Conclusion: The Crisis Anatomized

Winners and Losers

Crane Brinton's classic study *Anatomy of Revolution*, first published in 1938, sought 'uniformities' between the political upheavals in seventeenth-century England, eighteenth-century North America and France, and twentieth-century Russia. In the last chapter, Brinton asked 'What did these revolutions really change?,' and he answered:

Some institutions, some laws, even some human habits, they clearly changed in very important ways; other institutions, laws and habits they changed in the long run but slightly if at all. It may be that what they changed is more – or less – significant than what they did not change. But we cannot begin to decide the last matter until we have got the actual changes straight.

The preceding pages have attempted to 'get straight' what changed and what stayed the same in the seventeenth-century world; it now remains to assess their relative significance and to ascertain the 'uniformities' among the 50 or so revolutions and rebellions that occurred around the world between 1618 and 1688.¹

At the individual level, the most 'significant' change for most contemporaries was a sharp deterioration in the overall quality of life. During the Indian famine of 1631, English merchants living in Gujarat considered that 'The times here are so miserable that never in the memory of man [has] the like famine and mortality happened.' Ten years later, in China, according to the diary kept by a young scholar, 'Jiangnan has never experienced this kind of disaster.' In 1647 a Welsh historian opined: 'Tis tru we have had many such black days in England in former ages, but those paralleld to the present are to the shadow of a mountain compar'd to the eclipse of the moon'; while during the famine of 1649, a Scottish colleague wrote that 'The pryses of victual and cornes of all sortes wer heigher than ever heirtore any[e]one living could remember', so that 'the lyke had never beine seine in this kingdome heretofor, since it was a natione'?²

All ages produce pessimists who claim that the hardships they face are the 'worst in living memory', and the mid-seventeenth century produced unprecedented numbers of pessimists, and claims of unequalled misery – but the surviving evidence suggests that they were right. Because of the decrease in solar energy and
the increase in volcanic and El Niño activity, the environmental deterioration has few parallels; while the frequency of wars and state breakdown created unprecedented political, social and economic instability.

Some groups suffered disproportionately. Slaves led the way. In China, in parts of Europe (notably Britain and Ireland), and above all in Africa, millions of men and women lost their liberty and often their lives because they became slaves; while millions more in Russia and eastern Europe also lost their liberty because they became serfs. Whether free or unfree, women also suffered disproportionately in most parts of the world. Women killed themselves because they had been raped and otherwise humiliated and could not ‘live with the shame’; because they were destitute and could not face a life of hunger and deprivation; or because they did not wish to survive the death or disappearance of their loved ones. Many of the survivors faced a ‘bitter living’ (in the memorable words of a poor woman with only a small field or so to her name in Germany): she and her sisters had to work harder and longer just to stay alive. Their desperate situation helps to explain why so many women around the seventeenth-century world aborted, killed or abandoned their infant children.3

Admittedly, some European women could use the ‘weapons of the weak’ to retaliate against their oppressors. Female workers and servants abused by their employers could seek revenge not only through foot-dragging, pilfering and slander but also (in extreme cases) through arson and murder. Wives could not only plead with their abusive husbands in private: they could complain to their neighbours and to the courts; they could seek (or threaten) divorce; and they could threaten (or in extremis inflict) grievous bodily harm. In London, Elizabeth Pepys used all of these strategies in 1668 after she discovered her philandering husband Samuel making love to their 16-year-old servant. After tears, reproaches and ‘raining’, she threatened to tell their neighbours, to leave him, and even to join the Catholic Church. She also struck Samuel, attacked him with a pair of red-hot tongs and threatened to slit the servant's nose (a popular punishment for adultery). But Elizabeth's most effective weapon lay “in matters of pleasure”: she refused to sleep with him. Three weeks after his disgrace, Pepys confided to his diary that he was ‘troubled to see how my wife is by this means likely for ever to have her hand over me, that I shall be for ever a slave to her’.4 Only English and Dutch women seem to have enjoyed this limited power to ‘retaliate’, however. Their sisters in other areas of Europe might well ask, like Queen Christina of Sweden in the 1680s, ‘What crime has the female sex committed to be condemned to the harsh necessity of being shut up all their days either as prisoners or slaves? I call nuns “prisoners” and wives “slaves”.’5

Queen Christina would no doubt have felt the same about her female contemporaries in much of Asia, where ‘respectable’ women lived in seclusion from puberty to menopause (a seclusion reinforced in China by the practice of foot-binding: see chapter 4 above). The only exceptions in the Muslim world were the mothers, wives and concubines of Mughal, Ottoman and Safavid rulers, especially during succession disputes. Thus Shah Jahan, who was absent from the Mughal court when his father Jahangir died in 1627, gained the throne only because his female relatives
at court took control and outmanoeuvred those who supported other claimants. In the Ottoman empire Kösem, mother of Sultans Osman, Murad and Ibrahim, overthrew several Grand Viziers and even connived in the regicide of 1648, becoming the most powerful person in the state. Such power rarely lasted long: in 1651 Kösem was murdered at the behest of the mother of the new sultan, just as a generation earlier, in Iran, Shah Safi murdered scores of his female relatives because he feared they might try to overthrow him.6

Wars and revolutions killed, maimed and ruined large numbers of people, both directly through brutality and indirectly through forced migration and destruction of property. Deaths among young men rose with especial rapidity in western and central Europe during the Thirty Years War, in eastern Europe and Russia during the Thirteen Years War, and in China during the Ming-Qing transition. For many soldiers, as well as for thousands of civilians – Protestants and Catholics in Ireland, Jews and Poles in Ukraine, and Ming Clansmen in China – the World Crisis proved a terminal event. Taken together, these tragedies claimed the lives of so many millions, including so many members of the elite, that one might speak of a 'lost generation'.7

In some areas, a whole way of life disappeared. The violence of the Ming-Qing transition permanently destroyed sericulture in the province of Shaanxi, and the Gujarat famine and floods of 1628–31 did the same to one of India's premier cotton- and indigo-producing areas (see chapters 5 and 13 above). The plague epidemic that spread through southern Europe in the decade after 1649, killing one half of the inhabitants of Seville, Barcelona, Naples and other similar cities (see Fig. 11), set the seal on the decline of the Mediterranean as the heart of the European economy for ever. In many other areas, if the observations of Alex de Waal and Scott Cane concerning the effect of a prolonged 'hungry time' on farmers of marginal lands and on hunter-gatherers (see chapters 1 and 15 above) also prevailed in the seventeenth century, then many communities and countless families must have crossed a threshold of awfulness and perished, leaving no trace.

Admittedly, the turmoil produced winners as well as losers. In East Asia, both Nurhaci and Tokugawa Ieyasu were revered as gods soon after their deaths and bequeathed to their numerous descendants a luxurious lifestyle that would endure for more than two centuries. Indeed, the numerous Tōshōgū shrines in Japan still honour the divinity of the first shogun, making him by far the most successful denizen of the seventeenth-century world. The descendants of Michael Romanov also prospered from the political, economic and social balance created by the crisis of 1648–9, cementing their control over an empire that expanded at the rate of 55 square miles a day – more than 20,000 square miles a year – for almost three centuries.8 Many followers of these rulers also profited from the upheaval. In East Asia, tens of thousands of Manchu Bannermen and their families exchanged a precarious existence on the steppe for a life of plenty in one of the Tartar towns of China. Likewise, most of the military and civilian officials who swiftly transferred their allegiance from Ming to Qing prospered: of 125 senior officials who received the ambiguous title Er chen ('ministers who served both dynasties'), 49 became the
president or vice-president of a department of state after the conquest. In Japan, the Tokugawa clannsmen and most of their daimyō allies enjoyed more than two centuries of peace and plenty following the proclamation of the ‘Genna armistice’ in 1615. In Russia, the boyars and their descendants who in 1649 won control over their serfs through the Ulozhenie, maintained their advantage for over two centuries. In India, the leaders who supported Aurangzeb when he challenged his father and brothers during the Mughal Civil War of 1657–9 shared some of the wealth of the richest state on earth.

In Europe, among civilians, government office allowed Samuel Pepys to increase his personal fortune from £25, when he began to serve in 1660, to £10,000 ten years later; while Jean-Baptiste Colbert, who at school ‘was so dull that he was always bottom of the class’, thanks to the favour first of Cardinal Mazarin and then of Louis XIV, died a millionaire and bequeathed a hereditary peerage to his son. Among soldiers, Sweden’s commanders in Germany who survived the Thirty Years War returned home with immense wealth: the castle of Skokloster near Stockholm testifies even today to the booty brought home by General Karl Gustav Wrangel, while his colleague Hans Christoff Königsmarck, who began as a common soldier, died a nobleman with assets worth two million thalers. In England luck and good judgement during the Civil War allowed George Monck, the younger son of a squire (and fortunate as a young man to escape hanging for murdering a deputy sheriff), to become duke of Albemarle and commander-in-chief of England’s armed forces in 1660, and to die with assets worth £60,000. Monck’s followers also prospered. In return for facilitating the Restoration, the general insisted on full payment of the wage arrears of his men, and over the next two years the king’s treasurers at war paid them £800,000.

