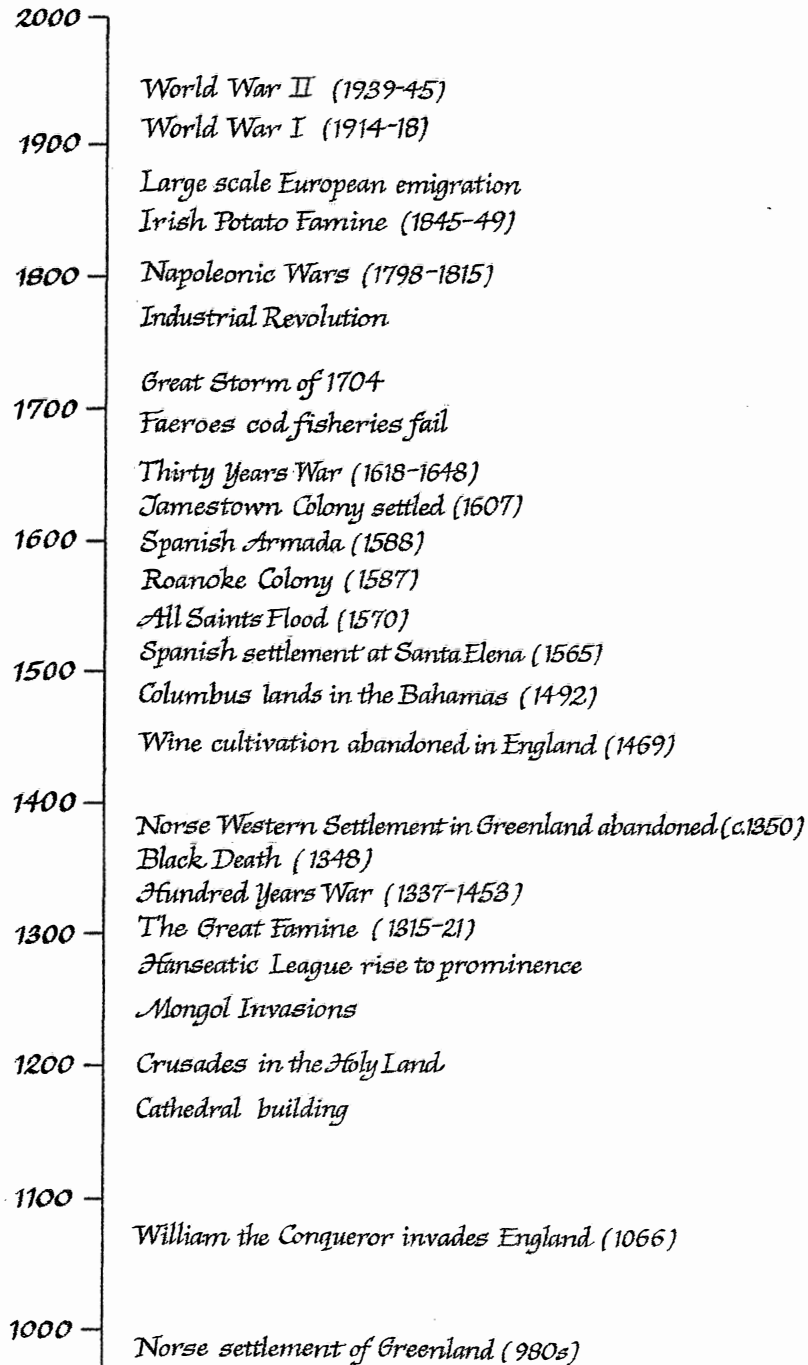
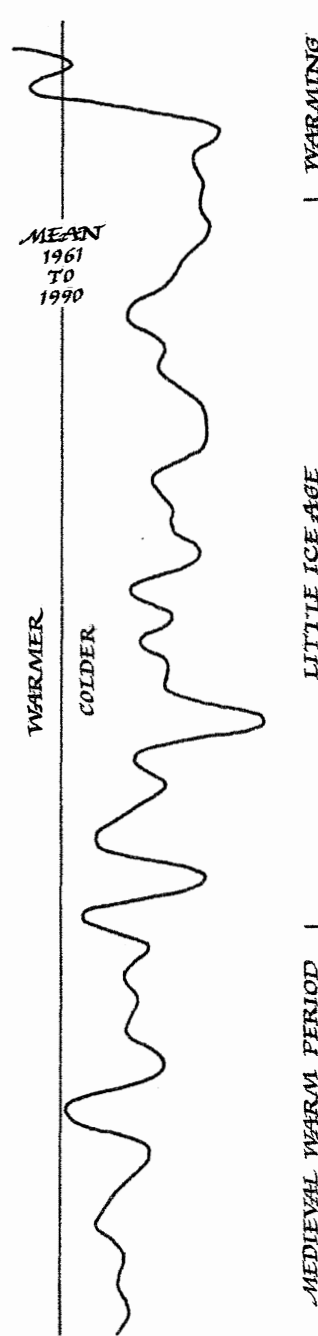


