CHAPTER ONE

"The Fury of the Northmen"

793–1066

There are many ways to get from the west coast of Greenland to L'Anse aux Meadows, none of them easy. You can fly from Kangerlussuaq to Reykjavik in a little less than five hours, and from there to New York in just under six; from New York to St. John's, on the southeast side of the island of Newfoundland, will take about three more. From there, you either drive or fly four hundred miles west—perhaps ten hours by road; an hour and fifteen minutes by twin-engine turboprop—to Deer Lake. Then, another three hundred miles by car on Canada's picturesque Route 480, along the Newfoundland coast, until you run out of road, and walk the last bit to a peat farm, a reconstructed forge, and half a dozen sod-roofed houses.

All of the available options are far easier than the direct route, first taken a thousand years ago: nine hundred stomach-heaving miles across the North Atlantic in a sixty-foot-long square-rigged wooden ship. But that ship, and others like it, are the reason L'Anse aux Meadows is a UNESCO World Heritage Site: the first European settlement in the New World, and probably the most famous place ever colonized by the merchants and traders we know as the Vikings.

It's nowhere near the largest. A Viking settlement on the banks of the Dnieper River, near Smolensk, has more than three thousand funeral mounds scattered across its forty acres. For centuries, the people who built them controlled the trade that moved along Europe's rivers all the way from the Baltic to Constantinople, and even as far as ninth-century Baghdad, when it was Islam's—and probably the world's—richest and most sophisticated city. Along the Dnieper and Volga, the

traders were generally known as Varangians or "rowers" and formed the personal guard of the Byzantine Emperor; sometimes as Rus, from which modern Russia takes its name. Closer to home, in Ireland, they were often known as Finngaills, or "fair foreigners." The earliest occupants of Britain called them Danes—in the story of *Beowulf*, "east-Danes" or "spear-Danes." Most frequently, they were known as Northmen, or Norsemen; after 793, when they raided the monastery at Lindisfarne, on the east coast of England, with "rapine and slaughter," it was said that all over Europe, people prayed, *"A furore normannorum libera nos, Domine"*: From the fury of the Northmen, deliver us, Lord.*

The Norse—the word "Viking" comes from an Old Norse word meaning "voyaging," later refined to mean "raiding," rather than "trading"—were merchants, warriors, farmers, and artisans. Despite a well-earned reputation for fearsomeness in battle, they appeared less savage to their contemporaries than to their modern mythmakers; in 1220, the chronicler John of Wallingford described them as, in thirteenth-century terms, a bit dandified:

> They were—according to their country's customs—in the habit of combing their hair every day, to bathe every Saturday, to change their clothes frequently and to draw attention to themselves by means of many such frivolous whims. In this way, they besieged the married women's virtue and persuaded the daughters of even noble men to become their mistresses.

But first, last, and always, they were sailors. Their only real competition for the title of the greatest sailing culture in history came from the eleventh- and twelfth-century Polynesians who colonized Hawaii and Easter Island, and their greatest accomplishments are best understood in the same context: travel across vast distances with neither magnetic compasses nor maps, navigating by their knowledge of currents, swells, and the migrations of birds and fish.

*Though the prayer is apocryphal—that is, no document containing it has ever been found—the sentiment is not.

The fish weren't just an aid to sailors but the most important reason they went to sea in the first place. Long before they were trading gold and amber along the shores of the Caspian, Black, and Mediterranean seas, Norse sailors honed their maritime skills in the most basic of human activities: gathering food, especially cod from the North Atlantic, which was, and is, the world's greatest fishery.

By the beginning of the ninth century, they were ready to expand to the west, east, and especially south. Historians have been puzzling over the impetus for centuries; Edward Gibbon, in the forty-ninth book of his *Decline and Fall of the Roman Empire*,* argued that the brutal conquest of the Saxons by Charlemagne in 804 not only opened the door to invasion of Europe from Scandinavia, but provoked it:

> The subjugation of Germany withdrew the veil which had so long concealed the continent or islands of Scandinavia from the knowledge of Europe, and awakened the torpid courage of their barbarous natives.

More methodical, though less eloquent, historians have looked, instead, to increased numbers of gravesites in the relatively poor lands of ninth-century Scandinavia and Iceland—areas, by most estimates, able to support no more than one to two people per square kilometer—as a clue to just the sort of population pressure that might have inclined Norsemen to go a-viking. Or, perhaps the Norse were simply reacting to a later invasion by Europe's Christian sovereigns, who were forcibly converting the pagan peoples on the continent's periphery by the beginning of the tenth century.

There is, though, a more powerful and plausible cause for the explosive spread of the Norse. The great achievements of the Viking Age were almost entirely enabled by the impersonal workings of climate.

This shouldn't come as a surprise. All human civilizations are hostage to weather, but none more so than sailors, who must confront

*Gibbon's great work begins with the death of Marcus Aurelius in 180, and ends, more or less, with the papal schism of the fourteenth century (about which more later). Something as big as Rome takes a very long time to fall.

both the violent nature of the ocean's surface and the capricious atmosphere that imparts motion to their wind-powered vessels. When those mariners are surrounded by seas that produce icebergs and pack ice for up to six months of the year, even a few more weeks of warmer weather a year were literally life-changing.*

Fluid dynamics is the branch of physics that studies liquids and gases in motion—among other things, weather, which gets its dynamism from the heat energy of the sun. That energy is received by every object in the solar system, but if the object in question lacks a fluid atmosphere, it has no weather, which is why a barren rock like Mercury, the closest planet to the sun, has none, and Jupiter, which receives a tiny fraction of the solar energy that hits Mercury, has hurricanes twenty-five thousand miles in diameter that last hundreds of years.

