); and Flint, *No Settlement, No Conquest*.

26. Critical edition and translation in Jerry R. Craddock, ed., "Fray Marcos de Niza, 'Relación' (1539), Edition and Study," *Romance Philology* 53 (fall 1999): 69–118.
27. "The Viceroy's Letter to the King, Jacona, April 17, 1540," in *Documents*, Flint and Flint, 233–41.
28. "Vázquez de Coronado's Letter to the Viceroy, August 3, 1540," in *Documents*, Flint and Flint, 252–70 (excerpted from the copy in Giovanni Battista Ramusio, *Navigazioni et viaggi* [1557]).
29. "The Relación de la Jornada de Cíbola, Pedro de Castañeda de Nájera's Narrative, 1560s," in *Documents*, Flint and Flint, 391.
30. "Cristóbal de Escobar's Proof of Service, 1543," in *Documents*, Flint and Flint, 571.
31. "Anonymous Narrative, 1540," in *Documents*, Flint and Flint, 289–95.
32. "Vázquez de Coronado's Letter to the Viceroy, August 3, 1540" in *Documents*, Flint and Flint, 252–70, 257 (quoted); and "Testimony of Juan de Contreras," in *No Settlement, No Conquest*, Flint, 108–12.
33. "Hernando de Alvarado's Narrative, 1540," in *Documents*, Flint and Flint, 308.
34. The month is based off of the conversion from the Julian to the Gregorian calendar.
35. "Castañeda de Nájera's Narrative," in *Documents*, Flint and Flint, 401.
36. *Ibid.*, 407; and "The Relación del Suceso (Anonymous Narrative), 1540s," in *Documents*, Flint and Flint, 507.
37. See Alonso de Benavides, *The Memorial of Fray Alonso de Benavides, 1630*, trans. Edward E. Ayer (1916; repr., Albuquerque, N.Mex.: Horn and Wallace, 1965), 51–52, 129–30.
38. Garcilaso de la Vega, *The Florida of the Inca*, ed. John Grier Varner and Jeannette Johnson Varner (1605; repr., Austin: University of Texas Press, 1951), 212, 215, 410–11; and Clayton, *De Soto Chronicles*, 105, 108, 129, 243, 296.
39. Full record of transcription and translation appears in Richard Flint, ed., *Great Cruelties Have Been Reported: The 1544 Investigation of the Coronado Expedition* (Dallas, Tex.: Southern Methodist University Press, 2002).
40. "Defense Offered by Vázquez de Coronado," in *Great Cruelties*, Flint, 344–88, 366 (quoted).
41. "Further Defense," in *Great Cruelties*, Flint, 432–56, 440 (quoted); "Castañeda de Nájera's Narrative," in *Documents*, Flint and Flint, 400; and Flint, *No Settlement, No Conquest*, 140.
42. Bradley J. Vierra, Martha R. Binford, and David Atlee Phillips, *A Sixteenth-Century Spanish Campsite in the Tiguex Province* (Santa Fe: Museum of New Mexico, Laboratory of Anthropology, Research Section, 1989); Bradley J. Vierra and Stanley Hordes, "Let the Dust Settle: A Review of the Coronado Campsite in the Tiguex Province," in *The Coronado Expedition to Tierra Nueva*, Flint and Flint, 249–61; and Flint, *No Settlement, No Conquest*, 144.
43. "Juan de Zaldívar's Testimony" in *Cruelties*, Flint, 250–69, 257 (quoted).
44. "Francisco Vázquez de Coronado's Testimony," in *Cruelties*, Flint, 270–311, 289 (quoted).
45. Riley, *Rio del Norte*, 178–79; and Flint, *No Settlement, No Conquest*, 140–41.
46. Flint, *Cruelties*, 523.
47. "Castañeda de Nájera's Narrative," in *Documents*, Flint and Flint, 402–4.
48. "Alonso Álvarez's Testimony," in *Cruelties*, Flint, 312–24, 317 (quoted).
49. Flint, *No Settlement, No Conquest*, 179.

