
El Patrocinio
de Guadalupe

CHAPTER SIXTEEN

Religion and Science

1450–1750

Nigerian pastor Daniel Ajayi-Adeniran is a missionary... to the United States.... with his mission field in the Bronx. The church he represents, the Redeemed Christian Church of God, began in Nigeria in 1952. It has acquired millions of members in Nigeria and boasts a missionary network with a presence in 100 countries. According to its leader, the church was "made in heaven, assembled in Nigeria, exported to the world." And the Redeemed Church of God is not alone. As secularism and materialism born of the Scientific Revolution and modern life have eroded religious faith in the West, many believers in Asia, Africa, and Latin America have felt called to reinvigorate Christianity in Europe and North America. In a remarkable reversal of an earlier pattern, they now seek to "reevangelize" the West, from which they originally received the faith. After all, more than 60 percent of the world's professing Christians now live outside Europe and North America, and, within the United States, one in six Catholic diocesan priests and one in three seminary students are foreign-born. For example, hundreds of Filipino priests, nuns, and lay workers now serve churches in the West. "We couldn't just throw up our hands and see these churches turned into nightclubs or mosques," declared Tokunboh Adeyemo, another Nigerian church leader seeking to minister to an "increasingly godless West."[1]

THE EARLY MODERN ERA OF WORLD HISTORY gave birth to two intersecting and perhaps contradictory trends that continue to play out in the twenty-first century. The first was the spread of

The Virgin of Guadalupe: According to Mexican tradition, a dark-skinned Virgin Mary appeared to an indigenous peasant named Juan Diego in 1531, an apparition reflected in this Mexican painting from 1720. Belief in the Virgin of Guadalupe represented the incorporation of Catholicism into the emerging culture and identity of Mexico.
(National Palace Mexico City/Gianni Dagli Orti/The Art Archive)

Christianity to Asians, Africans, and Native Americans, some of whom now seem to be returning the favor. The second lay in the emergence of a modern scientific outlook, which sharply challenged Western Christianity even as it too acquired a global presence.

And so, alongside new empires and new patterns of commerce, the early modern centuries also witnessed novel cultural transformations that likewise connected distant peoples. Riding the currents of European empire building and commercial expansion, Christianity was established solidly in the Americas and the Philippines; far more modestly in Siberia, China, Japan, and India; and hardly at all within the vast and still growing domains of Islam. A cultural tradition largely limited to Europe now became a genuine world religion, spawning a multitude of cultural encounters. While this ancient faith was spreading, a new understanding of the universe and a new approach to knowledge were taking shape among European thinkers of the Scientific Revolution, giving rise to another kind of cultural encounter—that between science and religion. In some ways, science was a new and competing worldview, and for some it was almost a new religion. In time, it became a defining feature of global modernity, achieving a worldwide acceptance that exceeded that of Christianity or any other religious tradition.

Although Europeans were central players in the globalization of Christianity and the emergence of modern science, they did not act alone in the cultural transformations of the early modern era. Asian, African, and Native American peoples largely determined how Christianity would be accepted, rejected, or transformed as it entered new cultural environments. Science emerged within an international and not simply a European context, and it met varying receptions in different parts of the world. Islam continued a long pattern of religious expansion and renewal, even as Christianity began to compete with it as a world religion. Buddhism maintained its hold in much of East Asia, as did Hinduism in South Asia and numerous smaller-scale religious traditions in Africa. And Europeans themselves were certainly affected by the many "new worlds" that they now encountered. The cultural interactions of the early modern era, in short, did not take place on a one-way street.

The Globalization of Christianity

Despite its Middle Eastern origins, Christianity was largely limited to Europe at the beginning of the early modern era. In 1500, the world of Christendom stretched from Spain and England in the west to Russia in the east, with small and beleaguered communities of various kinds in Egypt, Ethiopia, southern India, and Central Asia. Internally, Christianity was seriously divided between the Roman Catholics of Western and Central Europe and the Eastern Orthodox of Eastern Europe and Russia. Externally, it was very much on the defensive against an expansive Islam. Muslims had ousted Christian Crusaders from their toeholds in the Holy Land by 1300, and with the Ottoman seizure of Constantinople in 1453, they had captured the prestigious capital of Eastern Orthodoxy. The Ottoman siege of Vienna in 1529 marked a

Muslim advance into the heart of Central Europe. Except in Spain, which had recently been reclaimed for Christendom after centuries of Muslim rule, the future, it must have seemed, lay with Islam rather than Christianity.

Western Christendom Fragmented: The Protestant Reformation

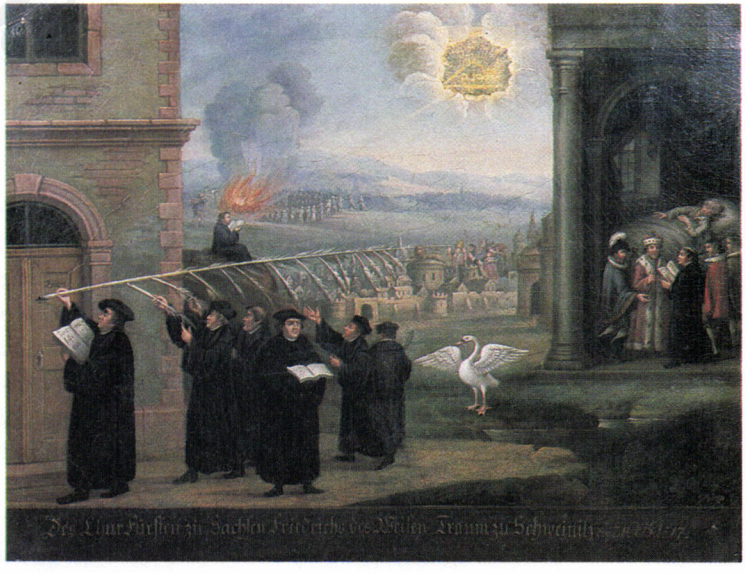
As if these were not troubles enough, in the early sixteenth century the Protestant Reformation shattered the unity of Roman Catholic Christianity, which for the previous 1,000 years had provided the cultural and organizational foundation of Western European civilization. The Reformation began in 1517 when a German priest, Martin Luther (1483–1546), publicly invited debate about various abuses within the Roman Catholic Church by issuing a document, known as the Ninety-five Theses, allegedly nailing it to the door of a church in Wittenberg. In itself, this was nothing new, for many people were critical of the luxurious life of the popes, the corruption and immorality of some clergy, the Church's selling of indulgences (said to remove the penalties for sin), and other aspects of church life and practice.

What made Luther's protest potentially revolutionary, however, was its theological basis. A troubled and brooding man who was anxious about his relationship with God, Luther recently had come to a new understanding of salvation, which held that it came through faith alone. Neither the good works of the sinner nor the sacraments of the Church had any bearing on the eternal destiny of the soul, for faith was a free gift of God, graciously granted to his needy and undeserving people. To Luther, the source of these beliefs, and of religious authority in general, was not the teaching of the Church, but the Bible alone, interpreted according to the individual's conscience. (See Document 16.1, pp. 749–51, for more of Luther's thinking.) All of this challenged the authority of the Church and called into question the special position of the clerical hierarchy and of the pope in particular. In sixteenth-century Europe, this was the stuff of revolution.

Contrary to Luther's original intentions, his ideas ultimately provoked a massive schism within the world of Catholic Christendom, for they came to express a variety of political, economic, and social tensions as well as religious differences. Some kings and princes, many of whom had long disputed the political authority of the pope, found in these ideas a justification for their own independence and an opportunity to gain the

Change

In what ways did the Protestant Reformation transform European society, culture, and politics?



The Protestant Reformation This sixteenth-century painting by the well-known German artist Lucas Cranach the Elder shows Martin Luther and his supporters using a giant quill to write their demands for religious reform on a church door. It memorializes the posting of the Ninety-five Theses in 1517, which launched the Protestant Reformation. (Dr. Henning Schleifenbaum, Siegen, Germany/Visual Connection Archive)

Snapshot Catholic/Protestant Differences in the Sixteenth Century

	Catholic	Protestant
Religious authority	Pope and church hierarchy	The Bible, as interpreted by individual Christians
Role of the pope	Ultimate authority in faith and doctrine	Denied the authority of the pope
Ordination of clergy	Apostolic succession: direct line between original apostles and all subsequently ordained clergy	Apostolic succession denied; ordination by individual congregations or denominations
Salvation	Importance of church sacraments as channels of God's grace	By faith alone; God's grace is freely and directly granted to believers
Status of Mary	Highly prominent, ranking just below Jesus; provides constant intercession for believers	Less prominent; denied Mary's intercession on behalf of the faithful
Prayer	To God, but often through or with Mary and saints	To God alone; no role for Mary and saints
Holy Communion	Transubstantiation: bread and wine become the actual body and blood of Christ	Denied transubstantiation; bread and wine have a spiritual or symbolic significance
Role of clergy	Generally celibate; sharp distinction between priests and laypeople; mediators between God and humankind	Ministers may marry; priesthood of all believers; clergy have different functions (to preach, administer sacraments) but no distinct spiritual status

lands and taxes previously held by the Church. In the Protestant idea that all vocations were of equal merit, middle-class urban dwellers found a new religious legitimacy for their growing role in society, since the Roman Catholic Church was associated in their eyes with the rural and feudal world of aristocratic privilege. For common people, who were offended by the corruption and luxurious living of some bishops, abbots, and popes, the new religious ideas served to express their opposition to the entire social order, particularly in a series of German peasant revolts in the 1520s. (See Visual Sources 16.1 and 16.2, pp. 762 and 763, for contrasting images of Protestant and Catholic churches.)