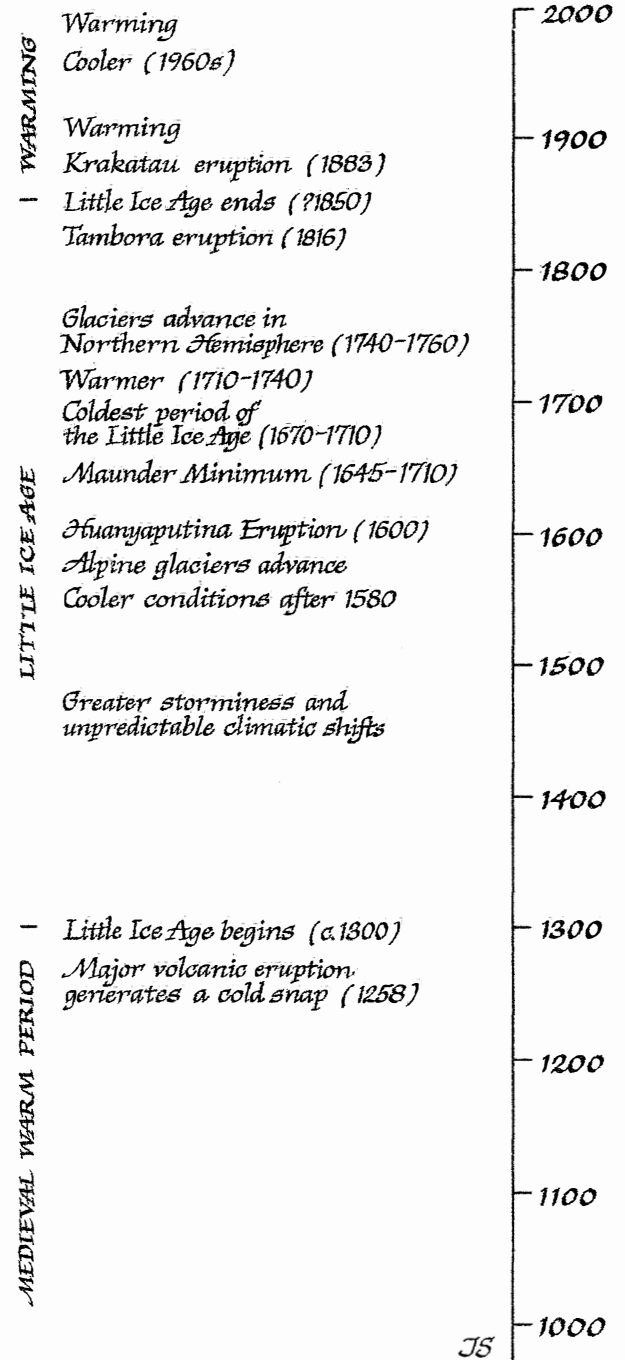
HISTORICAL EVENTS



TEMPERATURE



CLIMATIC AND NATURAL EVENTS



THE LITTLE ICE AGE

HOW CLIMATE MADE HISTORY
1300—1850

BRIAN FAGAN

BASIC



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AN GHORTA MÓR

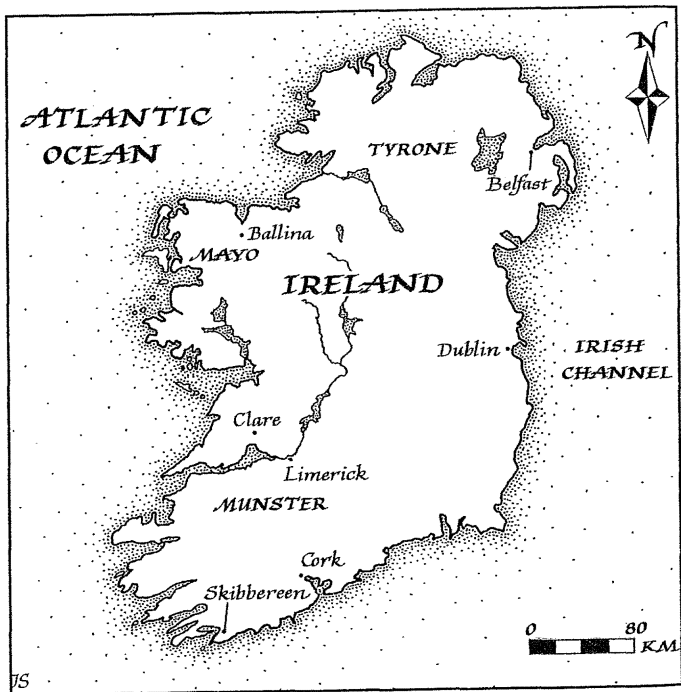
Ireland is famed for its crops of potatoes. . . . The culture of this plant has been longer practiced there than with . . . any other European nation. . . . The Irish have always, very judiciously, looked upon this article as an object of the greatest importance.

