

CHAPTER 1



Storms and Gods in a Spanish Sea

The worst storms of all the world's seas are
those of these islands and coasts.

—*Bartolomé de Las Casas (1561)*

San Miguel, arcangel

Saint Michael, Archangel

Principe general

The Prince over all

libranos de los rayos

Save us from the lightning bolts

del tremendo temporal

of the great storm

—*Traditional prayer, rural Puerto Rico*

The wind began on Thursday, the last day of August 1552, and by Friday it had become a storm of powerful winds and heavy rain. The residents New Spain's port of Veracruz were already accustomed to the *nortes*, strong north winds, brought by the cold fronts of November and December that could reach a force of 80 miles per hour along the coast and in the bay, but this was different. By Friday night it had become a violent tempest blowing from the north, and then shifting, as one observer later testified, "from all the other points of the compass" (*de todos vientos de la aguja*)—the telltale phrase for an early modern description of a hurricane. The rain had become a deluge, and by Friday night the Huitzilapan and San Juan rivers bordering the city were threatening to overflow their banks. The town, set in the flatlands adjoining the rivers, was in danger. Hernán Cortés's original settlement of Veracruz in 1519 had been created on the mosquito-infested sands near the coast. It had lacked good water, and was too far from any indigenous towns that could provide it food. He

had moved it nearer to an Indian town, but that site also had proven unsatisfactory, and in 1524–25 it had been moved again to the confluence of the two rivers.¹ The local Totonac peoples lived in the hills rising behind the coast, where they were protected from the *nortes* and flooding in the lowlands. The Spaniards had chosen poorly. The Totonacs could have warned them of the dangers of the region. Not far to the north in the uplands lay their great ceremonial center dedicated to Tajín, God of the Storms, the same deity that the Maya called Hurakan.

At ten o'clock on Saturday morning a sea surge swept onto the island of San Juan de Ulúa, just offshore, where a large fortress had been built to guard the harbor. Throughout the city and in the nearby countryside, trees were uprooted and houses began to crumble and collapse. Father Bartolomé Romero, vicar of the principal church, later testified that the wind and water were so bad that neither he nor the other priests could reach the church to say mass. The river water began to flow through streets and plazas with considerable force, isolating people in their homes and sending many to the roofs as the waters rose.

In the harbor there was havoc. Veracruz was New Spain's principal port, and it had become the terminus for the convoy system that had been established by the Spanish crown to transfer the silver of Mexico to Spain, and in return to deliver wine, textiles, and emigrants to New Spain.² The protecting fort at San Juan de Ulúa could do nothing for the ships in the roadstead. Five of the large merchant vessels or *naos* sunk, four others were demasted, and many service boats, and small vessels in the coastal trade from Yucatan, Tabasco, and Campeche, or that came in from Cuba or Hispaniola, also sank. Houses and merchant warehouses were flooded and the docks swept away or damaged. Many of the sailors from the ships took refuge on the island of San Juan itself, in a large house in front of the anchorage, and although four or five drowned, the majority were able to survive the sea surge that swept over the docks with such force that it dismantled the seawall and carried some of its stones to another nearby island. Elsewhere on the island, when the winds shifted direction, a house that served as an inn where ten or twelve blacks and whites had sought refuge was swept into the sea with the loss of all except one man left clinging to a tree for two hours before he swam to safety. Fifty or sixty Span-

iards reached the upper floor of another large house and hung on to safety. Some slaves survived by holding onto the wreckage of houses. A church bell was loosened and carried by the wind to the shore. It was a disaster that “in the memory of people had not been seen for a long time in these parts.”³

In the midst of disaster, who could offer help? By nine or ten o'clock on Saturday morning, the mayor and aldermen of the town had mounted their horses and were circulating through the streets warning the residents to get their families and property to high ground because of the rising water that they warned would rise to a level higher than it had in the serious flooding the city had suffered in the previous year. Many people fled on horseback to the surrounding hills. By Saturday night the water was in some places well above a man's height, and houses of adobe were disintegrating. Now barrels and casks of wine, bottles of vinegar and olive oil, and crates of merchandise flowed through the streets and were swept into the sea. Father Romero later testified that by Saturday night he saw the *alcalde* Martín Díaz and some helpers in a boat, moving about the city rescuing those residents who had stayed in their homes, taking the women and children who had fled to the roofs and were pitifully crying for God's mercy to save them from such a death. A young man named Juan Romero circulated with two of his slaves in a canoe, taking the ill and infirm, men, women, and children, to high ground from a large house near the church. The canoe sometimes tipped, and the passengers' money and jewels were lost in the righting of the vessel.

It was a flooded city: wreckage and refuse floating everywhere, shattered homes and broken lives, commerce disrupted, the bloated corpses of animals and people decaying or washing up on shore for days after, the smell of rot and death, and soon, sickness and a shortage of water and food. These were the images of a sixteenth-century Katrina—but they were set in a social, political, and conceptual frame that made an understanding of this catastrophe a moment for reflection on human sin and moral failure as the cause of God's anger. That interpretation would change over time from a providentialist view to one that by the eighteenth century emphasized the normal risks of the natural world, and thus no longer made humans the cause of their own suffering. Explanations would

then shift again in the late twentieth century to an emphasis on climatic change that once again placed the onus for natural disasters on human error, but this time on human decisions and policies, not on sin or moral failures.⁴

From his house Father Romero had seen the trees felled and the houses flattened; hour by hour he watched the river rise and eventually overflow its banks, flooding streets and plazas and causing great waves in the streets. He awaited an opportunity to swim to the church in order to rescue the Holy Sacrament, but it was impossible. After the storm had passed he was able to enter the sanctuary, now filled with mud and debris, but he could later report that the water had not risen to the level of the golden tabernacle where the Eucharist was kept, and thus it had not been necessary for him to carry it to the hills. He believed that its presence in the church had stopped the rising water and, in fact, explained why the whole city had not been lost. "God," he said, "was served to punish us all by the loss of our possessions and homes, and to leave us our lives so we could do penance for our sins." Society's relation to nature was not direct but mediated through God's will. The turbulence and disorder of nature had mirrored the disorder of society caused by sin, and departure from virtue provided the moral origin of the storm.⁵ Other Catholic interpretations of catastrophe were also possible. The forces of evil and the Devil might also be responsible for such harm, and thus the need for the protection of the saints, public prayers, and processions to reassure and protect the faithful.⁶

Spanish officials and settlers were by this time no strangers to the natural disasters of the New World. They had already acquired sixty years of experience of earthquakes, droughts, epidemics, floods, and hurricanes. In some way, their explanations of these phenomena were consistently providential, and even abnormalities of natural phenomena like earthquakes were still considered normal within divine purpose. But despite their acceptance of God's will as a primary cause, there was always a practical and a political aspect to their perceptions and to their responses as well. In this case, the Veracruz hurricane of 1552, we know the details of the disaster because the viceroy of New Spain, don Luis de Velasco, and the members of the *audiencia* or High Court that served as his council,

asked to be informed of the damage suffered so that the king, Charles I, could decide what steps to take. The mayor (*alcalde mayor*) of Veracruz, García de Escalante Alvarado, responded to the request by providing a report supported by testimony from various witnesses. They made clear that the municipal government and courageous town residents had been the first responders, warning the residents of the danger and carrying some to safety. Now the royal government would provide help. In the months following the storm, the viceroy took steps to assure that the people of the Veracruz region would be provided for by assigning a number of Indian communities in the region of Puebla, which had also suffered from the storm, to supply food.⁷ Escalante Alvarado pleaded to have the city relocated away from its dangerous location between the river and the sea, but that fourth and final move of Veracruz was not made until 1599, and even then, the city and its port remained, like everything else in this region, under the shadow of the great storms, the characteristic hazard of the Caribbean.