Although large numbers of women were attracted to Protestantism, Reformation teachings and practices did not offer them a substantially greater role in the church

or society. In Protestant-dominated areas, the veneration of Mary and female saints ended, leaving the male Christ figure as the sole object of worship. Protestant opposition to celibacy and monastic life closed the convents, which had offered some women an alternative to marriage. Nor were Protestants (except the Quakers) any more willing than Catholics to offer women an official role within their churches. The importance that Protestants gave to reading the Bible for oneself stimulated education and literacy for women, but given the emphasis on women as wives and mothers subject to male supervision, they had little opportunity to use that education outside of the family.

Reformation thinking spread quickly both within and beyond Germany, thanks in large measure to the recent invention of the printing press. Luther's many pamphlets and his translation of the New Testament into German were soon widely available. "God has appointed the [printing] Press to preach, whose voice the pope is never able to stop," declared one Reformation leader.[2] As the movement spread to France, Switzerland, England, and elsewhere, it also splintered, amoeba-like, into a variety of competing Protestant churches—Lutheran, Calvinist, Anglican, Quaker, Anabaptist—many of which subsequently subdivided, producing a bewildering array of Protestant denominations. Each was distinctive, but none gave allegiance to Rome or the pope.

Thus to the divided societies and the fractured political system of Europe was now added the potent brew of religious difference, operating both within and between states (see Map 16.1). For more than thirty years (1562–1598), French society was torn by violence between Catholics and the Protestant minority known as Huguenots. On a single day, August 24, 1572, Catholic mobs in Paris massacred some 3,000 Huguenots, and thousands more perished in provincial towns in the weeks that followed. Finally, a war-weary monarch, Henry IV, issued the Edict of Nantes (1598), which granted a substantial measure of religious toleration to French Protestants, though with the intention that they would soon return to the Catholic Church. The culmination of European religious conflict took shape in the Thirty Years' War (1618–1648), a Catholic–Protestant struggle that began in the Holy Roman Empire but eventually engulfed most of Europe. It was a horrendously destructive war, during which, scholars estimate, between 15 and 30 percent of the German population perished from violence, famine, or disease. Finally, the Peace of Westphalia (1648) brought the conflict to an end, with some reshuffling of boundaries and an agreement that each state was sovereign, authorized to control religious affairs within its own territory. Whatever religious unity Catholic Europe had once enjoyed was now permanently broken.

The Protestant breakaway, combined with reformist tendencies within the Catholic Church itself, provoked a Catholic Counter-Reformation. In the Council of Trent (1545–1563), Catholics clarified and reaffirmed their unique doctrines and practices, such as the authority of the pope, priestly celibacy, the veneration of saints and relics, and the importance of church tradition and good works, all of which Protestants had rejected. Moreover, they set about correcting the abuses and corruption that had

Map 16.1 Reformation Europe in the Sixteenth Century
The rise of Protestantism added yet another set of religious divisions, both within and between states, to European Christendom, which was already sharply divided between the Roman Catholic Church and the Eastern Orthodox Church.

stimulated the Protestant movement by placing a new emphasis on the education of priests and their supervision by bishops. A crackdown on dissidents included the censorship of books, fines, exile, penitence, and occasionally the burning of heretics. Renewed attention was given to individual spirituality and personal piety. New religious orders, such as the Society of Jesus (Jesuits), provided a dedicated brotherhood of priests committed to the renewal of the Catholic Church and its extension abroad.

Although the Reformation was profoundly religious, it encouraged a skeptical attitude toward authority and tradition, for it had, after all, successfully challenged the immense prestige and power of the pope and the established Church. Protestant reformers fostered religious individualism as people were now encouraged to read and interpret the scriptures for themselves and to seek salvation without the mediation of the Church. In the centuries that followed, some people turned that skepticism and the habit of thinking independently against all revealed religion. Thus the Protestant Reformation opened some space for new directions in European intellectual life.

In short, it was a more highly fragmented but also a renewed and revitalized Christianity that established itself around the world in the several centuries after 1500.

Christianity Outward Bound

Connection
How was European imperial expansion related to the spread of Christianity?

Christianity motivated European political and economic expansion and also benefited from it. The resolutely Catholic Spanish and Portuguese both viewed their movement overseas as a continuation of a long crusading tradition, which only recently had completed the liberation of their countries from Muslim control. When Vasco da Gama's small fleet landed in India in 1498, local authorities understandably asked, "What brought you hither?" The reply: they had come "in search of Christians and of spices."[3] Likewise, Columbus, upon arriving in the Americas, expressed the no doubt sincere hope that the people "might become Christians," even as he promised his Spanish patrons an abundant harvest of gold, spice, cotton, aloe wood, and slaves.[4] Neither man sensed any contradiction or hypocrisy in this blending of religious and material concerns.

If religion drove and justified European ventures abroad, it is difficult to imagine the globalization of Christianity without the support of empire. Colonial settlers and traders, of course, brought their faith with them and sought to replicate it in their newly conquered homelands. New England Puritans, for example, planted a distinctive Protestant version of Christianity in North America, with an emphasis on education, moral purity, personal conversion, civic responsibility, and little tolerance for competing expressions of the faith. They did not show much interest in converting native peoples but sought rather to push them out of their ancestral territories. It was missionaries, mostly Catholic, who actively spread the Christian message beyond European communities. Organized in missionary orders such as the Dominicans, Franciscans, and Jesuits, Portuguese missionaries took the lead in Africa and Asia, while Spanish and French missionaries were most prominent in the Americas. Missionaries of the Russian Orthodox Church likewise accompanied the expansion of the Russian Empire across Siberia, where priests and monks ministered to Russian settlers and trappers, who often donated their first sable furs to a church or monastery.

Missionaries had their greatest success in Spanish America and in the Philippines, areas that shared two critical elements beyond their colonization by Spain. Most

Japanese Christian Martyrs Christianity was beginning to take root in sixteenth-century Japan, but intensive persecution by Japanese authorities in the early seventeenth century largely ended that process. This monument was later erected in memory of twenty-six martyrs, Japanese and European alike, who were executed during this suppression of Christianity. (Photo Agency MH Martin Hladik, Photographer)

Connection

In what ways was European Christianity assimilated into the Native American cultures of Spanish America?

important, perhaps, was an overwhelming European presence, experienced variously as military conquest, colonial settlement, missionary activity, forced labor, social disruption, and disease. Surely it must have seemed as if the old gods had been bested and that any possible future lay with the powerful religion of the European invaders. A second common factor was the absence of a literate world religion in these two regions. Throughout the modern era, peoples solidly rooted in Confucian, Buddhist, Hindu, or Islamic traditions proved far more resistant to the Christian message than those who practiced more localized, small-scale, orally based polytheistic religions.

Conversion and Adaptation in Spanish America

Spanish America and China illustrate the difference between those societies in which Christianity became widely practiced and those that largely rejected it. Both cases, however, represent major cultural encounters of a kind that was becoming more frequent as European expansion brought the Christian faith to distant peoples with very different cultural traditions.

The decisive conquest of the Aztec and Inca empires and all that followed from it—disease, population collapse, loss of land to Europeans, forced labor, resettlement into more compact villages—created a setting in which the religion of the victors took hold in Spanish American colonies. Europeans saw their political and military success as a demonstration of the power of the Christian God. Native American peoples generally agreed, and by 1700 or earlier the vast majority had been baptized and saw themselves in some respects as Christians. After all, other conquerors such as the Aztecs and the Incas had always imposed their gods in some fashion on defeated peoples. It made sense, both practically and spiritually, to affiliate with the Europeans' God, saints, rites, and rituals. Many millions accepted baptism, contributed to the construction of village churches, attended services, and embraced images of Mary and other saints.