—*Austin Bourke*, 'The Visitation of God'?
The Potato and the Great Irish Famine, 1993

The [sedan] chairmen, porters, coalheavers in London, and those unfortunate women who live by prostitution, the strongest men and the most beautiful women perhaps in the British dominions, are said to be . . . from the lowest rank of people in Ireland, who are generally fed from this root. No food can afford a more decisive proof of its nourishing quality, or its being particularly suitable to the health of the human constitution.

—*Adam Smith*, *The Wealth of Nations*, 1776,
on the Irish and potatoes

Thanks to the Gulf Stream, Ireland enjoys a damp, moderate climate with generally mild winters and springs. For centuries, the Irish subsisted off butter, curds and whey in summer and off the fall oat crop in winter. Raising cereals had never been easy, even when combined with cattle farming. Excessive rainfall in spring and summer regularly damaged



Locations in Ireland mentioned in Chapter 11

growing crops. Famines were commonplace and invariably followed by plague and pestilence, which often killed more people than hunger. Both high and low NAO indices could spell trouble for Irish farmers. A low index brought unseasonably cold winters and frosts; high indices the constant threat of heavy rain during the growing season. Here the link between excessive rainfall, poor oat crops, and winter hunger was brutally direct.

No one knows exactly when the potato came to Ireland, but it appears to have been during the last fifteen years of the sixteenth century.¹ Irish farmers soon noticed that the strange tuber thrived in their wet and often sunless climate. Potatoes produced their greatest yields in years when auto-

well-drained, raised fields, potatoes were highly productive and reliable, even on poor soils. Ireland's long growing season without temperature extremes was ideal for the early European potato, which sprouted growth and flowers during long summer days and tubers in frost-free autumns, conditions very similar to those in many parts of the Andes. Unlike cereals, the tubers were remarkably immune to sudden climatic shifts. This was true almost anywhere in northern Europe, but in Ireland the wet climate especially favored the potato. While other crops rotted above ground, potatoes quietly grew below the surface. Easy to cook and store, they seemed an ideal food for the Irish poor. Above all, they were an effective famine food. The potato-cereal combination offered a safeguard against the failure of either crop. As long as a balance was maintained between the two, the Irish had a reasonably reliable safety net against hunger.

At first the potato was merely a supplement to the Irish diet, except throughout Munster in the south, where the poorest country people embraced it as a staple very early on. Wrote an observer in 1684: "Ye great support of ye poore sortes of people is thire potatoes." They were a winter food, consumed between "the first of August in the autumn until the feast of Patrick in the spring."² The harvest was so casual that many farmers simply left the tubers in the ground and dug them out when required. They learned the hard way that a hard frost would destroy the crop in short order.

Potato cultivation increased twentyfold over the next half century, despite a terrible famine in the exceptional cold of 1740 and 1741, when both the grain and potato crops failed; 1740–1 became known as *Blaidhain an air*, "the year of the slaughter." An unusually long spell of cold weather destroyed both grain and potato crops and killed livestock, even seabirds. By this time, the poor of the south and west were depending almost entirely on potatoes and were especially vulnerable to crop failure. The government intervened aggressively, prohibiting grain exports and deploying the army to provide famine relief. There was little excess food in Europe, partly because of poor harvest and also because of the War of Austrian Succession. Instead, "large supplies of provisions arrived from America."³ Both local landlords and gentry, and members of the Anglican church organized large scale charity relief in the form of free food, subsi-

social disorder and epidemic disease than by altruism. Despite the assistance, large numbers of the poor took to the roads to beg for relief or to move to the towns in search of food, employment, or a departing ship. Between 300,000 and 400,000 people perished of dysentery, hunger, and typhus in a famine that foreshadowed the great tragedy of the 1840s. In the end, at least 10 percent of Ireland's population perished of starvation and related medical ills. The famine demonstrated that neither potatoes nor oats were a complete panacea to Ireland's farming problems, partly because stored potatoes only kept about eight months in the damp climate.