GODS OF THE WIND

If at first the Spaniards, and then the other Europeans, basically saw in these great American storms a supernatural power, they differed very little in that regard from the native peoples of the region. For the latter, the great storms were part of the annual cycle of life. They respected their power and often deified it, but they also sought practical ways to adjust their lives to the storms. Examples were many. The Calusas of southwest Florida planted rows of trees to serve as windbreaks to protect their villages from hurricanes. On the islands of the Greater Antilles—Cuba, Jamaica, Hispaniola, and Puerto Rico—the Taino people preferred root crops like yucca, malanga, and yautia because of their resistance to wind-storm damage. The Maya of Yucatan generally avoided building their cities on the coast because they understood that such locations were vulnerable to the winds and to ocean surges that accompanied the storms. Archaeologists who work on Mesoamerica have suggested that such aspects of life as field management and crop selection, urban layouts and

drainage systems, house construction, forest usage and maintenance, warfare, migration, trade, and cultural shifts or interruptions like the Maya abandonment of some of the Classic cities (c. 200–1000 CE) all have been influenced by hurricanes and other natural calamities.⁸ It was from the inhabitants of the islands, the Taíno of the Greater Antilles and the Caribs who inhabited the smaller islands of the Lesser Antilles, that the Europeans first learned of the storms, but they subsequently also tapped into the knowledge and understanding of the peoples who occupied the Mexican Gulf Coast and of the Maya speakers of the Yucatan peninsula and northern Central America. All of the Mesoamerican peoples believed that wind, water, and fire were the essential elements in the cycles destruction by which they marked the passage of time. so the gods of rain and wind—Tlaloc and Ehcatl (a form of Quetzalcoatl) for the Nahuatl speakers of the Mexican highlands; Tajín for the Totonacs of Veracruz; and Chaak and Huracán for the Maya—played a predominant role in the cosmogony and cosmology of these peoples. In the *Popul Vuh*, the origin myth of the Quiché Maya, Huracán, “heart of the heavens,” god of wind, storm, and fire, was one of the creator gods in the cycle of destruction and creation of the universe. Sculptures from the Totonac ruins at El Tajín and the Maya cities of Uxmal and Copan as well as pre-contact and post-conquest pictographic codices make clear the importance and destructive power of such gods. The Mesoamerican religions recognized a duality of forces so that the gods of wind could in their benevolent form bring rains for the crops, but in their malevolent aspects were destroyers of homes and *milpas*, bearers of misery and death.⁹ Even among the Maya of contemporary Quintana Roo there is still a belief that hurricanes represent a struggle between benign and malevolent aspects of Chaak as part of a cosmic battle that can bring the destruction of floods, tidal surges, and high winds, but can also renew the earth and bring life-giving waters.¹⁰

A great deal of confusion clouds the etymology of the word “huracán,” by which the Spanish came to know the storms and from which the English “hurricane,” French “ouragan,” Dutch “orkaan,” and Danish “orkanen” all derive. Was it just coincidence that the Taíno word “hurakan” and the Maya “Huracán” were so similar, or was this the result of linguistic ties, or affinities, or cultural contact? Perhaps the Spanish “huracán”

simply postdates the contact with Mesoamerica and was applied after the fact by chroniclers who were writing about earlier contacts on the islands. We know that the term does not appear in Fray Ramón Pané's descriptions of Taíno culture from the 1490s, and is first used in Fernández de Oviedo's *Historia natural* in 1526. Columbus's journal employs the term, but the original of that document disappeared long ago, and the version that finally appeared in print was not published until the mid-sixteenth century, long after the conquest of Mexico had taken place. Thus, there is the possibility of a later post-Mesoamerican contact interpolation of the term.¹¹ It is also possible that the etymology of "huracán" is not Amerindian at all. The word does not appear in the original 1611 edition of Sebastian de Covarrubias's great dictionary, the first vernacular dictionary of Spanish, but a later edition of 1674 claimed that the etymology could be traced to the Spanish verb *horadar* (to penetrate) because the water seemed to almost penetrate the ships that were sunk, causing a "horacán." An eighteenth-century Spanish dictionary ascribed the origins of the word to the Latin term *ventus furens* (violent wind), which was then hispanized as "furan" or "furanco"—the form in which Columbus first used it.¹²

Whatever the origins of the term, however, the Native American peoples who had migrated to the islands from the South American continent had learned to structure their lives to the seasonality, frequency, and power of the storms. The Taínos of the large islands marked time in their communal ceremonial dances or *arritos* by singing of the great deeds of their ancestors and chiefs and by remembering the occasions of the great hurricanes. Ramón Pané, the Augustinian friar who accompanied Columbus's second voyage in 1492 and who became the first European to write about the indigenous peoples of the Greater Antilles, reported that the Taíno saw the winds as the force of the *ceimi* or deity Guabancex, the mistress of the winds, who was accompanied by her two assistants, Guataubá, the herald who produced hurricane-force winds, and Coatrisquie, who caused the accompanying flooding.¹³ The power of these *ceimis* was widely feared. The island people dreaded them because of their effect on agriculture and because of the devastation they caused, but the Taíno also came to know the storms and to recognize their seasonality and the signs by which their coming could be anticipated.

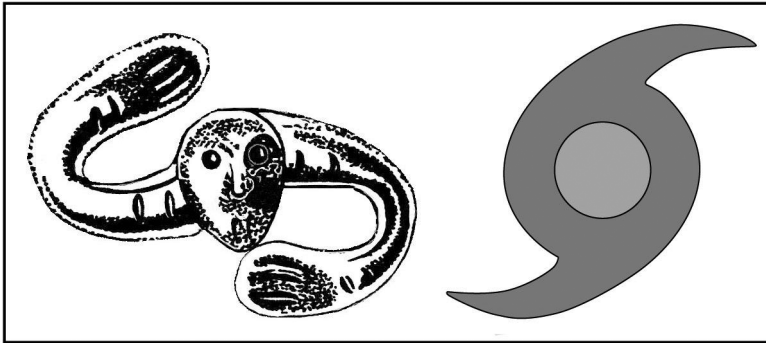


FIGURE 1.1 The curving arms of the Taino *zemi* on a Cuban ceramic seem to indicate a recognition of the rotation of the hurricane winds, just as does the modern meteorological symbol for a hurricane. (Original drawing of *zemi* appeared in Fernando Ortiz, *El huracán, su mitología y sus símbolos*, Mexico City: Fondo de Cultura Económica, 1947)

The Taíno saw the great storms as a dangerous but creative cosmic force in the formation of their world. In their cosmology these winds in the past had separated the Virgin Islands and the Bahamas from Cuba, and their force continued to shape the contours of the island world. As was pointed out by the Cuban scholar Fernando Ortiz in the 1940s, perhaps the most remarkable and most impressive evidence of Taíno familiarity with the hurricanes is the archaeological evidence from eastern Cuba of ceramic images of a round face with spiraling arms pointing in opposite directions, which suggests that the Taíno perceived the circulatory nature of the hurricane winds around an eye (the face of the image; fig. 1.1), a fact that would not be established by Western science until the mid-nineteenth century.¹⁴