Often, soldiers gained at the expense of civilians. A Brandenburg lawyer and tax official, Johann Georg Maul, kept a diary between 1631 and 1645 in which he obsessively catalogue the descent of his family from prosperity to virtual destitution at the hands of soldiers who either robbed them, lodged with them, or demanded contributions from them. Maul’s first experience of war cost him 280 thalers: a cavalry sergeant, three troopers and their lackey ‘ate their way through’ 55 thalers in food over 11 weeks; ‘there was also 115 thalers ... for 22 barrels of beer, which the aforementioned boozed away with his guests every night’. Maul also had to provide wine for some visiting officers, hay and straw for their guests, oats for the troopers’ horses and, to add insult to injury, ‘ten thaler for a horse which the major took as a mount for his Fool, who was called Pointynose’. Most subsequent years brought similar billeting demands, sometimes several times, which Maul grimly itemized along with robberies by troops living in his house, as well as endless demands for contributions to sustain troops billeted elsewhere. By 1640 Maul had enriched so many soldiers (and their camp-followers, like Pointynose) that he had virtually nothing left: when he defaulted on his contributions, the three troopers sent to extract payment ‘saw for themselves that I had no money’, so after drinking beer worth three thalers ‘they agreed to leave, taking a handkerchief each which my wife gave them, worth a thaler, and some bread’.
The upheavals of the age brought some women fame. Queen Christina said and did things after her abdication in 1654 that would have led other women to the gallows – making fun of religion; dressing, speaking and behaving as a man; ostentatiously kissing and sleeping with other women – but, as a prestigious convert to Catholicism as well as a former queen, she enjoyed unique freedoms. Between 1649 and 1653, Madeleine de Scudéry published The Great Cyrus, the longest French novel ever written (2 million words; 13,000 pages; 10 volumes), which achieved enormous success because its protagonists were thinly disguised caricatures of Paris socialites and Frondeurs (Cyrus himself was obviously the prince of Condé, and so on). Yet Mlle de Scudéry was also a resolute feminist. Her novels implicitly attacked the prevailing idea of love as something rational, calculated and possessive: instead, her characters insist that love springs from the heart, not the head; and that love is only real when a man is overcome by a force stronger than himself and becomes totally submissive to a woman. Despite their enormous length, her books also appeared in English translation and reached a wide public. Elizabeth Pepys, who was not normally an avid reader, enjoyed Scudéry’s books so much that one night she angered Samuel, as they travelled ‘in the coach, in her long stories out of Grand Cyrus, which she would tell, though nothing to the purpose nor in any good manner’. (Did Samuel perhaps recognize the threat to his philandering ways posed by the book’s feminist views?)

Mlle de Scudéry also presided over a literary salon every Saturday, attended by the leading French intellectuals. One of its numerous female members was Marie-Madeleine, countess of La Fayette (1634–93), whose Princess of Cleves (1678) has been hailed as the first modern novel in French, since it offers both historical verisimilitude (it takes place at the French court a century earlier) and psychological analysis. It also reveals a noblewoman wrestling with the temptation to commit adultery with another courtier – a subject scarcely conceivable for a pre-Crisis novel, especially one written by a woman. The Princess is currently available in numerous printed editions, as a film, a ‘Kindle’ book, and a book-on-tape (duration: 5 hours 46 minutes); it forms part of France’s National School Curriculum; and in 2008 Nicholas Sarkozy, then President of France, complained how much he had ‘suffered’ from being forced to read it at school. Fame indeed.

Both Scudéry and La Fayette appear to have passed unscathed through the human and natural disasters of the mid-seventeenth century. Few women enjoyed such luck. Although there was no ‘typical’ experience of the global crisis, the lives of two other remarkable female survivors, and of their families, may be more representative. Wang Duangshu (c. 1621–1701) was the daughter of a scholar official in China’s once wealthy Jiangnan region. Too old to fight the Qing, when their soldiers arrived in his town in 1645 her father posted on his door a sign that read ‘NO SURRENDER’ and refused to shave his head in the prescribed Manchu fashion. Instead, he fled to the mountains where he starved himself to death. Meanwhile his learned daughter, who had married an official who also refused to bow to the new regime, supported him as long as she could, through her teaching, writing and painting; but ‘when the chill and hunger became unbearable’
they left home together, taking turns at 'pushing a cart. Desolate while on the road, they sold her calligraphy, painting and writing for a living. That same year, 1645, Margaret Lucas, a lady-in-waiting to Queen Henrietta Maria of England who had followed her mistress into continental exile, married William Cavendish, marquis of Newcastle, the defeated royalist general at Marston Moor, 30 years her senior. The couple remained in exile until the Restoration of 1660, renting the exquisite town house that Peter Paul Rubens had used as his studio, where Margaret entertained literary luminaries and wrote books. In 1656 she presented the Antwerp City Library with a five-volume set of her own works; 11 years later she was the first woman to be allowed to visit the Royal Society (where she watched an 'experiment' performed by Robert Boyle); and by the time of her death in 1676 she had published over 20 books on subjects as diverse as natural philosophy, poetry, love (in verse and prose), and science fiction. She also composed an autobiography that, although expressing satisfaction with her social and literary successes, devoted far more attention to the loss of almost £1 million because Parliament had sequestered all her lands and revenues, and to the pain she felt at the death of her older brother Thomas from a head wound sustained while fighting for the king in Ireland, and the execution of her younger brother Charles by firing squad after the surrender of the royalist garrison of Colchester. Both died in 1648, and the following year her sister died of 'consumption' (no doubt tuberculosis), followed by her mother. Margaret wrote that her mother's death was, 'I believe, hastened through grief at having 'lived to see the ruin of her children.' She concluded sadly: 'I shall lament the loss so long as I live.' Despite her literary eminence, in her own eyes the balance sheet of her life, which ended before she was 50, was decidedly negative. The balance sheet of many states likewise showed both losses and gains. Thus although Qing China and Romanov Russia toppled the list of successful dynasties, millions of their subjects lost either their lives or their freedom. In Ukraine, although Ruthenian culture flourished (and even spread to Russia), while serfdom disappeared, the name Ruina given by its historians testifies to the costs of the struggle to shake off Polish rule. Portugal exploited Spain's weakness to gain independence – the only entirely successful rebellion of the seventeenth century – but once again this success reflected immense material and personal sacrifices, including the permanent loss of most of the Lusitianian empire in Asia (and the temporary loss of its colonies in Africa and Brazil). The Dutch Republic gained formal recognition as an independent state, and carved out a lucrative trading empire in south and Southeast Asia at the expense of Portugal and independent rulers like the sultan of Mataram; but it lost its colonies in North and South America. Britain's brief Republican experiment secured the Caribbean island of Jamaica, and commercial dominance in the North Atlantic, but the Civil Wars caused the premature death of perhaps 500,000 people in Britain and Ireland, while Scotland and Ireland (the first states to rebel) temporarily lost their independence. The weakness of the Ottoman empire allowed the Austrian Habsburgs to conquer most of Hungary; while the weakness of the Spanish Habsburgs allowed Louis XIV
to advance the frontiers of France – albeit, in both cases, at the cost of hundreds of thousands of lives.

Other states suffered grave political losses in the mid-seventeenth century and gained little or nothing. The kingdom of Kongo in Africa, and the Indian nations of New England, all perished; while the Polish-Lithuanian Commonwealth lost half its population, temporarily ceased to exist as an independent state, and lost for ever its status as a Great Power. The Spanish Monarchy, too, never recovered its political pre-eminence after the secession of Portugal and its overseas empire; and although Philip IV eventually overcame his rebels elsewhere, he did so only after making major concessions (in Catalonia, for example, he left the ‘Constitutions’ intact and pardoned virtually all those who had defied him). In East Asia, the short-lived Shun dynasty founded by Li Zicheng in China disappeared without trace; while the fall of the Ming forced a reconstruction of Korean identity, because it ‘shattered the premise concerning the world order of which the Koreans felt they were a part’ (just as it required Han Chinese intellectuals to refashion themselves). Around the Great Lakes of North America, the Hurons and their allies escaped famine, disease and the Iroquois by moving west where, as Daniel Richter noted, they ‘recombined and reinvented themselves’ to create a ‘Middle Ground’ between New England and New Mexico that lasted until the late eighteenth century – but they nevertheless lost all their ancestral lands.17

Above all, with the exception of Japan, New England and New France, the demographic balance of the seventeenth century was negative. Apart from the cases of drastic population loss already cited – Qing China; Romanov Russia and Ukraine; the Polish-Lithuanian Commonwealth; most of Germany – Philip IV ruled far fewer subjects at his death in 1665 than at his accession four decades before. Apart from the loss of his former vassals in Portugal and its empire, and along the French frontier, war devastated Catalonia, the areas of Castile along the Portuguese frontier, the Netherlands and Lombardy; while plague, recruiting and taxation depopulated large parts of the Spanish Mediterranean. Finally, in France, famines, epidemics and the civil war unleashed by the Fronde, ‘the climax of the Little Ice Age’ and the losses caused by his repeated wars meant that Louis XIV probably ruled over fewer subjects at his death in 1715 than when he began his personal rule in 1661.