50. George P. Hammond and Agapito Rey, eds., *The Rediscovery of New Mexico, 1580–1594* (Albuquerque: University of New Mexico Press, 1966). For complete critical editions of several key documents, see Jerry R. Craddock, trans., and Barbara De Marco, rev., “Diego Pérez de Luján, Relación de la expedición de Antonio de Espejo a Nuevo México, 1582–1583,” Cíbola Project (Berkeley: Research Center for Romance Studies, University of California, 2013), <http://escholarship.org/uc/item/5313v23h>; Barbara De Marco, trans., and Jerry R. Craddock, rev., “Relación de Hernán Gallegos sobre la expedición del Padre Fray Agustín Rodríguez y el Capitán Francisco Sánchez Chamuscado a Nuevo México, 1581–1582,” Cíbola Project (Berkeley: Research Center for Romance Studies, University of California, 2013), <http://escholarship.org/uc/item/4sv5h1gz>; and Barbara De Marco and Jerry R. Craddock, trans., “Testimony of the Mexican Indian Jusepe, Who Accompanied Francisco Leyva de Bonilla and Antonio Gutiérrez de Humaña on Their Unauthorized and Ill-Fated Expedition of 1593. February 16, 1599,” Cíbola Project (Berkeley: Research Center for Romance Studies, University of California, 2013), <http://escholarship.org/uc/item/1357v01f>.

51. David W. Stahle et al., “The Lost Colony and Jamestown Droughts,” *Science* 280 (April 1998): 564–67; and Karen L. Paar, “Climate in the Historical Record of Sixteenth-Century Spanish Florida: The Case of Santa Elena Re-examined,” in *Historical Climate Variability and Impacts in North America*, ed. Lesley-Ann Dupigny-Giroux and Cary J. Mock (Dordrecht, Netherlands: Springer, 2009), 47–58.

52. Stahle, “Tree-Ring Reconstructed Megadroughts,” 133–49; Edward R. Cook et al., “North American Drought: Reconstructions, Causes, and Consequences,” *Earth Science Reviews* 81 (March 2007): 93–134; David W. Stahle et al., “Cool- and Warm-Season Precipitation Reconstructions over Western New Mexico,” *Journal of Climate* 22 (July 2009): 3729–50; Daniel Griffin et al., “North American Monsoon Precipitation Reconstructed from Tree-Ring Latewood,” *Geophysical Research Letters* 40 (March 2013): 954–58; and Ellis Q. Margolis et al., “A Tree-Ring Reconstruction of Streamflow in the Santa Fe River, New Mexico,” *Journal of Hydrology* 397 (January 2011): 118–27.

53. Rodolfo Acuna-Soto et al., “Megadrought and Megadeath in 16th-Century Mexico,” *Emerging Infectious Diseases* 8 (April 2002): 360–62.

54. Philip Wayne Powell, *Soldiers, Indians and Silver: North America’s First Frontier War* (Tempe: Center for Latin American Studies, Arizona State University, 1975), 217–20; and Philip Wayne Powell, *Mexico’s Miguel Caldera: The Taming of America’s First Frontier, 1548–1597* (Tucson: University of Arizona Press, 1977), 205–22.

55. De Marco and Craddock, “Relación de Hernán Gallegos,” 35–36.

56. *Ibid.*, 41–43.

57. Such as the “Testimony of Hernando Gallegos, May 16, 1582,” in *Rediscovery*, Hammond and Rey, 137.

58. “Diego Pérez de Luxán’s Account of the Espejo Expedition into New Mexico, 1582,” in *Rediscovery*, Hammond and Rey, 170. They named this spot “La Ciénaga Helada.” Other toponyms in the text, including “Fuente Helada” and “El Helado,” also testify to the cold (*ibid.*, 181, 183).

59. “Diego Pérez de Luxán’s Account,” in *Rediscovery*, Hammond and Rey, 177, 183–85.

60. *Ibid.*, 177, 184, 203–4, 206.