The power and danger of the storms was no less important to the other major group of the island Caribbean, the Caribs of the Lesser Antilles. They also recognized the destructive nature of the storms and believed that evil spirits or *maboyas* were responsible for them. They too feared the storms, but recognized their seasonal nature and integrated them into rhythm of their year, and especially into their cycle of vengeance and war against their archenemies, the Taíno. Each year when the constellation of Ursa Minor, also known as the Little Dipper, appeared in the Caribbean sky following the summer solstice, it signaled to the Caribs the approach

of their raiding season. They called this constellation “the canoe of the heron,” and its return each year around the middle of June signaled the opening of the season when, following the stormy months of July, August, and early September, their own canoes were launched. The Carib raids against the Taíno for women, food, and captives, and later against the Europeans, were carried out principally from late September to December.¹⁵ These patterns continued for almost a century after the European arrival in the islands. Carib raids against Puerto Rico persisted until the early seventeenth century despite Spanish counterattacks against the Carib home islands of Dominica and Guadeloupe.¹⁶ The Spaniards saw the Caribs as the quintessential “savages,” and the term “Carib” became a juridical more than an ethnic designation, since their purported cannibalism and savagery justified enslavement according to Spanish law. At the same time, the Spaniards, and later the French and English, were impressed by their nautical skills and knowledge. The Carib ability to navigate three or four hundred miles by using the shape of the clouds, the direction of the wind, the color of the sky, and their knowledge of the stars, all drew admiration. A French observer, known only as Anonymous of Carpentras, claimed that their navigation showed an almost incredible knowledge of the sun and the stars. His compatriot Jacques Bouton called their familiarity with the skies a marvel, and found their ability to predict bad weather and storms uncanny.¹⁷

These indigenous epistemologies and understandings, a kind of local knowledge, became part of a cultural transfer, the transmission of objects, language, and knowledge that formed one side of the development of the distinctly American “conquest culture,” which was created in the first century of European occupation of the Caribbean. To some extent this interchange was made possible, or perhaps acceptable, because Europeans also had a long tradition of popular practices and beliefs that combined aspects of religion and astrology with a knowledge of the physical world and the signs that revealed it. Although often called “superstitious” by authorities, these popular beliefs remained, nevertheless, a powerful force in shaping a worldview, and Europeans in the Caribbean quickly incorporated into that cosmology what they learned from the native peoples of the region.

EARLY EUROPEAN OBSERVATIONS

Columbus was undoubtedly a skilled mariner, but he was also a very lucky one. About ninety percent of all tropical storms in the Atlantic form between the latitudes of 10° North and 35° North. Yet in September 1492, at the height of the hurricane season, Columbus voyaged uneventfully from the Canary Islands to his landfall in the Bahamas with good weather, sailing as he did along the predominant track of the great Atlantic hurricanes. While historians are unsure if in fact Columbus during his first decade in the Caribbean actually experienced any storm with what today we could define as hurricane force winds, it is clear that by 1498 he had weathered some heavy squalls or tropical depressions and had learned enough about the island seas and their winds to sense a tropical storm's approach.¹⁸

In July 1502, Columbus was making his fourth and final voyage from Spain when he stopped at the harbor of Santo Domingo, by now the main Spanish port in the Caribbean, to outfit an additional ship before continuing on to explore the mainland to the west. What Columbus found in Santo Domingo at that moment was a Spanish fleet of thirty ships preparing to weigh anchor for a voyage to Seville under the command of Francisco de Bobadilla, the royal investigator who had previously sent him back to Spain in chains in 1500 when complaints about Columbus's rule had caused a rebellion. The fleet was loaded with the gold that had been extracted by the forced labor of the Taíno Indians. The governor, Nicolás de Ovando, appointed to assert royal control and to undercut the concessions originally made to Columbus, was on bad terms with him and so refused his ships shelter in the port despite the fact that Columbus warned him that the southeasterly swell of the water, high cirrus clouds, and hazy atmosphere all signaled an impending storm. Ovando ignored Columbus's advice to hold the Spanish fleet in port for a few days, and some of the sailors and pilots even ridiculed him for his prophetic pretensions.¹⁹ The fleet sailed. Columbus's own small flotilla rode out the storm in a protected bay, but the governor's fleet was caught unprepared two days out of port. About twenty vessels went down with all hands; six others sank, with a few survivors reaching shore; and only three or four ships remained afloat. Of these, only the ship carrying the gold that was Colum-

bus's personal portion as Admiral of the Ocean Sea continued on to Spain. That stroke of luck, and Columbus's apparent ability to read the signs of the hurricane, caused rumors that he was a magician in concert with the Devil and that he had actually called down the storm upon his enemy.²⁰ His later chroniclers, his son Fernando and the Dominican priest Father Bartolomé de Las Casas, both reported that Columbus believed that a providential hand had saved his own treasure while Bobadilla's fleet, five hundred sailors, and the rest of the gold had gone to the bottom.

In this first European account of a Caribbean hurricane, we find intertwined three elements that often appear in the early observations about hurricanes: description of a violent natural hazard, explanations based on providential or diabolic intervention, and the use of theoretical knowledge and practical experience to understand and survive the storms. The tension between theology, theory, and experience in the face of nature both fascinated and baffled European observers during the following three centuries. The first Europeans in the Caribbean naturally turned to their previous experiences as a guide. While waterspouts and tornados were not unknown in the Mediterranean and North Atlantic, and had been commented upon by ancient natural philosophers and cosmographers, hurricanes were virtually unknown and thus an entirely new phenomenon for which theories of natural philosophy, astrology, and meteorology, as well as previous practical experience, had left Europeans essentially unprepared. First for the Spaniards and then for the other Europeans who sojourned in the Caribbean over the course of the next two centuries, the great storms challenged the idea that the world and its physical interactions were fully known and explained by classical authorities. Like so much of nature in the New World, the hurricanes seemed an anomaly, and their devastating power, be it natural, diabolical, or divine, demanded the attention of natural philosophers and theologians, as well as mariners, colonists, and kings.

In the sixteenth century, Spanish humanists and theologians sought to reconcile the existence of hurricanes within a framework of Aristotelian and Augustinian authority. In Aristotle's *Meteorologica* and the works of classical geographers like Pliny there was no reference to nonnatural explanations, and so when Christian authors like Aquinas commented on

these texts they rarely went beyond a general statement of God's power over all things.²¹ But, unlike many things observed in the Americas but unknown in Europe, hurricanes, despite zealous attempts, were not easily reconciled with the existing classical and biblical interpretations of the cosmos.²² Moreover, the struggle between learned natural philosophers and theologians that developed over the storms and the vagaries of natural phenomena in general was never simply a conflict of religious belief and theories of the natural world, or just another episode in a transition from a medieval to a modern and more "scientific" explanation of nature. It also involved a shared conversation with alternative popular beliefs and practices that, while often defined by church authorities as "superstitious," nevertheless allowed for experience and for alternative systems of knowledge to enter into the discussion. These alternative beliefs and lore about wind and weather, often in combination with prayers, rites, relics, and liturgies of the Church, provided a certain sense that men and women were not entirely powerless in the face of natural phenomena.²³ Finally, in the Caribbean, the existence of indigenous cosmologies and knowledge of the great storms also required the Europeans to consider and to incorporate indigenous understandings and experience, despite the fact that Europeans generally dismissed the indigenous peoples and their culture as inferior.

