INVENTING THE FLAT EARTH
COLUMBUS AND MODERN HISTORIANS
Jeffrey Burton Russell

Five hundred years after Christopher Columbus (1451-1506), history continues to be accompanied by a curious and persistent illusion: the well-known fable that when Columbus discovered America he proved that the earth is round—to the astonishment of contemporaries who believed that it was flat and that one might sail off the edge. This error has become firmly established in the popular mind by the media, textbooks, and teachers, despite the fact that historians of science have known and proclaimed for over sixty years that most people in Columbus' time believed the earth to be spherical.

Jeffrey Burton Russell sets the record straight, beginning with a discussion of geographical knowledge in the Middle Ages and what Columbus and his contemporaries actually did believe. Russell then demonstrates why and how the error was first propagated in the 1820s and 1830s—and how Washington Irving and Antoine-Jean Letronne were among those responsible. Later historians followed the mistakes of these writers, reaching a peak in the late nineteenth and early twentieth centuries when Christians opposed to Darwinism were labelled similar to medieval Christians who allegedly opposed the sphericity of the earth. Inventing the Flat Earth ends with an explanation of why the error remains pervasive in society, despite the overwhelming evidence against it, and the implications of this for historical knowledge and scholarly honesty. In this time of renewed popular interest in Christopher Columbus—accompanying the quincentenary of his discovery of the New World—Russell's volume will be of special interest to students and professors of history and Western civilization, as well as to history buffs and the general public.

About the Author
JEFFREY BURTON RUSSELL is Professor of History at the University of California, Santa Barbara. He is a frequent contributor to history volumes, including the *Handbook of World History* and *The Transformation of the Western World*. Dr. Russell has also written fifteen previous books and contributed articles to scholarly journals, such as *History Today* and *Christianity Today*.

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*Jacket design by Richard Rossiter*
This long-needed book reveals the facts behind the deceiving myths that have been professed about Columbus and his time—

- The Middle Ages were not “dark”—the Christian Church and science were in accord on many substantive questions, including agreement on the sphericity of the earth

- Washington Irving’s mostly fictional renderings of Columbus and his struggles to be “accepted” were pure imagination

- The “Flat Error” was proclaimed by Darwinist historians who compared the so-called “flat earth” mindset of the 1400’s with religious people of the 19th and 20th centuries who denied the truth of Darwin’s theory of evolution

- Columbus did not “prove” that the earth was round to unbelieving ecclesiastical authority—it was already general knowledge
Other Books by Jeffrey Burton Russell

Dissent and Reform in the Early Middle Ages (1965)
Medieval Civilization (1968)
A History of Medieval Christianity: Prophecy and Order (1968)
Religious Dissent in the Middle Ages (1970)
Witchcraft in the Middle Ages (1972)
The Devil: Perceptions of Evil from Antiquity to Primitive Christianity (1977)
Medieval Heresies: A Bibliography (with Carl Berkhout) (1981)
Lucifer: The Devil in the Middle Ages (1984)
Raga in aegis (with Madeleine L'Engle and Kathleen Drake) (1990)

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Illustrations follow page 50.
Jeffrey Burton Russell, who has published extensively on the intellectual history of the medieval world, has now turned his attention to the intellectual history of the modern world. In *Inventing the Flat Earth* he presents modern readers with a marvelously stimulating analysis of the powerful conventions that are used to define the difference between the medieval and the modern. The great irony present in his analysis is that it subverts that conventional understanding.

At the beginning of his book he quotes from current textbooks used in American grade schools, high schools, and colleges which insist that there was a consensus among medieval scholars from A.D. 300 to 1492 that the earth was flat. This also was the thesis of the influential historian Daniel Boorstin writing for a popular audience in his book, *The Discoverers*, published in 1983. Russell then uses his deep knowledge of medieval intellectual history to demonstrate that the opposite was true. It was conventional wisdom among both early- and late-medieval thinkers that the world was round.

According to what Russell calls the modern Flat Earth Error, it was the courage of the rationalist Christopher Columbus that began the liberation of modern people from the superstitions of the Catholic church. His voyage in 1492 supposedly destroyed the irrational mythology of the Dark Ages by empirically dem-
onstrating that the world was round, not flat. Although it was Europeans participating in the Renaissance and Reformation who invented the idea that there was a thousand years of darkness between the classical world and a new modern world, Russell believes that the Flat Earth Error did not become a modern orthodoxy until the nineteenth century. He finds its beginning in the writings of the American Washington Irving and the Frenchman Antoine-Jean Letronne. But it became widespread conventional wisdom from 1870 to 1920 as a result of “the war between science and religion,” when for many intellectuals in Europe and the United States all religion became synonymous with superstition and science became the only legitimate source of truth. It was during the last years of the nineteenth century and the early years of the twentieth century, then, that the voyage of Columbus became such a widespread symbol of the futility of the religious imagination and the liberating power of scientific empiricism.

The further irony for Russell is that as soon as the modern myth of Columbus as the pioneer who proved the error of medieval mythology became orthodoxy, the historians who were studying the medieval world during the 1920s began to present empirical evidence for the falsity of the modern Flat Earth myth. Soon the emerging field of the history of science provided further evidence that medieval thinkers, like the classical thinkers before them, believed the earth was round. But as Russell points out, the evidence presented by medieval historians and historians of science for the last seventy years has not undermined the persuasive power of the modern myth that medieval thinkers believed the earth was flat. The explanation of this pattern for Russell is that the Flat Earth Error is part of a much larger modern faith in progress. “Our determination to believe the Flat Error,” he writes, “arises out of contempt for the past and our need to believe in the superiority of the present.”

Russell’s book should be read in conjunction with another new book, Anthony Kemp’s The Estrangement from the Past (1991). Kemp is concerned with how modern people have found meaning in time once they rejected the medieval sense of unity. He shares Russell’s belief that when time is conceived in discontinuous terms, it becomes necessary to believe in progress to escape the terror of a world without meaning. As Russell so eloquently has written, “The terror of meaninglessness, of falling off the edge of knowledge is greater than the imagined fear of falling off the edge of the earth. And so we prefer to believe a familiar error than to search, unceasingly, the darkness.” This, then, is the great challenge of Russell’s book. He asks that we modern readers stop considering our world as superior to other human communities that have existed or will exist. Only a historian who is in command of the intellectual histories of both the medieval and modern worlds could write such a provocative and persuasive book.

David Noble
Preface

The almost universal supposition that educated medieval people believed the earth to be flat puzzled me and struck me as dissonant when I was in elementary school, but I assumed that teacher knew best and shelved my doubts. By the time my children were in elementary school, they were learning the same mistake, and by that time I knew it was a falsehood. Most of the undergraduates I have taught at the University of California have received the same misinformation—from schoolbooks, storybooks, cinema, and television. The Flat Error is firmly fixed in our minds; I hope this book will do a little to help dislodge it. “The round earths imagin’d corners” (Donne) always were imaginary.

I want to thank the following people who have helped enormously with this book in one way or another: Joseph Amato, Lawrence Badash, Morton Gibian, Anita Guerrini, Christine Gulish, Paul Hernadi, Lois Huneycutt, Lauren Helm Jared, Walter Kaufmann, David Lindberg, Leonard Marsak, David Noble, Michael Osborne, Janet Pope, Norman Ravitch, Diana Russell, Jan Ryder, A. Mark Smith, John Talbott, Waldo Tobler, Jack Vizzard, and Robert Westmann. Christine Gulish is the best research assistant I have ever known. Jan Ryder was generous with her time and comments. My dear friends Morton Gibian and Walter Kaufmann helped, the first by be-
ing stubbornly curious and the second by performing an impersonation of a Yiddish Columbus that is tempting to recount but might provoke yet another Error. I am most grateful to David Noble for his kind interest and willingness to write the foreword. My greatest thanks go to Joe Amato, without whose encouragement this book might well have never appeared.

CHAPTER ONE

The Well-Rounded Planet

Eight o'clock in the morning, August 3, 1992, marks a full half-millennium since Christopher Columbus set off on his first voyage to the New World, an occasion honored in the United States by the Congressional Quincentenary Jubilee Act of 1987. In the United States, the tone of the observance of 1992 contrasts with the joyous imperial celebration of 1892, because the dark side of Columbus's voyage comes to mind in a way that it did not a century ago. Native Americans may regard 1492 as the beginning of their disinheritance and African-Americans as the opening of the largest market for black slaves. Jews and Muslims may remember that 1492 was also the year of their expulsion from Spain by Ferdinand and Isabella, the very monarchs who sponsored Columbus. Hispanic-Americans may recall the colonial period with more grief than nostalgia. Beyond the immediate and pressing need to re-evaluate the impact of the opening of the Americas to Europe is another, curious problem, in its way as ethnocentric as the imperialism of 1892.

Five hundred years after Columbus (1451-1506), his story continues to be accompanied by a curious and persistent illusion: the well-known fable that Columbus discovered America and proved that the earth is round, to the astonishment of his contemporaries, who believed that it was flat and that one
might sail off the edge. It is an illusion by no means confined to the uneducated. John Huchra, of the Harvard-Smithsonian Institute for Astrophysics, was quoted as saying:

Back then [when the New World was discovered] there was a lot of theoretical, yet incorrect, knowledge about what the world was like. Some thought the world might be flat and you could fall off the edge, but the explorers went out and found what was truly there.¹

To put it in other words: it is falsely supposed that one purpose, and certainly one result, of Columbus’s voyage was to prove to medieval, European skeptics that the earth was round. In reality there were no skeptics. All educated people throughout Europe knew the earth’s spherical shape and its approximate circumference. This fact has been well established by historians for more than half a century.