Earlier conquerors, however, had made no attempt to eradicate local deities and religious practices. The flexibility and inclusiveness of Mesoamerican and Andean religions had made it possible for subject people to accommodate the gods of their new rulers while maintaining their own traditions. But Europeans were different. They claimed an exclusive religious truth and sought the utter destruction of local gods and everything associated with them. Operating within a Spanish colonial regime

that actively encouraged conversion, missionaries often proceeded by persuasion and patient teaching. At times, though, their frustration with the persistence of "idolatry, superstition, and error" boiled over into violent campaigns designed to uproot old religions once and for all. In 1535, the bishop of Mexico proudly claimed that he had destroyed 500 pagan shrines and 20,000 idols. During the seventeenth and early eighteenth centuries, church authorities in the Andean region periodically launched movements of "extirpation," designed to fatally undermine native religion. They destroyed religious images and ritual objects, publicly urinated on native "idols," desecrated the remains of ancestors, held religious trials and "processions of shame" aimed at humiliating offenders, and flogged "idolaters."[5]

Occasionally, overt resistance erupted. One such example was the religious revivalist movement in central Peru in the 1560s, known as Taki Onqoy (dancing sickness). Possessed by the spirits of local gods, or *huacas*, traveling dancers and teachers predicted that an alliance of Andean deities would soon overcome the Christian God, inflict the intruding Europeans with the same diseases that they had brought to the Americas, and restore the world of the Andes to an imagined earlier harmony. They called on native peoples to cut off all contact with the Spanish, to reject Christian worship, and to return to traditional practices. "The world has turned about," one member declared, "and this time God and the Spaniards [will be] defeated and all the Spaniards killed and their cities drowned; and the sea will rise and overwhelm them, so that there will remain no memory of them."[6]

More common than such frontal attacks on Christianity, which were quickly smashed by colonial authorities, were efforts at blending two religious traditions, reinterpreting Christian practices within an Andean framework, and incorporating local elements into an emerging Andean Christianity. Even female dancers in the Taki Onqoy movement sometimes took the names of Christian saints, seeking to appropriate for themselves the religious power of Christian figures. Within Andean Christian communities, people might offer the blood of a llama to strengthen a village church or make a cloth covering for the Virgin Mary and a shirt for an image of a huaca with the same material. Although the state cults of the Incas faded away, missionary attacks did not succeed in eliminating the influence of local huacas. Images and holy sites might be destroyed, but the souls of the huacas remained, and their representatives gained prestige. One resilient Andean resident inquired of a Jesuit missionary: "Father, are you tired of taking our idols from us? Take away that mountain if you can, since that is the God I worship."[7] (See Visual Source 16.3, p. 765, for an illustration of the blending of Andean religious symbols and the new Christian message.)

In Mexico as well, an immigrant Christianity was assimilated into patterns of local culture. Parishes were organized largely around precolonial towns or regions. Churches built on or near the sites of old temples became the focus of community identity. *Cofradias*, church-based associations of laypeople, organized community processions and festivals and made provision for a proper funeral and burial for their members. Central to an emerging Mexican Christianity were the saints who closely paralleled the functions of precolonial gods. Saints were imagined as parents of the

local community and the true owners of its land, and their images were paraded through the streets on the occasion of great feasts and were collected by individual households. Although parish priests were almost always Spanish, the *fiscal*, or leader of the church staff, was a native Christian of great local prestige, who carried on the traditions and role of earlier religious specialists.

Throughout the colonial period and beyond, many Mexican Christians also took part in rituals derived from the past, with little sense that this was incompatible with Christian practice. Incantations to various gods for good fortune in hunting, farming, or healing; sacrifices of self-bleeding; offerings to the sun; divination; the use of hallucinogenic drugs—all of these rituals provided spiritual assistance in those areas of everyday life not directly addressed by Christian rites. Conversely, these practices also showed signs of Christian influence. Wax candles, normally used in Christian services, might now appear in front of a stone image of a precolonial god. The anger of a neglected saint, rather than that of a traditional god, might explain someone's illness and require offerings, celebration, or a new covering to regain his or her favor.[8] In such ways did Christianity take root in the new cultural environments of Spanish America, but it was a distinctly Andean or Mexican Christianity, not merely a copy of the Spanish version.

An Asian Comparison: China and the Jesuits

■ Comparison
Why were missionary efforts to spread Christianity so much less successful in China than in Spanish America?

The Chinese encounter with Christianity was very different from that of Native Americans in Spain's New World empire. The most obvious difference was the political context. The peoples of Spanish America had been defeated, their societies thoroughly disrupted, and their cultural confidence sorely shaken. China, on the other hand, encountered European Christianity between the sixteenth and eighteenth centuries during the powerful and prosperous Ming (1368–1644) and Qing (1644–1912) dynasties. Although the transition between these two dynasties occasioned several decades of internal conflict, at no point was China's political independence or cultural integrity threatened by the handful of European missionaries and traders working there.

The reality of a strong, independent, confident China required a different missionary strategy, for Europeans needed the permission of Chinese authorities to operate in the country. Whereas Spanish missionaries working in a colonial setting sought primarily to convert the masses, the leading missionary order in China, the Jesuits, took deliberate aim at the official Chinese elite. Following the lead of their most famous missionary, Matteo Ricci (in China 1582–1610), many Jesuits learned Chinese, became thoroughly acquainted with classical Confucian texts, and dressed like Chinese scholars. Initially, they downplayed their mission to convert and instead emphasized their interest in exchanging ideas and learning from China's ancient culture. As highly educated men, the Jesuits carried the recent secular knowledge of Europe—science, technology, geography, mapmaking—to an audience of curious Chinese scholars. In presenting Christian teachings, Jesuits were at pains to be respectful of Chinese culture, pointing out parallels between Confucianism and Christianity rather than

portraying it as something new and foreign. They chose to define Chinese rituals honoring the emperor or venerating ancestors as secular or civil observances rather than as religious practices that had to be abandoned. Such efforts to accommodate Chinese culture contrast sharply with the frontal attacks on Native American religions in the Spanish Empire (see Visual Source 16.4, p. 767).

The religious and cultural outcomes of the missionary enterprise likewise differed greatly in the two regions. Nothing approaching the mass conversion to Christianity of Native American peoples took place in China. During the sixteenth and seventeenth centuries, a modest number of Chinese scholars and officials—who were attracted by the personal lives of the missionaries, by their interest in Western science, and by the moral certainty that Christianity offered—did become Christians. Jesuit missionaries found favor for a time at the Chinese imperial court, where their mathematical, astronomical, technological, and mapmaking skills rendered them useful. For more than a century, they were appointed to head the Chinese Bureau of Astronomy. Among ordinary people, Christianity spread very modestly amid tales of miracles attributed to the Christian God, while missionary teachings about "eternal life" sounded to some like Daoist prescriptions for immortality. At most, though, missionary efforts over the course of some 250 years (1550–1800) resulted in 200,000 to 300,000 converts, a minuscule number in a Chinese population approaching 300 million by 1800. What explains the very limited acceptance of Christianity in early modern China?

Fundamentally, the missionaries offered little that the Chinese really needed. Confucianism for the elites and Buddhism, Daoism, and a multitude of Chinese gods and spirits at the local level adequately supplied the spiritual needs of most Chinese. Furthermore, it became increasingly clear that Christianity was an all-or-nothing faith that required converts to abandon much of traditional Chinese culture. Christian monogamy, for example, seemed to require Chinese men to put away their concubines. What would happen to these deserted women?

Jesuits in China

In this seventeenth-century Dutch engraving, two Jesuit missionaries hold a map of China. Their mapmaking skills were among the reasons that the Jesuits were initially welcomed among the educated elite of that country. (Frontispiece to *China Illustrated* by Athanasius Kircher [1601–1680] 1667 [engraving], Dutch School, [17th century]/Private Collection, The Stapleton Collection/The Bridgeman Art Library)

By the early eighteenth century, the papacy and competing missionary orders came to oppose the Jesuit policy of accommodation. The pope claimed authority over Chinese Christians and declared that sacrifices to Confucius and the veneration of ancestors were "idolatry" and thus forbidden to Christians. The pope's pronouncements represented an unacceptable challenge to the authority of the emperor and an affront to Chinese culture. In 1715, an outraged Emperor Kangxi wrote:

> I ask myself how these uncultivated Westerners dare to speak of the great precepts of China.... [T]heir doctrine is of the same kind as the little heresies of the Buddhist and Taoist monks.... These are the greatest absurdities that have ever been seen. As from now I forbid the Westerners to spread their doctrine in China; that will spare us a lot of trouble.[9]

This represented a major turning point in the relationship of Christian missionaries and Chinese society. Many were subsequently expelled, and missionaries lost favor at court.

In other ways as well, missionaries played into the hands of their Chinese opponents. Their willingness to work under the Manchurian Qing dynasty, which came to power in 1644, discredited them with those Chinese scholars who viewed the Qing as uncivilized foreigners and their rule in China as disgraceful and illegitimate. Missionaries' reputation as miracle workers further damaged their standing as men of science and rationality, for elite Chinese often regarded miracles and supernatural religion as superstitions, fit only for the uneducated masses. Some viewed the Christian ritual of Holy Communion as a kind of cannibalism. Others came to see missionaries as potentially subversive, for various Christian groups met in secret, and such religious sects had often provided the basis for peasant rebellion. Nor did it escape Chinese notice that European Christians had taken over the Philippines and that their warships were active in the Indian Ocean. Perhaps the missionaries, with their great interest in maps, were spies for these aggressive foreigners. All of this contributed to the general failure of Christianity to secure a prominent presence in China.