In Spain, interest in the natural phenomena of the New World had been slow to develop. Despite the flurry of excitement after Columbus's first voyage and the rapid circulation of printed letters and newsletters across Europe, the Spanish monarchs, Isabella of Castile (d. 1504) and Ferdinand of Aragon (d. 1516), did not demonstrate much official interest in the peculiarities of the new lands during their reigns. Although early explorers, mariners, missionaries, and local officials had shown a curiosity about the geography, people, and nature of the New World, the rulers had not, and, according to Antonello Gerbi's study, the character and peculiarities of the New World appear to have generated little royal concern or learned interest in the first decades after the voyage of 1492. Other early Spanish expeditions, for example, were not required to submit reports (*relaciones*) of the lands and seas visited. The only account in print of Columbus's exploits available to Spaniards was Peter Martyr de Anglería's *Decades*, part of

which was published in Latin in 1516, a fuller version in 1530; it was not republished again. (It was finally translated into Spanish in 1892.) Elsewhere in Europe, from Antwerp to Venice, many editions in both Latin and the vernacular languages had appeared.²⁴

This royal disinterest changed with the appointment by King Charles I (r. 1516–1556) of the humanist Gonzalo Fernández de Oviedo as chronicler of the Indies in 1532, and the king's command that all officials in the Indies should submit reports to him. Perhaps it was the conquests of Guatemala and Peru that generated this change in official policy, but the crown's interest in the nature of the Indies and of its inhabitants was clearly renewed by the 1540s.²⁵ This curiosity, like so much of Spanish science in this period, was practical rather than philosophical, as the empire of Charles I sought to "see like a state," that is, to inventory, categorize, and control the new territories and their peoples.²⁶

After the first two decades of the sixteenth century cosmographers, historians, and natural philosophers began to write about the New World. In their desire to describe its conditions, attractions, and dangers, these authors collected, commented upon, and codified the observations of captains like Columbus and other early mariners who had sailed in the Caribbean during the hurricane season.²⁷ Mention of the great storms became a feature in many of the early Spanish descriptions of the Indies in general, and the Caribbean in particular.²⁸ The first book on the Indies, Martin Fernández de Enciso's *Suma de geographia* (Seville, 1519), included a discussion of the violence of the storms and a warning that failure to understand the hurricanes had already resulted in the loss of many ships.²⁹ Enciso, a lawyer, had settled for a while in Santo Domingo and had been to Panama and had seen or, at least, heard of the storms' dangers.³⁰ Father Bartolomé de Las Casas, who as both a settler and later as a priest also knew the islands well, said in his *Historia de las Indias* (1561) that the "worst storms of all the world's seas are those of these islands and coasts"; and he noted in his narrative various occasions when the storms had determined historical events.³¹

These early observers tried to reconcile their experience with the theological and natural interpretations of the storms. Oviedo had first arrived in Santo Domingo in 1514; he participated in the conquest of Panama as

well, and would eventually cross the Atlantic six times. Around 1524 he began to compose a natural history as part of a more general history.³² He had personally seen the destruction of the great storms, and he understood the importance of their impact, reporting, for example, that the site of the city of Santo Domingo had been moved after a devastating hurricane in 1504, and the new site was hit again in 1508 and 1509.³³ Oviedo wrote with eyewitness experience, "I have seen thick forests of very large trees torn down for the space of a league and a half and a quarter of a league wide. It was a terrible thing to see and was so frightening that without doubt it seemed to the Indians to be the work of the Devil." Oviedo himself seemed to agree. He said that the Devil "was an old astrologer" who knows what the weather would be and how nature rules things; by his control of the sun and the rain he could bring plenty or famine. But Oviedo offered his Christian readers a preternatural ray of hope. He informed them that wherever the Eucharist had been placed, "the hurricanes and great storms were no longer as frequent or as dangerous as they had formerly been."³⁴ Here he was repeating an earlier remark of Peter Martyr, and this tale of the Eucharist's power became a commonplace in sixteenth-century Spanish accounts.³⁵ The stories were an attempt to demonstrate that the savage novelty of the New World could be dominated and brought under the control of religion. Spanish settlers widely held that opinion, and it was supported at times by the clergy, as we saw in the opening vignette of this chapter, when Father Romero argued that the host had saved Veracruz from total destruction.³⁶ In fact, the idea that the Eucharist might have power to transform the great storms was nothing new in Europe. In a fusion of Catholic belief and what some theologians complained of as "peasant superstition," priests in rural communities had often taken saintly relics and the Holy Sacrament from churches into the fields to divert storms. Various synods sought to prohibit such practices, but the miraculous power of the host that in the priests' hands could transform bread into flesh was often called upon to transform violent storms or hail into soft and life-giving rain.³⁷ Spanish colonists brought these practices to the New World as well.

Oviedo and other early commentators demonstrated a strong empirical tendency born of their own experience, or based on first-hand accounts



FIGURE 1.2 “The horrible and unheard-of storm” is one of the earliest European images of a hurricane. The foundering ships and fleeing Spaniards and Native Americans emphasize human helplessness in the face of these storms. (From Johann Feyerabend and Theodor de Bry, *Americae pars quarta*, Frankfurt am Main, 1594; courtesy of the John Carter Brown Library at Brown University)

they had collected. They then sought to explain these observations by references both to classical natural history and to theology.³⁸ But while there were plenty of classical and biblical references to drought, floods, earthquakes, or other catastrophes and disasters, the great hurricanes, with their extreme velocity, rotating winds, great size, and seasonal regularity, were novel phenomena for which traditional authorities or Mediterranean precedents could provide little guidance, and so early observers, while not abandoning theological or classical explanations, looked to their own experience or turned to a rich European tradition of popular weather lore and beliefs, and even depended on the local knowledge of the native peoples of the region. In that sense the hurricanes provided an occasion and a pathway for a knowledge that crossed cultural and ethnic boundaries.

Early European images of hurricanes (fig. 1.2) and almost all of the descriptions made by Spanish eyewitnesses revealed the awe and terror that the violence of these tempests inspired. Around 1566, for example, Fray Diego de Landa, Bishop of Yucatan, reported:

One winter night, there came at about six in the evening a storm that grew into a hurricane of the four winds. This storm blew down all the fully grown trees, causing great slaughter of all kinds of game; and it knocked down the tall houses, which, being thatched and having fires within for the cold, caught fire and burned a great many people, while some who escaped being burnt were crippled by blows from [falling] timbers. The hurricane lasted until noon the next day, when they saw that those who lived in small houses had escaped, among them the newly married couples, whose custom was to build huts in front of the homes of their fathers or fathers-in-law where they lived for their first years [of marriage]. In this way, the land lost the name it had borne, that “of the turkeys and the deer,” and was left so treeless that today’s trees, all grown of one size, look as if they were planted together. Thus to view the land from certain high points, it looks as if it were all trimmed with a pair of shears.³⁹

The mariners knew the storms and their dangers. Juan Escalante de Mendoza, who mastered many ships in Spain’s transatlantic commerce or “Indies run” and finally rose to be captain general of the New Spain fleet, devoted a long section in his 1575 guide to mariners to the origin of the storms and their dangers. He called them “a fury of loose contrary wind, like a whirlwind, conceived and gathered between islands and nearby lands and created by great extremes of heat and humidity,” an observation that correctly suggested the circulatory nature of the storms and the importance of warm temperature and humidity in generating them. His account was filled with the steps that needed to be taken aboard ship before and during the storm; how the captain must show no fear and encourage his crew, and how he must supervise all without rest during the hurricane. He also reported the signs to look for—the stage of the moon, the behavior of the fish, or the flight of birds. He was careful to mention that “the things that are to come, you know, sir, only God our Lord knows, and none can

know them unless it is revealed by His divine goodness."⁴⁰ Prediction of the weather always treaded dangerously close to the Church's disapproval of divination.