One of the most eminent contemporary historians of science, David Lindberg, said: ²

In the usual story, theoretical dogma regarding a flat earth had to be overcome by empirical evidence for its sphericity. The truth is that the sphericity of the earth was a central feature of theoretical dogma as it came down to the Middle Ages—so central that no amount of contrary theoretical or empirical argumentation could conceivably have dislodged it.³

In 1964 C. S. Lewis had written, “Physically considered, the earth is a globe; all the authors of the high Middle Ages are agreed on this. . . . The implications of a spherical earth were fully grasped.” And Cecil Jane had already declared in the 1930s:

By the middle of the fifteenth century, the sphericity of the globe was accepted as a fact by all, or at the very least by almost all, educated men throughout western Europe. There is no foundation for the assertion, which was once credited, that in Spain a contrary view was maintained by orthodox theologians and supported by religious prejudice.⁴

The question then is where the illusion—“The Flat Error”—came from and why educated people continue to believe it. The Error is not the alleged medieval belief that the earth was flat, but rather the modern error that such a belief ever prevailed.⁵

This Flat Error remains popular. It is still found in many textbooks and encyclopedias.⁶ A 1983 textbook for fifth-graders reports, “[Columbus] felt he would eventually reach the Indies in the East. Many Europeans still believed that the world was flat. Columbus, they thought, would fall off the earth.”⁷ A 1982 text for eighth-graders said:

The European sailor of a thousand years ago also had many other strange beliefs [besides witches and the Devil]. He turned to these beliefs because he had no other way to explain the dangers of the unknown sea. He believed . . . that a ship could sail out to sea just so far before it fell off the edge of the sea. . . . The people of Europe a thousand years ago knew little about the world.⁸

A prestigious text for college students informs them that the fact that the earth is round was known to the ancient Greeks but lost in the Middle Ages.⁹ Literature follows suit. Joseph Chiari’s play, Christopher Columbus, contains this dialogue between Columbus and a Prior:

Columbus: The Earth is not flat, Father, it’s round!
The Prior: Don’t say that!
Columbus: It’s the truth; it’s not a mill pond strewn with islands, it’s a sphere.
The Prior: Don’t, don’t say that; it’s blasphemy.¹⁰
By the 1980s, a large number of textbooks and encyclopedias had corrected the story, but the Flat Error was restated in a widely read book by the former Librarian of Congress, Daniel Boorstin, *The Discoverers* (1983). Boorstin wrote:

A Europe-wide phenomenon of scholarly amnesia... afflicted the continent from A.D. 300 to at least 1300. During those centuries Christian faith and dogma suppressed the useful image of the world that had been so slowly, so painfully, and so scrupulously drawn by ancient geographers. He called this alleged hiatus the "Great Interruption." His fourteenth chapter, "A Flat Earth Returns," derided the "legion of Christian geographers" who followed the geographical path marked out by a sixth-century eccentric. In fact the eccentric Cosmas Indicopleustes had no followers whatever: his works were ignored or dismissed with derision throughout the Middle Ages.

How could Boorstin disseminate the Flat Error and the public accept it uncritically? The detective work on that question produces a result more frightening than the idea of falling off the edge of the earth: it is the idea of falling off the edge of knowledge.

The very statement that "Columbus proved the world was round" presents logical difficulties. Since Columbus did not ever sail around the world, it was not until Magellan's men came back from circumnavigating the globe in 1522 that the sphericity of the planet could be absolutely proved empirically. So, if Columbus's feat can be said to have been any kind of proof at all, it must be in the sense that it convinced people that the earth was probably round, people who until then had believed otherwise. But no one had believed otherwise.

What is meant by "no one"? No doubt some people alive on August 3, 1492, believed that the earth was flat. Some do today, and not only members of the International Flat Earth Society.

Surveys demonstrate the geographical ignorance of people in the late twentieth century. But the ideas of the uneducated had no effect upon Columbus, or upon his patron Queen Isabella. Why should they have? The educated—geographers and theologians alike—were there to tell them that the earth is round. Those who opposed Columbus's voyage did so on other grounds entirely.

The idea of geocentricity is often linked in the modern mind with the idea of flatness, but the two are separate. With a few exceptions, educated people before Copernicus (1473-1543) in fact believed that the planets—and the stars—revolved around the earth rather than around the sun. However, the idea that the earth is spherical is sharply distinct from the idea that the earth is at the center of the cosmos. A flat earth in no way follows logically from a spherical, geocentric cosmos. But there is one historical way in which the two are connected: by Copernicus in the sixteenth century, who linked them in order to discredit his geocentric opponents.

By the time Copernicus had revolutionized the way people viewed the planets—as revolving around the sun rather than the earth—the seed of the Flat Error had been planted, but it did not grow to choke the truth until much later. When did it triumph and why? Who was responsible? These are the main questions of this book. But the first question is what Columbus and his opponents and contemporaries really thought as opposed to what the Flat Error supposes that they did.

The story of Christopher Columbus, the bold young rationalist who overcame ignorant and intractable churchmen and superstitious sailors, is fixed in modern folklore.

"But, if the world is round," said Columbus, "it is not hell that lies beyond that stormy sea. Over there must lie the eastern strand of Asia, the Cathay of Marco Polo, the land of the Kubla Khan, and Cipango, the great island beyond it." "Nonsense!" said the
neighbors; "the world isn't round—can't you see it is flat? And Cosmas Indicopleustes who lived hundreds of years before you were born, says it is flat; and he got it from the Bible. . . ."

[Columbus at last gains a hearing from the clergy.] In the hall of the convent there was assembled the imposing company—shaven monks in gowns of black and gray, fashionably dressed men from the court in jaunty hats, cardinals in scarlet robes—all the dignity and learning of Spain, gathered and waiting for the man and his idea. He stands before them with his charts, and explains his belief that the world is round. . . . They had heard something of this before at Cordova, and here at Salamanca, before the commission was formally assembled, and they had their arguments ready.

"You think the earth is round, and inhabited on the other side? Are you not aware that the holy fathers of the church have condemned this belief? . . . Will you contradict the fathers? The Holy Scriptures, too, tell us expressly that the heavens are spread out like a tent, and how can that be true if the earth is not flat like the ground the tent stands on? This theory of yours looks heretical."

Columbus might well quake in his boots at the mention of heresy; for there was that new Inquisition just in fine running order, with its elaborate bone-breaking, flesh-pinching, thumb-screwing, burning, mangling system for heretics. What would become of the idea if he should get passed over to that energetic institution?18

The courage of the rationalist confronted by the crushing weight of tradition and its cruel institutions of repression is appealing, exciting—and baseless.19 Christopher Columbus was less a rationalist than a combination of religious enthusiast and commercial entrepreneur, and he enjoyed the kind of good luck that comes once in a half-millennium. Columbus lived at the right time: the Turks were blocking the old land routes to India and China; the Portuguese were seeking an eastward sea route around Africa and in the process establishing profitable trading posts; the "Catholic Monarchs" Ferdinand and Isabella were uniting Spain and could be persuaded to steal a march on their Portuguese competitors. Columbus argued that a direct route to the East would open China's riches to Catholic merchants and its souls to Catholic missionaries. He was not the last to entertain the illusion that Asians were ready to throw themselves body and soul at the feet of Europeans.

Columbus's speculations about sailing west to the Indies (a term that then meant the entire Far East) was part of a broad front of opinions already advancing in that direction. Columbus read widely and knew that others had argued that between Spain and the Indies the sea was short and could be crossed in a few days.20 Paolo dal Pozzo Toscanelli, the Florentine astronomer, replied to a letter of 1474 from a canon of Lisbon that a westward voyage was feasible, using islands as watering and provisioning places along the way. He sent him a map showing many small islands in the western sea between Europe and the Indies. Columbus, hearing of the correspondence, obtained a copy of letter and map from Toscanelli. In 1492, the same year that Columbus sailed westward, Martin Behaim, who had visited Lisbon in 1484, returned to his native city of Nuremberg and constructed a globe of the earth showing an open sea westward to Japan and China. In 1493, Hieronymus Munzer wrote to King John II of Portugal to propose the westward journey, unaware that on October 12, 1492, Columbus and his crew had already sighted the island of "San Salvador" (possibly Watling Island in the Bahamas). Columbus believed he was in an archipelago that included Japan.

None of the early sources, including Christopher Columbus's own Journal as presented by Las Casas, and Ferdinand Columbus's resume in his History of the Admiral of the reasons why his father made the voyage, raises any question about roundness.21 Neither do the accounts of the Cabots or other explorers before Magellan's circumnavigation. The reason was that there was no question. Whence, then, the lurid accounts of the explorer at bay before his benighted enemies?

In fact Columbus did have opponents. Around 1484, Co-
Lumbus proposed the voyage to King John of Portugal, but the king preferred to continue south and east along the African coast, a policy that was yielding rich economic rewards, rather than take a chance on the westward passage. When Columbus turned to the Spanish monarchs Ferdinand and Isabella, he found them preoccupied with completing the unification of Spain by conquering the Moorish kingdom of Granada. It is true that the Catholic Monarchs had established the Spanish Inquisition as a State Council in 1483, but that institution, aimed primarily against converted Jews who relapsed into their own religion, had no interest whatever in the shape of the globe.

In addition to the political hesitations there were intellectual objections. The Spanish monarchs referred Columbus to a royal commission headed by Hernando de Talavera, Queen Isabella's confessor and later Archbishop of Granada. This commission was in effect a secular ad hoc committee composed of both lay and clerical advisers; it was in no sense an ecclesiastical council, let alone an inquisitorial convention. These were practical men trying to establish whether a westward passage was practical.

After delays, Talavera called a rather informal committee meeting at Cordoba in early summer 1486, another at Christmas in Salamanca, and yet another in 1490 in Seville. The commission's meeting at Salamanca was no convention of scholars, and the university was involved only in the sense that the committee met in one of its colleges. Of the objections posed to Columbus, none involved questioning sphericity. Even the strange objection that a person having sailed "down" the curve of the earth might find it difficult to sail "up" it in return assumed sphericity. More convincingly, the opponents, citing the traditional measurements of the globe according to Ptolemy, argued that the circumference of the earth was too great and the distance too far to allow a successful western passage. They rightly feared that life and treasure might be squandered on an impossibly long voyage. The committee adjourned without agreeing, and the Spanish rulers, occupied in their wars against the Moors, gave no reply.

Meanwhile, between 1486 and 1490, Columbus carefully prepared the calculations with which to defend his plans. In 1490 the commission finally decided against him. Again, none of their objections called into question the roundness of the earth. Relying on Ptolemy and Augustine, they argued that the sea was too wide; the curvature of the planet would prohibit return from the other side of the world; there could not be inhabitants on the other side because they would not be descended from Adam; only three of the traditional five climatic zones were habitable; God would not have allowed Christians to remain ignorant of unknown lands for so long.

The committee's doubts were understandable, for Columbus had cooked his own arguments. The modern figure for the circumference of the planet is about 40,000 kilometers (km). The earth is divided latitudinally and longitudinally into 360 degrees, and the length of a degree of latitude could be roughly measured by sightings on the sun, as Eratosthenes had done nearly two millennia earlier; the modern figure is about 111 km. It follows that 1 degree of longitude at the equator is approximately the same figure as 1 degree of latitude. Columbus needed to persuade Ferdinand and Isabella that the journey across the ocean sea was not impossibly long, and to do that he needed to reduce two things: the number of degrees occupied by empty sea, and the distance between degrees.