As memories of the famine faded, the explosion in potato farming continued. The late eighteenth century was the golden age of the Irish potato, "universally palatable from the palace to the pig-sty."⁴ Potatoes formed a substantial part of the diet of the wealthy and the entire diet of the poor. The excellent Irish strains developed during these years were admired and planted throughout northern Europe not only for human use but as animal fodder. By the 1790s, farmers were throwing out large numbers of surplus potatoes each year, even after feeding their cattle and pigs. "They left them stacked in heaps at the back of ditches, piled them in the gaps of fences, used them as top dressing, buried them, or stacked them in fields and burned them."⁵

Visitor after visitor remarked on the healthy looks of Irish countryfolk, and their cheerful demeanor, and their constant dancing, singing, and storytelling. By the end of the eighteenth century, physicians were recommending potatoes "as a supper to those ladies whom providence had not blessed with children, and an heir has often been the consequence."⁶ John Henry wrote in 1771 that where "the potato is most generally used as food, the admirable complexions of the wenches are so remarkably delicate as to excite in their superiors very friendly and flattering sensations."⁷ In 1780, traveler Philip Lucksome observed that the poorer Irish lived on potatoes and milk year round "without tasting either bread or meat, except perhaps at Christmas once or twice."⁸

Everyone grew potatoes in rectangular plots separated from their neighbors' by narrow trenches. Each tract was about two to three meters wide, fertilized with animal dung, powdered shell, or with seaweed in coastal areas. Using spades called *lays*, ten men could turn over and sow 0.5 hectare

with potatoes in a day. To sow a cereal crop of the same area in the same time would take forty. The Irish "raised fields," sometimes called "lazy beds," could produce as many as seventeen tons of potatoes a hectare, an astounding yield when compared with oats. The potato had obvious advantages for land-poor farmers living in complete poverty. With the vitamins from their tubers and milk or butter from a few head of cattle, even the poorest Irish family had an adequate, if spartan, diet in good harvest years.

Oblivious of the potential dangers from weather and other hazards, Ireland moved dangerously close to monoculture. Grain was no longer part of the diet in the south and west of the country and had become predominantly a cash crop in the north. The beauty of the potato was that it fed the laborers who produced oats and wheat for export to bread-hungry England. The illusion of infallible supply caused a growing demand for Irish potatoes in northeast England to feed the growing populations of rapidly industrializing Liverpool and Manchester.

In 1811, at the height of the Napoleonic Wars, a writer in the *Munster Farmers' Magazine* called potatoes "the luxury of the rich and the food of the poor; the chief cause of our population and our greatest security against famine."⁹ But for all their advantages, potatoes were not a miracle crop. Unusually wet or dry summers and occasional exceptionally cold winters subjected the country to regular famine. The combination of rain and frost sometimes killed both cereals and potatoes. Even in plentiful years, thousands of the poor were chronically unemployed and dependent on aggressive government intervention for relief. Many Irish workers, including many skilled linen workers, emigrated to distant lands to escape hunger. In 1770 alone, 30,000 emigrants left four Ulster ports for North America. They departed in the face of rapid population growth, archaic land tenure rules that subdivided small farming plots again and again—and the ever-present specter of famine.



The periodic food shortages that plagued Ireland between 1753 and 1801 were mostly of local impact, with relatively low mortality.¹⁰ A serious food

shortage developed in 1782/83, when cold, wet weather destroyed much of the grain crop at the height of a major economic slump. Private relief efforts and aggressive intervention by the Irish government averted widespread hunger. The Earl of Carlisle, at the time the lord lieutenant of Ireland, disregarded the lobbying of grain interests, embargoed food exports to England and made £100,000 available as bounty payments on oat and wheat imports. Food prices fell almost immediately. When the severe winter of 1783/84 prolonged the food crisis, the lord lieutenant once again intervened. He assumed control over food exports and made money available for relief at the parish level in affected areas. Within ten days, the parish scheme brought generous rations for the needy: a pound of bread, a herring and a pint of beer daily. The number of deaths was much lower than it had been during the disaster of 1740–42. Government's priorities were clear and humane, and were matched by rapid response to needs.

An Act of Union joined England and Ireland in 1800. Ireland lost her political and legislative autonomy and her economic independence. The decades after 1800 saw Britain embark on a course of rapid industrialization that largely bypassed Ireland, where competition with their neighbor's highly advanced economy, the most sophisticated in Europe, undermined many nascent industries. By 1841, 40 percent of Britain's male labor force was employed in the industrial sector, compared with only 17 percent of Irishmen. Much of the deindustrialization in the famed Irish linen industry came from the adoption of labor-saving devices. New weaving machinery and steam power had transformed what had been a cottage industry into one concentrated in large mill facilities centered around Belfast in the north. Until the factories came along, thousands of small holders had subsisted off small plots of land and weaving and spinning. Now, having lost an important source of income, they were forced to depend on their tiny land holdings, and above all on the potato. And in lean years, the authorities in London were less inclined to be sympathetic than their Irish predecessors.

Irish commercial agriculture, which generated enough cattle and grain exports to feed 2 million people, required that as much as a quarter of Ireland's cereals and most livestock be raised for sale abroad. Ireland had become a bread basket for England: Irish oats and wheat kept English bread

lived at a basic, and highly vulnerable, subsistence level. Nowhere else in Europe did people rely so heavily on one crop for survival. And the structure of land ownership meant that this crop was grown on plots so small that almost no tenant could produce a food surplus.