61. Albert H. Schroeder, annot., and Daniel S. Matson, trans., *A Colony on the Move: Gaspar Castaño de Sosa’s Journal, 1590–1591* (Santa Fe, N.Mex.: School of American

Research, 1965) provides a detailed analysis of the itinerary. Spanish original published in *CDI*, 15:191–261. For the English translation, see Hammond and Rey, *Rediscovery*, 245–95.

62. “Memoria del descubrimiento que Gaspar Castaño de Sosa hizo en el Nuevo Méjico,” in *CDI*, 15:214, 221, 239–41, 249–50, 255–60. For locations, see Schroeder and Matson, *Colony on the Move*, 63, 75, 112, 147.

63. Charles W. Hackett, ed., *Historical Documents Relating to New Mexico, Nueva Vizcaya and Approaches Thereto, to 1773* (Washington, D.C.: Carnegie Institution, 1923), 1:225–367; George Peter Hammond and Agapito Rey, eds., *Don Juan de Oñate, Colonizer of New Mexico, 1595–1628*, 2 vols. (Albuquerque: University of New Mexico Press, 1953), 1:94–168; and Jerry R. Craddock, trans., and Barbara De Marco, rev., “Appointment of Juan de Oñate as Governor and Captain General of the Provinces of New Mexico, 21 October 1595,” *Cíbola Project* (Berkeley: Research Center for Romance Studies, University of California, 2013), <http://escholarship.org/uc/item/9pc3j952>.

64. Riley, *Kachina and Cross*, 44.

65. “Inspection Made by Juan de Frías Salazar of the Expedition, September 1597 to February 1598,” in *Oñate*, Hammond and Rey, 1:215–27; and “Monterrey to the King, May 4, 1598, Regarding the Juan de Frías Inspection,” in *Oñate*, Hammond and Rey, 1:390–92.

66. Jerry R. Craddock and Barbara De Marco, trans., “Ytinerario de la expedición de Juan de Oñate a Nuevo México 1597–1599,” *Cíbola Project* (Berkeley: Research Center for Romance Studies, University of California, 2013), <http://escholarship.org/uc/item/1f92f9b1>, 10.

67. pueblo que llamamos del Socorro por que nos dio mucho mayz. Craddock and De Marco, “Ytinerario,” 11.

68. “Fray Juan de Escalona to the Viceroy, October 1, 1601,” in *Oñate*, Hammond and Rey, 2:692–97, 692 (quoted).

69. For a narrative of these events, see Marc Simmons, *The Last Conquistador: Juan de Oñate and the Settling of the Far Southwest* (Norman: University of Oklahoma Press, 1991), 91–123.

70. For the annual tree-ring based Palmer Drought Severity Index, see Henri D. Grissino-Mayer et al., *Multi-Century Trends in Past Climate for the Middle Rio Grande Basin* (Albuquerque, N.Mex.: U.S. Department of Agriculture, 2002); and Barrett, *Conquest and Catastrophe*, 16–18.

71. See for example the testimony of Marcelo de Espinosa: “the said country depends for its moisture on snowfall, which is very frequent from September on until April.” Carlin, “Desertion: 3d Part,” 10.

72. The episode related in Villagrà, *Historia*, canto 16, lines 1–61, occurred before the Acoma battle, suggesting sometime in late 1598 (if it is not entirely fictional).

73. For a translation of the “Acts of Obedience,” see Hammond and Rey, *Oñate*, 1:337–62.

74. For a description and historical background, see Ward Alan Minge, *Ácoma: Pueblo in the Sky*, rev. ed. (Albuquerque: University of New Mexico Press, 2002), 1–9.

75. For full transcript, see Jerry R. Craddock, ed., and John H. R. Polt, trans., “The Trial of the Indians of Ácoma, 1598–99,” *Cíbola Project* (Berkeley: Research Center for Romance Studies, University of California, 2008), <http://escholarship.org/uc/item/14v-3j7sj>. Previous authors have usually relied on the incomplete translation in Hammond and Rey, *Oñate*, 1:428–79.

76. debaxo de traición y de caso pensado. “Opening Statement” in Craddock, “Trial,” 5.