The standard calculations accepted by most geographers in the fifteenth century were those of Claudius Ptolemy (c. A.D. 150). Ptolemy believed that the planet was covered by the ocean, except for the large, inhabited landmass that he called the oikoumene and that we refer to as Eurasia and Africa. Oikoumene will be translated here as "the known world." East to West Ptolemy's known world occupied about 180 degrees, leaving 180 for open sea. But Columbus also read Pierre D'Ailly, who gave a figure of 225 degrees for the land and 135 for the sea. This was much better for Columbus but not yet
good enough. Arguing that Marco Polo's travels had shown that the Asian landmass extended eastward much further than was known by Ptolemy or D'Ailly, Columbus added another 28 degrees to the land, making it 253 degrees against 107 for the sea. Since Japan was (Columbus believed from Marco Polo) far to the east of China, he subtracted another 30 degrees from the sea, making it 77. Then, since he planned to leave from the Canary Islands rather than from Spain itself, he subtracted another 9, leaving 68. Even this was not quite enough, and in a final superb gesture, he decided that D'Ailly had been 8 degrees off to begin with. By the time he had done, he had reduced the ocean to 60 degrees, less than one-third the modern figure of 200 degrees for the distance from the Canary Islands westward to Japan.

Not content with bending longitude, Columbus molded the mile. A degree of longitude at the equator is approximately equal to a degree of latitude, and D'Ailly cited the Arabic astronomer Al-Farghani or "Alfragano" (ninth century) as setting a degree of latitude at 56-2/3 miles. This figure was used by Columbus—with a twist. He chose to assume that Alfragano's were the short Roman miles rather than the longer nautical miles. Columbus translated Alfragano's figure into 45 nautical miles. Since Columbus planned to cross the ocean considerably north of the equator, he adjusted this to about 40 nautical miles (about 74 km) per degree.

Putting these figures together, Columbus calculated the distance between the Canaries and Japan at about 4,450 km. The modern figure is 22,000 km. Put another way, he estimated the voyage at about 20 percent its actual length. If God or good luck had not put America—the West Indies—in the way to catch him, Columbus and his crews might indeed have perished, not from falling off the earth but from starvation and thirst. Columbus clinched his argument to his patrons by adding that the voyage could probably be broken at intervening islands.

After long political maneuvering and many disappoint-
He criticized and corrected the work of Marinus of Tyre (c. A.D. 100), arguing against Marinus’s and Erastosthenes’ rectangular projections in favor of one contracting toward the pole and expanding at the equator. These are projections for maps, not geometrical descriptions. Columbus would prefer the tradition of Marinus as interpreted by D’Ailly, because Marinus’s ocean was much smaller than Ptolemy’s. Ptolemy was unfortunately soon forgotten in the West until the twelfth century, so the writers of the Roman Empire who had the most influence for the next millennium were the less exact Pomponius Mela (c. 40) and Pliny (23–79).

In the first fifteen centuries of the Christian era, five writers seem to have denied the globe, and a few others were ambiguous and uninterested in the question. But nearly unanimous scholarly opinion pronounced the earth spherical, and by the fifteenth century all doubt had disappeared. There was no “Great Interruption” in this era. So what or who led to the Flat Error?

CHAPTER THREE

Flattening the Globe

Nineteenth- and twentieth-century writers flattened the medieval globe. Daniel Boorstin paints a pathetic picture of the brave mariners of the fifteenth century struggling valiantly against the darkness. In their efforts to navigate accurately, they “did not find much help in Cosmas Indicopleustes’ neat box of the universe. . . . The outlines of the seacoast . . . could not be modified or ignored by what was written in Isidore of Seville or even in Saint Augustine. . . . The schematic Christian T-O map was little use to Europeans seeking an eastward sea passage to the Indies.” In fact, Cosmas Indicopleustes was unknown in the fifteenth century; Isidore and Augustine had nothing to say about the outlines of the coast; and the T-O maps were never intended for navigation.

The untruth of the Flat Error lies in its incoherence as well as in its violation of facts. First there is the flat-out Flat Error that never before Columbus did anyone know that the world was round. This dismisses the careful calculations of the Greek geographers along with their medieval successors; it makes Aristotle, the most eloquent of round-earthers, and Ptolemy, the most accurate, into flat-earthers.

Another crude form of the Flat Error is the lurid embellishment that sailors feared that they would plunge off the edge of the flat earth if they voyaged too far out into the ocean. The
falling-off-the-edge fallacy was popularized by Andrew Dickson White, who wrote in 1896:

Many a bold navigator, who was quite ready to brave pirates and tempests, trembled at the thought of tumbling with his ship into one of the openings into hell which a widespread belief placed in the Atlantic at some unknown distance from Europe. This terror among sailors was one of the main obstacles in the great voyage of Columbus.79

The Flat Error later combined openings into hell with the edge of the earth and simple sailors with experienced navigators.

Another version of the Error is that the ancient Greeks may have known that the world was round, but the knowledge was lost (or suppressed) in medieval darkness. According to this argument, the Middle Ages were a dark period for the development of science in Europe. At best, scholars made accurate but sterile copies of the works of the ancients, rejecting anything that did not conform with the dogmas of the Church. Such an intellectual environment stifled any development of scientific analysis. Concepts of the world that had been developed in ancient times were reshaped to conform to the teaching of the Church. The earth became a flat disc with Jerusalem at its center.80

This line of thought, presented in 1988, represents no advance in knowledge from the following statement, made sixty years earlier:

The maps of Ptolemy... were forgotten in the West for a thousand years, and replaced by imaginary constructions based on the supposed teachings of Holy Writ. The sphericity of the earth was, in fact, formally denied by the Church, and the mind of Western man, so far as it moved in this matter at all, moved back to the old confused notion of a modulated "flatland," with the kingdoms of the world surrounding Jerusalem, the divinely chosen centre of the terrestrial disk.81

Many inconsistent varieties of this version exist: The knowledge was lost in the first century A.D., or the second, or the fifth, or the sixth, or the seventh; and on the other end it was lost until the fifteenth century, or the twelfth, or the eighth. The mildest variety, therefore, posits only a few years of darkness from the flattening of the Greek earth to the rounding of the modern one.

Still another version is that almost everyone always believed the earth was flat, but in the darkness had shone a few, scattered lamps, held by Aristotle and Ptolemy and Bacon and Toscanelli. "A few bold thinkers had long believed that the earth was a globe."82

The growth of the Error was not steady. In the mid-nineteenth century some specialists remained cautious and accurate. Joachim Lelewel, for example, explained that medieval mapmakers often represented the inhabitable world, not the entire earth, as rectangular.83 The schoolbooks of the nineteenth century are inconsistent, but show an increasing tendency over the century to the Flat Error, a tendency that becomes especially pronounced from the 1870s onward as textbook authors engaged in the evolutionary fray and became more subject to pragmatist influence.84 Earlier in the century the dominant force behind the Error was middle-class Enlightenment anticlericalism in Europe and "Know-Nothing" anticatholicism in these United States. The origin of the Error resides in these milieus.

Throughout the nineteenth century, middle-class liberal progressives projected their own ideals upon heroes of the past, among them "Columbus, [who] from that justness of mind and reasoning which mathematical knowledge gives, calculated very justly."85 The image of Columbus as the clear-headed rationalist is at odds with both the original sources and the judgment of his most recent and definitive biographers. This Columbus existed only in the minds of amiable progressives whose disdain for the Catholic Revival and the Romantics of the early nineteenth century colored the way they viewed the Middle Ages.86 To the political and ecclesiastical liberals, Ro-
manticism and Catholicism (in reality seldom allies) were twin obstacles to progress. "In discarding medieval naivete and superstition . . . men looked to the guidance of Greek and Roman thinkers, and called up the spirit of the ancient world to exorcise the ghosts of the dark ages." This fit their image of Columbus.

Philosophers of progress such as Hegel (1770–1831) wrote about the infinite falsehood constituting the life and spirit of the Middle Ages. Romantic populists such as Jules Michelet attacked the clergy and the aristocracy as relics of the medieval mind. For Michelet the age of feudalism and scholasticism was a time of gathering darkness; the scholastics were somehow at one and the same time "valiant athletes of stupidity" and "trembling with timidity." Columbus, these writers said, defied them and discovered the earth as Copernicus would discover the heavens.

Auguste Comte (1798–1857) laid the philosophical basis for positivism with the argument that the history of humanity shows an unsteady but definite progress from reliance on magic, then religion, then philosophy, then natural science. A few definitions are necessary for clarity and precision. There is a spectrum of beliefs held by those who adopt a generally "scientific worldview." Some believe that there is no knowledge outside human constructs of it. Some maintain that science is only one of a number of roads to knowledge. Some believe that external reality exists and that science is making successively more exact approximations to truth about that reality without ever (or at least probably ever) coming to truth itself. Some maintain that science can and does express truth about the external world. And some (a decreasing number) maintain that science tells the truth, the only truth about the external world. The belief that science expresses the truth, or at least some truth, about the external world I call "scientific realism." The view that science is approaching the truth by successive approximations I call positivism. In common usage in the nineteenth and twentieth centuries, the terms scientific realism and positivism are often exchanged and used loosely, and in fact some writers did not distinguish between them. Positivism extends beyond natural science, too; historical positivism, for example, is the view that history advances toward truth about the human past in successive approximations. There is no one common term to embrace both scientific realists and positivists, so for the purpose of this book I will call both "progressivists."

Progressivists did not choose to understand other societies in those societies' terms, but, rather, chose to hold them to the standards of the nineteenth-century scientific method. By making that method the criterion of all truth and goodness, the progressivists necessarily ruled out other worldviews as false and bad. By the nineteenth century their victory was so complete that other views now seemed merely irrational, superstitious, trivial.

The progressivists succeeded, mainly in the half century between 1870 and 1920, in establishing the Flat Error firmly in the modern mind. As late as 1867 a rationalist historian such as W.E.H. Lecky could point to the church fathers' objections against antipodeans and to the bizarre ideas of Cosmas Indicopleustes without claiming that the fathers believed in a flat earth. Such a polemical rationalist and anticlerical as Charles Kingsley could refrain from the Error. Lecky and Kingsley were intent on attacking medieval philosophy—scholasticism—on the grounds that it dogmatically conformed to Aristotle, they knew very well that Aristotle's earth was round, and they knew that it followed logically that they could not accuse the scholastics of being flat-earthers.