But while navigators naturally demonstrated a practical concern for the storms and their characteristics, Spain's theologians and men of letters also took an interest in these novel and dangerous phenomena⁴¹ None of these early writers was more informative than Tomás López Medel. A high court judge, López Medel had served in the *audiencias* (appellate courts) of Santo Domingo, Guatemala, and New Granada (modern Colombia) in the 1540s and '50s, and he knew the Indies well. Influenced by the writings of Las Casas in defense of the native peoples and by his own humanistic readings, López Medel became an ardent believer in Spain's civilizing mission and a critic of Spanish exploitation of the Indians. On return to Spain from service in America, he entered the clergy, and was then nominated (but did not serve) as bishop of Guatemala. Around 1570, probably in response to an effort by the Board of Trade in Seville to collect geographical information on the Indies, he prepared his *Of the Three Elements: Treatise on Nature and Man in the New World*.⁴² This was a study of the climate's effect on humans and of environmental characteristics of the Indies. Chapter 5 of book 1, on the "breezes and winds," gave special if brief attention to what he called "*buracanes*," which he referred to as a "meeting and dispute of varied and contrary winds."⁴³ This recognizes the distinctive "indistinctiveness" of the winds' direction, and their swirling (which was later learned to be a circular rotation), distinguishing them from the steady direction of other winds. It was, in effect, a precocious perception that preceded the rotational theory of the hurricanes by three centuries. López Medel, like Las Casas and Oviedo, had personally seen the force of a hurricane, having lived through the 1551 blast that struck Yucatan and Veracruz.⁴⁴ He joined that personal observation with what he had learned from others to report the "monstrous" and "incredible" results of the hurricanes; of fully loaded ships driven far inland, barrels filled with iron carried through the air, and of a bell in Veracruz weighing over three *arrobos* (seventy-five pounds) that had been carried almost two miles by the force of the wind. "Surely," he said, "we suffer many travails when these winds and the furies of Nature occur."⁴⁵

In López Medel's brief treatment two aspects of the hurricanes appear that were common to many of these early descriptions: their great potential for devastation, and the way in which indigenous inhabitants of America could read the signs of their approach. Like Oviedo, López Medel suggested that the hurricanes had been more intense and frequent when the Indians lived in the darkness of their idolatry than after the Spaniards had brought the Eucharist to Hispaniola; but he also noted that while the native residents on the islands lived in terror of the great storms, "practice and experience" had taught them how to read the signs of their approach. Similarly, Peter Martyr noted that the low-built thatched roof huts or *bohios* of the Indians seemed to survive the force of the winds better than Spanish-built houses; and it probably did not take the Spanish long to realize that the root crops preferred by the Taíno were well adapted to a hurricane-prone environment, a lesson that later was learned by slaves and slave-owners throughout the region.

The Spaniards first, and later the other Europeans who came to the Caribbean, regularly noted that the native peoples had deified the storms and feared them, but also understood their potential and their seasonality; and, most interesting to the Europeans, they seemed to be able to read the signs of their coming. This problem of prediction in the age before the invention of the barometer and thermometer preoccupied European observers, most of whom, like López Medel, came to believe that the native peoples had developed some system that made prediction possible.

Divination and prognostication were dangerous activities in sixteenth-century Europe, where so-called judicial astrology, the foretelling of human events based on the movement of stars or planets, was condemned for its presumption of predetermining God's will. Augustine had argued that knowledge of the future was solely an attribute of God, and that without divine inspiration, it was a power beyond human ken. True prophecy was possible only with revelation. The Devil might by his astuteness be able to predict some things and derive some fragments of the future, but he did not have real prophetic power. From the thirteenth century forward bishops and inquisitors had campaigned against astrologers who went beyond the accepted limit of suggesting that heavenly bodies might influence nature or human affairs to propose instead that such movements de-

terminated outcomes. Similarly, there was an attempt to suppress and discredit seers and diviners, palm readers, conjurers, and magicians, whose prognostications were considered superstitious or fraudulent, and, when occasionally correct, simply accidental.⁴⁶ A papal bull of 1586 had condemned all divination, although there was always some leeway conceded to observations with practical application to navigation, medicine, or agriculture. Church authorities tended to be lenient and corrective toward excesses in these practices, unless there seemed to be an implicit diabolical pact in such activity.⁴⁷

But despite the suspect and contentious nature of various forms of divination, reading the signs of weather was a ubiquitous and at times necessary skill in agrarian societies, as the publication and consumption of a myriad of European almanacs confirm. In Spain, as elsewhere in Europe, people noted the shape of a cloud, a shift in the breeze, the taste of water, the movement of animals, and the flight of birds. Sometimes these observations were integrated into *refraneros*, books of short and catchy sayings that were considered depositories of popular wisdom. These were often collected and organized by learned humanists. The Marqués de Santillana's (1398–1458) *Refranes que dicen las viejas atrás del fuego* (*Sayings of Old Ladies around the Fire*), first published in 1508, was one of the most important, but there were many, and they were widely popular.⁴⁸ So too were the chronographies, books that combined astrology, astronomy, meteorology, and history and were used as guides to knowing the best days to take certain medicines, or how to read the signs that could inform you if it would be a cold winter, or if it would rain tomorrow. The *Chronographia o repertorio de tiempos* (*Chronography or Repertory of the Weather*) of Jerónimo de Chávez (1523–74) went through thirty-nine editions before the 500-page edition of 1588. Chávez's widely read book was no threat to orthodoxy. It was filled with references to Ptolemy, Aristotle, and other classical authorities, and carried a letter of presentation and approval from Philip II.

At the same time, however, a whole range of more suspect popular practices persisted. In Spain, for example, observations of the weather on certain days of the year were used to make predictions called *cabañuelas*. Those made on each of the first twelve days of the year were used to pre-

dict the weather in each of the following twelve months. Particular saints' days were used as forecasters of the weather and were conveyed as well in sayings like "A clear St. Vincent's day, a good harvest; a bad St. Vincent's day, no harvest" ("*San Vincente claro, pan harto; San Vincente oscuro, pan ninguno*"). In addition to these widely practiced customs, a kind of popular astrology observed the stages of the moon and other astral activity. Synods tried to prohibit this "wisdom," and treatises of theologians condemned it as superstition, but these traditions were deeply ingrained in Spain as elsewhere in Europe, and they easily crossed the Atlantic. The rural folk of Cuba maintained various forms of *cabañuelas* well into the twentieth century.⁴⁹

Such traditions also easily crossed the supposed divide between learned and popular cultures. A prophetic and millenarian strain of Christian thought accepted that these popular epistemologies might themselves be divinely inspired.⁵⁰ Columbus late in life presented himself as a simple mariner whose project, scoffed at by learned men, had been born of his observations and experience inspired by the Holy Spirit. He insisted: "In my own experience, I have met a simple villager who could explain the sky and stars and their movements better than those who paid their money to learn those things. I also believe that the Holy Spirit reveals future events not only in rational beings, but also discloses them to us in signs in the sky, in the atmosphere, and in animals, whenever it pleases him." God revealed his plan through both scripture and experience, even to the humble, in fact to all mankind. "I believe that the Holy Spirit works among Christians, Jews, and Moslems, and among all men of every faith."⁵¹

While Europeans sought to avoid the harm and devastation caused by bad weather, they also accepted that calamity might be divine punishment for the failure to live as good Christians, a possibility made clear by Aquinas, and confirmed at the Council of Trent in 1551. These demonstrations of God's will might have been welcomed as a purging of sin, but they rarely were, and there existed, in fact, sound scholastic arguments based on Aristotelian distinctions between primary and secondary causes that could justify attempts to avoid their effects. In addition, there was the simple common sense of survival strategies.⁵² Still, the hurricanes had a useful purpose in the culture of fear that served an early modern concern

with salvation.⁵³ Different interpretations of the storms were possible. Oviedo had suggested that hurricanes had diminished after the Spaniards had brought the Eucharist to the New World, but Father Bartolomé de Las Casas, the defender of the Indians and critic of Spanish excesses, reported that the Indians claimed that in former times the hurricanes were uncommon, and had increased since the Spanish arrival in the Indies. He suggested the cause of this could be found in the new and many sins of the Spaniards.⁵⁴ The divine intention of natural calamity was generally accepted, and rarely did a governor, royal official, or cleric report the effects of a hurricane or other natural disaster without mentioning God's purpose.⁵⁵ An anonymous tract reporting a hurricane that struck Santo Domingo in 1680 called the winds the "executive ministers of divine justice," and noted the "just disgust that our faults always motivate" in God.⁵⁶ But despite the humility and resignation implied by such statements, the population of the Spanish Caribbean still turned hopefully to traditional remedies and protections.