Persistence and Change in Afro-Asian Cultural Traditions

Although Europeans were central players in the globalization of Christianity, theirs was not the only expanding or transformed culture of the early modern era. African religious ideas and practices, for example, accompanied slaves to the Americas. Common African forms of religious revelation—divination, dream interpretation, visions, spirit possession—found a place in the Africanized versions of Christianity that emerged in the New World. Europeans frequently perceived these practices as evidence of sorcery, witchcraft, or even devil worship and tried to suppress them. Nonetheless, syncretic (blended) religions such as Vodou in Haiti, Santeria in Cuba, and Candomble and Macumba in Brazil persisted. They derived from various West

African traditions and featured drumming, ritual dancing, animal sacrifice, and spirit possession. Over time, they incorporated Christian beliefs and practices such as church attendance, the search for salvation, and the use of candles and crucifixes and often identified their various spirits or deities with Catholic saints.

Expansion and Renewal in the Islamic World

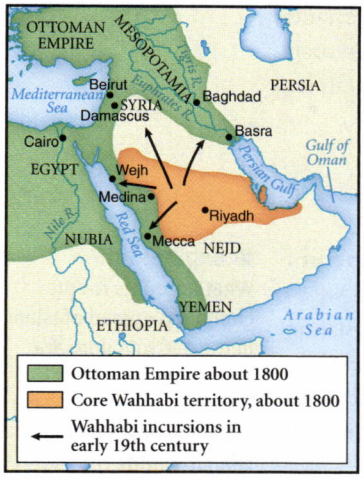
Explanation
What accounts for the continued spread of Islam in the early modern era and for the emergence of reform or renewal movements within the Islamic world?

The early modern era likewise witnessed the continuation of the "long march of Islam" across the Afro-Asian world. In sub-Saharan Africa, in the eastern and western wings of India, and in Central and Southeast Asia, the expansion of the Islamic frontier, a process already almost 1,000 years in the making, extended farther still. Conversion to Islam generally did not mean a sudden abandonment of old religious practices in favor of the new. Rather it was more often a matter of "assimilating Islamic rituals, cosmologies, and literatures into... local religious systems."[10]

Continued Islamization usually was not the product of conquering armies and expanding empires. It depended instead on wandering Muslim holy men, Islamic scholars, and itinerant traders, none of whom posed a threat to local rulers. In fact, such people often were useful to those rulers and their village communities. They offered literacy in Arabic, established informal schools, provided protective charms containing passages from the Quran, served as advisers to local authorities and healers to the sick, often intermarried with local people, and generally did not insist that new converts give up their older practices. What they offered, in short, was connection to the wider, prestigious, prosperous world of Islam. Islamization extended modestly even to the Americas, where enslaved African Muslims planted their faith, particularly in Brazil. There Muslims led a number of slave revolts in the early nineteenth century.

To more orthodox Muslims, this religious syncretism, which accompanied Islamization almost everywhere, became increasingly offensive, even heretical. Such sentiments played an important role in movements of religious renewal and reform that emerged throughout the vast Islamic world of the eighteenth century. The leaders of such movements sharply criticized those practices that departed from earlier patterns established by Muhammad and from the authority of the Quran. For example, in India, which was governed by the Muslim Mughal Empire, religious resistance to official policies that accommodated Hindus found concrete expression during the reign of the emperor Aurangzeb (1658–1707) (see p. 646). A series of religious wars in West Africa during the eighteenth and early nineteenth centuries took aim at corrupt Islamic practices and the rulers, Muslim and non-Muslim alike, who permitted them. In Southeast and Central Asia, tension grew between practitioners of localized and blended versions of Islam and those who sought to purify such practices in the name of a more authentic and universal faith.

The most well-known and widely visible of these Islamic renewal movements took place during the mid-eighteenth century in Arabia itself, where the religion had been born more than 1,000 years earlier. It originated in the teachings of the



The Expansion of Wahhabi Islam

Islamic scholar Muhammad ibn Abd al-Wahhab (1703–1792). The growing difficulties of the Islamic world, such as the weakening of the Ottoman Empire, were directly related, he argued, to deviations from the pure faith of early Islam. Al-Wahhab was particularly upset by common religious practices in central Arabia that seemed to him idolatry—the widespread veneration of Sufi saints and their tombs, the adoration of natural sites, and even the respect paid to Muhammad's tomb at Mecca. All of this was a dilution of the absolute monotheism of authentic Islam.

The Wahhabi movement took a new turn in the 1740s when it received the political backing of Muhammad Ibn Saud, a local ruler who found al-Wahhab's ideas compelling. With Ibn Saud's support, the religious movement became an expansive state in central Arabia. Within that state, offending tombs were razed; "idols" were eliminated; books on logic were destroyed; the use of tobacco, hashish, and musical instruments was forbidden; and certain taxes not authorized by religious teaching were abolished. Likewise, male control of women was strengthened in strict accordance with the law, but al-Wahhab was also concerned about lack of attention to widows and orphans, about sexual immorality, and about women who had not received a proper share of their families' inheritance. By the early nineteenth century, this new reformist state encompassed much of central Arabia, with Mecca itself coming under Wahhabi control in 1803. Although an Egyptian army broke the power of the Wahhabis in 1818, the movement's influence continued to spread across the Islamic world. (See Document 16.4, pp. 756–57, for a statement of the Wahhabi outlook.)

Together with the ongoing expansion of the religion, these movements of reform and renewal signaled the continuing cultural vitality of the "abode of Islam," even as the European presence on the world stage assumed larger dimensions. In the nineteenth and twentieth centuries, such movements persisted and became associated with resistance to the political, military, and cultural intrusion of the European West into the affairs of the Islamic world.

China: New Directions in an Old Tradition

■ Comparison
In what ways did Asian cultural changes in the early modern era parallel those of Europe, and in what ways were they different?

Neither China nor India experienced cultural or religious change as dramatic as that of the Reformation in Europe, nor did Confucian or Hindu cultures during the early modern era spread widely, as did Christianity and Islam. Nonetheless, neither of these traditions remained static. As in Christian Europe, challenges to established orthodoxies in China and India emerged as commercial and urban life, as well as political change, fostered new thinking.

China during the Ming and Qing dynasties continued to operate broadly within a Confucian framework, enriched now by the insights of Buddhism and Daoism to generate a system of thought called Neo-Confucianism. Chinese Ming dynasty rulers, in their aversion to the despised Mongols, embraced and actively supported

this native Confucian tradition, whereas the foreign Manchu or Qing rulers did so in order to woo Chinese intellectuals to support the new dynasty. Within this context, a considerable amount of controversy, debate, and new thinking emerged during the early modern era.

During late Ming times, for example, the influential thinker Wang Yangming (1472–1529) argued that truth and moral knowledge were innate to the human person. (See Document 16.3, pp. 754–55, for a selection from the writings of Wang Yangming.) Thus anyone could achieve a virtuous life by introspection and contemplation, without the extended education, study of the classical texts, and constant striving for improvement that traditional Confucianism prescribed for an elite class of "gentlemen." Such ideas figured prominently among Confucian scholars of the sixteenth century, although critics later contended that such thinking promoted an excessive individualism. They also argued that Wang Yangming's ideas had undermined the Ming dynasty and contributed to China's conquest by the foreign Manchus. Some Chinese Buddhists as well sought to make their religion more accessible to ordinary people, by suggesting that laypeople at home could undertake practices similar to those performed by monks in monasteries. Withdrawal from the world was not necessary for enlightenment. This kind of moral or religious individualism bore some similarity to the thinking of Martin Luther, who argued that individuals could seek salvation by "faith alone," without the assistance of a priestly hierarchy.

Another new direction in Chinese elite culture took shape in a movement known as *kaozheng*, or "research based on evidence." Intended to "seek truth from facts," kaozheng was critical of the unfounded speculation of conventional Confucian philosophy and instead emphasized the importance of verification, precision, accuracy, and rigorous analysis in all fields of inquiry. During the late Ming years, this emphasis generated works dealing with agriculture, medicine, pharmacology, botany, craft techniques, and more. In the Qing era, kaozheng was associated with a recovery and critical analysis of ancient historical documents, which sometimes led to sharp criticism of Neo-Confucian orthodoxy. It was a genuinely scientific approach to knowledge, but it was applied more to the study of the past than to the natural world of astronomy, physics, or anatomy, as in the West.