The ground was prepared for the alleged "warfare between science and religion" suggested by William Whewell (1794–1866), Vice-Chancellor of Cambridge University and priest of the Church of England. Whewell took his doctorate in Divinity when that degree was standard and normal for a learned man, but his interests were science and mathematics (and to some degree poetry) rather than religion. "His sermons do not exhibit any special theological learning, and it is curious
that . . . he should have been so little attracted by divinity." His History of the Inductive Sciences, first published in 1837, became the standard text in the history of science for half a century. A liberal progressive whose imperious character brooked no nonsense, Whewell spoke of "the Indistinctness of Ideas, the Commentatorial Spirit, the Dogmatism, and the mysticism of the Middle Ages." In later editions Whewell pointed to the culprits Lactantius and Cosmas Indicopleustes as evidence of a medieval belief in a flat earth, and virtually every subsequent historian imitated him—they could find few other examples.

Lactantius (c. 245-325) was born and reared in Africa as a pagan. A professional rhetorician, he converted to Christianity and wrote a number of books defending his new faith. But his views eventually led to his works being condemned after his death. He maintained, for example, that God wills evil as a logical necessity and that Christ and Satan are metaphorical twins, two angels, two spirits, one good and one evil, both created by God. The irony is that after being under some suspicion through the Middle Ages, Lactantius was revived by the Humanists of the Renaissance as a model of excellent Latin style. Lactantius, revolting against his own pagan upbringing, rejected the teachings of the Greek philosophers on every point he could. The philosophers argue for sphericity, he wrote, but there is no evidence to support their view that the earth is round, and as the Bible is not clear on the subject, it is unimportant. In this view, he was similar to Augustine and Basil. But unfortunately he went on, as his detractors did seventeen-hundred years later, to tie the question of roundness to that of the antipodes. Is there anyone so silly, he demanded, as to believe that there are humans on the other side of the earth, with their feet above their heads, where crops and trees grow upside down, and rain and snow fall upward and the sky is lower than the ground? From Lactantius's angle of vision, Christians were faced with two competing approaches to truth: one based on the authority of the revealed Scriptures and the other based on the authority of philosophical logic. It was coherent for Lactan-

tius to believe that revelation must be prior to any human system of thought; that is central to a coherent Christian worldview. However, his mistake lay in trying to force the philosophers into the biblical mode, failing to distinguish, as Augustine and Chrysostom had, between two kinds of statements, the scientific and the revealed, which need not be reconciled in one system. At any rate, Lactantius was not widely heeded.

The other villain for the progressivists was from the Greek East: Cosmas Indicopleustes. Cosmas wrote a "Christian Topography" (547-549), in which he argued that the cosmos was a huge, rectangular, vaulted arch with the earth as a flat floor. Cosmas drew upon a misapprehension of both the Bible and the pagan philosophers. He chose naively to take as science the poetic biblical passages about the earth having ends and four corners and the sky being spread above it like a tent or a vault. Like Lactantius, Cosmas courted difficulty by trying to reconcile biblical metaphor and philosophical logic. He also misinterpreted the scientific description of the world as being rectangular and longer East-West than North-South. His confusion was based upon the longstanding ambiguity as to the meaning of the term "world." Eratosthenes and Strabo had drawn rectangular maps to represent the known world, which they knew occupied a portion of the surface of the spherical earth: their maps were attempts at projection. Cosmas took such views as implying a physically flat, oblong earth.

Cosmas argued against the sphericity of heaven and earth and the existence of the antipodes. The New Testament Epistle to the Hebrews 9:1-5, following the Book of Exodus, calls the Tabernacle of Moses to hagion kosmikon, literally, "the cosmic holy thing." A modern translation is "a sanctuary on this earth," but Cosmas took it to mean that the earth had the same shape as the Tabernacle. If the Tabernacle of Moses is constructed in imitation of the shape of the world, then it follows that the world must be in the shape of the Tabernacle. Cosmas saw the enclosed vault of the sky as the Tabernacle itself and the earth
as the flat table on which the “showbread” or “loaves of presentation” were placed. As the table was oblong, the earth must be oblong as well. Cosmas derived the image from the influential church father Origen of Alexandria (185-251), whose method of interpreting Scripture was strongly allegorical. Origen understood such a statement as Hebrews chapter 9 as metaphor, but Cosmas did not grasp the refinement.  

Cosmas knew about the Aristotelian view of a round earth surrounded by concentric spheres but rejected it. He believed that night is caused by the sun’s passing behind a huge mountain in the far north. Cosmas’s scheme is bizarre, but modern anthropologists and historians have shown that if anything in another culture strikes us as strange, we should be alert to levels of understanding that we are not immediately grasping. What did Cosmas intend with such a system? It appears that he did not intend to furnish a physical geography, much less a practical guide to travel. He wanted, like Dante later, to convey the essential meaning of a cosmos whose innermost sense is moral and spiritual. For Cosmas the physical universe was primarily a metaphor for the spiritual cosmos. It mattered little to him whether the physical cosmos he designed to illustrate his point was geographically valid. Unfortunately, his emphasis upon the physical details of the system led him into trouble. Unlike Dante’s, his system was muddled and cumbersome.

But the influence of Cosmas’s blundered effort on the Middle Ages was virtually nil. In Greek only three reasonably full manuscripts of Cosmas exist from the Middle Ages, with five or six substantial fragments. Cosmas was roundly attacked in his own time by John Philoponus (490-570). Philoponus, striving for a reconciliation of philosophy and theology, insisted (like almost all the fathers) that Christians not make statements about the physical cosmos that were contradictory to reason and observation and thus made Christianity look foolish in the eyes of the educated pagans. After Philoponus, Cosmas was ignored until the ninth century, when the Patriarch Photius of Constantinople again dismissed his views. In Latin, no medie-
theologians had recognized that religion and science are two divergent worldviews, with different roots, and they should not be confounded. Religion's roots are in the poetic, the non-rational (not "irrational") preconscious; science's in analytical reason. But by 1870 the Catholic Church had, under Pius IX (1846–1878), declared itself hostile to modern liberalism; and theological conservatism was rising in many segments of Protestantism as well. Interpreting the contemporary situation as created a new empire and defeated France; Britain divergent worldviews, with different roots, and they should not images of war dominated Western society. Germany had just theamil metaphor was an enormous success. It got its tenacious grip on intellect during the period 1870-1910 when images of war dominated Western society. Germany had just created a new empire and defeated France; Britain would go to war with the Boers, and the United States with Spain. The whole age echoed gunfire: the Salvation Army; the Church Militant; the Battle Hymn of the Republic; Onward Christian Soldiers; jingoism; the naval competition between Germany and Britain; the building of colonial empires. The "Social Darwinists" were arguing that Europe's military superiority proved that it was destined to rule the world. The military metaphor was striking, colorful, well-timed, and so effective a propaganda tool that today it is still common to think of science and religion as being in armed conflict.

The opening barrage of the war came from John W. Draper. Draper (1811–1882) came from a religious family; his father was an itinerant Methodist preacher, and at the age of eleven John was sent to a Methodist school. However much he rejected these origins later, he retained the Methodist's optimistic belief that progress can be won through hard work. He studied briefly at University College London, where he was exposed to positivism and began to translate his progressive faith in religion into a progressive faith in science. After his father's death, he emigrated in 1832 with his mother, wife, and sisters to the United States, studied medicine at Pennsylvania, and became professor of chemistry and biology at New York University and eventually head of the medical school.

He governed his family's marriages, money, and even leisure. On matters of religion he brooked no opposition. When his sister Elizabeth's son William died at the age of eight, she put the boy's prayer book on Draper's breakfast plate. It was a challenge that her brother accepted by driving her from the house; she became a Catholic convert and remained alienated from the family.

In 1860, after presenting evolutionary views in a paper read to the British Association, Draper was attacked by Bishop Wilberforce, whose expressed intention was to "smash Darwin," and then defended by Thomas Huxley in a crushing counterattack. The confrontation encouraged Draper to believe that religion and science were at war. By 1860 he had already completed his History of the Intellectual Development of Europe, although it was not published until 1862 owing to the U.S. Civil War, and the first edition shows a more irenic spirit than his later work. It argued that humanity was making slow but steady progress and that the growth of science was in the best interests of a healthy Christianity. Indeed, Europe's alleged Enlightenment as opposed to the decadence of China, Draper explained, may be traced to the benevolent influence of Christianity. But Christianity would have to accept as its basis science in place of revelation. The book denounced the fathers and the scholastics for subordinating science to the Bible.

The British Association meeting, the increasing intractability of Protestantism to the theory of evolution, and especially the escalating hostility of the papacy to liberal thought, convinced Draper during the 1860s that Christianity—or at least Roman Catholicism—would never give up its epistemological basis in Scripture and tradition and would be an obstacle rather than an aid to progress, which he defined as the advance of science and technology. In 1873 he began a new book, The History of the Conflict between Religion and Science, largely a popular condensation of his earlier work with a few additions, but in tone and attitude combining the Enlightenment skepticism of Gibbon and the positivism of Comte with the political liberal's faith in the advance of society. "For his own taste he had made a
gratifying whole of science and liberalism. The *History of the Conflict* is of immense importance, because it was the first instance that an influential figure had explicitly declared that science and religion were at war, and it succeeded as few books ever do. It fixed in the educated mind the idea that “science” stood for freedom and progress against the superstition and repression of “religion.” Its viewpoint became conventional wisdom.

There was some hope, Draper felt, that science could live with Protestantism, because liberal Protestantism was yielding its moral authority to the secular state and its epistemological basis to science. But science could never live with Catholicism, which under Pius IX condemned liberal progressivism in the “Syllabus of Errors,” opposed the union of Italy into a secular state, and declared the pope’s infallibility. The pope, as Draper saw it, was clinging to his eroding power by attempting to quash freedom of thought. Draper saw the secular national state as the protector and steward of liberal progress, and he admired Bismarck’s “Cultural War” (*Kulturkampf*) against the church in Germany. This was also the period when American Know-Nothing hatred of Catholicism was being stoked by waves of Irish and Italian immigrants who, American Protestants and secularists believed, threatened to divide the nation or even bring it under papal tyranny.

It was also the heyday of the *leyenda negra*, or “Black Legend of Spain,” which perceived Spanish Catholicism of the sixteenth and seventeenth centuries to be the evil force behind Bloody Mary, the Armada, and the “Inquisition,” a force dedicated to the destruction of decent (especially Anglo) Protestantism. The Black Legend began in England under Elizabeth I (1558–1603), when parts of Bartolome de las Casas were translated into English. Las Casas had favored lenient treatment of the Amerindians under Spanish rule and as a result had in his works condemned the Spanish exploiters. These passages were eagerly seized upon by the English (and the Dutch and other Protestant powers) to prove the evil of the Spanish Catholics. It was ironic, of course, since the English were much more ruthless in exterminating the Indians than the Catholic Spanish or Portuguese, but again the fallacy fit the political programs of the Protestant powers and Protestant popular prejudice.