In Search of Common Denominators

According to political scientist Mark Hagopian’s book, The Phenomenon of Revolution, even

When we have enumerated adequate sets of antecedent conditions with their respective empirical generalizations, [t]he resulting explanation or prognosis is bound to be highly complex, but those seeking simplicity should study something else than the causes of revolution. In addition, there is good reason to doubt the ‘completeness’ that any explanation of revolution could possibly attain.
Thus inspired, let us begin with the 11 'antecedent conditions' (or, as a historian might call them, 'causes') offered by Francis Bacon in his celebrated essay 'Of seditions and troubles', first published in 1612:

The causes and motives of seditions are: innovation in religion; taxes; alteration of lawes and customs; breaking of priviledges; general oppression; advancement of unworthy persons; strangers; deareths; disbanded soldiers; factions growne desperate; and whatsoever, in offending people, joyneth and knitteth them in a common cause.¹⁸

Most of these categories can be broken down into components. Thus, in his lectures to the Statistical Society of London in 1878 on 'The famines of the world: past and present', Cornelius Walford proposed 13 distinct causes for just one of Bacon's categories: 'deareths'. Walford discerned six natural precipitants of harvest failure, including excessive rain, frosts, droughts, 'plagues of insects and vermin' and sunspot cycles, and seven more 'artificial' (read: human) precipitants, including war, 'defective agriculture', insufficient transport, legislative interference, currency manipulation, hoarding, and diverting grain from making bread to other purposes (such as brewing or distilling).¹⁹

Nevertheless although Walford relied mostly on nineteenth-century data from England and British India, the same combination of 'natural' and 'artificial causes' he identified also prevailed in the seventeenth century. Famines caused by unfavourable weather were often exacerbated by 'defective agriculture' (farmers who refused to cultivate maize and other crops more resistant to a harsher climate); by a shortage of vessels and carts to transport food from areas with a surplus to those in deficit; by grain merchants who withheld or diverted supplies in order to increase their profits while people around them starved; and by governments that promoted economic chaos by tampering with the currency, squandered resources that might have fed the starving, and refused to make peace in order to reduce demands for troops and taxes. The seventeenth century also witnessed an 'enigma', noted by Walford, that 'the very remedies which have been adopted to prevent, or to mitigate the severity of, these periodical visitations [of famine], have by some reflex action, apparently, either aided in producing them, or at least added very much to the severity of the results flowing from them' – results that often included rebellion and sometimes revolution. Nevertheless, Walford remained convinced that extreme climatic events normally played a greater role than human action in creating catastrophe.²⁰

Does the seventeenth-century evidence support this analysis? Certainly, the major revolts almost all broke out in a period of unparalleled climatic adversity, notably when a 'blocked climate' produced either prolonged precipitation and cool weather or prolonged drought (1618–23, 1629–32, 1639–43, 1647–50, 1657–8 and 1694–6). Some areas suffered for longer: both Scotland (1637–49) and Java (1643–71) suffered the longest droughts in their recorded history. The century also saw a run of 'landmark winters', including some of the coldest months on record, and two 'years without a summer' (1628 and 1675); and an unequalled series of extreme climatic events – the freezing over of both the Bosporus (1620) and the
Baltic (1658); the drying up of China’s Grand Canal (1641); the maximum advance of the Alpine glaciers in 1642–4. In 1641 the river Nile at Cairo fell to the lowest level ever recorded, while Scandinavia experienced its coldest winter ever recorded. These various climatic aberrations accompanied a major episode of global cooling that lasted at least two generations: something without parallel in the past 12,000 years. The famines caused by this change in the global climate caused what would today be called a ‘humanitarian crisis’ in which millions of people starved to death.

These same years of dearth also saw rebellions and revolutions, with two distinct ‘peaks’: Normandy, Catalonia, Portugal and its overseas empire, Mexico, Andalusia, Ireland and England in 1639–42; and Naples and Sicily, France, England (again) and Scotland, Russia, the Ottoman empire and Ukraine in 1647–8. Sometimes a link between rebellion and climate change is manifest. Thus, in Scotland, the summer of 1637 (in which Charles I sought to impose his new liturgy) was the driest in two decades, while 1638 (when he refused to make concessions to his Scottish opponents) was the driest in a century. Government innovation and inflexibility at a time of unprecedented climatic adversity led many Scots to join the Covenanting revolt. The earl of Lothian, a prominent landowner, spoke for many when (having described how, in October 1637, ‘the earth has been iron in this land’, ruining the harvest) he wrote ‘I think I shall be forced this term to run away and let the creditors of the estate catch that catch may, for I cannot do impossibilities’. In the event, his lordship did not ‘run away’. He had already signed the formal protest against the new Prayer Book; six months later he signed the National Covenant. In 1640 Lothian led a regiment in the invasion of England, declaring that ‘necessarie made us come from home’ and ‘in our laulfull defence WE DARE DIE’. In Ireland, too, the failed harvests of 1638–41 caused widespread hardship among the Catholic population, disposing many to support the rebellion that began in October 1641, when ice and snow covered many parts of the island; and then followed ‘a more bitter winter than was of some years before or since seen in Ireland’, which turned the brutal mistreatment of Protestant settlers by their Catholic neighbours into a massacre that would in turn provoke massive retaliation. Likewise, in East Asia, the repeated harvest failures caused by adverse weather in the early 1640s had two dramatic political effects. First, the famines and popular rebellions in Jiangnan fatally weakened the Ming as they struggled against the inroads of ‘roving bandits’ from the northwest. Second, drought and cold in Manchuria so reduced harvest yields that the Qing leaders concluded that invading China offered the only way to avoid starvation.

Climate-induced dearth also contributed to many other rebellions. Perhaps, as Leon Trotsky wrote of the Russian Revolution of 1917, ‘the mere existence of privations is not enough to cause an insurrection; if it were, the masses would always be in revolt’ – but the privations inflicted by climate change in the mid-seventeenth century were an exception. The revolts in Évora in 1637, Palermo in 1647, Ferro in 1648, and the ‘Green Banner’ revolts of Andalusia in 1652, began in just the same way as the greatest rebellion of the twentieth century in Petrograd in 1917: when
adverse weather ruined a harvest and thereby created a food shortage that brought hungry people onto the streets shouting ‘bread’.24

In such a tense situation, even a small increase in government pressure could produce an apparently disproportionate popular reaction. The revolt of the towns of Sicily in 1647 began when the government decreed an end to the subsidy that had kept down the price of bread; while the Naples revolution a month later began when the viceroy reimposed an unpopular excise on fruit. In both cases, Philip IV overrode the misgivings of his ministers because he needed funds to pay for his wars — despite the fact that domestic rebellion opened a ‘second front’. The same perverse logic prevailed in the French Monarchy, where Louis XIII repeatedly raised taxes in times of high food prices, so that his subjects had no money left to buy bread. ‘Long live the king; death to taxes!’ became the cry of rebellious subjects throughout Europe.

Governments could also stimulate or spread insurrections by other means. Charles I’s insistence on imposing a new liturgy on Scotland in 1637 inflamed and united his opponents as nothing else could have done. The desecration by royal troops of the churches in villages that defied them had the same effect in Catalonia in 1640; as did the decision of the Qing regent Dorgon to enforce the head-shaving edict on all males in China in 1645. The revolt of the Catalans would last for 18 years; the resistance of Ming loyalists would last for 38 years. Ineptitude by rulers could also encourage resistance. In Naples the inability of the eleito del popolo to settle a squabble over who should pay the ‘fruit excise’ on the morning of 7 July 1647 allowed Masaniello and his ‘boys’ to galvanize irate bystanders into action. During the summer of 1648, revolts broke out in Moscow when the tsar refused to receive a ‘Supplication’ from his subjects that condemned corruption among his ministers, and in Paris when the regent botched an attempt to arrest her leading opponents as they left a service in Notre Dame cathedral. The ineffective use of force by governments in the initial stages of a rebellion could also prove disastrous. In Barcelona in 1640, in Naples at 1647 and in Messina in 1674, rebellions began just after the galley squadrons based in each port city departed to fight elsewhere.25

The most violent opposition to governments in the mid-seventeenth century often began in a capital city — a circumstance that reflected the greater vulnerability of all urban areas to both climatic change and to government abuse. The major revolts against Charles I and Philip IV all began in a political capital (in Edinburgh, Dublin and London against the former; in Barcelona, Lisbon, Palermo and Naples against the latter), as did other insurrections that rocked and sometimes toppled seventeenth-century regimes: Prague in 1618; Istanbul in 1622, 1648 and 1651; Manila in 1639; Paris in 1648; Moscow in 1648 and 1662; Edo in 1651.

Popular protests alone rarely brought down governments, however, and all the major rebellions of the mid-seventeenth century included members of the secular and, in most Christian and Muslim societies, also the clerical elite. Churchmen headed four rebel governments, at least for a time (Henderson in Scotland, Claris in Catalonia, Rinuccini in Ireland and Genoino in Naples); while throughout the French, Stuart and Spanish Monarchies, clerics preached sermons and published
propaganda in support of the rebel cause. In the Polish Commonwealth, the Ukrainian clergy threw its weight behind Khmelnytsky; while in the Ottoman empire the Chief Mufti (the Şeyhülislam) played a pivotal role in legitimizing the deposition (and subsequent murder) of the sultan in 1622 and again in 1648.26

Noblemen, too, took the lead in several European revolts — Condé and Longueville in France; Argyle and Hamilton in Scotland; Antrim and Maguire in Ireland; Essex and Manchester in England — and, in all four countries, virtually the entire nobility participated in the resulting civil war. In Portugal, Duke John of Bragança founded a new royal dynasty in 1640; in Castile, the duke of Medina Sidonia sought to become the head of an independent Andalusia in 1641; while seven years later the duke of Guise established the short-lived 'Royal Republic of Naples.'27 In the Mughal, Ottoman and Chinese empires, in contrast, the hereditary nobility played virtually no part because their fortunes were too closely linked to the state.

Most of the remaining leaders of the major mid-seventeenth rebellions belonged to the intellectual elite. At least 80 per cent of the members of the English House of Commons between 1640 and 1642, and many English peers, had either studied law at the Inns of Court, or gone to university, or both.28 The Fronde in France began with the revolt of its senior judges. Those who had mastered China's national curriculum and started to climb its administrative 'ladder of success' by passing the state examinations took the lead both in paralyzing the Ming with factionalism and in opposing the Qing with suicidal energy.