What is noticeable in these early conjectures about the cause and meaning of the storms is that the early Spanish observers and commentators rarely depended on the learned approaches of natural history or divination, that is, on the texts of the classical world, or the complex systems of astrology or cabala, to explain the origins of the storms, or to suggest methods to combat them. They returned instead to the widely shared popular ideas and sympathetic practices of the agrarian society from which they came. For example, in Spain, one of the traditional ways to respond to the threat of dangerous storms was the ringing of church bells or the firing of artillery, practices based on the theory that the sound would create heat that could dissipate the clouds.⁵⁷ Saint Barbara, patroness of artillerymen, was in fact considered a protector against storms.⁵⁸ This theory perhaps lay behind the concern in the Caribbean expressed by many of the early commentators over the presence or absence of thunder during hurricanes, and may explain the origins of the Cuban *guajiro* (peasant) belief that thunder during a hurricane meant that it would soon end.⁵⁹ Oviedo had warned that absence of thunder in a storm was the worst possible sign, and in early Hispaniola, unlike Spain, thunder and lightning were welcomed because they presaged the end of the storm.⁶⁰

Key in the traditional response to the dangers of weather was the use of prayers, processions, rogations, relics, and the Eucharist.⁶¹ The prayer against storms, *Ad repelendas tempestates*, was made part of the liturgy in Cuba for the months of September and October and in Puerto Rico in August and September, reflecting local perceptions of when the storms were most likely. The 1645 synod of San Juan, Puerto Rico noted that under pressure from the laity some priests had actually removed the Blessed Sacrament from its monstrance and even exposed it outside the church to ward off the great storms. This was prohibited, and the synod urged the use of approved prayers and exorcisms instead. But the traditional practices were deeply rooted, and so as a concession, the synod permitted them in cases of emergency or extreme urgency, “so that the people could be brought to the Church to ask God, Our Lord, for his mercy and that he might relieve them of the danger and straits of their situation.”⁶²

Even such concessions could not keep the laity from turning to other, less approved, traditional technologies of defense against dangerous storms. Palm fronds brought to churches to be blessed on Palm Sunday were brought back to homes and placed on porches and in windows to ward off catastrophes. Sometimes they were burned in hopes that the smoke would rise and break up threatening clouds, a tradition that was still alive in rural Cuba and Puerto Rico at the beginning of the twentieth century.⁶³ The old mariners’ practice of untying any unnecessary knots on ships’ ropes as a way of bringing wind to the sails was adapted to the situation so the tying or untying of knots was thought of as a way to bind up or unleash the winds. The sailors prayed, “Saint Lawrence, Saint Lawrence, tie up the dog and release the winds.”⁶⁴ The knotted cord that bound the robes of the Franciscans, the missionary order so important in the early phases of Spanish settlement, was thought to be especially powerful as a force against the hurricanes, and the Feast of Saint Francis in October was thought to be an especially important day of devotion, occurring as it did during the hurricane season.⁶⁵ On the Caribbean islands, many of these beliefs and practices were eventually combined or overlaid with African ideas or concepts for the control of natural forces.⁶⁶

Prediction then was simply an extension of the beliefs and practices of protection, drawn from the same union of authorized religion and a bun-

dle of folk practices of different origins. For protection, the people sought the intervention of various saints, as in these two examples:

Saint Barbara, the maiden,
free us from the lightning and sparks;
like you saved Jonah from the belly of the whale.

Saint Isidore, the farmer,
drive away the rain
and give us the sun.⁶⁷

The early colonists and their descendants also turned to amulets like horseshoes or tortoise shells, and other “superstitious” practices that sometime caused the discomfort of the clergy. Thus there was clerical ambivalence about popular forms of weather prediction and protection in the early Caribbean where prognosis of the coming of a hurricane was truly a life and death matter. There were also similar objections to the borrowing or use by Europeans of indigenous knowledge or beliefs about the storms. While for most of the early European observers the native peoples of the Caribbean represented savagery and idolatry, there was recognition of an indigenous epistemology that might be beneficial, if also potentially dangerous. Various authors seemed to admire the Indians’ ability to read the signs and sought to learn from them, but in 1550, an investigation (*residencia*) of the governor of Puerto Rico revealed that he had ordered an Indian punished as a sorcerer for predicting the arrival of a hurricane.⁶⁸ It is also curious that the humanist Oviedo in his description of the indigenous perception of the storms linked their knowledge to the influence of indigenous shamans in league with the Devil, and by doing so tied the understanding of the new storms to traditional causes of ill.

English and French observers in their Caribbean colonies in the next century also believed that there was an Indian method of predicting the storms. “The Indians are so skillful that they know two or three or four days beforehand of the coming of it,” wrote John Taylor in his *New and Strange News from St. Christophers, of a tempestuous Spirit which is called by the Indians a Hurricano* (1638).⁶⁹ As in the Spanish islands, the skill of indigenous peoples at reading meteorological signs could also be turned against

them. The English and French sometimes saw in Carib powers of observation and prediction clear evidence of their pact with the Devil. Early French missionaries had at first dismissed such predictions as false prophecies, but when they turned out to be accurate, they claimed that only through contact with the Devil had they been possible.⁷⁰ Such accusations sometimes were used to justify the expulsion of the Indians from particular islands, but this way of thinking could be shortsighted. The elimination of native populations during the European conquest increased European vulnerability. On St. Christopher, after the Caribs had been removed from the island, English colonists had to send to neighboring Dominica, where some Indians still resided, so that they could be brought back to provide storm warnings. A ship captain named Langford reported that settlers on both French and English islands were accustomed to seek word from the Caribs on Dominica and St. Vincent about the immanence of storms, and they were rarely wrong in their predictions.⁷¹

Some European observers sought to record the signs the Indians used. The Spanish Augustinian Father Iñigo Abbad y Lasierra, in his 1788 account of Puerto Rico, noted that the Indians had read certain signs as forewarnings of a hurricane's approach: a red sun, a strong odor from the sea, the rapid change of the breeze from east to west.⁷² Not every European observer was convinced of the Indian's abilities at prediction. Father Jean Baptiste du Tertre, a Jesuit who wrote from experience in the French islands in the mid-seventeenth century, noted that many settlers believed that the Indians could foretell the arrival of the storms, but that in fact, since the storms came in the same period each year, it was natural that sometimes their predictions were correct, even though they had no special knowledge in this matter.