Draper wrote that the Catholic Church and science are “absolutely incompatible; they cannot exist together; one must yield to the other; mankind must make its choice—it cannot have both.”

When and where had Christianity gone wrong? Draper’s new book offered two answers:

The antagonism we thus witness between Religion and Science is the continuation of the struggle that commenced when Christianity began to attain political power. A divine revelation must necessarily be intolerant of contradiction; it must repudiate all improvement in itself, and view with disdain that arising from the progressive intellectual development of man. . . . The history of Science is not a mere record of isolated discoveries; it is a narrative of the conflict of two contending powers, the expansive force of the human intellect on one side, and the compression arising from traditionary [sic] faith and human interests on the other. . . . Faith is in its nature unchangeable, stationary; Science is in its nature progressive; and eventually a divergence between them, impossible to conceal, must take place. [It is the duty of the educated to take a stand, for] when the old mythological religion of Europe broke down under the weight of its own inconsistencies, neither the Roman emperors nor the philosophers of those times did any thing [sic] adequate for the guidance of public opinion. They left religious affairs to take their chance, and accordingly those affairs fell into the hands of ignorant and infuriated ecclesiastics, parasites, eunuchs, and slaves.

One suggestion implicit here is that Christianity went wrong by assuming political power. Draper explained that this happened in fourth-century Rome with the conversion of Constantine to Christianity and developed over the centuries into nineteenth-
century monarchical papalism. The other suggestion is that Christianity was inherently and absolutely wrong from the outset in basing itself upon divine revelation. There was no comfort in his words to Protestants, though some nurtured a fond hope of distancing themselves from the ignorant ecclesiastics, parasites, eunuchs, and slaves in the Vatican, whose hands "have been steeped in blood." Soon, however, Protestantism was to share the fate of Catholicism in being declared an obstacle to Progress.

Draper was right that the epistemological bases of science and religion are different, but in projecting his condemnation backward on nineteen centuries of Christianity, he saw the whole religion in the image of Pius IX. Draper's description of the church fathers' cosmological views failed even as caricature. He despised St. Augustine particularly, attributing to him views more appropriate to a dim nineteenth-century nonconformist preacher. "No one did more than this Father to bring science and religion into antagonism; it was mainly he who diverted the Bible from its true office—a guide to the purity of life—and placed it in the perilous position of being the arbiter of human knowledge, an audacious tyranny over the mind of man." In their ignorance the fathers "saw in the Almighty, the Eternal, only a gigantic man." They believed that the Bible was to be taken as scientific truth, an allegation Draper of course extended to the Middle Ages. In the same sentence that he claimed everyone knew the sphericity of the planet, he said that the dominant scholasticism of the universities rejected it. "The writings of the Mohammedan astronomers and philosophers had given currency to that doctrine [of a spherical earth] throughout western Europe, but, as might be expected, it was received with disfavor by theologians. Draper did not explain how, if the scholastics, the intellectual leaders of the time, had rejected it, it could have been generally received. He said that Columbus was attacked at Salamanca by fanatical pedants led by the alleged "Grand Cardinal of Spain," hurling arguments drawn from "St. Chrysostom and St. Augustine, St. Jer-

ome . . . St. Basil and St. Ambrose." Draper's Conflict was the best selling volume of the International Scientific Series; in the United States it had fifty printings in fifty years, in the United Kingdom twenty-one in fifteen years; and it was translated worldwide.

Draper might not have been so successful had it not been for the emergence of the controversy over evolution and the "descent of man." This controversy seemed to Draper and his colleagues to be another major battle in the supposedly ancient "war between religion and science." The symbolic beginning of this battle was the confrontation in 1860 between Wilberforce and Huxley. For nearly a century the hostilities continued, and Draper's military metaphor took hold in the popular imagination. Christian extremists insisted that Biblical texts that were intended as myth or poetry be taken as science. Polemicists on the "science" side oddly agreed with the religious extremists that the Biblical texts were intended as science, but used this argument to declare the Bible to be bad science. Neither side grasped that religion and natural science were simply two different ways of thinking, two epistemological "languages" that could not readily be translated into one another.

Zealous in protecting biological and geographical facts, the progressivist warriors projected their own methodological error onto the fathers and scholastics, blaming them for suppressing truth in order to support a dogmatic system. The progressivists in the trenches drew upon Draper in their schoolbooks:

The sphericity of the earth was a doctrine held by many at that day [Columbus's]; but the theory was not in harmony with the religious ideas of the time, and so it was not prudent for one to publish openly one's belief in the notion.

In higher academic ranks Draper's flag was carried deeper into enemy territory by Andrew Dickson White (1832-1918). Like Draper, White rebelled against his upbringing. His family
were high-church Episcopalians who sent him to a religious boarding school that he hated. When he rose to educational prominence, he faced down strong religious opposition in founding Cornell University (1868) as the first determinedly and explicitly secular university in the United States. He became president of Cornell at the age of 33. Whereas Draper's animosity was focused on Catholics, White's ire was turned against Protestants as well, for it was Protestants who obstructed his work as president of the university. White was also troubled by the virulence of American anticatholicism as symbolized by the Ku Klux Klan, and he understood that it was artificial historically to separate Catholics from Christianity in general.

On December 18, 1869, White delivered a fiery sermon in defense of science against the anti-Darwinists, a lecture published in full in the *New York Daily Tribune* the following day. Widely publicized, this material appeared in 1876 in articles in the United Kingdom and the United States (including *Popular Science*), and as a pamphlet, under the title "The Warfare of Science," primarily aimed at pious New Yorkers opposing the creation of a secular university at Cornell. White gradually "narrowed the focus of his attack: from 'religion' in 1869, to 'eclesiasticism' in 1876, when he published a little book entitled *The Warfare of Science*, and finally to 'dogmatic theology' in 1896, when he brought out his fully documented, two-volume *History of the Warfare of Science with Theology in Christendom*." By 1896 he had shifted his views to recognize the value of religion, as opposed to theology, which, he said, "smothered" truth.  

It is only just to make a distinction here between the religious and the theological spirit . . . that tendency to dogmatism which has shown itself in all ages the deadly foe not only of scientific inquiry but of the higher religious spirit itself.  

White's efforts to construct a new Christianity based on that "higher religious spirit" were doomed, for scientific realists insisted that all truth was scientific and that there was no room for revelation, while traditional Christians insisted that if Scripture and tradition were dismissed, Christianity was left with no intellectual basis. By the time White reinforced Draper and Whewell, the Flat Error had grown to a stature that entirely dwarfed the historical reality.

Scientific realists saw the Flat Error as a powerful weapon. If Christians had for centuries insisted that the earth was flat against clear and available evidence, they must be not only enemies of scientific truth, but contemptible and pitiful enemies. The Error, which had existed in seed from the time of Copernicus and had been planted by Irving and LeJeanne in the nineteenth century (see chapter 4), was now watered by the progressivists into lush and tangled undergrowth. The Error was thus subsumed in a much larger controversy—the alleged war between science and religion.

Meanwhile the nature of progressivism had changed. After about 1870, Enlightenment "secular humanism" was gradually replaced by pragmatism, especially as put forward by William James. Although Enlightenment rationalism differed strongly from Christian rationalism, both shared the belief that the use of reason could lead us to, or at least toward, the truth. Pragmatism was a radical break with the rational tradition. It was no longer truth that was sought but "what worked" in a given problem or field. The result was a movement toward solipsism, subjectivism, and relativism. True relativism is compatible with "progress" in the solving of certain individual problems defined within the parameters of a "game," but it is entirely incompatible with the idea of progress in general, because by definition there is no universal goal—truth or otherwise. Oddly, pragmatism nonetheless became linked with progressivism in that it emphasized survival value of the "best" of what we have. The problem was that there was no standard by which "better" or "worse" could be measured. Later, existentialism would try to build human standards from scratch, but the legacy of pragmatism remained strong. In the late nineteenth century and early twentieth century the prevalence of pragmatism predi-
posed people even more strongly to the notion that medieval, Christian, or other noncurrent-Western views were unworthy of consideration.

White attacked the fathers, although with greater restraint than his predecessors. A scholar where Draper had been a propagandist, White knew that the fathers as a whole approved of sphericity, but his thesis pushed him to minimize this fact: "A few of the larger-minded fathers of the Church . . . were willing to accept this view, but the majority of them took fright at once." He went on to misrepresent St. Basil and St. John Chrysostom as flat-earthers, apparently because he did not read them. He cited as sources only secondary writers who shared his opinions: Kretschmer, Draper, and of course Whewell. The curious result is that White and his colleagues ended by doing what they accused the fathers of, namely, creating a body of false knowledge by consulting one another instead of the evidence. Thus White continues:

[The fathers] were not content with merely opposing what they stigmatized as an old heathen theory; they drew from their Bibles a new Christian theory, to which one Church authority added one idea and another, until it was fully developed. 124

In fact, as two distinguished current historians of science observe, "The notion that any serious Christian thinker would even have attempted to formulate a world view from the Bible alone is ludicrous." 125

In defense of what he already assumed to be true, White proceeded illogically:

As to the movement of the sun, there was a citation of various passages in Genesis, mixed with metaphysics in various proportions, and this was thought to give ample proofs that the earth could not be a sphere. 126

White presented Cosmas Indicopleustes as typical and influential. During the Middle Ages "some of the foremost men in the Church devoted themselves to buttressing [Cosmas] with new texts and throwing about it new networks of theological reasoning." He also lambasted Lactantius, declaring him typical of the "great majority of the early fathers of the Church." Unlike Draper he admitted that Clement of Alexandria, Origen, Ambrose, and Augustine knew about the round earth and that Isidore of Seville in the seventh century and Bede in the eighth defended it, but then he made the odd statement that they went against the dominant theology of a flat earth. Like Draper, White did not explain how Origen and Augustine, two of the most influential fathers, and Isidore and Bede, the two most influential early medieval writers, could be said to be against the "dominant theology" of Lactantius, condemned as a heretic, and of Cosmas, unread and ignored.