Most insurgents in Europe claimed that they desired only the restoration of an earlier state of affairs which they considered preferable. Thus the rebels in Palermo and Naples demanded a return to the charters granted by Charles V a century before; the Catalans called for respect for their ancient 'constitutions'; the Portuguese wanted a return to the relationship with the king created at the union of crowns in 1580 (and when they could not get it, a restoration of the constitutional situation that had prevailed before 1580). Initially, Charles I's enemies also called merely for a return to the past. In England, they demanded government by the crown-in-Parliament, as created by his predecessors; in Ireland the Catholics sought implementation of the 'Graces', which would end the recent trend in Protestant expansion at Catholic expense; in Scotland, the Covenanters insisted on retaining their traditional liturgy. In France, the judges wanted a return to the constitutional 'balance of power' that they believed had prevailed in the Middle Ages; while the nobles saw the 'liberties' and 'franchises' won by the blood of their ancestors in the service of the crown as their birthright, and to defend it they felt a 'duty to rebel.' In Russia, the crowd wanted the tsar to accept their petitions as he and his predecessors had done before.

Rebels in other parts of the world also drew strength from past precedents. In China, Li Zicheng, Zhang Xianzhong and the Qing, all of whom strove to replace the Ming dynasty, cited earlier examples (some of them two millennia earlier) of dynasties that had lost 'the Mandate of Heaven'; and Wu Sangui would do the same in 1673 when he initiated the Revolt of the Three Feudatories against the Qing. In the Ottoman empire, Kadızade Mehmet and his followers called for a return to the
political and religious conventions that had prevailed at the time of the Prophet Mohammed a millennium before. Many others, such as the Swiss in Entlebuch and the Norman Nuit-Piété, demanded a return to a Golden Age when 'justice' had prevailed. To quote Crane Brinton once more: 'Revolutions cannot do without the word "justice" and the sentiments it arouses.'

Attempts to gain 'justice' drew strength, at least in Europe, when supported by legal institutions of unquestioned legitimacy, such as the law courts or Parliament. To this end the rebel leaders in Scotland, Catalonia and Portugal immediately summoned the 'Estates of the Realm' to legitimize their challenge to established authority, as well as to enact appropriate policies and vote funds – thus creating an 'alternative government' capable of winning widespread support both at home and abroad. In Ireland, since the Protestant-dominated Dublin government condemned the rebellion of 1641, the Catholic leaders created their own General Assembly and Supreme Council at Kilkenny, which served for a decade as the government of an independent Ireland (it even boasted its own corps of resident foreign diplomats: an achievement not repeated until the twentieth century). In England, Parliament was already in lawful session when the king declared its members rebels, but both Houses continued to sit until in January 1649 the surviving members of the House of Commons (the 'Rump') tried and executed him, and then proclaimed England a Republic with themselves as its sole sovereign body. Meanwhile, in the Dutch Republic, the States-General exploited the death in 1650 of William II of Orange to gain control over the executive functions that he had exercised. In Ukraine, finally, Hetman Bohdan Khmelnytsky from the first sought the approval of the assembly of Cossack freemen for his various actions, including a declaration of independence from the Polish Commonwealth and, later, a treaty of union with Russia that preserved most of the gains won by the initial revolt.

The unifying appeal of these aims helps to explain why so many seventeenth-century insurgencies lasted so long. The revolt of Bohemia against Habsburg authority in 1618 initiated a war that lasted 30 years. The revolt of Portugal against Habsburg authority in 1640 began a conflict that lasted 28 years; while the Catalan Diputació's repudiation of Philip IV the following year turned the principality into a battleground for 19 years. In Ukraine, the Cossacks' rejection of the authority of the Polish crown in 1648 also led to 19 years of war. The execution of Charles I by his English subjects in 1649, and the proclamation of a Republic, inevitably led to hostilities against the Scots, the Irish and several American colonies (which proclaimed Charles II as their sovereign), and the former Stuart Monarchy remained on a war footing, with a large army and navy even in peace time, right up to the Restoration in 1660.

Longevity, however, changed the character of most rebellions. As John Wallis later observed about England: 'As is usual in such cases, the power of the sword frequently [passed] from hand to hand, because of those who begin a war, not being able to foresee where it will end.' None of the 'Five Members' whom Charles I tried to arrest early in 1642 possessed military experience, and few had held executive office, so they gave way to those like Oliver Cromwell whose actions
demonstrated their ability to lead. Likewise, in Naples, the constitutional lawyers Genoino and Arpaja replaced the illiterate demagogue Masaniello, only to lose their places to Gennaro Annese and the duke of Guise, who possessed military experience. The rise of a 'second generation' of more militant leaders, like Cromwell and Annese, helps to explain why revolutions became more violent the longer they lasted. The experience of resistance habituates leaders to actions that would earlier have seemed intolerable. Moreover, any government, whether established or insurgent, needs to take drastic measures when faced with climatic extremes, famine and war (and in the mid-seventeenth century such challenges occurred with unusual frequency), but regimes that lacked legitimacy (and experience) might resort to more extreme measures to enforce their policies.

Rebellious regimes might also appeal for foreign aid, and in so doing fragment their domestic support. In Ireland, the Catholic Confederacy turned to their co-religionists in Europe, and although the Papacy, France and Spain all provided valuable material assistance, each foreign power had its own agenda and did not scruple to create and exploit damaging domestic divisions in order to achieve them. In the Iberian Peninsula, the Catalan opponents of Philip IV appealed for French assistance; and although French troops and military advisers helped to save Barcelona, Louis XIII demanded that the Catalan leaders abandon their resolve to become an independent republic and instead recognize him as their sovereign. Most spectacular of all, in China, the Ming commander Wu Sangui appealed to his northern neighbours for military assistance against the 'roving bandits', and allowed the Manchu Grand Army to pass through the Great Wall to destroy Li's forces; but once this mission had been accomplished, the Manchus claimed that their victory conferred the Mandate of Heaven to rule all China, which they did until 1911.

Within the composite states of Europe, opponents of the same ruler in one area often took active steps to encourage others to rebel. Thus immediately after his 'acclamation', King John IV of Portugal sent envoys to Barcelona to make common cause with the Catalan rebels; and somewhat later his principal adviser, the Jesuit António Vieira, went to Rome to invite the Pope to invest John's son as king of Naples (a papal fief). In 1648 in Castile, Don Carlos de Padilla, lynchpin of the 'conspiracy of the duke of Híjar', looked to John IV of Portugal for support; and government agents found the name of Don Miguel de Íñiguez, who had recently spearheaded successful opposition to royal policies in Navarre, among his papers (see chapter 9). Most striking of all, as soon as news arrived that riots in Palermo against excise duties in 1647 had secured their abolition, the citizens of Naples began to put up 'pungent and bitter invectives' calling for 'a revolution like Palermo'; and as soon as the revolution began, 'some people from Palermo' urged the Neapolitans 'to demand everything, in the same way that had happened in Palermo'. One of these 'Palermitanos' was Giuseppe d'Alesi, who returned to lead the movement in his native city that secured the same concessions as those granted the previous month to the rebels of Naples. In addition, in both kingdoms, revolt in the capital provoked copycat uprisings in numerous other towns (see chapter 14).
The opponents of Charles I in different parts of his Monarchy likewise created links across borders that aimed to improve their chances of success. Thus some Scottish ministers in northern Ireland found the hostility of the earl of Strafford’s religious policies so intolerable that in 1639 they chartered a vessel to take them to Massachusetts (John Winthrop had visited Ulster the previous year), but storms drove them back to their native land. They saw this as a divine sign that they should ‘find an America in Scotland’ and, once arrived there, joined the Covenanters’ opposition to Charles I. In Russia, too, disorders spread throughout the empire largely because in June 1648 the capital was full of petitioners from provincial towns, and local uprisings followed as soon as the petitioners returned home with news of the Muscovites’ apparently successful defiance of the tsar (see chapter 6). Finally, the peasants of Entlebuch who began the ‘Swiss revolution’ in 1653 sent envoys to mobilize support elsewhere in Canton Luzern and its neighbours (see chapter 8).

If

Despite the unparalleled frequency of revolts in the mid-seventeenth century, it is possible to imagine a more peaceful world — even with the litany of ‘antecedent conditions’ listed above. As Charles I reminded the Long Parliament in November 1640, while explaining how the Scots had managed to defeat his forces so swiftly: ‘Men are so slow to believe that so great a sedition should be raised on so little ground’.33 ‘Accidents’ — totally unpredictable developments — could crucially affect the outbreak or outcome of a rebellion: the election by lot of two talented yet intransigent Catalan patriots, Pau Claris and Francesc de Tamarit, as the senior Diputats of Catalonia, in 1638 (see chapter 9); the interregnum in the Polish- Lithuanian Commonwealth created by the death of King Władysław IV just after the Cossack rebels routed its field army in 1648 (see chapter 6); the death from smallpox of William II of Orange without an adult heir just after he had defeated his domestic opponents in 1650 (see chapter 8).