Earth's weather lacks Jupiter's violence, but has its own complexities. Not because the source of heat—the sun—is so variable, but rather because the amount of heat energy absorbed by the Earth during its annual orbits is distributed unevenly. The consequences of that variability are such things as the ice ages—there have been at least four in the last billion years—when glaciers left huge chunks of the northern hemisphere covered with ice sometimes hundreds of feet thick, as well as eras when temperatures were 4 to 5 degrees warmer than today, causing sea levels to be at least twenty-five feet higher.

Weather and climate remain the product of complex interactions between ocean and atmosphere, a dance set to almost unimaginably complicated rhythms, made even more complicated because one partner—the atmosphere—is enormously quicker to respond to change than the other.

The boundary between atmosphere and water is where the dance

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*Which is not to say that the Norse were just lucky. Once climate permitted travel past the Arctic pack ice, they were ingenious enough to equip their longships with a so-called sun-compass—a circular sundial with an adjustable gnomon that would hit a particular spot on the circle at noon, indicating the ship's latitude, and so allowing dead reckoning. And latitude-accurate dead reckoning was sufficient not only to get from Norway to Scotland, but to Iceland, Greenland, and even North America.

partners meet, but their rhythms are created elsewhere: in the ocean's depths, a three-dimensional maze of conveyor belts, powered by heat and salt. The top layer is warmed by the sun, whose rays penetrate a good forty meters, and not only contains most of the ocean's marine life (and CO_2) but stores more than ten times as much energy as the entire Earth's atmosphere. The reason is specific heat: the amount of energy, measured in calories, needed to raise the temperature of a given mass of a particular substance by one degree Celsius. When the given mass is a gram, the specific heat is measured in small *c* calories; when it's a kilogram, the measure is kilocalories.* Whether measured in grams or kilos, the specific heat for water is higher than for virtually any other common substance. It takes one calorie to heat a gram of water by a single degree, which is nearly twice as much as alcohol, five times as much as aluminum, and—most important—more than four times as much as air. And that's just the top forty meters; because the total mass of the oceans is four hundred times that of the atmosphere, the amount of heat energy stored in the Earth's oceans is some sixteen hundred times that of the atmosphere.

The result of this enormous oceanic engine, dependent as it is on tiny changes in the proportions of heat and salt, is that a tiny blip in oceanic temperature can alter atmospheric temperatures for a thousand years.† Which is what happened, sometime around the ninth century, when a few of those oceanic conveyor belts fell into a state of equilibrium for a moment infinitesimally short in geologic time, but a significant fraction of human history. The Medieval Warm Period—sometimes, more cheerfully, called the Medieval Climate Optimum (or, more honestly, the Medieval Climate Anomaly)—lasted only from the end of the ninth century to the beginning of the fourteenth;

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*Just to confuse matters, the "calorie" used to measure the amount of energy in food is actually a kilocalorie.

†So, indeed, can sunspots, which cause an even slighter change in the radiation emitted by the sun. Or volcanoes, which can shoot enough dirt into the atmosphere to change the Earth's albedo—the amount of radiation it reflects back into space—and the amount of heat reaching the surface. In April 1815, the top four thousand feet of Mount Tambora, on the Indonesian island of Sumbawa, erupted into an aerosol dust that gave the world a famous "year without summer" months later.

four centuries when the Northern Hemisphere experienced its warmest temperatures of the last eight thousand years.

The causes of the Medieval Warm Period are the subject of so many competing theories that it seems certain that they are going to remain murky for a while; but its existence is pretty much inarguable. The geological footprint left by moraines—the rocky debris carried by glaciers as they advance and recede—includes plant material that can not only be dated pretty precisely but carries evidence of small changes in annual temperature. Dendrochronologists—biologists who derive all sorts of information from the width and composition of tree rings—have spent decades studying dozens of different species of trees that add a ring each year, and long ago learned that, in temperate climates, the rings differ in width depending on the year's climate. With a tree of a known date—a tree with a hundred rings was a hundred years old when cut down, and used, for example, in a building that is known to have been built, for example, in the year 1000—the temperature of any particular year can be calculated with a high degree of accuracy.

It's more than just the ring's width: the amount of the radioactive isotope Carbon-14 in tree rings measures the amount of solar activity in any particular year. The reasons are, like everything having to do with climate history, intricate: Carbon-14 is formed by cosmic-ray interactions with the nitrogen and oxygen in the Earth's upper atmosphere, so, when there's less solar activity, the amount produced by cosmic rays is relatively greater. Lower solar activity, more Carbon-14. And, sure enough, what are known as "cosmogenic anomalies" match up with what the chronicles report as warm eras in western Europe, not just during the MWP, but the early Iron Age from about 200 BCE.

There's more. There's ice. For more than forty years, geologists have been drilling out cylinders of ice in places like Greenland and Antarctica—places where the ice sheets haven't melted in hundreds of thousands of years. Since the ice accumulates every year at a regular rate, a core—usually between about two and three inches in diameter, but up to two miles long—forms a calendar that records the composi-

tion, and the temperature, of the atmosphere over time. And, once again, the ice cores show an unmistakable warming period between the ninth and thirteenth centuries.

Its geographic extent is a little more problematic. Hubert Lamb, the English climatologist who first posited (and named) the Medieval Warm Period, was working from a limited data set; most of his historical sources—estate records, monastery documents, and the like—were European, and insufficient to demonstrate the global phenomenon he believed he had discovered. One result is that the Medieval Warm Period is regularly used as evidence for those who want to challenge the reality of man-made climate change—"during the Middle Ages, temperatures were even *warmer* than they are today."

In reality, though, it turns out to be far easier to measure the temperature locally, whether in Scandinavia or China, than to solve the notoriously tricky puzzle of worldwide climate. Hubert Lamb was right, but the era he discovered and named was a Northern Hemisphere phenomenon, and particularly one that affected the civilizations along the north Atlantic between about 800 and 1200. The best estimates are that temperatures of northern Europe averaged a healthy 2°C higher than they do today; climate-change skeptics notwithstanding, there is still little evidence that *worldwide* temperatures were, on average, warmer than today.