While such matters occupied the intellectual elite of China, in the cities a lively popular culture emerged among the less well educated. For city-dwellers, plays, paintings, short stories, and especially novels provided diversion and entertainment that were a step up from what could be found in teahouses and wine shops. Numerous "how-to" painting manuals allowed a larger public to participate in this favorite Chinese art form. Even though Confucian scholars disdained popular fiction, a vigorous printing industry responded to the growing demand for exciting novels. The most famous was Cao Xueqin's mid-eighteenth-century novel *The Dream of the Red Chamber*, a huge book that contained 120 chapters and some 400 characters, most of them women. It explored the social life of an eighteenth-century elite family with connections to the Chinese court.

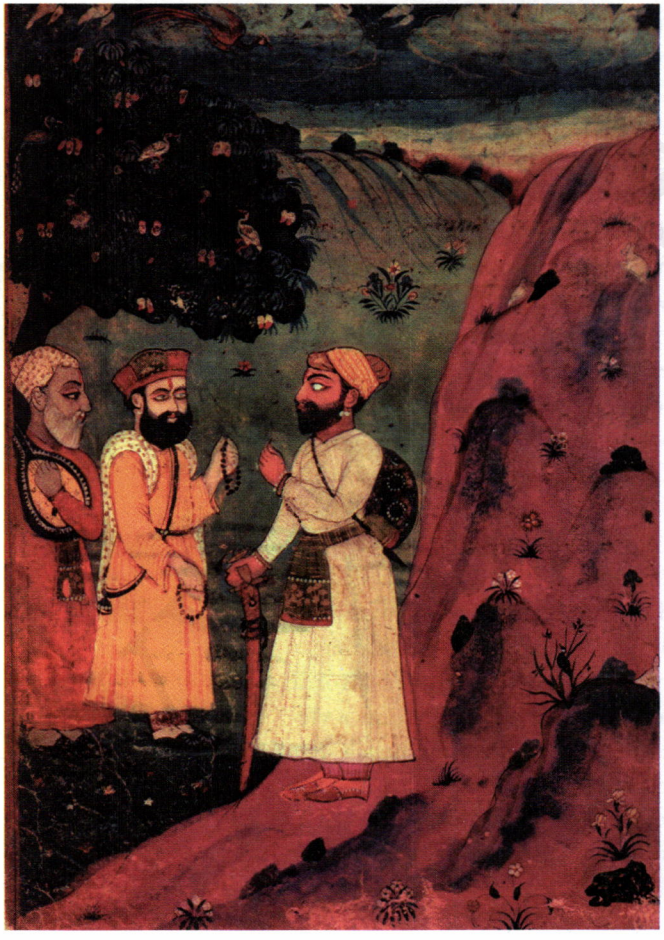
India: Bridging the Hindu/Muslim Divide

In a largely Hindu India, ruled by the Muslim Mughal Empire, several significant cultural departures took shape in the early modern era that brought Hindus and Muslims together in new forms of religious expression. One was the flourishing of a devotional form of Hinduism known as *bhakti*. Through songs, prayers, dances, poetry, and rituals, devotees sought to achieve union with one or another of India's many deities. Appealing especially to women, the bhakti movement provided an avenue for social criticism. Its practitioners often set aside caste distinctions and disregarded the detailed rituals of the Brahmin priests in favor of direct contact with the divine. This emphasis had much in common with the mystical Sufi form of Islam and helped blur the distinction between these two traditions in India (see Document 16.5, pp. 758–59).

Among the most beloved of bhakti poets was Mirabai (1498–1547), a high-caste woman from northern India who abandoned her upper-class family and conventional Hindu practice. Upon her husband's death, tradition asserts, she declined to burn herself on his funeral pyre (a practice known as *sati*). She further offended caste restrictions by taking as her guru (religious teacher) an old untouchable shoemaker. To visit him, she apparently tied her saris together and climbed down the castle walls at night. Then she would wash his aged feet and drink the water from these ablutions. Much of her poetry deals with her yearning for union with Krishna, a Hindu deity she regarded as her husband, lover, and lord.

> What I paid was my social body, my town body,
> my family body, and all my inherited jewels.
> Mirabai says: The Dark One [Krishna] is my
> husband now.[11]

Yet another major cultural change that blended Islam and Hinduism emerged with the growth of Sikhism as a new and distinctive religious tradition in the Punjab region of northern India. Its founder, Guru Nanak (1469–1539), had been involved in the bhakti movement but came to believe that "there is no Hindu; there is no Muslim; only God." His teachings and those of subsequent gurus also generally ignored caste distinctions and untouchability and ended the seclusion of women, while proclaiming the "brotherhood of all mankind" as well as the essential equality of men and women. Drawing



Guru Nanak
In this early-eighteenth-century manuscript painting, Guru Nanak, the founder of Sikhism, and his constant companion Mardana (with a musical instrument) encounter a robber (the man with a sword) along the road. According to the story accompanying the painting, that experience persuaded the robber to abandon his wicked ways and become a follower of the Sikh path.

converts from Punjabi peasants and merchants, both Muslim and Hindu, the Sikhs gradually became a separate religious community. They developed their own sacred book, known as the Guru Granth (teacher book); created a central place of worship and pilgrimage in the Golden Temple of Amritsar; and prescribed certain dress requirements for men, including keeping hair and beards uncut, wearing a turban, and carrying a short sword. During the seventeenth century, Sikhs encountered hostility from both the Mughal Empire and some of their Hindu neighbors. In response, Sikhism evolved from a peaceful religious movement, blending Hindu and Muslim elements, into a militant community whose military skills were highly valued by the British when they took over India in the late eighteenth century.

A New Way of Thinking: The Birth of Modern Science

While some Europeans were actively attempting to spread the Christian faith to distant corners of the world, others were nurturing an understanding of the cosmos very much at odds with traditional Christian teaching. These were the makers of Europe's Scientific Revolution, a vast intellectual and cultural transformation that took place between the mid-sixteenth and early eighteenth centuries. These men of science would no longer rely on the external authority of the Bible, the Church, the speculations of ancient philosophers, or the received wisdom of cultural tradition. For them, knowledge would be acquired through a combination of careful observations, controlled experiments, and the formulation of general laws, expressed in mathematical terms. Those who created this revolution—Copernicus from Poland, Galileo from Italy, Descartes from France, Newton from England, and many others—saw themselves as departing radically from older ways of thinking. "The old rubbish must be thrown away," wrote a seventeenth-century English scientist. "These are the days that must lay a new Foundation of a more magnificent Philosophy."[12]

The long-term significance of the Scientific Revolution can hardly be overestimated. Within early modern Europe, it fundamentally altered ideas about the place of humankind within the cosmos and sharply challenged both the teachings and the authority of the Church. Over the past several centuries, it has substantially eroded religious belief and practice in the West, particularly among the well educated. When applied to the affairs of human society, scientific ways of thinking challenged ancient social hierarchies and political systems and played a role in the revolutionary upheavals of the modern era. But science also was used to legitimize racial and gender inequalities, by defining people of color and women as inferior by nature. When married to the technological innovations of the Industrial Revolution, science fostered both the marvels of modern production and the horrors of modern means of destruction. By the twentieth century, science had become so widespread that it largely lost its association with European culture and became the chief symbol of global modernity. Like Buddhism, Christianity, and Islam, modern science became a universal worldview, open to all who could accept its premises and its techniques.

The Question of Origins: Why Europe?

Comparison
Why did the Scientific Revolution occur in Europe rather than in China or the Islamic world?

Why did the breakthrough of the Scientific Revolution occur first in Europe and during the early modern era? The realm of Islam, after all, had generated the most advanced science in the world during the centuries between 800 and 1400. Arab scholars could boast of remarkable achievements in mathematics, astronomy, optics, and medicine, and their libraries far exceeded those of Europe.[13] And what of China? Its elite culture of Confucianism was both sophisticated and secular, less burdened by religious dogma than in the Christian or Islamic worlds; its technological accomplishments and economic growth were unmatched anywhere in the several centuries after 1000. In neither civilization, however, did these achievements lead to the kind of intellectual innovation that occurred in Europe.

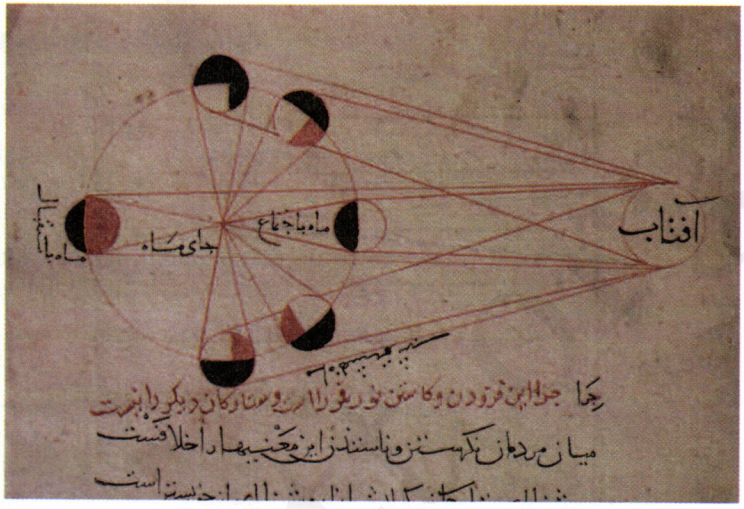
Europe's historical development as a reinvigorated and fragmented civilization (see Chapter 10) arguably gave rise to conditions uniquely favorable to the scientific enterprise. By the twelfth and thirteenth centuries, Europeans had evolved a legal system that guaranteed a measure of independence for a variety of institutions—the Church, towns and cities, guilds, professional associations, and universities. This legal revolution was based on the idea of a "corporation," a collective group of people that was treated as a unit, a legal person, with certain rights to regulate and control its own members.