Some ‘accidents’ were more predictable — especially those caused by distance, which was (in Fernand Braudel’s adage) ‘Public Enemy Number One’. Philip IV’s advisers hesitated to react immediately to the revolt of Naples ‘because the state of affairs over there changes from one moment to the next, and what seems appropriate today might not be so tomorrow’; while his envoy to the Irish Catholic Confederation complained that distance constituted ‘the greatest problem of my job’ because it meant that ‘I cannot neither send successive accounts of what is happening nor receive in good time the royal orders of Your Majesty’.34 Even within the Iberian Peninsula, as Sir John Elliott noted,

The distance between Madrid and Barcelona meant that [the viceroy’s] letters and those from Madrid never kept in step. While circumstances were changing from day to day in the Principality, Madrid was at least three days behind the news, and still legislating as if the situation was exactly the same as when the viceroy had written his last set of dispatches.35
Likewise, the central government in Madrid received the first reports of the Portuguese revolution that occurred in Lisbon on 1 December 1640 just one week later, but refused to believe them. 'It is possible that a popular tumult might have produced a good deal of what we have heard,' the Council of State informed Philip IV, 'but to proclaim a king the same day is not credible.' The king did not sign letters warning ministers in Europe about 'the accident of Portugal' until 15 December; he did not instruct colonial administrators to take defensive measures until 27 December; he did not warn the treasure fleets coming from America to avoid Portuguese harbours until 5 January 1641; and he did not order the closing of all frontiers, both in the peninsula and in America, to commerce with the rebels until 10 January.36

Conversely, 'accidents' could also unexpectedly derail rebellions. Thus Lord Maguire's plot to seize Dublin Castle in 1641 failed only because one of the conspirators decided to betray his colleagues — but even then the magistrates 'gave at first very little credit to so improbable and broken a [story], delivered by an unknown, mean man, well advanced in his drink,' and so sent him away. He only managed to sabotage the plot because he made a second attempt — this time successful — to betray his colleagues (albeit now too late to send a warning of the plot to Ulster, where it succeeded: see chapter 11). Likewise, ten years later, the samurai plot to seize Edo and destroy the Tokugawa regime came to light only because one of the conspirators became delirious and unwittingly shouted out the details.37 In each of these cases (and no doubt in many others) a minor 'rewrite' of the historical record would thus produce a dramatically different outcome; and the same is true of natural disasters, such as earthquakes and volcanic eruptions, which occur with little or no warning; if only the 1640s had not seen, at much the same time, the virtual disappearance of sunspots, much more volcanic activity, and double the number of El Niño episodes...

Nevertheless, although contingency (like catastrophe) cannot be written out of history, when constructing 'What if?' scenarios, historians must always consider second-order (or reversionary) counterfactuals: the possibility that rewriting the short-term historical record, as in the examples above, might still not alter the long-term outcome. Reversionary counterfactuals take two forms: one positive (an 'accident' could delay but not permanently derail a particular development) and the other negative (a development that was, so to say, 'an accident waiting to happen'). Positive examples are relatively easy to find. From the 'human archive', 22 years after the death of William II and the 'Dutch Revolution' that followed, his posthumous son William III recovered almost all of the traditional powers and influence of the princes of Orange; just as Charles II regained virtually all of his father's powers in all his dominions 11 years after the regicide in 1649. Turning to the 'natural archive', since some parts of the planet could only feed their inhabitants in 'good years', then even had fewer volcanic eruptions and El Niño episodes occurred in the 1640s, sooner or later 'bad years' would come, and they would still cause heavy mortality.

M. de Bellièvre, the French resident in London, provided a good example of a negative 'reversionary counterfactual' as he contemplated the situation in Ireland in 1648. He informed Cardinal Mazarin that
What surprises most of those who consider the affairs of that country [Ireland] is to see the people of the same country and the same religion, who know that the decision to exterminate them totally has been taken, so strongly divided by their private hatreds, so that zeal for their religion, the preservation of their country, and their own self-interest does not suffice to make them abandon — at least for a while — the passions that incite them against each other.\[^{38}\]

The English conquest began the following year, and within three years Confederate Ireland was no more — but, in Bellèvre’s view, even if the London government had delayed its campaign of repression, internal dissention still doomed the Catholic cause to ultimate defeat. Historian Julian Goodare has proposed a similar negative ‘reversionary counterfactual’ for Scotland: given the character of both Charles I and the leading Covenanters, ‘the Scottish crisis of 1637–8, with its momentous consequences for Britain, had been waiting to happen for some time; if the Prayer Book had not ignited it, something else soon would have done.’\[^{39}\]

Many of Charles’s fellow rulers — Qing Regent Dorgon, Tsar Alexei Romanov, Gustavus Adolphus of Sweden and Christian IV of Denmark — displayed a similar inflexibility, and so did their principal ministers. None of them seemed prepared to contemplate alternatives to the policies they had adopted. Thus in 1632 Thomas Wentworth, later earl of Strafford, informed a colleague: ‘Let the tempest be never so great, I will much rather put forth to sea, work forth the storm, or at least be found dead with the rudder in my hand’ — an uncanny echo of the claim seven years earlier by the count-duke of Olivares that ‘As the minister with paramount obligations, it is for me to die unprotesting, chained to my oar, until not a fragment is left in my hands.’\[^{40}\] Although Philip IV’s ministers never gave their political programme a boastful name like ‘Thorough’, they blindly pursued policies that were equally ambitious and equally unrealistic. However desperate the political situation seemed, introducing innovations and imposing additional burdens during the adverse economic and social situation caused by the Little Ice Age was sooner or later likely to provoke resistance and rebellion.

**The Two Worlds of Robinson Crusoe**

Robinson Crusoe, one of the most famous fictional inhabitants of seventeenth-century Britain, grew up during the Civil War and left home in 1651, just after the execution of Charles I; and after being marooned on a remote island he returned to his native land in 1687, just in time to witness the flight of James II and the Glorious Revolution. Yet Crusoe’s ‘Strange and surprizing adventures’, first published in 1719, included not a word on these political changes. By contrast, Daniel Defoe, Crusoe’s creator, repeatedly emphasized how the mental world in which his character grew up differed from the mental world of his readers. For example, Young Robinson kept a diary that initially resembled the spiritual journal and balance sheet maintained by many Puritans in the mid-seventeenth century (see chapter 20 above); but before long he filled it with balance sheets of profit and loss, reflecting
the commercial outlook that had made England prosperous. Moreover, whereas England in the mid-seventeenth century had been riven by confessional strife, Crusoe despised religious intolerance. He 'allow'd liberty of conscience throughout my dominions' to Catholics, Protestants and pagans alike; and he considered 'all the disputes, wranglings, strife and contention, which has happen'd in the world about religion, whether niceties in doctrines or schemes of church government, they were all perfectly useless to us, as for ought I can yet see, they have been to all the rest of the world'. Crusoe's enthusiasm for religious toleration did not stem from a desire to attract religious refugees (as under Cromwell) but because it was essential for profitable international trade (which Crusoe pursued with great success). Finally, Crusoe successfully practised the 'new philosophy' (see chapter 22 above). He salvaged from his wrecked ship 'infinitely more than I knew what to do with', leading to the 'reflection, that all the good things of this world are no farther good to us than they are for our use'; and that, on the contrary, 'All I could make use of, was all that was valuable'. Crusoe also became a successful planter, and soon found that his two most valuable assets were tools ('the carpenter's chest' he salvaged was 'much more valuable than a ship loading of gold would have been') and labour: Crusoe saved 'my man Friday', a native American, from cannibals and immediately set him to work on his 'colony' (Crusoe's term), where the first English word he had to learn was 'Master'. So although Crusoe 'had never handled a tool in all my life' yet 'I improv'd myself in this time in all the mechanic exercises, which my necessities put me upon applying myself to'. A clearer example of the impact of the new 'experimental philosophy' would be hard to find.

The world of 1719 differed from the world of 1651 in one other important respect: the frequency and violence both of volcanic eruptions and El Niño events diminished, the current 11-year sunspot cycle resumed, and the long episode of global cooling came to an end. The benign climate, coinciding with a more systematic exploitation of the environment, allowed the supply of goods to increase faster than demand for them, and so permitted rapid population growth in more fertile areas. In China, the Kangxi emperor noted in 1716 that the population grew 'day after day', unlike the available arable land, and complained – just like his predecessors a century before – about the increase in the number of unproductive consumers, singling out intellectuals, merchants and clerics. A few years later, a senior official in Fujian estimated that 'the population had doubled' during the previous six decades. He also complained that 'while the population increases daily, the amount of land under cultivation does not'. The following year, the central government launched a drive to bring more land under cultivation because 'population has increased of late, so how can [the people] obtain their livelihood? Land reclamation is the only solution'. Thanks to such measures, by the mid-eighteenth century both East Asia and western Europe boasted a far denser population than ever before – but this time without a decline in life expectancies or standard of living. Equally important, the new equilibrium of population and resources made the demands of the fiscal-military state more bearable. The return of a warmer climate had broken the 'fatal synergy'.
Nevertheless, the same dynamic of subsistence prevailed, and continues to prevail. Societies in which the demand for food exceeds the supply must either increase supply (by adopting technological changes that improve crop yields per acre, by mobilizing a new source of energy, or by securing food elsewhere by trade or by force); or else they must reduce demand (by eating less, or by reducing the number of mouths to be fed through fewer births, increased migration, or more deaths). All these strategies played their part in coping with the problems caused by the fatal synergy of human and natural factors in the seventeenth century. Many starved and many more went hungry; while more abortions and infanticides, more delayed or forgone marriages, and more migration (both forced and voluntary) reduced the number of mouths to feed. Yet, since all these adaptive measures took effect only slowly, in most societies around the world food supply and demand only came back into equilibrium after ‘enough’ people had died.

Although blind, and confined to his house, John Milton understood this dynamic as clearly as any contemporary. He began to compose *Paradise Lost* in London during the landmark winter of 1658, and continued through the years of dearth that accompanied the Restoration of Charles II, so it is hardly surprising that unpredictable and unforgiving changes in the climate are central to his story. Milton’s fictional world, like the real one in which he lived, was (as he termed it) a ‘universe of death’ at the mercy of extremes of heat and cold.

At certain revolutions all the damn’d
Are brought: and feel by turns the bitter change
Of fierce extremes, extremes by change more fierce,
From beds of raging fire to starve in ice
Their soft ethereal warmth, and there to pine
Inmovable, infixed, and frozen round
Periods of time; thence hurried back to fire. 45
Epilogue: ‘It’s the climate, stupid’

Once upon a time, the history of climate was a ‘hot topic’. In 1979 the World Meteorological Organization, the United Nations Environment Programme, the National Science Foundation, the Ford Foundation and the Rockefeller Foundation paid for 250 historians, geographers, archaeologists and climatologists from 30 countries to attend the first international ‘Conference on Climate and History’, hosted by the Climatic Research Unit at the University of East Anglia (England) – a unit sponsored by (among others) British Petroleum and Royal Dutch Shell. Cambridge University Press later published a volume containing the most innovative of the conference papers. That same year, the World Meteorological Organization created the ‘World Climate Program’ with a mandate to ‘insert climatic considerations into the formulation of rational policy alternatives’. No one doubted then either that global climate had undergone dramatic changes in the past or that, sooner or later, it would undergo equally dramatic changes in the future.