Potatoes were an inadequate insurance against food shortages. More than 65,000 people died of hunger and related diseases in 1816, the "year without a summer." They died in part because the British authorities chose not to ban grain exports, an effective measure in earlier dearths. Chief Secretary Robert Peel justified this on the specious grounds that private charity givers would relax their efforts if the government assumed major responsibility for famine relief. In June 1817, he issued a fatuous proclamation to the effect that "persons in the higher spheres of life should discontinue the use of potatoes in their families and reduce the allowance of oats to their horses."¹¹



By 1820, the potato varieties that had sustained the Irish in earlier times were in decline. Black, Apple, and Cup potatoes were outstanding varieties, especially the Apple with its deep green foliage and roundish tubers, which produced a rich-flavored, mealy potato likened by some to bread in its consistency. These hardy and productive strains began to degenerate due to indiscriminate crossbreeding in the early nineteenth century. They gave way to the notorious Lumper, or horse potato, which had originated as animal fodder in England. Lumpers were highly productive and easily raised on poor soil, an important consideration when people occupied every hectare of land. By 1835, coarse and watery Lumpers had become the normal staple of Irish animals and the poor over much of the south and west. Few commentators had anything polite to say about them. Henry Dutton described them as: "more productive with a little manure . . . but they are a wretched kind for any creature; even pigs, I am informed, will not eat them if they can get other kinds."¹²

The agricultural writer Arthur Young, touring through Ireland in 1779, had written glowingly of the potato and its ability to feed people. But as

came apparent. Lumpers did not keep from one year to the next, so one could not rely on the previous year's crop as a cushion against a poor harvest. Ireland's poor, already living on an inferior potato with dubious nutritional value, thus had no food reserves. They were also running out of land. Ireland's population had risen rapidly until it was over one-half the combined population of England and Wales. The rapid rise put severe pressure on farming land even as larger farmers increasingly converted their land to grain or stock raising for export. The conversions forced poor potato growers higher into the hills and on to ever less fertile land. Inevitably, crop yields fell. During the often hungry summer months, people were tempted to consume their seed potatoes, even to dig up their new crops as soon as the tubers formed. Year after year, as the distress intensified, thousands of Irish migrated to North America to escape increasingly difficult circumstances at home. Many commentators on both sides of the Irish Channel became voices of doom. "The condition of Ireland becomes worse and worse," wrote John Wiggins in *The Monster Misery of Ireland*, published in 1844. Ireland was "a house built upon sand . . . and must inevitably fall the moment that the winds blow and the waves rage, or even with the first and slightest gale."¹³ He urged immediate action.

But it was too late. A tiny fungus bred on the other side of the Atlantic was already on its way to Europe. Another observer, Dr. Martin Doyle, wrote in his letters on the state of Ireland that "should a dearth of provision occur, famine and pestilence will set in together, and rid us probably of a million."¹⁴ The disaster, waiting to happen, was compounded by indifference and inertia. A series of Parliamentary Commissions examined the state of Ireland but did nothing. In the memorable words of Austin Bourke: "Each in turn lifted the lid of the cauldron, looked helplessly into the mess of injustice, prejudice, starvation, and despair, and quietly put the lid on again."¹⁵



Potatoes, like all crops, are susceptible to disease. Outbreaks of a viral disease called curl came in 1832-4 and were followed by a dry rot epidemic.

phytophthora infestans, sometimes called "late blight," attacked growing crops in the hinterland of major eastern United States ports. Extremely fast moving, its spores germinated on the leaves and stems of the potato plant or in the surrounding soil. The disease first appeared as black spots, then as a furry growth. The plant soon decayed and the growing tubers became discolored, pulpy messes. A distinctive smell was often the first sign that blight had struck. Over the next two years the disease spread rapidly from the New York-Philadelphia area both into the southeastern United States and westward into the Great Lakes region and Canada. Inevitably, the spores crossed the Atlantic. No one knows how, from where, or when the blight spread to Europe. Some authorities believe it arrived in potatoes imported from Peru, on ships carrying guano fertilizer (fertilizer from bird droppings) as early as 1844. Others point to Mexico or North America as sources. Once established, the blight spread rapidly, helped by the prevailing weather conditions.

The summer of 1845 was cold, sunless and wetter than normal, but by no means unusual for the mid-nineteenth century. Shallow, thundery depressions with highly variable winds penetrated into the Continent. The damp, chill weather and shifting winds favored the transport of blight spores in all directions. At the time, potato crops throughout Europe were extremely susceptible to blight, and the Lumper was even more so than most. The disease worked through plots of growing Lumpers with terrifying rapidity, sometimes rotting the tubers almost overnight.