77. "Letter from Alonso Sánchez, Treasurer of New Mexico, to Rodrigo del Río de Losa, Knight of Santiago, February 28, 1599," in *Oñate*, Hammond and Rey, 1:425–27, 426 (quoted).

78. For the testimonies of Sgt. Rodrigo Zapata, Juan Blázquez de Cabanillas, and Francisco Robledo, see Craddock, "Trial," 14, 20, 32.

79. For the testimonies of Alonso González and Bernabé Pedro, see Craddock, "Trial," 23, 37.

80. For the testimonies of Sgt. Rodrigo Zapata and Francisco de Sosa, see Craddock, "Trial," 14, 46.

81. For the testimony of Alonso González, see Craddock, "Trial," 22.

82. For the "Confession" of Caucachi, see Craddock, "Trial," 61. For the testimony of Capt. Juan de Ortega and corroborating testimonies, see Carlin, "Desertion: 3d Part," 36, 22–23, respectively.

83. Natalie Munro, "The Role of the Turkey in the Southwest," in *Handbook of North American Indians*, vol. 3, *Environment, Origin, and Population*, ed. Douglas H. Ubelaker (Washington, D.C.: Smithsonian Institution Press, 2006), 463–70.

84. Craddock, "Trial," 73. See also the anonymous account, "un favorabilissimo ayre tan frio que jamas se escalentaron los arcabuces con disparar todo el dicho tiempo sin cessar," in Craddock and De Marco, "Ytinerario," 36.

85. Jerry R. Craddock, trans., and John H. R. Polt, rev., "Oñate's Report to the Viceroy March 2, 1599," Cíbola Project (Berkeley: Research Center for Romance Studies, University of California, 2009), <http://escholarship.org/uc/item/8s9oh6b6>.

86. Hammond and Rey, *Oñate*, 503. Monterrey's communications apparently raised high hopes for New Mexico at the royal court in Madrid, as noted on 8 April 1600 by Philip III's court chronicler: Por las cartas que han venido de la Nueva-España, se ha entendido que iba sucedido bien con el descubrimiento del Nuevo-Méjico, y que hallaban ciudades muy populosas con casas y edificios de tres altos, y gente pulítica, y que era muy fértil y abundosa, y que se reducian á la obediencia y servicio de S.M. y admitian al conquistador con poca resistencia; el cual se llama don Diego de Oñate, y lleva consigo 500 hombres. Luis Cabrera de Córdoba, *Relaciones de las cosas sucedidas en la corte de España desde 1599 hasta 1614* (Madrid: J. Martin Alegria, 1857), 64.

87. Jerry R. Craddock and John H. R. Polt, trans., "Letter of Luis Gasco de Velasco Against Oñate, 1601," Cíbola Project (Berkeley: Research Center for Romance Studies, University of California, 2010), <http://escholarship.org/uc/item/oh29s1cb>; and Hammond and Rey, *Oñate*, 608–18. Hammond and Rey described it as a letter to the viceroy, but Craddock's and Polt's commentary reveals it was not.

88. Carlin, "Desertion: 3d Part." Some minor details about the resignation of the officers and later career of Ginés de Herrera Horta also appear in an unpublished document in Archivo General de Indias [hereafter AGI], Mexico, 262, N. 128, Seville, Spain.

89. For a complete critical edition, see A. Roberta Carlin et al., "The Desertion of the Colonists of New Mexico 1601: 1st Part and 2d Part," Cíbola Project (Berkeley: Research Center for Romance Studies, University of California, 2009), <http://escholarship.org/uc/item/4214090v> and <http://escholarship.org/uc/item/7gfk5tr>.