White wrote that for the later Middle Ages, "eminent authorities . . . like Albert the Great, St. Thomas Aquinas, Dante, and Vincent of Beauvais, felt obliged to accept the doctrine of the earth's sphericity." White acknowledged the truth that everyone but a few strange people accepted it, yet continued the rhetorical tradition that these were brave individuals struggling against a reactionary flat-earth dogmatism. White said, for example, that Gerbert and Roger Bacon had come close to calculating the circumference of the planet correctly—but that their reward was to be considered sorcerers. 127

White's Columbus was the brave navigator "at war" with ignorant theologians:

The warfare of Columbus the world knows well: how the Bishop of Ceuta worsted him in Portugal; how sundry wise men of Spain confronted him with the usual quotations from the Psalms, from St. Paul, and from St. Augustine; how, even after he was triumphant, and after his voyage had greatly strengthened the theory of the earth's sphericity . . . the Church by its highest authority
solemnly stumbled and persisted in going astray. . . . In 1519
science gains a crushing victory. Magellan makes his famous voy-
age. . . . Yet even this does not end the war. Many conscien
tious men oppose the doctrine for two hundred years longer.128

White's thesis depicted a warfare "with battles fiercer, with
sieges more persistent, with strategy more vigorous than in any
of the comparatively petty warfares of Alexander, or Caesar, or
Napoleon." The rhetoric "captured the imagination of genera-
tions of readers, and his copious references, still impressive,
have given his work the appearance of sound scholarship, be-
dazzling even twentieth-century historians who should know
better."129 Many authors great and small have followed the Drap-
er-White line down to the present. The educated public, see-
ing so many eminent scientists, philosophers, and scholars in
agreement, concluded that they must be right.

In fact, the reason they were in agreement is that they imi-
tated one another. Some historians resisted the warfare idea,
and some modern defenders have even gone so far as to argue
that science could not have developed without the aiding hand
of Christian theology. The reality is that "historical investiga-
tion to date has revealed a rich and varied interaction between
science and Christianity."130 Many other historians, however,
acquiesced in flattening the medieval earth.131

The war continued into the twentieth century in Europe and
especially in the United States, where Fundamentalism posed a
real threat to the theory of evolution. In Germany, Sigmund
Günther on the eve of World War I was still denouncing medi-
 eval flat-earth biblical literalism.132 As late as 1974 J. H. Parry,
with no sense of anachronism, transferred both the name and
the attitude of American preachers into thirteenth-century phi-
osophers, "the flat-earth fundamentalists."133 And in 1927 Ship-
 pley declared:

More than twenty-five millions of men and women, with ballot
in hand, have declared war on modern science. Ostensibly a "war
on the teaching of evolution in our tax-supported schools," the
real issue is much broader and deeper, much more comprehen-
sive in its scope. The deplorable fact must be recognized that in
the United States to-day there exist, side by side, two opposing
cultures, one or the other of which must eventually dominate our
public institutions, political, legal, educational, and social. On
the one side we see arrayed the forces of progress and enlighten-
ment, on the other the forces of reaction, the apostles of tradi-
tionalism. There can be no compromise between these
diametrically opposed armies. If the self-styled Fundamentalists
can gain control over our state and national governments—
which is one of their avowed objectives—much of the best that
has been gained in American culture will be suppressed or
banned, and we shall be headed backwards to the pall of a new
Dark Age.134

Long after evolution ceased to be a central issue for society as
a whole, the metaphor of warfare continued, with its implica-
tion that Christianity must have opposed the spherical earth.
The Flat Error must be true, it appears, because it fits modern
preconceptions about the Middle Ages. Thus, in 1986, William
O'Neil wrote of the fathers:

Without differentiating amongst the details of their several views
it may be said that they rejected the Hellenistic notion of the
sphericity of the Earth and of the universe in favour of a layered,
flat, square scheme as suggested in Genesis. Indeed to varying
degrees they tended to support the view that the Mosaic Taber-
nacle represented the shape of the universe. . . . Compromise
. . . went further and further as the medieval centuries passed.135

The standard, conventional wisdom lay behind Boorstin's as-
sumptions. He and his audience took the Error for granted.
Boorstin's chapter 13, "The Prison of Christian Dogma," ex-
plains that Christians exerted "amnesiac effort to ignore the
growing mass of knowledge [about sphericity] and retreat into
Chapter 14, "A Flat Earth Returns," paints a picture of sinister ecclesiastical authority enforcing flatness. "To avoid heretical possibilities, faithful Christians preferred to believe there could be no Antipodes, or even, if necessary, that the earth was no sphere. Saint Augustine, too, was explicit and dogmatic." Cosmas occupies two full pages of the book, and "after Cosmas came a legion of Christian geographers each offering his own variant on the Scriptural plan."

By Boorstin’s time, the Error had been so firmly established that it was easier to lie back and believe it: easier not to check the sources; easier to fit the consensus; easier to fit the preconceived worldview; easier to avoid the discipline needed in order to dislodge a firmly held error. Religion and science had not been at war until the Draper-White thesis made them so; but the result of the "war" was that "religion" lost, because of the process . . . (of which we know next to nothing) by which ideas cease to hold the attention owing to some contagion of discredit or tedium . . . a vague suspicion that science had got the better of it. . . . The logical outcome of the controversy might amount to very little alongside the fatigue of seeing it through to a conclusion.

Boorstin’s bibliography indicates that he obtained his ideas not in the sources, but in the works of early twentieth-century historians of geography who rallied to the Draper-White flag. Among these were James Simpson, John Wright, and George Kimble. Simpson, writing in 1925, imposed a flat earth on the fathers, yet admitted that Lactantius is always trotted out as the whipping boy and commented that it is "simply a mistake to consider him in any way as representative of the recognized theological thought and attitude of mind of his day." John Kirtland Wright, who published a thorough book in 1925 on the state of European geography at the time of the crusades, maintained that "on [Isaiah 40] and other scraps even less de-
Notes

6. For example, since 1900: An Anonymous Introductory History of the United States (Sacramento, Calif., 1900), 2; Calista McCabe Court enay, Christopher Columbus (New York, 1917), 6; José Forgione, History of the United States (Moscow, 1934), 127; Carlos Cánepa, Historia de la gran familia humana (Buenos Aires, 1937), 147; Ramon Peyton Coffman and Nathan G. Goodman, Famous Explorers for Boys and Girls (New York, 1942), 21; Encyclopedia Britannica, ed. (London, Chicago, and New York, 1947), vol. 6, 79; and vol. 10, 146; Alberta Powell Graham, Christopher Columbus, Discoverer (New York, 1950), 21; Ingridel and Edgar Parin d'Aulaire, Columbus (New York, 1955), 7; Bernardine Bailey, Christopher Columbus: Sailor and Dreamer (Boston, 1960), 44; The American People: A History (Arlington Heights, Ill., 1981).

7. America Past and Present (Scott Foreman, 1983), 98.

8. We the People (Heath, 1982), 28-29.


11. School texts presenting correct accounts include American History (Allyn and Bacon, 1983), 24; United States History (Addison-Wesley, 1986), 13; The Rise of the American Nation (Harcourt Brace Jovanovich, 1982), 12; American Adventures (Steck-Vaughan, 1987), 16. Encyclopedias presenting the correct account include The New Encyclopedia Britannica (1985); Collier's Encyclopedia (1984); The Encyclopedia Americana (1987); and The World Book for Children (1989), which says, bluntly but rightly: "Columbus was not trying to prove the world was round, as so often has been said. He didn't have to."


13. Ibid., 109.


17. Latin was the language of scholarship in Western Europe for the first seventeen centuries of our era. The ancient and medieval meanings of the key Latin words are ambiguous: orbis or orbis terrarum ("orb" or "orb of lands") could mean round in the full sense or merely circular (modern languages are also ambiguous, as in the English "round table"). Rotundus, too, may mean spherical or merely circular: it derives from rota, a wheel. The words globus and sphera are sharper. A globus is sometimes an undifferentiated mass—a "glob"—but more often a ball, sphere, or orbit, and a sphera is a ball or globe in addition to being a perfect geometrical figure.


20. Columbus used a 1485 Latin translation of The Book of Marco Polo, an Italian translation of Pliny’s Natural History printed in 1489, Pierre d’Ailly’s Imago mundi published between 1460 and 1483, and a 1477 edition of Aeneas Silvius Piccolomini’s Historia rerum ubique gestarum. Morison, Admiral, 92.

21. Ferdinand Columbus, The Life of the Admiral, chapters 6-7.

22. See Fidel Fernandez, Fray Hernando de Talavera: Confesor de los reyes catolicos y primer arzobispo de Granada (Madrid, 1942).

23. This objection may derive from “Sir John Mandeville” in the fourteenth century, who wrote of traveling “up” or “down” the sphere: see chapter three.

24. Morison, Admiral, 97-98. Heers, Christophe Colomb, 190-91, offers a detailed refutation of the picture of the young hero facing the ignorat council. Heers makes an interesting suggestion: Irving may have been reading the Galileo case into that of Columbus.

25. Modern geographers know, but navigators then did not, that the earth is slightly larger East-West than North-South; in any event the difference is inconsiderable for navigational purposes. Not until the mid-eighteenth century was closer to the mark than Ptolemy. Marinus (c. A.D. 140) was an older contemporary of Ptolemy.

26. It also extended from 63 degrees North to 16 degrees South.

27. D’Ailly followed Marinus in his Cosmographiae tractatus. By modern calculations, Ptolemy’s oikoumene, from the tip of Iberia to the tip of Siberia, spans about 200 degrees, so Marinus was in fact closer to the mark than Ptolemy. Marinus (c. A.D. 140) was an older contemporary of Ptolemy.

28. Columbus was influenced by his reading of the apocryphal book 4 Esdras (or 2 Esdras in most editions of the apocrypha) 6:42 to believe that the earth was six-sevenths land. Morison, Admiral, 71.

29. Alfragano’s Elementa astronomica were translated from Arabic into Latin by Gerard of Cremona and Joannes Hispalensis in the twelfth century.

30. Morison gives a clear account of the politics and preparations in Admiral, 79-149.

31. Astronomers such as Georg Peurbach (1423-1461) and Regiomontanus (Johannes Muller, 1436-1476), assumed it. Authors of works on the sphere include Henry of Simbergh, Conrad de Monte Puellarum, Dominic de Chivasso, Andalo di Negro, Nicholas Oresme, and Pierre D’Ailly. The “Geography,” (Cosmographia) of Ptolemy was translated into Latin from Greek in 1410 by Jacopo d’Angelo. Aeneas Silvius Piccolomini (1405-1464) used it in his Historia rerum ubique gestarum. Aristotle’s treatises “On the Heavens” and “Metaphysics” were translated in the twelfth and thirteenth centuries.

32. D’Ailly completed his Imago mundi about 1410 and later composed a Compendium cosmographiae summarizing Ptolemy’s geography. Edmond Buron, Imago mundi de Pierre d’Ailly (Paris, 1930). Columbus’s own copy of D’Ailly is densely annotated.