By the mid-seventeenth century, the reading of natural signs was no longer a skill reserved to the indigenous peoples of the islands or to the mariners. It had become a local or creole knowledge, a necessary skill practiced by all. Over time, colonist observations and mariner experience were joined with the clues learned from the indigenous peoples and developed into a kind of local wisdom on each island of the signs to look for. Indians had watched the behavior of certain birds and fish, and the colonists learned from them. Father Jean-Baptiste Labat, a French Dominican,

in his description of the French islands in the seventeenth century, noted that on the approach of a hurricane, the birds had certain uneasiness and flew away from the coast and toward the houses. Even today in the U.S. Gulf states and in the Bahamas the flight of the frigate birds inland is taken as a sign of impending storm.⁷³ Elsewhere other signs were read. "When the crickets, cicadas, toads and frogs disappear, hurricane for sure" is a saying in Puerto Rico.⁷⁴ Settlers also observed the habits of the nonnative species, the familiar animals they brought to the islands. López Medel spoke with amazement about how the cattle could sense the storms' arrival; the animals

[m]any hours before the storm arrives feel and predict it. It is a marvelous thing how they foresee it, coming down from the heights to the lowlands and going to places where from past experiences they know they will be safer. And the instinct of these animals is so precise that the men and residents of those islands take warning from them to predict and understand that which is coming.⁷⁵

In this observation López Medel was following the long-practiced techniques of observation that had become part of the common wisdom shared and exchanged between the learned authors of the chronographies and the residents of the towns and villages of Spain. Those techniques were now transported and adapted to a new environment and a new danger.

The popular wisdom of every Caribbean island and coastal community includes recognition of "signs" that are said to tell of the approach of the hurricanes, such as a particularly good harvest of avocados on Puerto Rico, clams burrowing deep in the sea floor on the Texas Gulf coast, or the roosting of chickens on the island of Nevis. Such signs are given credence alongside the modern predictors of barometer readings, aerial photographs, and computer simulations.⁷⁶ Fernando Ortiz, the great Cuban polymath, wrote: "A clap of thunder and the roosting of hens are the Cuban peasants' infallible barometer."⁷⁷

While local knowledge turned toward the immediate challenge of how to anticipate the coming of the storms and how to survive them, scientific interest in Spain itself concentrated on the practical problems that the hurricanes presented to commerce and communication. The Board of

Trade (*Casa de Contratación*), which established a clearinghouse of information and charts and school for mariners and pilots in the Indies trade, took note of the winds in the Atlantic and the Caribbean and tried to codify that knowledge. In 1573, Philip II ordered each town, village, and city to provide information about its population, topography, and economic activities so that an inventory of information about the Indies could be prepared. The instructions included a section on hydrography and a specific question about the occurrence of hurricanes. In this same period, Juan López de Velasco, the official chronicler and cosmographer of the Board of Trade, published in 1570 his *Geography and Universal Description of the Indies*. This treatise, based on reports collected from all over the Indies, constituted a sort of compendium of Spanish knowledge about the geography and character of their empire. It noted, “the storms called hurricanes [are] the greatest that are known at sea.”⁷⁸ López de Velasco’s objective was practical, with warnings to mariners of the seasonal dangers.⁷⁹ But, despite the concrete and scientific line of his discussion, López de Velasco could also not resist noting the seeming “wondrous” power of the storms.

DESCRIBING THE STORMS

The novelty of the hurricanes and their irregular occurrence on any one island made consistent observation difficult and created insecurity about the exact nature of the storms. This confusion about their characteristics was intensified by the general use of the term “huracán” in Spanish, and then by the use of its equivalents in other European languages for any large and destructive storm. Many variations of the word were put to use; some thirty-eight have been counted in English alone, before the common forms were settled on.⁸⁰ By the seventeenth century it was not uncommon to find the term used to describe storms that caused destruction anywhere in the Atlantic world. A Spanish reference to a Madrid storm (probably a tornado) in 1622 that lasted no more than a few minutes called it a *huracán*.⁸¹ The term “hurricane” became an adjective to describe any destructive wind or torrential rain.

In the Caribbean itself, where the full brunt of true hurricanes was most commonly felt, they were often associated with another all too frequent threat, earthquakes. For most Europeans the level of destruction of the winds was beyond common experience, and so an assumption was made that the winds must be accompanied by tremors of the earth to explain the devastation that resulted; but undergirding that belief there was also a long-standing theoretical basis in Aristotle's *Meteorology*, which said that winds were the strongest force in nature, and that vaporous winds moving beneath the surface of the earth were the cause of quakes and tremors.⁸² This concept survived well into the eighteenth century, and even though the Aristotelian view is no longer held, there are still seismologists who are seeking to establish a direct association between hurricanes and earthquakes.⁸³

Part of the problem was simply one of terminology. In fact, in Spanish the terms hurricane (*huracán*) and earthquake (*terremoto*) were at times used interchangeably. A description of a frightening hurricane in 1624 noted a "tumult of rigorous thunder and lightning with very great earthquakes of hurricanes of air."⁸⁴ The playwright Calderón de la Barca used the terms "tempest" (*tempestad*) and "earthquake" (*terremoto*) interchangeably to describe a Mediterranean storm in his play *The Prince of Fez* (1668). In the early modern Hispanic world, "a hurricane was an earthquake in the air, and an earthquake was a hurricane beneath the ground."⁸⁵

But the confusion of terminology does not provide a satisfactory explanation of the misperception of the sometimes-simultaneous occurrence of earthquakes and hurricanes. Many early accounts of the storms, especially by people who lived through them, suggest that winds and earthquakes were simultaneous, and such claims were made as well in the eighteenth and nineteenth centuries. The original disbelief that winds alone could cause such destruction may have been partly responsible, but there was also a basis in Aristotelian meteorology, which, as mentioned above, argued that winds moving beneath the earth's surface were the cause of seismic activity. A belief that electricity had something to do with earthquakes that became popular in the eighteenth century made their association with hurricanes often accompanied by thunder and lightning also seem natural.⁸⁶ Later English observers were no less prone than the Span-

ish commentators to report their coincidence. Major Dalling, governor of Jamaica, while reporting on the devastation caused by the great storm of 1780, noted that the winds had been accompanied by the shocks of earthquakes.⁸⁷ The historian Bryan Edwards reported a tremendous hurricane that struck St. Lucia in 1788 during which an earthquake killed several hundred inhabitants.⁸⁸ In 1848, Robert Hermann Schomburgk, the able Prussian historian and naturalist in the service of Great Britain, listed eight such coincidences between 1722 and 1821, in various parts of the Caribbean, but recognized that the English meteorologist William Reid had challenged the association of the two phenomena. As with so much about the hurricanes, Schomburgk could say, "they are covered with a veil which man has in vain attempted to remove."⁸⁹

Even more important to observers than the possible association of hurricanes and earthquakes was hurricane frequency and whether certain islands or regions of the Caribbean were exempt or less likely to receive their blows. Oviedo had reported that Indians claimed that prior to the Spanish arrival the hurricanes had been infrequent; and he had also told the story of how the host seemed to protect Santo Domingo after its placement in the churches there. While we may have doubts about his explanations, his observations about the changing frequency of the hurricanes may have been accurate. We now know that Atlantic hurricane frequency is linked to the ENSO (El Niño Southern Oscillation) cycle of warming (El Niño) and cooling (La Niña) of the waters in the Pacific. During an El Niño phase, warm equatorial waters of the Pacific extend further to the east and winds blow easterly toward South America, causing great rains to fall on its Pacific coast, which tends to decrease hurricane activity and precipitation in the Atlantic basin, thus causing droughts. During a La Niña phase, the opposite is true: the warm waters do not extend eastward, the winds blow toward Asia, and tropical storms increase in the Atlantic.⁹⁰ Hurricanes can take place during either phase or during neutral periods, but La Niña conditions increase their frequency. Important studies have established weather records back to the sixteenth century, and other anecdotal information may provide some clues to general patterns. Perhaps Oviedo's informants were correct. It is possible that the decades prior to Columbus's arrival had been an El Niño period of low hurricane frequency,

while the period from 1498 to 1510 or so saw an increase in hurricane activity characteristic of a La Niña episode. This was then followed by another El Niño that coincided with the post-1510 stabilization of the Church and the increased activity of the missionaries, which would seem to support Oviedo's perception of the Holy Sacrament's protective powers. Overall, the principal study of the cycles suggests that periods of increased hurricane activity characterized the years around 1530, 1550, and 1570, during Spain's virtually exclusive control of the Caribbean region. The following period, from the 1590s to the early 1640s, when the English, French, and Dutch began to establish their own settlements, was one of less hurricane activity, a factor that probably facilitated their successful development of plantation agriculture.⁹¹