90. Testimony of Capt. Bartolomé Montero in Carlin, "Desertion: 2d Part," 11.

91. Testimonies of Jusepe Brondat and Marcelo de Espinosa in Carlin, "Desertion: 3d Part," 3, 10.

92. See for example the testimony of Capt. Alonso Sánchez Contador in Carlin, “Desertion: 1st Part,” 11.

93. Craddock, “Letter of Gasco de Velasco,” 2.

94. Even Herrera Horta, mostly a detractor of the expedition, admitted the irrigated crop was successful, although he also emphasized that the Spanish failed to plant anywhere but in the small irrigated plot. For his testimony, see Carlin, “Desertion: 3d Part,” 27.

95. Testimony of Marcelo de Espinosa in Carlin, “Desertion: 3d Part,” 14. The loyalists’ official testimony later claimed 3,500 fanegas of wheat and maize, see Carlin, “Desertion: 2d Part,” 4–5.

96. Testimonies of Jusepe Brondat and Marcelo de Espinosa in Carlin, “Desertion: 3d Part,” 5, 14. The loyalists’ official testimony later claimed “more than 3,000 head of cattle—beeves, sheep, and goats.” Carlin, “Desertion: 2d Part,” 4–5.

97. Testimony of Ginés de Herrera Horta, 30 July 1601, in Carlin, “Desertion: 3d Part,” 25.

98. Testimony of Capt. Juan de Ortega in Carlin, “Desertion: 3d Part,” 36–37.

99. Testimony of Capt. Alonso Gómez de Montesinos in Carlin, “Desertion: 2d Part,” 19; and Craddock, “Letter of Gasco de Velasco,” 4.

100. Florence Hawley Ellis, *San Gabriel del Yungue as Seen by an Archaeologist* (Santa Fe, N.Mex.: Sunstone Press, 1989), 78 (quoted), 80–81; and Stephen C. Lent, *Survey, Test Excavation Results, and Data Recovery Plan for Cultural Resources Near San Juan Pueblo, Rio Arriba County, New Mexico*, Archaeology Notes (Santa Fe: Museum of New Mexico, Office of Archaeological Studies, 1991), 12.

101. “Fray Juan de Escalona to the Viceroy, October 1, 1601,” in *Oñate*, Hammond and Rey, 2:696.

102. Jerry R. Craddock, ed., and John H. R. Polt, trans., “Juan de Oñate in Quivira, 1601: the ‘Relación Cierta y Verdadera’ and the Valverde Interrogatory,” *Cíbola Project* (Berkeley: Research Center for Romance Studies, University of California, 2013), <http://escholarship.org/uc/item/7162z2rp>, 58, 163.

103. Testimony of Jusepe Brondat in Carlin, “Desertion: 3d Part,” 6–7. Another officer claims only 2,000 fanegas (*ibid.*, 16).

104. Testimony of Ginés de Herrera Horta, 30 July 1601, in Carlin, “Desertion: 3d Part,” 26. For the testimony of Lope Izquierdo on 7 September 1601 and concurring testimonies, see Carlin, “Desertion: 1st Part,” 5–8, 2–4, 12, 13–14, 18, respectively.

105. hasta dejarlos tan sin grano y en tanta necesidad que de pura hambre revuelven con carbón no sé con que semillejas del campo y esto comen. Ellis, *San Gabriel*, 79–80; and Letter of Fray Escalosa in Juan de Torquemada, *Monarquía Indiana* (1615; repr., México D. F.: Universidad Nacional Autónoma de México, 1983), 450.

106. Carlin, “Desertion: 3d Part,” 20, 31–32.

107. Carlin, “Desertion: 3d Part,” 25 (quoted). Descriptions in the testimony of Lope Izquierdo in Carlin, “Desertion: 1st Part,” 7–8.

108. Testimony of Ginés de Herrera Horta, 30 July 1601, in Carlin, “Desertion: 3d Part,” 25–26. For conflicts over food and blankets, see “Letter of Fray Juan de Escalona to the Viceroy, October 1, 1601,” in *Oñate*, Hammond and Rey, 2:693.

109. Testimony of Ginés de Herrera Horta, 30 July 1601, in Carlin, “Desertion: 3d Part,” 28, (apparently the first recorded American use of the expression “ocho meses de invierno, cuatro de infierno” still repeated in New Mexico).