33. Edward Grant, Physical Science in the Middle Ages (New York, 1971), 61. In 1496 Lilio published a strange book containing treatises on the wretchedness of the human lot, the nature of the winds, the life of Charlemagne, and the antipodes. Zacharia Lilio, In hac volumine continentur hi libri Zachariae Lili. Primus liber: De origine et laudibus scientiarum; secundus liber: Contra Antipodas; tertius liber: De miseria hominis et contemptu mundi; quartus liber: De generibus ventorum; quintus liber: Vita Caroli Magni (Florence, impressum per F. Bonacursum, in quarto, 1496). See Randles, De la terre plate au globe terrestre, 31. A perusal of the original text indicates Lilio’s confusion, for he cites Ptolemy’s measurement of the known world against the “roundness” of the earth. Alonso Tostado Ribera (d. 1455), “Commentaria in Genesim,” in Opera omnia may be another anomaly.


35. Jean Buridan, Quaestiones super libris quattuor de caelo et mundo, ed. E. A. Moody (Cambridge, Mass., 1942), 159. See Edward Grant, “Cosmology,” in Science in the Middle Ages, ed. David Lindberg (Chicago, 1978), 284-91; Randles, De la terre plate au globe terrestre, 43. Randles offers the hypothesis that the disc-shaped medieval maps offer a roughly accurate picture of a small, flat oikoumene perched atop a globe of water, and indeed this fits the apparent view of writers such as Dicuil, who measured the length and breadth of a flat known world without attempting any spherical projection. Nicole Oresme, Le livre du ciel et du monde, ed. A. D. Menut and A. J. Denomy (Madison, 1968), 563-65.

"Pour quoy on peut (331) appercevoit que la terre et la mer sont de ronde fournee; car la partie du firmament appartient a un pays qui ne appartient point a autre. Et ce peut-on appercevoit par experience et subtile indication, que se on trouvoit passage de nef et gens qui voussissent aler et chercher le monde, on pourroit aler a nauie tout entour le monde, et desseure et dessoubz. . . . (334): Il semble aux simples gens que on ne pourroit aler dessous la terre et que on devoit chéoir vers le ciel, quant on seroit dessous la terre. Mais ce ne pourroit estre, neant plus que nous pourrions chéoir vers le ciel de la terre ou nous sommes." (For this reason one can understand that the land and the sea are round in form, for the part of the sky that is over one country is not the same as that over another. And one can know this through experience and clever reasoning, for if one found a ship and sailors who wanted to go and see the world, one could go on a vessel all around the world, and above it and below it. It seems to simple people that one could not go below and that one would fall off towards the sky there. But that could not be, any more than we can fall off the earth into the sky from the part of the earth that we dwell in.)


40. Tattersall, "Sphere or Disc?" 46.


44. Compare a modern map of "the polar regions."

45. Von den Brincken, "Die Kugelgestalt der Erde in der Kartographie des Mittelalters," 85, estimates that 99 of 636 maps she surveyed were efforts at projection.

46. Ezekiel 5:5: "I have set the city of Jerusalem in the midst of the nations and their peoples."


48. See Lynn Thorndike, ed. and trans., *Joannes de Sacrobosco: The Sphere of Sacrobosco and Its Commentators* (Chicago, 1949), 81-83 and 120, and the commentaries by Michael Scot (294-95) and Cecco d'Ascoli (366-67). Sacrobosco, 81: "Quod terra etiam sit rotunda sic patet (Thas it is clear that the earth is round.)" Sacrobosco received commentaries from Michael Scot, Robert the Englishman, and Cecco
d'Ascoli. Campanus of Novara's *Theorica planetarum* (about 1260) was more advanced and detailed.

49. Notable are Thabit ibn Qurra (827–901), al-Biruni (973–1048), al-Kindi (d. 1266), and al-Farghani (800–870). These were translated into Latin in the twelfth century. The Arabs had translated Ptolemy's *Almagest* (its Arabic name) into Arabic in the ninth century.


52. Martianus, *Martianus Capella* 220–24: "non planam . . . neque concavam . . . sed rotundam, globosam etiam." Macrobius, like Crates, believed that the inhabited world was a small island on a vast globe of sea.

53. Isidore used the term *globus* for the moon and planets; he spoke of the axis of the celestial sphere. See Isidore, *Etymologies*: 3:27–53; 13:1–6; 14:1–2. Book 3:40–41 is very confused, and 3:47 makes the perverse observation that the sun rises in the east at the same time as it rises in the west. In his *De natura rerum*, ed. Jacques Fontaine, *Isidore de Seville: Traité de la nature* (Bordeaux, 1960), chapter 16 duplicates this error, but chapter 28 says, to the contrary, that the sun orbits the earth and illumines the other side when it is night on this side. In chapter 48 Isidore estimates the circumference of the earth at 80,000 stadia (see also chapters 10–14; 45). *Etymologies* 3:32 and 14:1 affirm that the sphere of the sky is round with the earth at its center, the sky being equally distant from the earth on all sides. See Olaf Pedersen, "Astronomy," in Lindberg, *Science*, 307; Woodward in *The History of Cartography*, Harley and Woodward, 320: "Despite Isidore's apparent confusion . . . the evidence appears to confirm that he thought the earth, like the universe, was a sphere."


55. Bede, *De natura rerum*, chapters 3, 5, 6–10, 36–39, 46: "We call the earth a globe, not as if the shape of a sphere were expressed in the diversity of plains and mountains, but because, if all things are included in the outline, the earth's circumference will represent the figure of a perfect globe" (46). Bede, *Beatus opera de temporibus*, ed. C. W. Jones (Cambridge, Mass., 1943), chapter 32: "Causa autem inaequalitatis corundem dierum terrae rotunditas est; neque enim frustra et in scripturae divinae et in communium litterarum paginis orbis terrae vocatur. Est enim re vera orbis idem in medio totius mundi inferior sit, non in latitudinis solum sed instar pocus pilae undeque versus equuli rotundate persimilis."

(The cause of the inequality of the length of days is that the earth is round, and it is not in vain that both in the bible and pagan literature it is called the "orb of lands." For truly it is an orb placed in the center of the universe; in its width it is like a circle, and not circular like a shield but rather like a ball, and it extends from its center with perfect roundness on all sides.) A much later compatriot of Bede's, the monk Byrhtferth of Ramsey abbey in the eleventh century, upheld the idea in his *Manus*, ed. EETS 177 (1929): 80–81, 124–25. Eriugena, *Periphrasis*, trans. I. P. Sheldon-Williams, Rev. John O'Meara (Montreal, 1987), 347–53. Eriugena describes how the Greek Eratosthenes had calculated the circumference of the globe.

56. Raban Maur, *De universo* (MPL 111: 332–33). His *Liber de computo* (MPL 107) is clearer: in chapters 46–50 he uses terms such as
globo terrae and globo terrarum. Gerbert (Pope Sylvester II, 945–1003), Liber de astralibae in Opera mathematica, ed. Nicholas Bulbul (Berlin, 1899); Gerbert was influenced by Martianus Capella. Dicuil (9th century), Liber de mensura orbis terrae, ed. J. J. Tierney (Dublin, 1967), measures the length and breadth of a flat orbis terrae but clearly refers to the oikoumenë ("Europa, Asia, Libya"). Alcuin made no explicit statement on the topic but regarded Pliny and Bede as authorities.


58. The „literal” interpretation of the Bible is much spoken of and little understood. Since any text can be (and is inevitably) read in a variety of ways, the only useful sense of „literal” is the original intent of the author, which is often difficult to discern. Even the most avid „literalists,” however, must see the difference between poetic and historical statements.

59. See also Deuteronomy 5:8; 13:7; 28:64; 33:17; 1 Samuel 2:10; Psalms 48:10; 61:2; 66:5; 88(89):11–12; 98:3; 103(104):3; 135; Proverbs 17:24; 30:4; Isaiah 5:2; 11:2; Jeremiah 25:3; Job 37:3; Ezekiel 7:2; Revelation 7:1; 19:8. Most of these have to do with „quarters” of the earth (which can be understood in either flat or round terms) or „ends” of the earth, the kind of passages that Augustine took metaphorically. For example Proverbs 30:4, speaking of God, says, „Who has mounted to the heavens, then descended? who has gathered the wind in the clasp of his hand? who has wrapped the waters round him?” How can one insist that this means that the earth physically has „ends” without mistaking that God wraps the ocean in a physical cloak?

60. Isaiah 40:22. The Greek uses the term ho ginos for the earth, which more likely means „circle” than „sphere,” and says that God hos stasas hos kamaran ton ouranou, kai dieutanas hos skenen katoikein; the Vulgate renders this as Qui sedet super gyrum terrae . . . qui extendit velut nihilum coelos, et expandid eos sicut tabernaculum ad inhabitandum (He who sits above the circle of the earth, who extends the skies as a void and expands them like a tent for us to inhabit.); Job 22:14; Amos 9:6; Psalm 104:2.


NOTES


67. W. M. O’Neil, Early Astronomy from Babylonia to Copernicus (Sydney, 1986).


69. Ibid., 72–198; Thomas S. Kuhn, The Copernican Revolution (Cambridge, Mass., 1957), 26–83; Heracleides of Pontus also suggested that the apparent motion of the stars was caused by the actual rotation of the earth, and Aristarchus argued for a heliocentric universe. See also van Helden, Measuring the Universe, 4–13 and Harold P. Nebelsick, Circles of God: Theology and Science from the Greeks to Copernicus (Edinburgh, 1985), 9–51.

70. Kuhn, The Copernican Revolution, 85.


72. Ibid., 157.

73. On Crates, Hipparchus, Theodosius of Bithynia (c. 150–70 b.c.), Poseidonis (c. 135–50 b.c.), Geminus of Rhodes (c. 70 b.c.), Strabo, and Marinus of Tyre (c. A.D. 100) see The History of Cartography, Harley and Woodward, 161–255. Harley, 174: Strabo knew from Eratosthenes how to project a sphere upon a plane surface.