Blight was first reported in Belgium in July 1845. By August, infected foliage appeared in fields around Paris and in the Rhineland; southern England and the Channel Islands were affected at about the same time. There was no effective antidote. Botanists and learned societies scrambled for an explanation of the unknown infection, attributing it to the unusually cool and gray summer, to progressive degeneration of the potato, or even to "some aerial taint originating in outer space." Meanwhile, the blight spread inexorably. At the end of August, the first reports of infection were reported from the Botanic Gardens in Dublin.

At first, the Irish newspapers played down the significance of the infestation, appearing as it did at harvest time. Public panic set in during October, when millions of ripe tubers turned rotten in the fields. "Where

Lindley, the editor of the widely read *Gardener's Chronicle*.¹⁶ The crop losses were heaviest in areas where the summer had been wettest. The mean loss from tuber rot in Ireland in 1845 was about 40 percent and the threat of famine immediate.

At first, potatoes were in plentiful supply. People hastened to sell their sound tubers or to eat them at once. The famine did not truly begin until five or six months later, when every fragment of potato had been consumed. Relief measures were complicated by the lack of good roads and by the chronic insolvency of many Irish landlords, who were virtually powerless to help their tenants. In London, Prime Minister Sir Robert Peel responded to the reports of crop failure by appointing a Scientific Commission to diagnose the problem, report on the extent of the damage, and recommend an antidote. The Commission estimated that as much as half of the crop was destroyed or rotting in storage, failed to diagnose the cause, and raised such an alarm that Peel ordered the immediate importation of £100,000-worth of maize from the United States. Peel intended this measure not as a way of feeding the starving potato farmer but as a way of controlling grain prices cheaply, without any danger of the government being accused of interfering in the cereal marketplace.

By April 1846, the House of Commons learned that people were eating their seed potatoes. About a third less hectareage of potatoes was planted as a result, making scarcity inevitable. The spring was cold and wet, but May and June turned warm and dry. Hopes ran high. The growing potatoes looked luxuriant in the fields. Then in early August, the blight appeared a full two months earlier than the previous year, progressing east and northeastward on the wings of the prevailing winds at a rate of about eighty kilometers a week. Almost every potato was lost. Father Mathew, a celebrated temperance advocate of the day, wrote how he had traveled from Cork to Dublin on July 27: "This doomed plant bloomed in all the luxuriance of an abundant harvest. Returning on the third instant I beheld with sorrow one wild waste of putrefying vegetation. In many places the wretched people were seated on the fences of their decaying gardens, wringing their hands and wailing bitterly the destruction that had left them foodless."¹⁷ For hundreds of miles, the fields were black as if ravaged by fire. The stench of rotting potatoes filled the air.

In 1845, the distress had been severe but not overwhelming, thanks to an above average harvest and at least partially effective relief efforts. This time, the failure was complete. There were not even any freshly harvested potatoes to tide over the hungry. Every scrap of clothing and other possessions, even bedding, had already been pawned or sold for food. Not a green potato field could be seen from Limerick to Dublin. Torrential rain fell, violent thunderstorms ravaged the blackened fields, and dense fog hovered over the blighted land. On September 2, the London *Times* called the potato crop a "total annihilation."

Poor cereal crops made 1846 a year of widespread food shortages in Europe, forcing countries to bid against one another for cargoes of food imports from the Mediterranean and North America. France and Belgium paid high prices, England was outbid, and Irish relief suffered. Private merchants bought up stocks avidly for Ireland, but they were the worst kind of traders, who sold grain in tiny lots at enormous prices to relief organizations and those few individuals who could afford it. Official indifference compounded the problem. High British government officials knew less of Ireland and its economics than they knew about China. Irish peasants were told to eat grain instead of potatoes, but at the same time the government did nothing to curb the export of grain from the starving country. Free-trade doctrines prevailed, whereby the exporting of grain would provide money for Irish merchants to purchase and import low-priced food to replace the potato. No one in the impoverished west of Ireland knew anything about importing food, nor did the infrastructure exist to get it there.

By late September, the situation was desperate. People were living off blackberries and cabbage leaves. Shops were empty. Troops were sent to protect wagons carrying oats for export. Even if the exported food had been kept in the country, the people would not have been much better off, for they had no money to buy it. Proposals for public works to employ the hungry were stalled in Whitehall, then delayed by protests over task work and low wages. Even the government's payments to the destitute workers were irregular because of a shortage of silver coin. The fields, combed by emaciated families, contained not even a tiny potato. Children began to die. The weather turned cold at the end of October, and

fifteen centimeters of snow fell in County Tyrone in November. Adding to Ireland's troubles, the North Atlantic Oscillation flipped into low mode, bringing the most severe winter in living memory.