110. "Concerning the Excesses of don Juan de Oñate and the Discovery of New Mexico, Valladolid, January 19, 1606," in *Oñate*, Hammond and Rey, 2:1032–34, 1032 (quoted).

111. The full correspondence occupies hundreds of pages in Hammond's and Rey's *Oñate*, involving further investigations and recommendations traded among Mexico, Seville, and Madrid. However, the original *audiencia* and "discourses" of Monterrey in 1602 do not appear to have any influence on royal decisions, perhaps because by the time they were considered in Spain, Monterrey was being transferred to Peru. Likewise, the correspondence indicates that Viceroy Montesclaros's strongest criticisms of Oñate only reached Madrid after Phillip III signed off on the Council of the Indies decision described above. See "The King to the Viceroy, August 19, 1606," in *Oñate*, Hammond and Rey, 2:1039. As Simmons argues in *Last Conquistador*, the delay in actually removing Oñate and then proceeding with his prosecution probably owes to the return of Oñate's personal friend Velasco as viceroy in 1607–1611. See Simmons, *Last Conquistador*, 179–87.

112. "Conviction of Oñate and His Captains, May 16, 1614," in *Oñate*, Hammond and Rey, 2:109–24, 1112, 1116 (quoted). The *real cédula* (royal pronouncement) of 1619 that commuted Villagrás's punishment also listed among his offenses that he "wrote to my Viceroy of New Spain of the bounty, richness, [and] fertility of the provinces, although it was the contrary." AGI, Indiferente, 450, l.A5, fol. 202v–203.

113. "Viceroy Velasco to the King, March 7, 1608," in *Oñate*, Hammond and Rey, 2:1056–58, 1056 (quoted).

114. "Don Luis de Velasco to the King, December 17, 1608," in *Oñate*, Hammond and Rey, 2:1067–68.

115. See the testimony of Lope Izquierdo, 7 September 1601, in Carlin, "Desertion: 1st Part," 7.

116. Michael V. Gannon, *The Cross in the Sand: The Early Catholic Church in Florida, 1513–1870* (Gainesville: University of Florida Press, 1965), 49–50; AGI, Santo Domingo, 224, r. 6, N. 60.

117. France V. Scholes, "Royal Treasury Records Relating to the Province of New Mexico, 1596–1683," *New Mexico Historical Review* 50 (January and April 1975): 5–24, 139–64.

118. Vicente Pérez Moreda, *Las crisis de mortalidad en la España interior (siglos XVI–XIX)*, Historia (Madrid: Siglo Veintiuno de España, 1980), 254–96; I. A. A. Thompson and Bartolomé Yun Casalilla, eds., *The Castilian Crisis of the Seventeenth Century: New Perspectives on the Economic and Social History of Seventeenth-Century Spain* (Cambridge: Cambridge University Press, 1994); Peter Clark, ed., *The European Crisis of the 1590s: Essays in Comparative History* (London: Allen and Unwin, 1985); and Sam White, *The Climate of Rebellion in the Early Modern Ottoman Empire* (New York: Cambridge University Press, 2011).

119. Dennis O. Flynn, "Fiscal Crisis and the Decline of Spain (Castile)," *Journal of Economic History* 42 (1982): 139–47; and Kenneth Andrien, *Crisis and Decline: The Viceroyalty of Peru in the Seventeenth Century* (Albuquerque: University of New Mexico Press, 1985).

120. Geoffrey Parker, *The Grand Strategy of Philip II* (New Haven, Conn.: Yale University Press, 2000).

121. Geoffrey Parker, *Global Crisis: War, Climate Change and Catastrophe in the Seventeenth Century* (New Haven, Conn.: Yale University Press, 2013), 254–90.

122. James Ivey, "'The Greatest Misfortune of All': Famine in the Province of New Mex-

ico, 1667–1672,” *Journal of the Southwest* 36 (spring 1994): 76–100; and John L. Kessel, *Pueblos, Spaniards, and the Kingdom of New Mexico* (Norman: University of Oklahoma Press, 2008), 117, *passim*.