75. Pomponius Mela, De situ orbis libri tres, 3 vols. (Leipzig,
1806–1807), 1:1. De situ orbis speaks of the “antichthones” who live opposite us; we cannot get to them because the torrid zone south of the equator is too hot.
76. Boorstin, The Discoverers, 102.
77. Jan Ryder helped both in identifying some of the modern proponents of the Error and later in reading over the whole manuscript; I am greatly in her debt.
78. Boorstin, The Discoverers, 146–49.
79. Andrew Dickson White, A History of the Warfare of Science with Theology in Christendom, 2 vols. (New York, 1896), 1:97. The only sense to be made out of the opening into hell is the legend that (because of its intense volcanic activity) the area around Iceland opened into the underworld. It is also true that the Greeks and the Romans feared the seas beyond the Straits of Gibraltar owing to the vastness and bad climate of the Atlantic, so that it had a fearsomely ominous aura to it. Nonetheless, the numinous power of the Ocean did not prevent ancient Greeks, Phoenicians, and Romans, as well as their medieval successors, from plying the western coasts of Europe for trade.
82. M. F. Thalheimer, The Ecclesiastical History of the United States (Cincinnati, 1881), 23.
84. The Cubberley Library in the Stanford University School of Education houses a collection of old textbooks; I checked all that were relevant and found that a large number of texts before 1870 do not even allude to the controversy; after 1880 most make the flat-earth accusation. Monsieur Campe, La découverte de l’Amérique: Pour l’instruction et l’amusement des jeunes gens (Geneva, 1798; Brunswick, 1811) suggests that the question arose at the time of Columbus; C. O. Barbaroux, L’histoire des États-unis de l’Amérique (Boston, 1832): no mention; Joseph E. Worchester, Elements of History (Boston, 1850): the question arose, and “Columbus had more correct ideas of the figure of the earth than were common in his time;” Jacob Abbott, American History (New York, 1860–1865): no mention; G. P. Quackenbos, Illustrated School History of the United States of America (New York, 1872): “The geographical researches of Columbus had convinced him that the earth was round;” Edward A. Freeman, Outlines of History (New York, 1873) skirts the issue; A Primary History of the United States (New York, 1885, anon.): people thought Columbus was crazy, but the enlightened Queen Isabella believed him [the same enlightened Queen Isabella that established the Spanish Inquisition!]; Thomas Wentworth Higgins, Young Folks’ History of the United States (London and New York, 1898): “Most persons” believed the earth was flat. Dates of other texts making no mention: 1828, 1832, 1855, 1866, 1868, 1869.
86. Herder (1744–1803) and Goethe (1749–1832), among other popular and influential writers, had romantically positive views of the Middle Ages.
93. Isaiah 40:22, Matthew 24:31; Revelation 7:1. On Cosmas see

95. Ibid., 2:79–80, 394–99. Apparently, Cosmas himself claims to have derived his ideas from The History of Euphorus (405–330 B.C.), a work now lost.
100. Wolska-Conus, La Topographie, 149. Underlying the philosophical difference was a political/theological animosity, because Philoponus was a Monophysite and Cosmas a Chalcedonian. John Philoponus, Against Aristotle, on the Eternity of the World, trans. Christian Wildberg (Ithaca, N.Y., 1987).
113. Ibid., xii.
114. Ibid., 62.
115. Ibid., 160.
116. The words are taken verbatim from Washington Irving, The Life and Voyages of Christopher Columbus (Boston, 1981), 46-49.
118. P.V.N. Myers, A General History for Colleges and High Schools (Boston and London, 1891), 513.
120. Lindberg and Numbers, "Beyond War and Peace," 339.
121. White, History of the Warfare, 1:113.
122. Ibid., 1:91.
123. Konrad Kretschmer, Die Entdeckung Ameriki's in ihrer Bedeutung für die Geschichte des Weltbildes (Berlin, 1892).
125. Lindberg and Numbers, "Beyond War," 342.
126. White, History of the Warfare, 1:92.
127. Ibid., 1:91-92; on Cosmas: 1:93-95; on Lactantius: 1:97; on the Middle Ages: 1:105-6; on Gerbert and Bacon: 1:110-11. It is true that legend (never theology) made Gerbert and Roger Bacon wizards, but hardly because they calculated the earth's circumference. White may have had sorcery on the brain because of the research of his assistant and collaborator George Lincoln Burr into witchcraft. But Burr's own lecture "Ante the Middle Ages," in George Lincoln Burr: His Life; Selections from his Writings, ed. Roland Bainton, 2 vols. (Ithaca, 1943), 378-96, is too careful and judicious to mention the Flat Earth.
130. Ibid., "Beyond War," 352-54.
136. Gianni Gransotto, Christopher Columbus (Garden City, N.Y., 1985), 50, offers the really idiosyncratic view that medieval people thought the sea was "infinite." Compare Harold Lamb, New Found World: How North America Was Discovered and Explored (New York, 1955), 39.
138. Ibid., 107-9.
139. Fleming, John William Draper, 131-32.
140. Boorstin, The Discoverers, 688-89.
142. Simpson, Landmarks in the Struggle, 97.
144. Kimble, Geography in the Middle Age, 19, 36.
History (New York, 1833); Henry Altemus, Christopher Columbus and the Discovery of America (Philadelphia, 1897).


147. Ibid., 3–4.

148. Irving embellished his account with pseudo-footnotes, for example p. 22, where the reference is simply “Miss. Biblioth. Ro. Fr.” a useless, untraceable reference to unspecified “manuscripts in the French royal library.” Moreover, the reference is to the adventures of a luridly fictitious “Aboul-Hassan-Aly” Nancy Partner, Making Up Lost Time: Writing on the Writing of History, Speculum 61 (1986): 90–117, demonstrates that there is no clear borderline between history and fiction. All fiction is about real human beings in at least the sense that it draws upon the author’s experience of humans, and all history involves creative acts of organisation, choice of point of view, choice of sources, and human empathy as well as literary composition. Honesty and respect for one’s audience demand only that the author be frank about his intention and his assumptions.

149. Irving, Columbus, 47–51.


152. Gonzalo Fernandez de Oviedo y Valdes, Historia general y natural de las Indias, 4 vols. (Madrid, 1851–1855) 1:18–20; Irving cites book 2, chapter 4. Ferdinand Columbus, The Life of the Admiral, chapters 6–7. Antonio de Remesal, Historia general de las Indias occidentales y particular de la gobernacion de Chiapa y Guatemala (Madrid, 1619); Bartolomé de las Casas, Historia de las Indias, 3 vols. (Madrid, 1927), History of the Indies ed. and trans. Andrée Collard (New York, 1971). The original is: “Como todo el agua y la tierra del mundo constituyen una esfera y, por consiguiente, sea redondo, consideró Cristóbal Colón ser posible rodearse de Oriente a Occidente” (Since all the water and land of the earth constitute a sphere and consequently are round, Christopher Columbus considered it possible to travel east to west.) Irving also used Antonio de Herrera, The General History of America, trans. John Stevens (London, 1725–1726) and Juan B. Muñoz, Historia del Nuevo-Mundo (Madrid, 1793). On Irving’s use of the sources on Salamanca, see Madariaga, Vida del muy magnifico, 215–16.

171. Antoine-Jean Leprone, Matières pour servir à l'histoire du christianisme (Paris, 1833); Examen critique de la découverte du cœur de Saint Louis faite à la Sainte Chapelle le 15 mai 1843 (Paris, 1844).


176. Edward Gibbon, The Decline and Fall of the Roman Empire, 6 vols. (Boston, 1854), chapter 40, 4:73; Thomas Paine (1737-1809), The Age of Reason (London, 1794), 493-94.


185. Copernicus, De revolutionibus, 2:5. Copernicus's own prefase must not be confused with the foreword written by the Protestant divine Andreas Osiander (1498-1552). Osiander, apparently trying to smooth the way for Copernicus's reception, firmly took the position that Copernicus was writing to save the appearances rather than claiming to find the Truth through science. Osiander may have distorted Copernicus's own position in this, and Galileo's followers found his words offensive: "For these hypotheses need not be true or even probable." As John Dillenberger glosses, "It is enough if they provide a calculus which fits the observations." Many modern philosophers of science would tend to agree with Osiander. See John Dillenberger, Protestant Thought and Natural Science: A Historical Interpretation (New York, 1960), 42. From the other side, the papacy found the whole discussion of Lactantius offensive, and the Sacred Congregation of the Index ordered it stricken from the book; however, the first three editions of the book were issued before the order (issued March 5, 1616) could take effect.

186. The best treatment of the ideas of "Renaissance" and "Middle Ages" remains Wallace K. Ferguson, The Renaissance in Historical Thought: Five Centuries of Interpretation (Cambridge, Mass., 1948); See


189. An exception was Flavio Biondo, who wrote a history of the decline of Rome from the fifth century to his own day (c. 1450); the exception proves the point: Biondo could see the period only as one of decline. Biondo's work was a direct precedent for Gibbon's *Decline and Fall of the Roman Empire* (London, 1788). Ferguson, *Renaissance in Historical Thought*, 11-12.


191. Ferguson, *Renaissance in Historical Thought*, 74-76. Terms used included *media tempestas, medium aevum, media aetas*. Christoph Keller (Cellarius) was a Protestant professor of history at Halle. *Historia mediæ aevi a temporibus Constantini Magni ad Constantinopolin a Turcia captam deducta* (Zeitl, 1688).

192. The system of dating B.C. and A.D. was invented by Denis Petain, a French Jesuit, in 1627, and the system caught on as early as 1650.


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One of the earliest portraits of Columbus.
Portrait of Queen Isabella. Ceded and authorized by the Patrimonio Nacional de España.
A modern Mercator projection map. A future historian would be unjustified in concluding from this flat map that twentieth-century people believed in a flat earth.

Medieval cartography: Rhumb line centers from a 1449 map by Petrus Roselli. By permission of the Badische Landesbibliothek, Karlsruhe.

The Farnese Atlas: the ancient god holds the spherical world on his shoulders. By permission of Museo Nazionale Archeologico di Napoli.
Spheres of earth and water. By permission of W.G.L. Randles.

Portrait of Galileo.

Portrait of Copernicus.
Portrait of Petrarch. By permission of Case Western University.

Portrait of Voltaire.
Portrait of Andrew Dickson White. By permission of the Department of Manuscripts and University Archives, Cornell University Library.

Portrait of St. Isidore. By permission of Jacques Fontaine.
The schoolbooks followed the scholars in shifting toward the Flat Error in the late nineteenth century. One reason was the mounting debate over evolution. Another was the prestige of the classics, which produced a number of books extolling the legacy of Greece and Rome, books that contrasted the broad, sunlit uplands of the ancient world with the stinking alleyways of the Middle Ages. Another—in the United States—was a chauvinism that wanted to believe that before the dawn of America broke the world had been in darkness. Columbus’s first voyage, for American patriots, was rather like a new day of creation in the freshness of Eden.

Yet another reason was the influence of the most dramatic perpetrator of the Flat Error, Washington Irving (1783-1859), whose romantic tale of Columbus the hero swayed all before him. A textbook by John J. Anderson written in 1880 merely stated that Columbus “believed the earth to be round,” but by 1898 Anderson added the scene where Columbus confronts the benighted “wise men” who quote Lactantius at him: “Is there anyone so foolish as to believe that there are people living on the other side of the earth with their heels upward and their heads hanging down?” The wording is not from the sources but is a paraphrase, almost a direct quote, from Irving. Anderson concluded that the wise men believed “that the earth was flat like a plate.”145