These initiatives took place in the shadow of a world food crisis: the price of wheat tripled and that of rice quintupled between 1972 and 1974, a reflection of harvest failures in South Asia, North America, the Sahel and the USSR, themselves a reflection of the strong El Niño episode of 1971–2 which suggested that a system of teleconnections might explain how the global climate ‘worked’. The United Nations therefore convened a ‘World Food Conference’ in 1974, which made the solemn ‘Declaration’ that: ‘As it is the common responsibility of the entire international community to ensure the availability at all times of adequate world supplies of basic food-stuffs by way of appropriate reserves, all countries should co-operate in the establishment of an effective world system of food security.’ The Conference’s equally solemn ‘Resolutions’ included:

- ‘Achievement of a desirable balance between population and food supply’;
- ‘Reduction of military expenditure for the purpose of increasing food production’; and
- ‘[Creating] a global information and early warning system on food and agriculture’.

Before governments had time to enact these resolutions, however, the ‘shadow of a world food crisis’ disappeared thanks to the ‘Green Revolution’: new high-yielding
varieties of wheat, maize and rice, combined with the increased use of irrigation, fertilizers, pesticides and herbicides, dramatically increased food production. Famines virtually disappeared from the headlines and climate change virtually disappeared from the research agenda of historians. 3

Then in 1990 the 'Intergovernmental Panel on Climate Change' (IPCC), another United Nations initiative, issued its first Assessment Report, summarizing the research of several hundred working scientists from 25 countries. The document claimed that emissions resulting from human activities are substantially increasing the atmospheric concentrations of greenhouse gases, and that without immediate action to reduce greenhouse gas emissions, 'additional warming of the Earth's surface' was inevitable. To clarify the scale of the problem, the Report called on colleagues to 'further investigate changes which took place in the past'. The response of the scholarly community, including many historians, has been magnificent: since 1990 they have compiled thousands of data-sets and published hundreds of articles about past climate change, revealing a series of significant shifts that culminated in an unprecedented trend of global warming. 4

Unlike the research presented in the 1970s, these new findings have been ignored, rejected and belittled; while suggestions that states should 'insert climatic considerations into the formulation of rational policy alternatives' also provoke passionate opposition. Just after he became Chairman of the Environment and Public Works Committee of the United States Senate in 2003, Senator James Inhofe declared global warming to be the 'greatest hoax ever perpetrated on the American people'. In 2011 Senator Inhofe co-sponsored legislation (the Upton-Inhofe bill) that would prevent the federal government from 'promulgating any regulation concerning, taking action relating to, or taking into consideration the emission of a greenhouse gas to address climate change'; while later that year the United States House of Representatives defeated by 240 votes to 184 a motion known as the 'Waxman Amendment' stating that 'climate change is occurring, is caused largely by human activities, and poses significant risks for public health and welfare'. 5

The Waxman Amendment conflated two distinct issues: determining whether 'human activities' (notably, the emission of greenhouse gases and deforestation) can produce climate change is not the same as proving that 'climate change' occurs. There may perhaps be residual doubts about the first proposition, just as some still deny that smoking tobacco increases the risk of lung cancer, but the historical record leaves no doubt that climatic change occurs, and that it can have catastrophic consequences for 'public health and welfare'. Although humans appear to have played no part in precipitating the climate changes of the seventeenth century, they suffered and died from its consequences all the same.

The surviving human and natural archives reveal episodes of major climate change in the fourteenth century and in 1816, as well as in the seventeenth century. A series of articles by economic historian Bruce Campbell demonstrates that the 1310s and 1340s saw both 'extreme instability' in the climate and lethal disease (rinderpest in 1316–25 and bubonic plague 1346–53), at a time when both the bovine and human populations had reached unprecedented densities. England's
excellent surviving records suggest these natural disasters ‘more than halved’ the population. The climate-induced catastrophe in 1816, another ‘year without a summer’, occurred when sunspots were few (the ‘Dalton Minimum’, 1795–1828), and just after the most powerful volcanic eruption recorded in the past 10,000 years, at Tambora in Indonesia: a combination that appears to have reduced average temperatures on earth by between 1° and 2°C – exactly the same variation as in the mid-seventeenth century. This sufficed to produce not only global cooling but also extreme climatic events. In North America, throughout the summer, fronts of Arctic air dumped snow north of a line stretching from British Columbia to Georgia, producing temperature oscillations from 35°C to freezing in a single day; and in September 1816, New Hampshire experienced ‘the four greatest frosts known . . . at this season by any man living. Across the Atlantic, intense cold prevailed for most of the summer from Finland to Morocco; rain fell on Ireland for 142 out of 153 days between May and September; England experienced the third coldest summer since continuous records began in 1659; and grapes in all French and Swiss vineyards ripened later than in any other year since continuous records began in 1437. In Asia, the monsoon failed in India, while snow fell in Jiangnan and Taiwan. In 1817 at Barnstead, New Hampshire, St Valentine’s Day was ‘the coldest day [that] has been for forty years’; while at Salem, Massachusetts, the Reverend William Bentley spent ‘the first [day] in my life in which I kept house upon account of the cold’. The extreme weather also generated both disease and famine: a severe epidemic of typhus broke out in Europe while cholera ravaged India; scarcity of bread provoked widespread food riots in Europe; while ‘through[out] New England scarcely a tenth part of the usual crop of sound corn will be gathered: The price of wheat in New York City in 1816 would not be surpassed until 1973.8

The ‘Yankee Chills’ (as survivors in North America called their miserable summer) produced massive emigration from New England to the Midwest. ‘The lands to the westward are luxuriant, and the climate mild and salubrious’, crowed a land promoter, and thousands of families believed him and abandoned their farms for the golden Ohio country: between 1817 and 1820 the population of the state of Ohio rose by 50 per cent, taking it above 500,000 for the first time. Most of the newcomers were New Englanders fleeing the sudden climate change.9

Two centuries later, flight to Ohio would offer little relief if ‘Yankee Chills’ (or any other natural disaster) should strike New England. In the words of the 2011 version of the state of Ohio’s Strategic Plan: ‘Getting food from farms to dinner tables involves a complex chain of events that could be interrupted at many different stages. Because food and agriculture are such vital industries to our state, Ohio must vigilantly protect animal, plant, and food supply chains’ – but with over 11 million Ohioans, it is hard to see how the state could also feed 50 per cent more in an emergency.10 Admittedly, if the ‘chills’ killed only corn, or only affected New England, the transport and distribution infrastructure that has developed in Ohio since 1816 could probably import sufficient emergency food rations from unaffected (or less affected) areas; but this might prove impossible in the wake of a natural disaster nearer home. In 2005 it took almost a week to get vital supplies of food and water
into New Orleans after Hurricane Katrina struck, because the storm that flooded the city also severed road and rail links and disabled both landline and cellular telephones; while the evacuation of over one million people from areas of the Gulf Coast affected by the hurricane created a ‘hollowed economy’, with an infrastructure no longer capable of satisfying its basic food, water and health needs.11

Although Katrina was the costliest natural disaster in the history of the United States, it was only one among 432 reported natural disasters of 2005 around the world, causing between them $1.76 billion of economic damage. That figure remained the record until 2011 when, although the total of reported national disasters fell to 302, the economic damage they caused exceeded $3.50 billion. This total included $2 billion caused by a tornado that struck Tuscaloosa, Alabama; $11 billion caused by the earthquake that struck Christchurch, New Zealand; $25 billion caused by another tornado that hit Joplin, Missouri; and $210 billion caused by the Tohoku earthquake and tsunami in Japan. Between them, those four natural disasters killed well over 20,000 men, women and children. In addition, in 2011, over 106 million people around the world were affected by floods; almost 60 million more by drought; and a further 40 million by storms.12

No human intervention could have prevented these natural catastrophes – although a better early-warning system, better popular education about evasive strategies, and faster and more effective emergency responses would surely have mitigated the consequences. Likewise, no human intervention can prevent volcanic eruptions, halt an El Niño episode, or delay the onset of another sunspot minimum – despite the certainty that each will affect the climate, reduce harvest yields, and cause starvation, economic dislocation, political instability and death.13 So what can be done to mitigate the consequences? The disastrous hurricane seasons of 2004 and 2005 (which included not only Katrina but seven of the nine costliest systems ever to strike the United States’) led the National Hurricane Center, a division of the National Weather Service located at Miami, Florida, to pose just this question. The Center concluded sadly that another ‘disastrous loss of life is inevitable in the future, mainly because the majority of those living in areas at risk have ‘never experienced a direct hit by a major hurricane’ and seem incapable of envisaging what one is like, while even the rest ‘only remember the worst effects of a hurricane for about seven years’. For the National Hurricane Center, the problem lay less in the frequency of hurricanes than in the failure of human beings to learn from them: ‘The areas along the United States Gulf and Atlantic coasts, where most of this country’s hurricane-related fatalities have occurred are also experiencing the country’s most significant growth in population’ – striking testimony to the strong ‘culture of denial’ that prevails.14