Why the MWP's effects were confined to the Northern Hemisphere—and especially to Europe—can be explained by a climatic seesaw known as the North Atlantic Oscillation, the prime determinant for the weather of northern and western Europe. The first end of the oscillation is a persistent zone of relatively low atmospheric pressure over Iceland; the second, a high-pressure zone over the Azores.* The weather fronts that bring rain to Europe follow a track determined by the pressure gradient between the two. Thus, when the Azores High is, relatively high, and the Iceland Low relatively low, heat from the Atlantic is conveyed to Europe, making for warm summers and mild winters. As a result, the gradient

*Lower pressure can have many causes, including wind direction. Persistent "thermal lows" are caused, in general, by warmer air in the upper atmosphere; warmer air is less dense and therefore has less mass for its volume than colder air.

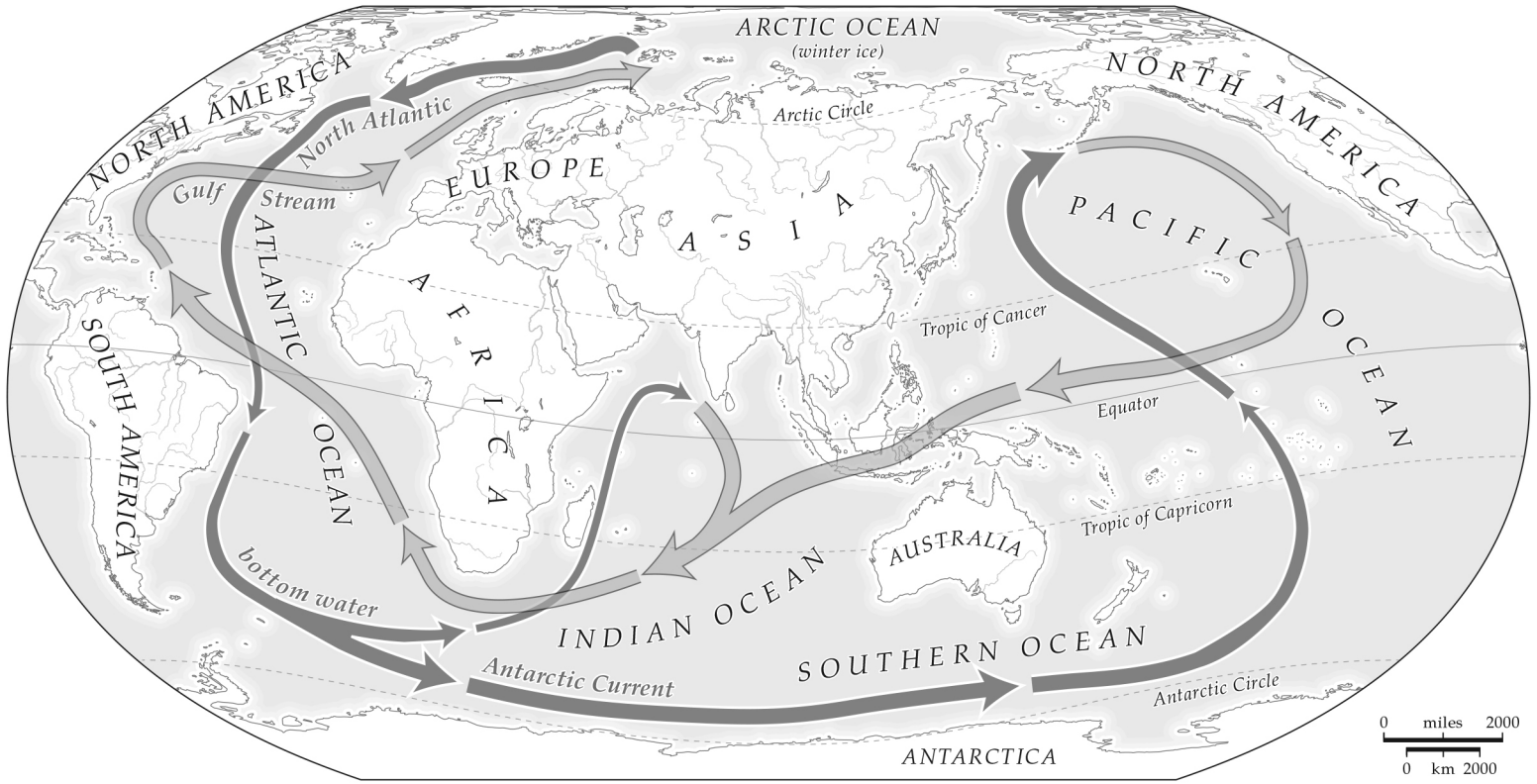
during the MWP generally favored warmer weather in Europe, though not the entire world.

That the North Atlantic Oscillation affected "only" a portion of the world's climate doesn't make it a trivial instrument of change. Its effects were as serious as it got for Europeans living in the era that began with the Viking expansion, and that ended just about the time that Edward II and Isabella of France were celebrating their marriage vows. To the eight out of ten people who farmed the land, sun and rain were what turned land into food. Sun and rain, in the proper proportions, were what supported human life. And there was a lot more of human life at risk in 1308 than had been the case in the year 800.

It's not that European weather during the four centuries of the MWP was uniformly good. Both modern anthropology and historical documents testify to a depressingly long list of droughts, storms, freezes, and lost harvests during the four centuries of the MWP, possibly because of the very human habit of spending more time recording disasters than prosperity. But the weather between the ninth and fourteenth centuries was nonetheless markedly *better*—a little bit warmer, and a little bit more predictable—than any recorded period since the birth of civilization. An increase in temperature and reduction in variability doesn't have to be enormous to initiate a very long, and very consequential, series of events.