Ireland's winters are normally mild and the poor normally spent them indoors, where peat fires burned. This time they had to work out of doors to survive. By November, over 285,000 poor were laboring on public relief works for a pittance. Many died of exposure. Thousands more poured into towns, abandoning their hovels in ditches and near seashores. Inevitably, farm work was neglected, with few tilling the soil, partly because the peasants feared, with reason, that landlords would seize their harvests for rent. A Captain Wynne visited Clare Abbey in the west and confessed himself unmanned by the extent of the suffering: "witnessed more especially among the women and little children, crowds of which were to be seen scattered over the turnip fields like a flock of famished crows, devouring the raw turnips, mothers half naked, shivering in the snow and sleet, uttering exclamations of despair, while their children were screaming with hunger."¹⁸ Even the dogs had been eaten.

Magistrate Nicholas Cummins of Cork visited Skibbereen in the western part of the country, entered a hovel that appeared deserted, and found "six famished and ghastly skeletons, to all appearances dead . . . huddled in a corner on some filthy straw, their sole covering what seemed to be a ragged horsecloth, their wretched legs hanging about, naked above the knees. I approached with horror, and found by a low moaning they were alive—they were in fever, four children, a woman and what had once been a man."¹⁹ Within minutes, Cummins was surrounded by more than two hundred starving men and women. Rats were devouring corpses lying in the streets. The government in London argued that relief was the responsibility of "local relief committees." None existed, and food was plentiful in Skibbereen market. But the poor had no money to buy it.

Disease followed inevitably in the wake of hunger. Rural hospitals and clinics were few, the medical infrastructure grossly inadequate, the workhouses overwhelmed with dying victims. Patients lay on the ground. The government provided tented hospitals and other relief measures, but too little too late. Ten times more people died of fevers than of starvation itself, just as they had in Europe in 1741.

Despite a glorious summer and healthy crops, the famine continued into 1847. A shortage of seed potatoes meant that only about a fifth of the normal hectareage was planted, so the harvest, although superb, was inadequate to feed the people. Nor could the poor buy food, now a third cheaper than the year before: there was no employment to be had, nor wages to be earned. The British government, believing firmly in the sanctity of the free market, pursued the ideology of minimal intervention that dominated many European governments of the day. Ministers believed that poverty was a self-imposed condition, so the poor should fend for themselves. They were motivated mainly by fear of social unrest and a concern not to offend politically powerful interests such as corn merchants and industrialists. A financial crisis in England caused by sharply falling grain prices and wild speculation in railway shares gave the government an excuse to provide no more relief funding for Ireland, where corpses lay by roadsides because no one was strong enough to bury them. People died at the gates of workhouses, landlords were assassinated by their desperate tenants. As violence broke out, the authorities called in the military. By the end of 1847, 15,000 troops were billeted in a country pauperized by starvation and fever, where employment was nonexistent.

The spring of 1848 was cold, following heavy snow in February. People were optimistic that the cold winter would prevent the reappearance of blight and made every sacrifice to plant potatoes everywhere they could. The weather was favorable through May and June but turned cool and very wet in July. The blight struck almost overnight. By August, the extent of the new disaster was becoming apparent as heavy rain also damaged wheat and oat crops. The failure of the 1848 potato crop was as complete as that of 1846. Thousands defaulted on their rents and were evicted from their lands by landlords, who were themselves heading toward insolvency because of overwhelming debt. Everyone who could scrape together the money contemplated emigration. Not only the poor left, but farmers, some of considerable property, whom the country could ill afford to lose. The countryside was becoming deserted. Thousands of hectares of land around Ballina in County Mayo in the northwest looked like a devastated battlefield. In Munster, the landlords could not deal with the abandoned farms. Paupers squatted on empty arable land, too

weak to cultivate it, living in ditches. Trade ground to a standstill all over the country. Shops were boarded up and “thousands are brought to the workhouse *screaming* for food and can’t be relieved.”²⁰ Nearly 200,000 people crowded into workhouses designed for 114,000. Jails became a refuge. Desperate young men committed crimes so they could be sentenced to transportation. Barrister Michael Shaughnessy reported that many poor children “were almost naked, hair standing on end, eyes sunken, lips pallid, protruding bones of little joints visible.” He asked: “Am I in a civilized country and part of the British Empire?”²¹

The final casualty figures from An Ghorta Mór, “The Great Hunger,” will never be known. The 1841 census records 8,175,124 people living in Ireland. In 1851, the number had fallen to 6,552,385. The Census Commissioners of the day calculated that, with a normal rate of increase, the total should have been just over 9 million. Two and a half million people were lost, a million to emigration, the remainder, mostly in the west, to famine and associated disease. These estimates are probably conservative. A combination of highly unpredictable climate, overdependence on a single crop, and official indifference killed over a million people in a Europe that, thanks to greatly improved infrastructures, was becoming increasingly isolated from the ravages of hunger.



Thus the Little Ice Age ended as it began, with a famine whose memory resonated through generations. Ireland changed radically as a result. The population continued to decline for the remainder of the nineteenth century due to emigration, delayed marriages, and celibacy. Emigration rates remained high, reaching a peak in 1854. Ninety thousand people still left annually in the 1860s, a level reached by no other country until Italy after the 1870s. By 1900 Ireland’s population was half the prefamine level, making it unique among European nations. The population decline did not reverse until the 1960s.