Most important for the development of science in the West was the autonomy of its emerging universities. By 1215, the University of Paris was recognized as a "corporation of masters and scholars," which could admit and expel students, establish courses of instruction, and grant a "license to teach" to its faculty. Such universities—for example, in Paris, Bologna, Oxford, Cambridge, and Salamanca—became "neutral zones of intellectual autonomy" in which scholars could pursue their studies in relative freedom from the dictates of church or state authorities. Within them, the study of the natural order began to slowly separate itself from philosophy and theology and to gain a distinct identity. Their curricula featured "a basically scientific core of readings and lectures" that drew heavily on the writings of the Greek thinker Aristotle, which had only recently become available to Western Europeans. Most of the major figures in the Scientific Revolution had been trained in and were affiliated with these universities.

In the Islamic world, by contrast, science was patronized by a variety of local authorities, but it occurred largely outside the formal system of higher education. Within colleges known as madrassas, Quranic studies and religious law held the central place, whereas philosophy and natural science were viewed with great suspicion. To religious scholars, the Quran held all wisdom, and scientific thinking might well challenge it. An earlier openness to free inquiry and religious toleration was increasingly replaced by a disdain for scientific and philosophical inquiry, for it seemed to lead only to uncertainty and confusion. "May God protect us from useless knowledge" was a saying that reflected this outlook. Nor did Chinese author-

ities permit independent institutions of higher learning in which scholars could conduct their studies in relative freedom. Instead Chinese education focused on preparing for a rigidly defined set of civil service examinations and emphasized the humanistic and moral texts of classical Confucianism. "The pursuit of scientific subjects," one recent historian concluded, "was thereby relegated to the margins of Chinese society."[14]

Beyond its distinctive institutional development, Western Europe was in a position to draw extensively upon the knowledge of other cultures, especially that of the Islamic world. Arab medical texts, astronomical research, and translations of Greek classics played a major role in the birth of European natural philosophy (as science was then called) between 1000 and 1500. In constructing his proofs for a sun-centered solar system, Copernicus in the sixteenth century likely drew upon astronomical work and mathematical formulations undertaken 200 to 300 years earlier in the Islamic world, particularly at the famous Muslim observatory of Maragha in present-day Iran.



Muslim Astronomy and the Scientific Revolution
This diagram of the eclipses of the moon by the eleventh-century Muslim mathematician and astronomer al-Biruni is a reminder of Muslim scientific achievements, some of which stimulated European scientific thinking. (Drawing by al-Biruni (973-1048), from the Digitized MSS Collection of the IRI Majlis Library, Tehran/Visual Connection Archive)

In the sixteenth through the eighteenth centuries, Europeans found themselves at the center of a massive new exchange of information as they became aware of lands, peoples, plants, animals, societies, and religions from around the world. This tidal wave of new knowledge, uniquely available to Europeans, clearly shook up older ways of thinking and opened the way to new conceptions of the world. The sixteenth-century Italian doctor, mathematician, and writer Girolamo Cardano (1501–1576) clearly expressed this sense of wonderment: "The most unusual [circumstance of my life] is that I was born in this century in which the whole world became known; whereas the ancients were familiar with but a little more than a third part of it." He worried, however, that amid this explosion of knowledge, "certainties will be exchanged for uncertainties."[15] It was precisely those uncertainties—skepticism about established views—that provided such a fertile cultural ground for the emergence of modern science.

Science as Cultural Revolution

Before the Scientific Revolution, educated Europeans held a view of the world that derived from Aristotle, perhaps the greatest of the ancient Greek philosophers, and from Ptolemy, a Greco-Egyptian mathematician and astronomer who lived in Alexandria during the second century C.E. To medieval European thinkers, the earth

■ Change
What was revolutionary about the Scientific Revolution?

Snapshot Major Thinkers and Achievements of the Scientific Revolution

Thinker/Scientist	Achievements
Nicolaus Copernicus (Polish; 1473–1543)	Posited that sun is at the center of solar system, earth rotates on its axis, and earth and planets revolve around the sun
Andreas Vesalius (Flemish; 1514–1564)	"Father of anatomy"; made detailed drawings of human body based on dissection
Francis Bacon (English; 1561–1626)	Emphasized observation and experimentation as the key to modern science
Galileo Galilei (Italian; 1564–1642)	Developed an improved telescope; discovered sunspots, mountains on the moon, and Jupiter's moons; performed experimental work on the velocity of falling objects
Johannes Kepler (German; 1571–1630)	Posited that planets follow elliptical, not circular, orbits; described laws of planetary motion
William Harvey (English; 1578–1657)	Described the circulation of the blood and the function of the heart
René Descartes (French; 1596–1650)	Emphasized the importance of mathematics and logical deduction in understanding the physical world; invented analytical geometry
Isaac Newton (English; 1642–1727)	Synthesized earlier findings around the concept of universal gravitation; invented calculus; formulated concept of inertia and laws of motion

was stationary and at the center of the universe, and around it revolved the sun, moon, and stars embedded in ten spheres of transparent crystal. This understanding coincided well with the religious outlook of the Catholic Church because the attention of the entire universe was centered on the earth and its human inhabitants, among whom God's plan for salvation unfolded. It was a universe of divine purpose, with angels guiding the hierarchically arranged heavenly bodies along their way while God watched over the whole from his realm beyond the spheres. The Scientific Revolution was revolutionary because it fundamentally challenged this understanding of the universe.

The initial breakthrough came from the Polish mathematician and astronomer Nicolaus Copernicus, whose famous book *On the Revolutions of the Heavenly Spheres* was published in the year of his death, 1543. Its essential argument was that "at the middle of all things lies the sun" and that the earth, like the other planets, revolved around it. Thus the earth was no longer unique or at the obvious center of God's attention.

Other European scientists built on Copernicus's central insight, and some even argued that other inhabited worlds and other kinds of humans existed. Less speculatively, in the early seventeenth century Johannes Kepler, a German mathematician, showed that the planets followed elliptical orbits, undermining the ancient belief that they moved in perfect circles. The Italian Galileo Galilei developed an improved telescope, with which he observed sunspots, or blemishes, moving across the face of the sun. This called into question the traditional notion that no change or imperfection marred the heavenly bodies. His discovery of the moons of Jupiter and many new stars suggested a cosmos far larger than the finite universe of traditional astronomy. Some thinkers began to discuss the notion of an unlimited universe in which humankind occupied a mere speck of dust in an unimaginable vastness. The French mathematician and philosopher Blaise Pascal (1623–1662) perhaps spoke for many when he wrote: "The eternal silence of infinite space frightens me."[16]

The culmination of the Scientific Revolution came in the work of Sir Isaac Newton, the Englishman who formulated the modern laws of motion and mechanics, which remained unchallenged until the twentieth century. At the core of Newton's thinking was the concept of universal gravitation. "All bodies whatsoever," Newton declared, "are endowed with a principle of mutual gravitation."[17] Here was the grand unifying idea of early modern science. The radical implication of this view was that the heavens and the earth, long regarded as separate and distinct spheres, were not so different after all, for the motion of a cannonball on earth or the falling of an apple from a tree obeyed the same natural laws that governed the orbiting planets.

By the time Newton died, a revolutionary new understanding of the physical universe had emerged among educated Europeans. That universe was no longer propelled by supernatural forces but functioned on its own according to scientific principles that could be described mathematically. In Kepler's view, "the machine of the universe is not similar to a divine animated being but similar to a clock."[18] Furthermore, it was a machine that regulated itself, requiring neither God nor angels to account for its normal operation. Knowledge of that universe could be obtained through human reason alone—by observation, deduction, and experimentation—without the aid of ancient authorities or divine revelation. The French philosopher René Descartes resolved "to seek no other knowledge than that which I might find within myself, or perhaps in the book of nature."[19]

Like the physical universe, the human body also lost some of its mystery. The careful dissections of cadavers and animals enabled doctors and scientists to describe the human body with much greater accuracy and to understand the circulation of the blood throughout the body. The heart was no longer the mysterious center of the body's heat and the seat of its passions; instead it was just another machine, a complex muscle that functioned as a pump.