The first, and most significant, effect of such predictably good weather was a huge expansion in the kind of land that could be made to produce food. During the MWP, cereals were harvested in European farms at altitudes of more than a thousand feet above sea level—unthinkable today—and vineyards started appearing in northern England. Throughout northwest Europe, land that hadn't produced respectable amounts of food in millennia became productive. Including the lands of the Norsemen.

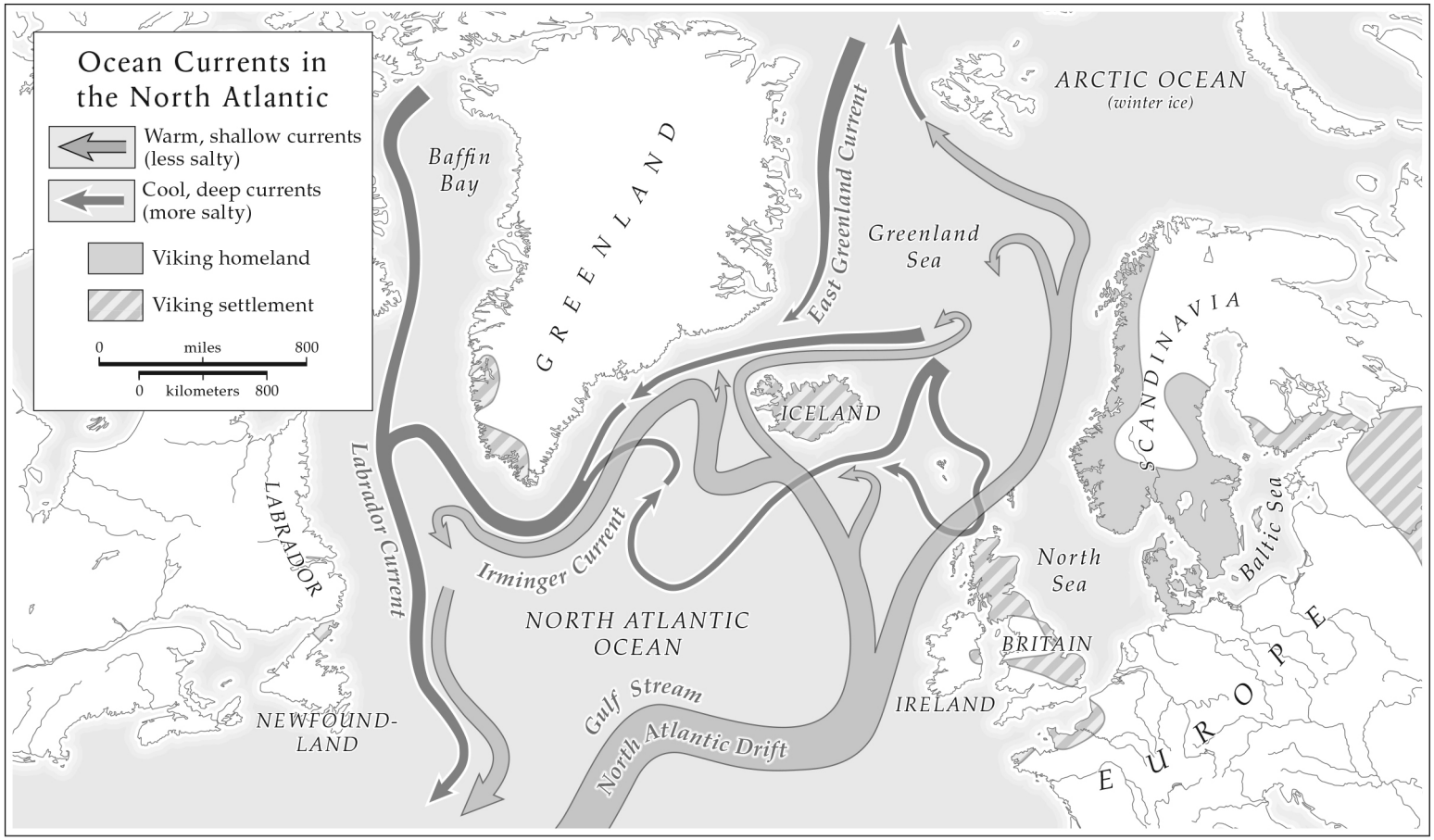
Erik Thorvaldsson, better known to history as Erik the Red, wasn't the first Norseman to discover the eight hundred thousand square miles of tundra and permafrost located between the Atlantic and Arctic, but he was the first to settle there. Sometime before 950, Erik's father left the family home in Norway, one step ahead of the family of



The Conveyor Belts of the World's Climate

Warm, shallow currents (less salty)

Cool, deep currents (more salty)



the man he had killed in a violent brawl, to settle in Iceland, which the Medieval Warm Period had turned into a warm enough place for decent if not great farming. Norse colonists established themselves in Iceland by 900, and were able to produce barley (at least until the twelfth century) and hay for dairy cattle. In around 982, Erik, as prone to violence as his father, was sentenced to a three-year exile for his own series of murders—the sons of one man and "a few other men"—and he took his banishment as an opportunity for one of history's best-known real estate promotions. He established, during his three-year exile, a relatively prosperous camp along what was, as a result of the warming trend, an ice-free coastline. By the 870s, not only had the amount of pack ice in the North Atlantic fallen dramatically, but the soil of the islands of the far north was composed of less permafrost than virtually any time in the last one hundred twenty-five thousand years. When Erik returned to Iceland, he was able to promote his new settlement, which he named Greenland partly because of the enormous grassy meadows that he found there but mostly because his "people would be attracted to go there if it had a favorable name."