Nevertheless, as the social psychologist Paul Slovink pointed out, ‘The ability to sense and avoid harmful environmental conditions is necessary for the survival of all living organisms’, while ‘survival is also aided by an ability to codify and learn from past experience’. Moreover, Slovink continued, ‘Humans have an additional capability that allows them to alter their environment as well as respond to it’.15 This ability to ‘alter’ our environment presupposes two distinct skills: learning processes
(the observation, measurement and classification of natural phenomena) and learning steps (the development of techniques, practices and instructions designed to reduce vulnerability in future hazards). History offers numerous examples of both in action. Repeated floods in the lands around the North Sea in the Middle Ages led to the evolution not only of preventive measures and coping strategies but also of permanent cadres of ‘experts’ and an unusually resilient entrepreneurial culture: all underpinned the rise of the Dutch Republic as a world power. Likewise, the crescendo of urban fires in the mid-seventeenth century gave rise in one city after another to both better fire-fighting measures and (at least in Europe) to the development of a system of specialized insurance companies that now form some of the most powerful business enterprises in the modern world.16

Nevertheless, in order to activate our ‘additional capability to alter [our] environment’, it seems that humans need to experience natural disasters ‘not only in magnitude but in frequency as well. Without repeated experiences, the process whereby managers evolve measures of coping with [disasters] does not take place.17 Effective measures to prevent and to mitigate floods and fires therefore only seem to evolve after repeated disasters of unprecedented severity strike a community. Perhaps this defect in human cognition explains why, despite the fact that 2010 saw the warmest global surface temperatures ever recorded, and was the 34th consecutive year with global temperatures above the twentieth-century average, the Washington Post proclaimed in 2011 that global warming had become ‘a second-tier issue’.18

This strange disconnect prompted a team of researchers to ask over 67,000 people in 47 different countries to answer the question: ‘How serious do you consider global warming?’ The findings, published in the Journal of Peace Research in 2012, supported the assertion of the Washington Post: ‘Global warming is not considered as an especially important environmental problem by the public.’ The data also suggested five broad explanations:

- Concern about climate change correlates with education level, but not with age: those younger than 30 and those older than 60 both seem less concerned than those who are middle-aged.
- As countries become affluent, their citizens shift their concern from issues related to economic conditions and personal security to ‘issues related to political and individual freedom and environmental protection’.19
- A statistically significant negative correlation exists between Biblical Fundamentalism and ‘concern for the environment’, particularly among Christians in the United States, for many of whom natural disasters are divine punishments for sins and so must be accepted.20
- Respondents in rich countries, and in countries with high carbon dioxide emission levels, showed less concern about global warming than those in poor countries, or in countries with low greenhouse gas emissions (perhaps because it is harder to accept global warming as a problem when it requires recognition that it is partly your fault: a relationship that has been labelled ‘uncomfortable truth’).
Finally, the level of concern about global warming is negatively correlated with concern for climate-related natural disasters: that is, people living in countries highly exposed to natural disasters (such as droughts or earthquakes) are less concerned about global warming, either because they perceive the other environmental problems they face as more acute, or because prolonged exposure to natural adversity has taught them to live with it — or, in the words of a study entitled *The Culture of Disaster*: ‘For the greater part of humanity, hazard and disaster are simply just accepted aspects of daily life.’

Until recently, the fact that almost all people killed and most people affected by natural disasters lived outside North America and Europe fostered two assumptions in the West: that such things only happened ‘somewhere else’ (an assumption encouraged by terms such as ‘Typhoon Alley’, ‘The ring of fire’ or ‘El Nino-prone’); and that certain groups are particularly ‘vulnerable’ not just because of where they live but also how they live (such as people who live in overpopulated cities or on marginal lands). Such views are not unfounded: for example, the Philippine archipelago really does experience more disasters than any other comparable area of the world, with 220 volcanoes (at least 12 of them active), 5 earthquakes a day, and up to 30 typhoons a year; while the Haitian earthquake of 2010 reminded the world that urban overcrowding and poverty magnify the impact of disasters. But now, natural disasters are also striking North America and Europe, where each one becomes an ‘insurance event’.

According to a White Paper prepared for the European Commission, almost two-thirds of all ‘loss events’ between 1980 and 2007 were ‘directly attributable to weather and climate events (storms, floods and heat-waves)’ while a further quarter ‘are attributable to wild fires, cold spells, landslides and avalanches, which may also be linked to weather and climate’. Therefore, ‘95% of the overall losses of catastrophic events result from these weather and climate related events.’ According to the same White Paper, ‘overall losses caused by weather and climate related events have increased during the period 1980–2007 from a decadal average of less than €7.2 billion (1980–1989) to about €13.7 billion (1998–2007).’ The central European floods of 2002, alone, ‘resulted in overall losses of €16.8 billion and insured losses of about €3.4 billion’.

These striking data have not escaped the attention of the world’s insurance companies — indeed, their own estimate in 2009 was that ‘losses from weather events are growing at an annual 6 per cent, thus doubling every 12 years’ — and, in response, they have made some dramatic changes in coverage and premiums. Thus in the Netherlands, where over one-third of the country would be under water without artificial barriers, flood insurance is now unavailable; while in Great Britain it is currently available only for properties built before 2009, and for them only until a government re-insurance system expires at the end of 2012. In Florida, where in 1992 Hurricane Andrew caused more than $15 billion in insurance losses and bankrupted 12 insurance companies, the State government created a public alternative to the private market. Then came the hurricanes of 2004 and 2005,
which forced private insurers to pay out a further $39 billion to ‘rebuild Florida’ – but when those insurers asked the State’s permission to raise premiums to cover the increased risk, the State refused. Several private companies therefore refused to insure property in Florida, creating an ‘insurance crisis’ that has yet to be resolved. In the Bahamas, finally, where government declined to introduce a publicly guaranteed alternative to private insurance, after three major hurricanes between 1999 and 2004 ‘flood insurance (and consequently mortgage lending) became withdrawn [by private companies] for some low-lying areas and, without any State-backed alternative, houses have become abandoned as their value collapsed’.25

These developments led the International Association for the Study of Insurance Economics, also known as ‘the Geneva Association’, to conclude that ‘insurers need to emphasize that climate change brings societal problems to which insurance can only provide solutions in partnership with government and business’. This is easier said than done. Not everyone believes insurance companies, even when their message takes the form of dramatically higher premiums (if they did, no one would smoke tobacco because smokers pay so much more for life and health insurance.) Moreover, as the European Commission White Paper points out,

In a number of regions, less populated and economically less performing, often located in areas that are particularly sensitive to climate change risks (coastal, mountainous), the costs to cover adaptation needs will be so huge that they exceed the capacity of public funding. In these areas, losses can take such massive dimensions also for the private sector that they rise eventually beyond the financial capacity of individual companies and businesses.26

The impact of the 2004 and 2005 hurricane seasons on the Florida property market demonstrates why neither insurers nor ‘market forces’ nor local government are likely to cope with all the consequences of climate change. In 2009 the Florida Chamber of Commerce composed a report entitled Into the Storm, warning that the state’s entry into the insurance business had created a $2 trillion exposure in property risks, so that taxpayers face ruin when the next major hurricane strikes. The report recommended two obvious steps: offering incentives to owners who improved their properties to minimize storm damage (and thus reduce the cost of compensation and repair); and allowing the state insurance scheme to ‘let risk determine rates’ (that is, in the pungent phrase of former Representative Dennis Ross, ‘The risk of living in high-risk areas should be borne by the people who choose to live in those areas’). The authors of Into the Storm envisaged only two other proposals: either to attract private insurers back by allowing them to raise premiums to levels that ‘reflect the risks that property owners actually take’; or else to ‘Push the Feds’, because without private insurers ‘We need to have a federal backstop for a Florida catastrophe’. The Chamber of Commerce recognized that neither proposal had much chance of success: allowing the ‘free market’ to determine property insurance premiums would result in rates that few owners could afford; while ‘any national legislation that might serve as a back-up to Florida’s
potential catastrophic losses due to natural disasters still faces a very steep uphill battle from states that argue Florida's extreme exposure to natural disasters would pose an unfair burden to U.S. taxpayers. As Dennis Ross might have put it: 'If you knew that devastating hurricanes strike Florida every year, why did you build a house here?'

Pessimism regarding support from Washington does not lack scriptural warrant. In the twenty-first century, federal agencies have slightly increased funding to states and cities for disaster response planning; and they have spent rather more on 'mitigation' – that is, on moving things out of harm's way (such as relocating houses out of flood plains) and improving physical defences against natural hazards (such as restoring levees, canals and coastal wetlands in areas threatened by hurricanes and floods). The majority of federal disaster spending, however, has taken the form of aid to help state and local governments to cope with disasters that have already happened. These funds have normally gone to support short-term activities in the days and weeks after the event: search and rescue; law enforcement; putting out fires; providing temporary shelter; organizing the emergency distribution of food, water and medicine. Relatively little federal funding has gone into helping vulnerable localities prepare for long-term recovery in the wake of a future disaster: how to ensure that local government continues to operate; how to re-house displaced people; how to prepare for the inevitable health problems, mental as well as physical.