Much of this thinking developed in the face of strenuous opposition from the Catholic Church, for both its teachings and its authority were under attack. The Italian philosopher Giordano Bruno, proclaiming an infinite universe and many worlds, was burned at the stake in 1600, and Galileo was compelled by the Church

to publicly renounce his belief that the earth moved around an orbit and rotated on its axis.

But not all was conflict between the Church and an emerging science. None of the early scientists rejected Christianity. Galileo himself proclaimed the compatibility of science and faith when he wrote that "God is no less excellently revealed in Nature's actions than in the sacred statements of the Bible."[20] Newton was a serious biblical scholar and saw no necessary contradiction between his ideas and belief in God. "This most beautiful system of the sun, planets, and comets," he declared, "could only proceed from the counsel and dominion of an intelligent Being."[21] The Church gradually accommodated as well as resisted the new ideas, largely by compartmentalizing them. Science might prevail in its limited sphere of describing the physical universe, but religion was still the arbiter of truth about those ultimate questions concerning human salvation, righteous behavior, and the larger purposes of life.

Science and Enlightenment

Change
In what ways did the Enlightenment challenge older patterns of European thinking?

Initially limited to a small handful of scholars, the ideas of the Scientific Revolution spread to a wider European public during the eighteenth century. That process was aided by novel techniques of printing and book-making, by a popular press, and by a host of scientific societies. Moreover, the new approach to knowledge—rooted in human reason, skeptical of authority, expressed in natural laws—was now applied to human affairs, not just to the physical universe. The Scottish professor Adam Smith (1723–1790), for example, formulated laws that accounted for the operation of the economy and that, if followed, he believed, would generate inevitably favorable results for society. Growing numbers of people believed that the long-term outcome of scientific development would be "enlightenment," a term that has come to define the eighteenth century in European history. If human reason could discover the laws that governed the universe, surely it could uncover ways in which humankind might govern itself more effectively.

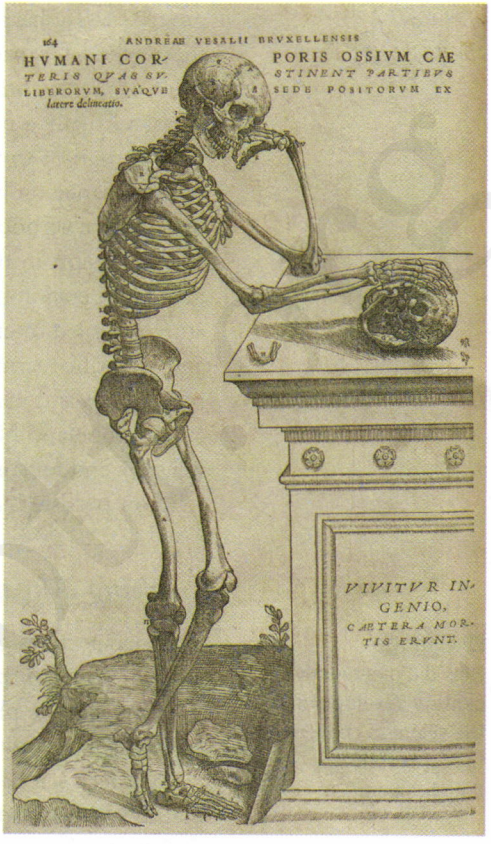
"What is Enlightenment?" asked the prominent German intellectual Immanuel Kant (1724–1804). "It is man's emergence from his self-imposed... inability to use one's own understanding without another's guidance.... Dare to know! 'Have the courage to use your own understanding' is therefore the motto of the enlightenment."[22] Although they often disagreed sharply with one another, European Enlightenment thinkers shared this belief in the power of knowledge to transform human society. They also shared a satirical, critical style, a commitment to open-mindedness and inquiry, and in various degrees a hostility to established political and religious authority.

Many took aim at arbitrary governments, the "divine right of kings," and the aristocratic privileges of European society. The English philosopher John Locke (1632–1704) offered principles for constructing a constitutional government, a contract between rulers and ruled that was created by human ingenuity rather than divinely prescribed. Any number of writers, including many women, advocated education for women as a means of raising their status in society.

Much of Enlightenment thinking was directed against the superstition, ignorance, and corruption of established religion. In his *Treatise on Toleration*, the French writer Voltaire (1694–1778) reflected the outlook of the Scientific Revolution as he commented sarcastically on religious intolerance:

> This little globe, nothing more than a point, rolls in space like so many other globes; we are lost in its immensity. Man, some five feet tall, is surely a very small part of the universe. One of these imperceptible beings says to some of his neighbors in Arabia or Africa: "Listen to me, for the God of all these worlds has enlightened me; there are nine hundred million little ants like us on the earth, but only my anthill is beloved of God; He will hold all others in horror through all eternity; only mine will be blessed, the others will be eternally wretched."[23]

Voltaire's own faith, like many others among the "enlightened," was deism. Deists believed in a rather abstract and remote Deity, sometimes compared to a clockmaker, who had created the world, but not in a personal God who intervened in history or tampered with natural law. Others became *pantheists*, who believed that God and nature were identical. Here was a conception of religion shaped by the outlook of science. Sometimes called "natural religion," it was devoid of mystery, revelation, ritual, and spiritual practice, while proclaiming a God that could be "proven" by human rationality, logic, and the techniques of scientific inquiry. In this view, all else was superstition. Among the most radical of such thinkers were the several Dutchmen who wrote the *Treatise of Three Imposters*, which claimed that Moses, Jesus, and Muhammad were fraudulent imposters who based their teachings on "the ignorance of Peoples [and] resolved to keep them in it."[24]



Uncovering the Human Skeleton
This drawing by the sixteenth-century Flemish anatomist Andreas Vesalius suggests a rational and philosophical approach to life, even as it presents the human skeleton with scientific precision. (Courtesy, National Library of Medicine)

Though solidly rooted in Europe, Enlightenment thought was influenced by the growing global awareness of its major thinkers. Voltaire, for example, idealized China as an empire governed by an elite of secular scholars selected for their talent, which stood in sharp contrast to continental Europe, where aristocratic birth and military prowess were far more important. The example of Confucianism—supposedly secular, moral, rational, and tolerant—encouraged Enlightenment thinkers to imagine a future for European civilization without the kind of supernatural religion that they found so offensive in the Christian West. (See Visual Source 15.1, p. 712, for European fascination with things Chinese.)

The central theme of the Enlightenment—and what made it potentially revolutionary—was the idea of progress. Human society was not fixed by tradition or divine command but could be changed, and improved, by human action guided by reason. No one expressed this soaring confidence in the unending perfectability of humankind more clearly than the French thinker the Marquis de Condorcet (1743–1794), whose views are excerpted in Document 16.2 on pages 752–54. Belief in

progress was a sharp departure from much of premodern social thinking, and it inspired those who later made the American, French, Haitian, and Latin American revolutions. Born of the Scientific Revolution, that was the faith of the Enlightenment. For some, it was virtually a new religion.

The age of the Enlightenment, however, also witnessed a reaction against too much reliance on human reason. Jean-Jacques Rousseau (1712–1778) minimized the importance of book learning for the education of children and prescribed instead an immersion in nature, which taught self-reliance and generosity rather than the greed and envy fostered by "civilization." The Romantic movement in art and literature appealed to emotion, intuition, passion, and imagination rather than cold reason and scientific learning. Religious awakenings—complete with fiery sermons, public repentance, and intense personal experience of sin and redemption—shook Protestant Europe and North America. Science and the Enlightenment surely challenged religion, and for some they eroded religious belief and practice. Just as surely, though, religion persisted, adapted, and revived for many others.

Looking Ahead: Science in the Nineteenth Century

■ Change
How did nineteenth-century developments in the sciences challenge the faith of the Enlightenment?

The perspectives of the Enlightenment were challenged not only by romanticism and religious "enthusiasm" but also by the continued development of science itself. This remarkable phenomenon justifies a brief look ahead at several scientific developments in the nineteenth century.

Modern science was a cumulative and self-critical enterprise, which in the nineteenth century and after was applied to new domains of human inquiry in ways that undermined some of the assumptions of the Enlightenment. In the realm of biology, for example, Charles Darwin (1809–1882) laid out a complex argument that all of life was in flux, that an endless and competitive struggle for survival over millions of years constantly generated new species of plants and animals, while casting others into extinction. Human beings were not excluded from this vast process, for they too were the work of evolution operating through natural selection. Darwin's famous books *The Origin of Species* (1859) and *The Descent of Man* (1871) were as shattering to traditional religious views as Copernicus's ideas about a sun-centered universe had been several centuries earlier.

At the same time, Karl Marx (1818–1883) articulated a view of human history that likewise emphasized change and struggle. Conflicting social classes—slave owners and slaves, nobles and peasants, capitalists and workers—successively drove the process of historical transformation. Although he was describing the evolution of human civilization, Marx saw himself as a scientist. He based his theories on extensive historical research; like Newton and Darwin, he sought to formulate general laws that would explain events in a rational way. Nor did he believe in heavenly intervention, chance, or the divinely endowed powers of kings. The coming of socialism, in this view, was not simply a good idea; it was inscribed in the laws of historical development (see Document 18.1, pp. 856–59).