It was singularly appropriate that the Greenland colony—which would last until the fifteenth century, with upward of four thousand permanent residents, who built, among other things, a cathedral and two monasteries—was such a well-remembered beneficiary of the climatic change, since most of the weather of northern Europe, including the four centuries of the MWP, is determined by an exceedingly complicated set of ocean currents around Greenland and Iceland. The Irminger Current (also known as the East Greenland Current, which is a part of North Atlantic Current, and a subsidiary of the Gulf Stream) runs just south of Iceland, and carries very cold water from the Arctic south, and out of the northern sea lanes. When it is flowing along the path it took during the Medieval Warm Period, the cold water is pushed down an underwater cliff on the floor of the Denmark Strait—a very high cliff, more than four times higher than Niagara Falls, and with more than four *hundred* times the volume. Submerging this quantity of water several hundred meters below the surface keeps pack ice, which forms between January and April, at least one

hundred kilometers away from Iceland, and the coast of Greenland, which is where it was kept during both the Medieval Warm and today.

The disappearance of that ice not only drew Erik the Red to Greenland (and his son, Leif, to North America, and—probably—L'Anse aux Meadows) but, as a consequence of the MWP, led most of Europe into its first sustained population increase since the fall of the Roman Empire. And, eventually, to the wedding of Edward and Isabella in Boulogne in 1308.

The connections between four centuries of historically good weather, and four days of historically luxurious celebration, are primarily economic. For virtually all human civilizations before the Industrial Revolution the largest contributor to national wealth was arable land: land on which crops could be grown and livestock fed. Every aspect of life depended on land, and the rural population who worked it. Agriculture didn't just feed the guests at the royal wedding; it paid for the cathedral where the vows were exchanged, and even the clothes on the bride's back.

The agricultural laborers who collectively supported Europe's armies, roads, cities, and most of its commerce were, in turn, dependent on the continent's supply of sunny days. The addition, on average, of even ten or twenty days of sun each growing season—which is what a frost-free May two years out of three would produce, courtesy of the Medieval Warm Period—meant more food: enough food to allow a few more children to survive infancy, and a few more adults to survive for more productive years. Like compound interest, this meant dramatic change over time: a population explosion. Records are scanty before the year 1000, but for the next two centuries, Europe became home to a great many more Europeans: England's population grew from 1.5 million to more than 5 million; France from fewer than 6 million to between 17 and 21 million; and Italy, whose population had declined by more than a third after the fall of Rome, rebounded to nearly double, from 5 million to more than 9 million. Farther east, the phenomenon was even more dramatic: the population of that portion of Europe that makes up modern Germany and Poland nearly tripled.

More food increases fertility. Increased fertility means more mouths;

and more mouths demand more food. The longer growing seasons of the Medieval Warm Period improved agricultural productivity, but not so much that it could keep up with the resulting population explosion. Only new land could do that. The Viking response was to colonize previously undesirable—and unpopulated—places like Greenland, but this was no sort of option for either continental Europe or islands like Britain or Ireland. There, unfortunately, the land that wasn't under cultivation usually wasn't for a very good reason: it was covered with trees.

Western and central Europe, at the time the Roman Empire began its retreat, around the end of the fifth century, was 80 percent forest; by 1300, it was less than 30 percent, which means that, over seven centuries, at least 100 *million* acres were deforested. France's forests alone were reduced from 74 million acres to 32 million. Not all of them were turned into farmland, or even pasture; Europe's trees were valuable on their own, for building, heat, and—as armor manufacture became more and more established—fuel for smelting iron.*

Agriculture and armor manufacture weren't the only reasons for forest-clearing material improvement. Peasants climbed a hundred feet in the air to carve the branches from oaks and aspens, were crippled by deadfalls that refused to topple as predicted, and died in the fires they set to destroy the remaining stumps, as much to reclaim the tree-rich sanctuaries of pagan worship for a more Christian world as to claim them for the plow. Wild landscapes were in a state of sin; cultivated land was literally saved by the "prayer book and the ax."

The process was well along by the seventh century, as abandoned-and-reclaimed properties were established in the zones between existing settlements just in time for the great population explosion that began around 800. The resulting change in the topography of Europe was huge: The northern European plain, and England, from the Midlands to the Channel, were transformed into open stretches of field broken up by the occasional village. All that was left of the great forests was an occasional stand of trees, most notably in the west and southeast of

*Until the discovery of a method for purifying coal into coke in the seventeenth century, *all* iron manufacture depended on charcoal, because it had so few of the impurities that make iron brittle.

England, Brittany, and Normandy. The eastern Franks called the new areas *brabants*, from which the formerly heavily forested portion of what is today Belgium got its name. (The forest itself was known as the Silva Carbonnaria, or charcoal-burners forest.)

Converting millions of acres of forest into farmland, especially the sort used to grow cereals like wheat, rye, barley, and oats, actually produced a temporary increase in fertility: when you burn trees (the term of art is *assarting:* a collective endeavor in which trees are cut by a group, who then divide the "new" land like-as-like) in order to plant wheat, the ash left behind actually increases the productivity of the soil. Throughout Europe, sermonizers could, and did, cite Psalm 65: "The grasslands of the wilderness overflow; the hills are clothed with gladness." Over the long term, however, it meant impoverishment, as more and more marginal land was producing a larger and larger percentage of the continent's food.

The result of this centuries-long agricultural expansion was, to a modern agronomist, predictable: yields—the difference between the number of seeds, or bushels, planted, and those available for consumption after reserving seed for the next crop—that dropped precipitously. After centuries of weather that made even poor soil productive, the typical French or English farmer was harvesting no more than ten grains of wheat for every one he planted, and frequently as few as three; in places like Scotland (and places like Erik the Red's homeland, to say nothing of his Arctic colony) the ratio was sometimes barely two to one.*

This is agricultural balance on the edge of a Malthusian knife. When previously unattractive land becomes—at least temporarily—fertile, and population continues to grow, one option is expanding the land under cultivation, but another is extracting the value of the land using a sword instead of a plow. Frontiers become battlegrounds. War-like cultures invade peaceful ones.