These climatic cycles were, of course, unknown at the time. The irregularity of the hurricanes promoted an insecurity and unease. Settlers hoped to be spared the dangers of the storms and sought islands or coasts that were exempt from their visits. Those hopes were often frustrated. Commentators noted that there were sometimes long periods when storms were absent. The English, after taking Jamaica in 1655, were fortunate, and came to believe that unlike Nevis, St. Christopher, or Montserrat, for some reason their island was exempt from the storms—that is, until it was hit by one in 1712, and then again by a major blast in 1722. Barbados too enjoyed a reputation as a safe haven for a while, until a disastrous hurricane in 1675 proved that opinion wrong. By the seventeenth century Europeans had begun to recognize that the islands closest to the northern coast of South America and that coast itself were relatively free from the “dreadful visitations” of hurricanes. The little volcanic island of Grenada, toward the southern end of the Lesser Antilles chain, had that reputation, as did Tobago, near the coast of Venezuela; its promoter, John Poyntz, wrote that this being the southernmost island, “no hurricane has hitherto invaded as ever was heard [of] by any of the inhabitants.”⁹² We now know that, in fact, those islands and coasts lying south of 12° N latitude benefited from the protection provided by the “Coriolis effect” in which the earth's rotation creates a force that impedes the rotational movement of the winds of a hurricane as it approaches the equator, and thus greatly lessens but does not entirely eliminate the threat of a hurricane strike at these low latitudes.

DANGERS, PROVIDENCE, AND REASON

European inhabitants of the Caribbean came to accept the hurricanes often as one of the inescapable dangers of living or doing business in the region. They quickly incorporated them into a worldview of dangers that included droughts, famines, epidemics, pirates, foreign rivals, poor market prices, and slave revolts as well as earthquakes, tsunamis, and volcanoes. Christian providentialism and a theological acceptance of God's anger because of sin were widely held, at least by those in authority, as the framework in which the great storms were best understood. The cathedral chapter of Santo Domingo, concerned that the tithes supporting the clergy had been greatly reduced by various calamities, wrote in 1600 that God had shown his displeasure by "awarding this land many trials and tribulations." Beginning from the time that Francis Drake had robbed and burned the city, it listed fleets lost at sea, a pestilence that had carried off half of the slaves, three hurricanes that destroyed crops, sugar mills, and homes, and various "other plagues" such as the packs of dogs that so reduced the livestock that former pasture was returning to wilderness.⁹³ A Jesuit annual letter from the same island reported that the destruction to cacao trees and commerce caused by a 1663 hurricane was due to the greed of merchants and planters who had failed to pay the tithe owed to the Church. Divine justice, said its author, was revealed by a nature out of balance. As hunger was a sign of the earth's infertility, the gathering of wind into great storms demonstrated an instability of air that also bespoke the anger of God.⁹⁴

Nevertheless, noticeably absent in the Hispanic Early Caribbean was the development of an extensive literature of despair and self-criticism so typical of the continental colonies of Peru and Mexico, where catastrophes, especially earthquakes and volcanic activity, generated a culture of fear and eschatological anguish richly conveyed through a variety of literary and artistic means.⁹⁵ The apocalyptic sermons and memorials that followed the Santiago de Chile earthquake of 1647, the Lima quake of 1746, and the great 1755 earthquake of Lisbon have virtually no parallel in the Caribbean, where there is little evidence that hurricanes became a central element in a discourse of culpability.⁹⁶ The jurist and legal author-

ity Juan de Solórzano Pereira, in his *De indiarum iure* (1628), recognized the great potential of the New World, and believed in Spain's providential role in revealing its lands and peoples, but warned of its many potential dangers, especially its earthquakes and volcanoes. His neostoicism, however, led him to believe that humankind should see all natural phenomena as part of a providential design and should be more concerned with what will happen after death rather than what caused the natural disasters. Perhaps due to his personal experience as a judge in Peru, he was far more concerned with seismic activity and eruptions; he never mentions hurricanes.⁹⁷

Even in the Caribbean itself, ecclesiastical attention to hurricanes was relatively slight. With the exception of the condemnation by the San Juan synod of 1645 of the exposure of the Eucharist to ward off storms, neither it nor the synod of Santiago de Cuba of 1681 devoted any particular attention to the challenges of the storms, or to their theological implications. It is true that to some extent the lack of printing in the Hispanic Caribbean before the nineteenth century may obscure such sentiments from the modern researcher. No flurry of published sermons and popular broadsides developed in the Hispanic Caribbean around the storms. But the absence of such a literature probably had causes that are deeper than the lack of a well-developed printing industry, a popular readership, or the constraints on publication and reading enforced by the Church. The very periodicity and seasonality of the hurricanes undercut explanations that their cause could be found principally in human failure and divine justice. If anomalies in nature supposedly reflected the disorder of society that called for correction, the hurricanes that came to the region each year in the same season seemed to challenge such reasoning. Their regularity, seasonality, and seemingly random appearance in various places within the region made moral interpretations of the storms difficult. At the same time, their seasonal predictability differentiated hurricanes from other kinds of "natural hazards" even though their effects were still awesome and frightening. They were simply too frequent and too random to fit into that "moral cosmos" of destructive tempests, calves with two heads, deformed babies, epidemics, and recurrent catastrophes as divine punishments by which early modern societies sought to explain their world.⁹⁸ Since, for Catholic

believers, natural disasters might be the result of diabolical or evil action, in the Hispanic and French Caribbean populations turned to the traditional religious protections of benedictions, prayer, processions, and the interventions of the Virgin or the saints to protect them from the vagaries of nature. Providentialist interpretations surely existed and were sometimes applied to interpret individual storms, but it was usually the successive strikes of storms in a single year or multiple strikes within a few years that moved people to consider their sins or those of their society as the principal cause of catastrophe.

The Spanish understanding of the hurricanes remained a mixture of Aristotelian natural explanations, systematic observation, and religious beliefs. These approaches existed simultaneously both in learned discourse and in the day-to-day lives of everyone who entered the world of the Greater Caribbean. When, in 1699, Diego Martínez de Arce, a Mexico City merchant, revealed to Inquisitors his dream about a destructive *juracan*, he used the image of the storm as a depiction of life's insecurities.⁹⁹ Sailors, planters, slaves, governors, and housewives all sought to learn the signs of the storms, and get to higher ground or find shelter in anticipation of a hurricane's arrival. At the same time, they turned to the traditional religious remedies and protections like the preternatural power of the host to divert the winds, or the power of a cross tossed into the sea to calm the raging waves. Following a storm they might offer thanks and express contrition as did the crew of a Spanish galleon that survived a hurricane en route from Havana to Seville in 1622, when it celebrated a mass in honor of Our Lady of Carmen, a patroness of mariners and protector against tempests.¹⁰⁰ With the arrival of the other European settlements in the seventeenth century, it became clear that this fusion of secular and religious responses cut across religious and denominational divisions. God could send the winds to punish or admonish, or he could raise his hand to protect against their blast. The questions for all the inhabitants of the Greater Caribbean were not only which action God would take, and why, or if other forces, natural or malevolent, might be involved, but what peoples and governments could do each year, morally and materially, when the sea warmed, and the winds of August again began to swirl.