Blight mostly disappeared by 1851, but the destruction wrought by the famine continued. The lasting physical effects among the survivors

remained high among the poor. Irish society now contained high proportions of the old and the very young, contributing to social conservatism and torpor. But the huge loss of population, tragic as it was, brought some long-term advantages. There was less competition for employment, while remittances from emigrants kept many stumbling farms in the west alive. The structure of Irish agriculture changed radically: land holdings became larger and more streamlined, and farming more commercial. Livestock replaced grain as farmers adjusted to the realities of a far smaller workforce.

The living standards of the poor remained very low. In the west, many continued to subsist on potatoes. Crop yields dropped considerably, partly because of less intensive use of fertilizer, because of much waste land and occasional local outbreaks of blight. The Lumper gave way to more palatable potato strains. Peoples’ diets gradually became more diverse as the market economy grew and railroads spread through the country. But they were still vulnerable to occasional food shortages that brought scenes like those of the 1840s, though never on the same scale. Death from starvation was unusual. But the poor harbored deep resentments against the wealthier farming neighbors, who shared little of their prosperity with their laborers. Memories of the Famine, fears of starvation and eviction, were profound political realities for the remainder of the nineteenth century. The psychological scars of the Famine and hate of the English still run deep in Irish society.

An Ghorta Mór was not the last European famine. Catastrophic food shortages owing to crop failures and cold weather developed in Belgium and Finland in 1867/68. The politically driven Volga famine of 1921 and the terror famine of the Ukraine in 1932/33 dwarf the Irish disaster. But for sheer shame, the Great Hunger has no rivals.



As the Irish starved, warming conditions in the far north kept pack ice away from Icelandic coasts. Warmer water brought by the Irminger Current led to a short boom in cod fishing off western Greenland between

anticyclones brought the easterly winds and harsh winters that plagued the Irish poor. By 1855, the North Atlantic Oscillation had switched again, and ice returned to Icelandic coasts. The prevailing westerlies over the North Atlantic strengthened, bringing a milder climate to Europe and the beginnings of sustained glacial retreats. The summer of 1868 was exceptionally hot, with a record temperature of 38.1°C at Tunbridge Wells, south of London, on July 22 and many days with readings over 30°. The following winter was very mild, with a mean temperature closer to that of warmer and more oceanic Ireland. The warmer years continued through the 1870s, except for occasional cold Februaries and very wet summers from 1875 onward.

Another cold snap in 1879 brought weather that rivaled that of the 1690s. December 1878 and January 1879 saw weeks of below-freezing temperatures in England, followed by a cold spring and one of the wettest and coldest summers ever recorded. In some parts of East Anglia, the 1879 harvest was still being gathered after Christmas. Coming at a time of general agricultural decline, when Britain's grain market was flooded with cheap North American wheat from the prairies, 1879's disaster caused a full-grown agricultural depression. Farmers in the northwest turned from grain to beef, but even livestock soon proved unprofitable when frozen beef entered the country from Argentina, Australia, and New Zealand. Thousands of unemployed farm laborers left the land for the towns and emigrated to Australia, New Zealand, and other countries with greater opportunities. The late 1870s were equally cold in China and India, where between 14 and 18 million people perished from famines caused by cold, drought, and monsoon failure. Glaciers advanced in New Zealand and the Andes, and Antarctic ice extended much further north than in Captain Cook's time a century earlier. Sailing ships traversing the Roaring Forties along the clipper route from Australia to Cape Horn regularly sighted enormous tabular icebergs, with some seen as far north as the mouth of the River Plate, just 35° south latitude.

The cold snap persisted into the 1880s, when hundreds of London's poor died of accident hypothermia. As late as 1894/95, large ice floes formed on the Thames in the heart of winter. Then prolonged warming began. Between 1895 and 1940, Europe enjoyed nearly a half-century of

colder than usual, but they certainly never witnessed the prolonged sub-zero temperatures of the Little Ice Age.

By this time, human activities were leaving their mark on global climate, not only through the discharge of carbon dioxide into the atmosphere but through pollution. The coldest European winter of the twentieth century was 1963, with a winter mean of -2°C and a January mean of -2.1°C. Such air temperatures were cooler than many of the seventeenth and eighteenth century, when Londoners held frost fairs on the frozen Thames. This time, the river waters never fell below about 10°C and ice never formed. A constant spew of industrial waste and other pollutants kept the water at artificially high temperatures. Climatologist Hubert Lamb remarks: "The progress of urbanization suggests . . . the pastimes in future cold winters will be to skate on the Thames at Hampton Court—at the western limit of the metropolis—and then swim in it to Westminster pier!"²²