And Norse traders become Viking raiders. Even before they established themselves in Iceland and Greenland, they were raiding as far afield as Majorca, Provence, and even Tuscany. Norwegians occupied

*Modern yields are closer to 300 to 1.

the Orkneys, Shetlands, and Hebrides. In 851 Danes invaded and—by 866—essentially conquered England.* Most relevant of all, for those in attendance at Edward and Isabella's nuptials, in 820, a Norse expedition, comprising thirteen ships, arrived at the mouth of the Seine.

They came to raid, but stayed to conquer. In 841, they burned and captured Rouen; within a decade they had built a permanent camp on the now-disappeared (and possibly imagined) island of Jeuvosse in the middle of the Seine, as a convenient jumping-off place for, among other things, raiding Paris, which they did in 857, burning and sacking Chartres for good measure. Every few months, a party of Vikings would sail (or row) up the Seine, and either take everything of value they could, or accept a bribe to go away. By 910, the bishops of Noyon, Beauvais, Bayeux, and Avranches had each been killed in Viking raids. Finally, in the fall of 911, a desperate Charles III, a descendant of Charlemagne, and king of the Western Franks, or Francia (*roi des Francs;* the nation of France was not yet a going concern) signed the Treaty of Saint-Clair-sur-Epte with a Viking chieftain named variously Robert, Rolf, Rosso, or, most frequently, Rollo. The document doesn't survive, and most of its terms, which probably included Rollo's baptism and marriage to one of the king's daughters, remain speculative. The core of the treaty, however, couldn't be clearer: a grant of territory in return for a promise to stop raiding Frankish land.

The land in question was named for its new Norse rulers: Normandy.

The impact of the Norman colony wasn't immediate. Though the colonizers were Danes and Norwegians, and secondhand Norse families from the Orkneys, Ireland, and England, they quickly embraced the customs of their new home. By the time of Rollo's death in 931, he had been baptized into the Christian church; by the time his grandson Richard I succeeded to the rule of the territory, he had not only become a loyal vassal of the soon-to-be kings of France, but gave himself, in the Frankish fashion, a new title, the first duke of Normandy—a territory

*Cnut the Great, a king with a complicated ancestry—part Polish, part Danish—ruled Denmark, Norway, England, and most of Sweden from 1016 to 1035.

that had grown from its original grant to include, by 933, the Cotentin Peninsula and the Avranches in Brittany.

The onetime Viking raiders were quick to exchange their old titles, names, languages, and feudal obligations for new ones. What they retained was a powerful tradition of military conquest. As the tenth century turned into the eleventh, Norman knights had campaigned successfully everywhere from Armenia to Byzantine Greece, and even, under Roger I, the descendant of one of Rollo's soldiers, established the Norman kingdom of Sicily, which ruled both the island and the boot of Italy as far north as Naples until the end of the twelfth century.

But when historians speak of "the" Norman Conquest, they aren't talking about Armenia or Sicily. The most significant bit of military adventuring in European history—and the reason that the groom in Boulogne in 1308 spoke a dialect known as Norman French—was the work of one of Rollo's direct descendants, Duke William II of Normandy.

The year that changed Europe, and particularly Britain, forever, began with the death, on January 4, 1066, of England's king, Edward the Confessor. Saint Edward—in 1161, he became England's first and only king to be canonized—had spent his reign in a series of fairly inconsequential attempts to keep one step ahead of both Viking invaders and his own nobility when he died, childless and, most inconveniently, without a named successor.

The realm itself was something of a shaky edifice anyway, a onetime Roman colony that had been invaded, successively, by Saxons, Norwegians, and Danes, one of whom, Cnut the Great, had been Edward's immediate predecessor as England's king. In fact, given the numerous ways in which the Medieval Warm Period unleashed the Viking Age upon European history, it isn't actually so surprising that the three contenders for Edward's throne were each, in one way or another, Norsemen.*

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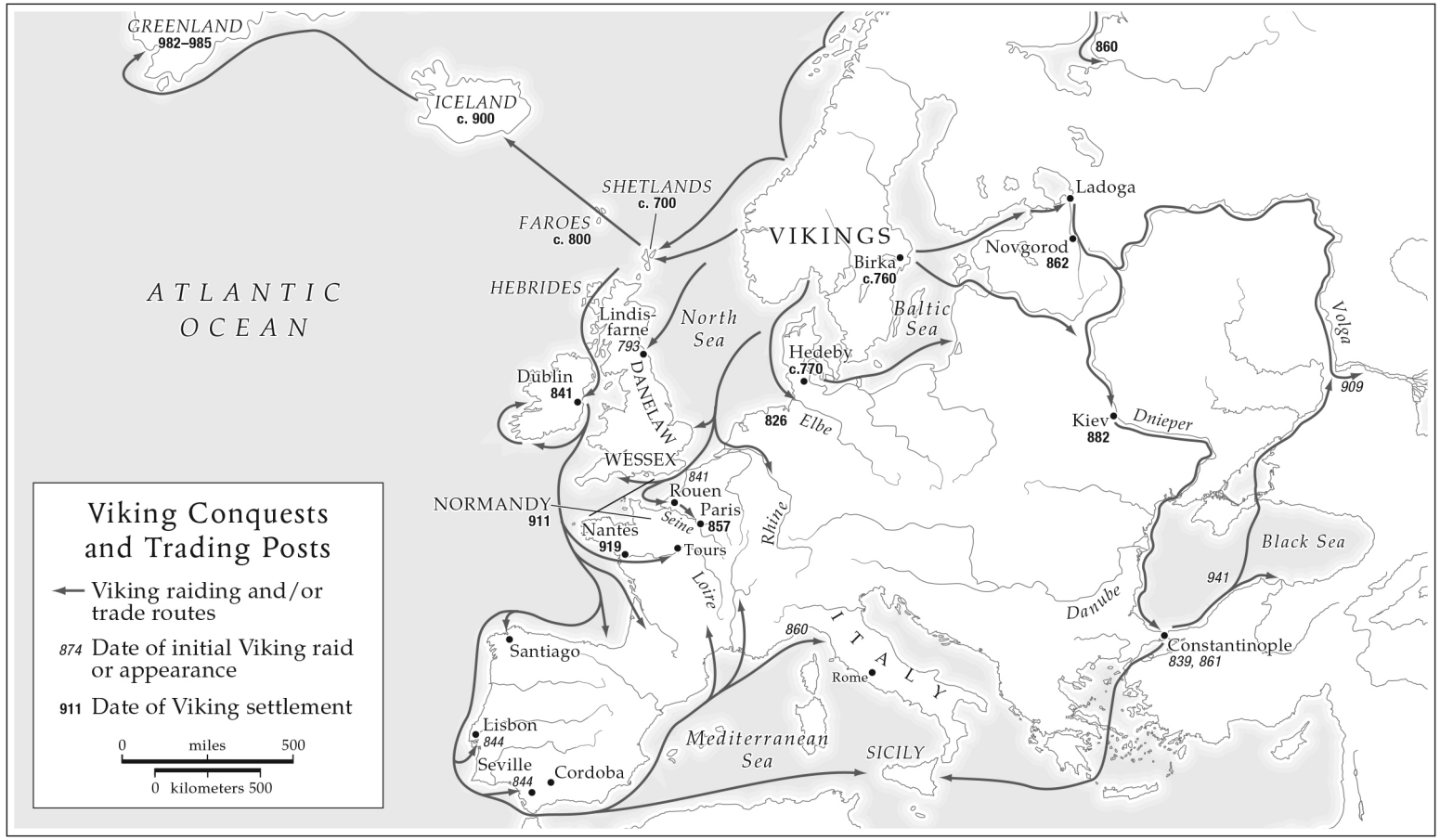
*When the Anglo-Saxon Saint Edward took the throne himself, in 1042, he interrupted a fairly long string of Vikings who had worn the English crown; his mother had married Cnut the Great, king of not only England but Denmark and Norway, and when Cnut's son and successor, Harthacnut, died, the throne went to Edward, his half-brother.