Like the intellectuals of the Enlightenment, Darwin and Marx believed strongly in progress, but in their thinking, conflict and struggle rather than reason and education were the motors of progress. The Enlightenment image of the thoughtful, rational, and independent individual was fading. Individuals—plant, animal, and human alike—were now viewed as enmeshed in vast systems of biological, economic, and social conflict.

The work of the Viennese doctor Sigmund Freud (1856–1939) applied scientific techniques to the operation of the human mind and emotions and in doing so cast further doubt on Enlightenment conceptions of human rationality. At the core of each person, Freud argued, lay primal impulses toward sexuality and aggression, which were only barely held in check by the thin veneer of social conscience derived from civilization. Our neuroses arose from the ceaseless struggle between our irrational drives and the claims of conscience. This too was a far cry from the Enlightenment conception of the human condition.

European Science beyond the West

■ **Connection**
In what ways was European science received in the major civilizations of Asia in the early modern era?

In the long run, the achievements of the Scientific Revolution spread globally, becoming the most widely sought-after product of European culture and far more desired than Christianity, democracy, socialism, or Western literature. In the early modern era, however, the level of interest in European scientific thinking within major Asian societies was both modest and selective.

In China, for example, Qing dynasty emperors and scholars were most interested in European astronomy and mathematics, derived largely from Jesuit missionaries, because those disciplines proved useful in predicting eclipses, reforming the calendar, and making accurate maps of the empire. European medicine, however, held little interest for Chinese physicians before the nineteenth century. But the reputation of the Jesuits suffered when it became apparent in the 1760s that for two centuries the missionaries had withheld information about Copernican views of a sun-centered solar system because those ideas had been condemned by the Church. Nonetheless, European science had a substantial impact on a number of Chinese scholars as it interacted with the data-based kaozheng movement, described by one participant as "an ant-like accumulation of facts."[25] European mathematics was of particular interest to kaozheng researchers who were exploring the history of Chinese mathematics. To convince their skeptical colleagues that the barbarian Europeans had something to offer in this field, some Chinese scholars argued that European mathematics had in fact grown out of much earlier Chinese ideas and could therefore be adopted with comfort.[26] In such ways, early modern Chinese thinkers selectively assimilated Western science very much on their own terms.[27]

Although Japanese authorities largely closed their country off from the West in the early seventeenth century (see Chapter 15), one window remained open. Alone among Europeans, the Dutch were permitted to trade in Japan at a single location near Nagasaki, but not until 1720 did the Japanese lift the ban on importing Western

books. Then a number of European texts in medicine, astronomy, geography, mathematics, and other disciplines were translated and studied by a small group of Japanese scholars. They were especially impressed with Western anatomical studies, for in Japan dissection was work fit only for outcasts. Returning from an autopsy conducted by Dutch physicians, several Japanese observers reflected on their experience: "We remarked to each other how amazing the autopsy had been, and how inexcusable it had been for us to be ignorant of the anatomical structure of the human body."[28] Nonetheless, this small center of "Dutch learning," as it was called, remained isolated amid a pervasive Confucian-based culture. Not until the mid-nineteenth century, when Japan was forcibly opened to Western penetration, would European science assume a prominent place in Japanese culture.

Like China and Japan, the Ottoman Empire in the sixteenth and seventeenth centuries was an independent, powerful, successful society whose intellectual elites saw no need for a wholesale embrace of things European. Ottoman scholars were conscious of the rich tradition of Muslim astronomy and chose not to translate the works of major European scientists such as Copernicus, Kepler, or Newton, although they were broadly aware of European scientific achievements by 1650. Insofar as they were interested in these developments, it was for their practical usefulness in making maps and calendars rather than for their larger philosophical implications. In any event, the notion of a sun-centered solar system did not cause the kind of upset that it did in Europe.[29]

More broadly, theoretical science of any kind—Muslim or European—faced an uphill struggle in the face of a conservative Islamic educational system. In 1580, for example, a highly sophisticated astronomical observatory was dismantled under pressure from conservative religious scholars and teachers, who interpreted an outbreak of the plague as God's disapproval with those who sought to understand his secrets. As in Japan, the systematic embrace of Western science would have to await the nineteenth century, when the Ottoman Empire was under far more intense European pressure and reform seemed more necessary.

Reflections: Cultural Borrowing and Its Hazards

Ideas are important in human history. They shape the mental or cultural worlds that people everywhere inhabit, and they often influence behavior as well. Many of the ideas developed or introduced during the early modern era have had enormous and continuing significance in the centuries that followed. The Western Hemisphere was solidly incorporated into Christendom. A Wahhabi version of Islam remains the official faith of Saudi Arabia into the twenty-first century and has influenced many contemporary Islamic revival movements, including al-Qaeda. Modern science and the associated notions of progress have become for many people something approaching a new religion.

Accompanying the development of these ideas has been a great deal of cultural borrowing. Filipinos, Siberians, and many Native American peoples borrowed elements of Christianity from Europeans. Numerous Asian and African peoples borrowed Islam from the Arabs. Northern Indian Sikhs drew upon both Hindu and Muslim teachings. Europeans borrowed scientific ideas from the Islamic world.

In virtually every case, though, that borrowing was selective rather than wholesale, even when it took place under conditions of foreign domination or colonial rule. Many peoples who appropriated Christianity or Islam certainly did not accept the rigid exclusivity and ardent monotheism of those faiths. Elite Chinese were far more interested in European astronomy and mathematics than in Western medicine, while Japanese scholars became fascinated with the anatomical work of the Dutch. Neither, however, adopted Christianity in a widespread manner.

Borrowing was frequently the occasion for serious conflict. Some objected to much borrowing at all, particularly when it occurred under conditions of foreign domination or foreign threat. Thus members of the Taki Onqoy movement in Peru sought to wipe out Spanish influence and control, while Chinese and Japanese authorities clamped down firmly on European missionaries, even as they maintained some interest in European technological and scientific skills. Another kind of conflict derived from the efforts to control the terms of cultural borrowing. For example, European missionaries and Muslim reformers alike sought to root out "idolatry" among native converts.

To ease the tensions of cultural borrowing, efforts to "domesticate" foreign ideas and practices proliferated. Thus the Jesuits in China tried to point out similarities between Christianity and Confucianism, and Native American converts identified Christian saints with their own gods and spirits. By the late seventeenth century, some local churches in central Mexico had come to associate Catholicism less with the Spanish than with ancient pre-Aztec communities and beliefs that were now, supposedly, restored to their rightful position.

The pace of global cultural borrowing and its associated tensions stepped up even more as Europe's modern transformation unfolded in the nineteenth century and as its imperial reach extended and deepened around the world.

Second Thoughts

What's the Significance?

Protestant Reformation
Catholic Counter-Reformation
Taki Onqoy
Jesuits in China
Wahhabi Islam
Wang Yangmin
kaozheng
Mirabai
Sikhism
Copernicus
Newton
European Enlightenment
Voltaire
Condorcet and the idea of progress

To assess your mastery of the material in this chapter, visit the **Student Center** at bedfordstmartins.com/strayer.

Big Picture Questions

1. Why did Christianity take hold in some places more than in others?
2. In what ways was the missionary message of Christianity shaped by the cultures of Asian and American peoples?
3. Compare the processes by which Christianity and Islam became world religions.
4. In what ways did the spread of Christianity, Islam, and modern science give rise to culturally based conflicts?
5. Based on Chapters 13 through 16, how does the history of Islam in the early modern era challenge a Eurocentric understanding of those centuries?

Next Steps: For Further Study

For Web sites and additional documents related to this chapter, see **Make History** at bedfordstmartins.com/strayer.

Natana J. Delong-Bas, *Wahhabi Islam: From Revival and Reform to Global Jihad* (2004). A careful study of the origins of Wahhabi Islam and its subsequent development.

Patricia B. Ebrey et al., *East Asia: A Cultural, Social, and Political History* (2005). A broad survey by major scholars in the field.

Geoffrey C. Gunn, *First Globalization: The Eurasian Exchange, 1500–1800* (2003). Explores the two-way exchange of ideas between Europe and Asia in the early modern era.

Toby E. Huff, *The Rise of Early Modern Science* (2003). A fascinating and controversial explanation as to why modern science arose in the West rather than in China or the Islamic world.

Steven Shapin, *The Scientific Revolution* (1996). A brief, accessible, and scholarly account of the emergence of modern science.

Paul R. Spickard and Kevin M. Cragg, *A Global History of Christians* (1994). A broad-brush account of the global spread of Christianity and its various expressions in different cultures.

Internet Modern History Sourcebook, "The Scientific Revolution," http://www.fordham.edu/halsall/mod/modsbook09.html. A collection of primary-source documents dealing with the breakthrough to modern science in Europe.