The pattern of federal emergency spending reflects a deep-seated fear of 'Big Government' in the United States. The principal rationale offered by the sponsors of the Upton-Inhofe bill (apart from the belief that global warming is a hoax) is that any attempt by a federal agency to mitigate or avert damaging climate change represents a 'power grab' by Washington that must at all costs be resisted. The same deep-seated fear also prevailed in seventeenth-century England. Plague epidemics in 1603, 1625 and 1636 had killed tens of thousands of Londoners, and so it was easy to anticipate the probable impact should a new epidemic spread from Holland in 1665. Nevertheless, neither the City nor the national government took appropriate action. Instead, when plague struck, the king and his court, many magistrates and almost all the rich fled the capital. When Charles II convened Parliament to debate appropriate intervention, no legislation passed because the peers demanded an exemption from restrictive measures such as quarantine and insisted that no plague hospitals be erected near their homes. One may wonder why the central government did not act unilaterally to save its capital; but, as a contemporary pamphlet pointed out, 'their power was limited and they must proceed legally' – the rule of Oliver Cromwell and his army officers a decade before had left a bitter taste, and as King Charles put it, he was 'too old to go again on my travels' and would not risk alienating his subjects with unpopular actions. The consequences of government inaction were therefore measured in the corpses of plague victims dumped daily in mass graves. In all, the Great Plague killed 100,000 Londoners, one quarter of the total population of the capital, plus 100,000 more people elsewhere in England.
In the twenty-first century, as in the seventeenth, coping with catastrophes on this scale requires resources that only central governments command. The construction of the Thames Barrier in southeast England offers an instructive example. The river Thames has frequently burst its banks and flooded parts of London. In 1663 Samuel Pepys reported ‘the greatest tide that ever was remembered in England to have been in this river: all White Hall having been drowned’; and proposals to erect a barrier to prevent similar catastrophes began a century later – but the opposition of the London merchants, whose trade would suffer if ships could not sail up the Thames, and disagreements among competing jurisdictions over the cost, thwarted them all. Then in 1953 a tidal surge in the North Sea flooded some 150,000 acres of eastern England and drowned more than 300 people. A government minister assured the British House of Commons that ‘We have had a sharp lesson, and we shall have only ourselves to blame if we fail to profit from it’, and he set up a committee to propose remedies, which recommended the immediate construction in the Thames estuary of a ‘suitable structure, capable of being closed. The government eventually considered two types of barrier but, once again pressure from shipping interests and cash-strapped local authorities prevented action.29

Then in 1966 a new government asked its Chief Scientific Adviser, Professor Hermann Bondi, to examine the matter afresh. A mathematician by training, Bondi devoted much attention to assessing risks; but he also consulted historical sources and found that the height of storm tides recorded at London Bridge had increased by more than three feet between 1791 (when records began) and 1953, and he predicted that this trend would continue. Bondi compared the risk of another storm tide with other risks, such as a meteorite falling on central London – which would also cause immense damage – but, he noted, the probability was very low and there was no way to take evasive action. By contrast, ‘a major surge flood in London would be a disaster of the singular and immense kind’; given the rising level of the North Sea, it was inevitable; and ‘It would be indeed a knock-out blow to the nerve centre of the country.’ Bondi therefore unequivocally recommended the construction of a Thames barrier, and although shipping interests and fragmented local government once again caused delay, in 1972 Parliament passed the Thames Barrier and Flood Protection Act, which authorized the project and promised to fund it. By 1982, when the barrier was complete, it had cost a stunning £534 million – but the value of the property it protects now exceeds £200 billion, including 40,000 commercial and industrial properties and 500,000 homes with 1¼ million residents. All would be inundated if another flood ‘drowned’ Whitehall, the heart of government now as in the time of Samuel Pepys, containing both Houses of Parliament and the offices where 87,000 members of the central administration work. It would also ‘drown’ the new Docklands economic development, and disable 16 hospitals, 8 power stations and many of the fire stations, police stations, shops and suppliers needed to repair and replace items damaged in the flood, as well as 200 miles of roads, 100 miles of railway, 51 rail stations and 35 Underground stations. Londoners would therefore lose not only their homes and jobs but also the essential means of response and recovery. In short, without the Thames Barrier, London would be like
New Orleans in 2005: vulnerable to a natural disaster that, like Katrina, is sooner or later inevitable.30 Completion of the Thames barrier came just in time — it had to be activated 39 times between 1983 and 2000, and 75 times between 2001 and 2010 — and its success, combined with the increased frequency of extreme weather, has encouraged a more proactive attitude towards climate change on the part of the British government. The 2004 Report by its Chief Scientific Officer, summarizing the research of nearly 90 experts on the risks of flooding, expressed the choice with engaging simplicity: ‘We must either invest more in sustainable approaches to flood and coastal management or learn to live with increased flooding’.31 A similar choice exists for other climate-related risks (such as hurricanes), and indeed for other types of risks (such as the spread of diseases, perhaps accentuated by bio-terror or, for that matter, by ‘bio-error’): societies can either ‘pay to prepare’, and commit substantial resources now to avoid far greater costs later, or else ‘learn to live with increased’ risks.

Despite the many differences between the seventeenth and the twenty-first centuries, governments during the Little Ice Age faced the same dilemma — although some needed more reminders than others of the need to choose. In Japan, at one extreme, the famine, rural revolts and urban riots of the Kan’ei era sufficed to convince Tokugawa Iemitsu and his advisers of the need to create more granaries, to upgrade the communications infrastructure, to issue detailed economic legislation, and to avoid foreign wars in order to accumulate sufficient reserves to cope with the possible return of extreme weather. England took somewhat longer. Despite the subsistence crises of the 1590s, 1629–31 and 1647–9, only in the 1690s did property owners accept the central government’s argument that, in the long run, it was economically cheaper and more efficient (as well as more humane) to support those who became old, widowed, ill, disabled or unemployed, thus creating the first ‘welfare state’ in the world. Other societies endured even more disasters before they reached the same conclusion that welfare formed an essential and necessary part of collective risk management; but by the nineteenth century the ‘welfare state’ had become a hallmark of all economically advanced states.

Climatic adversity is a great leveller, because the human population in advanced societies shares many of the needs of the human population elsewhere. ‘The hungry time’, the term used by the aboriginal people of western Australia for the season between the end of one annual cycle and the beginning of the next (see chapter 15), sounds relatively simple for groups of hunters in another hemisphere, but climate change can create a ‘hungry time’ for those living in even the most advanced societies. Of course, the total human population in the seventeenth century was far less than the three billion in 1950, let alone the seven billion today; but the geographical distribution of the present population is changing in ways that increase the resemblance between the world today and that of the seventeenth century. Thus in 1950 Europe had three times the population of Africa, but in 2012 the population of Africa is at least 50 per cent larger than that of Europe — a disparity that widens every year as the former grows and the latter declines. This shift increases the percentage of the total population that spends a high proportion of its disposable income on
basic needs such as food, energy and housing, often in areas where even central governments lack the effective means of dealing with big disasters, making them more vulnerable to the effects of climate change. Thus Hurricane Katrina in 2005 caused damage equivalent to 1 per cent of the Gross Domestic Product of the United States, but drought in 1999 caused damage equivalent to 16 per cent of the Gross Domestic Product of Kenya.

It is impossible to measure the human suffering caused by natural disasters. We cannot compare the misery of the women who went to the New Orleans Convention Center in 2005, expecting to find food, water, medical care and shelter in the aftermath of Katrina, but were instead raped, robbed and left to die, with the Australian women who starved as they watched their children die of hunger during an unusually long ‘hungry time’, or with the poor women of Shanghai who found in 1642 that ‘the only currency that could buy rice was children’, and that the price of enough rice to feed one person for a week ‘was two children’. Nor can we measure the true human cost of any of these catastrophes via some sort of ‘body count’. Although some contemporaries speculated that ‘a third of the world’ died in the mid-seventeenth century, and although the surviving data confirm that some communities lost up to half of their populations, while others disappeared altogether, it is impossible to calculate a world-wide total. Certainly, the Global Crisis ended prematurely the lives of millions of people, just as a natural catastrophe of similar proportions today would end prematurely the lives of billions of people.

Historians who prophesy rarely receive much attention from their colleagues (or anyone else), and those who prophesy doom (whether or not they are historians) are normally dismissed as ‘whiners’ – Hoggidiani, to use the dismissive phrase in Secondo Lancellotti’s book Nowadays. Yet the Hoggidiani are not always wrong. Some natural disasters occur so suddenly that, without advanced preparation, no escape is possible. George Gordon, Lord Byron, discovered this in 1816. He fled England to escape accusations of incest, adultery, wife-beating and sodomy, planning to spend a pleasant summer in a villa near Lake Geneva with a former mistress, his personal physician (and, perhaps, catamite) John Polidori, and a select group of close friends. Instead, the party spent a ‘wet, ungenial summer’ (Switzerland was one of the areas worst affected by global cooling), which forced Byron and his companions to spend almost all their time indoors. Among other recreations, they competed to see who could compose the most frightening story. Mary Wollstonecraft Shelley began work on Frankenstein, one of the first horror novels to become a best-seller, while Polidori wrote The Vampyre, the progenitor of the ‘Dracula’ genre of fiction. Byron himself composed a poem which he called ‘Darkness’. All three works reflect the disorientation and desperation that even a few weeks of abrupt climate change can cause. Since the question today is not whether climate change will strike some part of our planet again, but when, we might re-read Byron’s poem as we choose whether it is better to invest more resources in preparation today or live with the consequences of inaction tomorrow. After all, unlike our ancestors in 1816, and in the seventeenth century, we possess both the resources and the technology to make that choice.
I had a dream, which was not all a dream.
The bright sun was extinguish’d, and the stars
Did wander darkling in the eternal space,
Rayless, and pathless; and the icy earth
Swung blind and blackening in the moonless air.
Morn came and went – and came, and brought no day,
And men forgot their passions in the dread
Of this their desolation; and all hearts
Were chill’d into a selfish prayer for light:
And they did live by watchfires – and the thrones,
The palaces of crowned kings – the huts,
The habitations of all things which dwell,
Were burnt for beacons; cities were consum’d,
And men were gather’d round their blazing homes...

And War, which for a moment was no more,
Did glut himself again: a meal was bought
With blood, and each sat sullenly apart
Gorging himself in gloom: no love was left.
All earth was but one thought – and that was death
Immediate and inglorious; and the pang
Of famine fed upon all entrails...