The first, Harold Godwinson, the earl of Wessex, selected as Edward's successor by the *witenagemot*—the assembly of leading nobles that functioned as a sort of privy council to the Anglo-Saxon kings of England—was half-Norse, the son of a Danish princess. The second, a Dane named Harald Hardrada, claimed the English throne by way of a conveniently lost agreement with Cnut's son, Harthacnut, supposedly promising to recombine the Danish and English thrones. And, last, there was Duke William, whose claim rested on an equally convenient—and equally lost—agreement with Edward the Confessor. William's position was not only that Edward had promised *him* the throne during a time when the future saint was living in Normandy but that Harald Hardrada had sworn support when the duke rescued the Norwegian king, who had been shipwrecked on the coast of Brittany.

Conflict was inevitable. Mobilizing took some time, but by fall, both Harald Hardrada and William had assembled armies, and departed for England . . . though they did so in very different ways, and with even more significant consequences. In September 1066, King Harald landed near York, and Duke William in Sussex, each with an army of perhaps ten thousand men, though, as always with medieval orders of battle, solid numbers are hard to come by.

The two battles that followed were each, in their way, decisive.

Though the town of Stamford Bridge occupies the site today, it was nothing but a river crossing over the River Derwent when Hardrada's forces arrived around September 16, 1066. They were led by Harald himself, and by the earl of Northumbria, Tostig Godwinson, the violently estranged brother of Harold, England's newly crowned king. His troops were mostly Norwegians, but included a fair number of Scots, Danes, and mercenaries from northern Europe. They were well armed and experienced, but not especially ready for combat, secure in the news that King Harold was arrayed in the south, preparing a welcome for Duke William and his army. However, in an impressive bit of soldiering, Harold, once apprised of the arrival of the army to his north, led a truly remarkable forced march—185 miles in four days, if the chronicles are to be believed—and, on September 25, surprised his

enemy in the worst of all possible situations.* A few thousand troops of Hardrada's army were on the west side of the bridge, with the remainder on the east. All of them had left their armor aboard ship.

Though exhausted from marching, Godwinson's army immediately closed on their opponents and destroyed Hardrada's heavily outnumbered forces on the west side of the Derwent, and prepared to cross the bridge to deal with the remainder. No one knows precisely what delayed them, but *The Anglo-Saxon Chronicle* records the Homeric story of a giant Dane who kept King Harold's forces from crossing the bridge, killing forty Englishmen before he was finally overcome. The heroic effort bought enough time for the Hardrada forces to line up behind their shields in a strong defensive position, some thirty meters above the riverbed. It did not, however, give them the time required to get their armor; not even time to get mail coats on either King Harald or Earl Tostig, both of whom were killed as the battle turned into a slaughter. The best estimate is that the Norwegians landed with three hundred ships, and returned home with fewer than twenty.

Unfortunately, Stamford Bridge was only a battle. Winning the war meant defeating William's Normans as well. Which is why, three weeks later, King Harold's army, battered and exhausted, arrived at Caldbec Hill, on October 13. The following morning, they deployed across the only road from the enemy's camp at Hastings, which was blocked to the west and the east by inlets that have long since been drained.

The two forces that faced each other at Hastings that day were similar in size, but in no other way. Harold's Englishmen were almost entirely infantry: at the center, the king's housecarls, the professional soldiers who formed the core of the English army, armored with helmets and mail hauberks, and mostly armed with three-foot-long, thirty-pound Danish axes. On either wing were less experienced freemen, similarly armed and armored, and stiffened with Anglo-Saxon

*The chronicles probably aren't to be believed. The "quick march" of a modern infantry platoon is 120 strides per minute, at thirty inches a stride, or 3.4 miles per hour. At that pace, they would have to have been marching for nearly fourteen hours each day.

nobles: thegns, or thanes. Tactically, they were well trained and equipped to defend, and so they established themselves in a powerful defensive position: at the top of Senlac Hill, in a long but shallow ridge, behind a phalanx of locked shields. William's army, on the other hand, was a combined arms force—perhaps fifteen hundred archers, carrying longbows and crossbows, as well as three thousand to four thousand infantry—but the core of the army, its shock troops, valuable only in attack and pursuit, were two thousand or so heavy cavalry—mailed, helmeted, and armed with lance and sword.

Predictably, therefore, it was the Norman force—really a northern European force, with Bretons on the left and Flemings on the right—that began the attack, with a salvo of arrows that did little against the interlocked shields of the English. William then sent his left division in a probing attack that likewise failed to break the integrity of the English line, though it did succeed, in a manner of speaking, by pulling some of Harold's troops out of the shield wall as it pursued them down Senlac Hill.

And so it went, for hour after indecisive hour: a Norman attack, or feint, that failed to decide anything except the fates of a few dozen soldiers who fell at each one. Eventually, however, William calculated how to turn the attacks into a winning tactic: Every quarter hour or so, he charged a portion of his cavalry at the English line, turning at the last minute in order to provoke a pursuit. Once having pulled a few dozen English housecarls out of the shield wall, the Norman cavalry would turn and cut it to pieces. This they did over and over again, while William's archers were given the order to fire at a high enough trajectory to have their missiles drop down on Harold's forces from above, further weakening the obdurate English shield wall. In legend, at least, it was one of those high-arching arrows that fell on the unprotected head of King Harold himself, killing him instantly.

At that moment, the English army, though still formidable, had lost. It is impossible to overstate the importance of personal leadership in combat, and in the mess that was a medieval battle, there were no noncommissioned officers or company commanders. In the battle's early hours, an English counterattack seemed to have struck down

Duke William, and, in an army no bigger than a modern regiment, the loss of the only real leader would have been disastrous, which is why the duke of Normandy knew enough to climb back onto his horse, remove his helmet, and display his well-known face to his troops by riding along the entire front line of his army, restoring their morale. It was not an option available to the English, and they scattered almost as soon as word of Harold's death spread—all except his most loyal housecarls, who fought literally to the death as their bodies formed a wall around their fallen king. The field had been won, decisively, by the duke of Normandy, and with it the crown of England.

The Battle of Hastings is rightly remembered as one of the signature "battles that changed history," and it certainly deserves to be; it ended five centuries of nearly uninterrupted Anglo-Saxon rule of Britain and inaugurated eight centuries of conflict between the rulers of England and France.

But there's an even more fundamental significance to Hastings, which was not only a battle between two armies but also between two very different ways of life. The military contrast couldn't have been more stark: One force, entirely infantry, with a core of professional soldiers—Harold's housecarls—were paid a wage by the sovereign. The other, William's Normans, was built around heavy cavalry, and such a force was enormously more expensive to maintain. Like every premium form of military technology, the premium came at a premium price. In continental Europe, the only way to finance it—in money and manpower—was a social innovation that, in broad terms, has come down to us as feudalism.

In its simplest meaning, feudalism is a system in which an entire class of men owes military service to the class immediately above them, in return for the right to a specific bit of land. Though the term is widely, and casually, used to describe arrangements everywhere from Mesoamerica to imperial China, its European version was unique: a system that organized society through oaths of fealty—by contract, rather than blood. Its origins are traceable to Charlemagne and his subordinates, but the system owed its endurance to both its

flexibility and its unique ability to exploit a new version of a centuries-old military technology: masses of heavy cavalry.

Ever since the sixth century, when the armored cataphracts of the eastern Roman Empire battled against their similarly armed Persian opponents, the use of cavalry as shock troops had been a decisive tactic on European battlefields. But the lancers of late antiquity were armed and armored by imperial treasuries. The heavy cavalry forces of the high medieval era, with lance, mail, and sword for each rider, in addition to a form of armor for at least one of his warhorses, were even more expensive to maintain—among other things, every knight needed multiple mounts, each one bred specifically for combat, and several retainers and grooms to maintain them—and the cost fell squarely on the knights themselves. During the eighth century, a single knight's armor, helmet, sword, lance, shield, and one horse cost fifteen times as much as a cow. By the eleventh, at least ten times as much income was needed to maintain a single knight in the field as a single foot soldier.

To William of Normandy, whose tactics required one mounted soldier for every four afoot, this was not just a logistical problem but a recruiting one. His Anglo-Saxon and Norwegian opponents could field an army with a core of professional ax-wielding infantrymen, personally loyal to the sovereign, who paid them an annual wage. William, unable to do so, assembled an army drawn not just from Normandy but the lands that would subsequently be known as Brittany, Flanders, and Germany. He did so not with the lure of coin but the promise of lands and titles in the island of Britain. Gibbon, in the *Decline and Fall,* describes Charlemagne fearing "the destructive progress of the Normans," but in truth William's victory at Hastings was Charlemagne's as well, because it was William's feudal army—a heritage from the Carolingian emperor—that destroyed the Saxon host. And it was William who, in the manner of Charlemagne, appointed himself as the de facto landlord of all England, and redeemed the promises made to his knights (not merely the great nobles but nearly everyone who carried a lance at Hastings). The victor at

Hastings dispossessed the Anglo-Saxon owners of virtually every acre in England and transferred them to newly made lords, earls, and barons, who held them as his vassals.

At the time of Hastings, the decisive elements of Northern Europe's next few centuries were already largely in place. Enabled by what would eventually be four centuries of warm summers and moderate winters, population and land cultivation both continued to grow, one barely keeping up with the other. For three centuries after William's victory, feudal levies would shape the course of European conflict, and manorial land tenure the nature of European agriculture and trade. The combination of population growth and feudal land expansion—the seeds for a future disaster—were already planted in Europe before the Norman army sailed across the channel in 1066.

Without Hastings, though, there's no obvious reason the same system would have taken root in Britain. As, indeed, it did.