The primary documents in this chapter emphasize two broad questions that faced these seventeenth-century scientists. First, how can one ascertain the truth? The answers of Descartes, Galileo, and Newton are examined. Second, what is the proper line between science and scriptural authority? Galileo, who came most directly into conflict with Church authorities, provides us with clues.

The secondary documents concentrate on the nature and causes of the Scientific Revolution. In what ways was seventeenth-century science different from the science of earlier centuries? What explains these differences? What were the motives of seventeenth-century scientists?

Most of these intellectual developments were known to only a few throughout Europe. In the eighteenth century those scientific ideas and methods became popularized as part of the intellectual ferment of the Enlightenment.

**Primary Sources**

**The Discourse on Method**

**René Descartes**

Seventeenth-century science needed new philosophical and methodological standards for truth to replace those traditionally used to support scientific assumptions. These were forcefully provided by René Descartes (1596–1650) in his Discourse on Method (1637). Born and educated in France, but spending his most productive years in Holland, Descartes gained fame as a mathematician, physicist, and metaphysical philosopher. The following excerpt from his Discourse contains the best-known statement of his approach to discovering truth.

**CONSIDER:** The ways in which Descartes' approach constitutes a break with traditional ways of ascertaining the truth; the weaknesses of this approach and how a modern scientist might criticize this method; how this approach reflects Descartes' background as a mathematician.

In place of the multitude of precepts of which logic is composed, I believed I should find the four following rules quite sufficient, provided I should firmly and steadfastly resolve not to fail of observing them in a single instance.

The first rule was never to receive anything as a truth which I did not clearly know to be such; that is, to avoid haste and prejudice, and not to comprehend anything more in my judgments than that which should present itself so clearly and so distinctly to my mind that I should have no occasion to entertain a doubt of it.

The second rule was to divide every difficulty which I should examine into as many parts as possible, or as might be required for resolving it.

The third rule was to conduct my thoughts in an orderly manner, beginning with objects the most simple and the easiest to understand, in order to ascend as it were by steps to the knowledge of the most composite, assuming some order to exist even in things which did not appear to be naturally connected.

The last rule was to make enumerations so complete, and reviews so comprehensive, that I should be certain of omitting nothing.

Those long chains of reasoning, quite simple and easy, which geometers are wont to employ in the accomplishment of their most difficult demonstrations, led me to think that everything which might fall under the cognizance of the human mind might be connected together in a similar manner, and that, provided only one should take care not to receive anything as true which was not so, and if one were always careful to preserve the order necessary for deducing one truth from another, there would be none so remote at which he might not at last arrive, nor so concealed which he might not discover. And I had no great difficulty in finding those with which to make a beginning, for I knew already that these must be the simplest and easiest to apprehend; and considering that, among all those who had up to this time made discoveries in the sciences, it was the mathematicians alone who had been able to arrive at demonstrations—that is to say, at proofs certain and evident—I did not doubt that I should begin with the same truths which they investigated.

**Letter to Christina of Tuscany: Science and Scripture**

**Galileo Galilei**

The most renowned scientist at the beginning of the seventeenth century was the Italian astronomer, mathematician, and physicist Galileo Galilei (1564–1642). His discoveries...

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about gravity, velocity, and the movement of astronomic bodies were grounded in a scientific method that ran contrary to the accepted standards for truth and authority. In the following excerpt from a letter to the Grand Duchess Christina of Tuscany (1615), Galileo defends his ideas and delineates his view of the correct line between science and scriptural authority.

**CONSIDER:** According to Galileo’s view, the kinds of topics or questions that are appropriately scientific and those that are appropriately theological; how Galileo’s views compare with those of Descartes; why Galileo’s views are so crucial to the Scientific Revolution.

I think that in discussions of physical problems we ought to begin not from the authority of scriptural passages, but from sense-experiences and necessary demonstrations; for the holy Bible and the phenomena of nature proceed alike from the divine Word, the former as the dictate of the Holy Ghost and the latter as the observant execratrix of God’s commands. It is necessary for the Bible, in order to be accommodated to the understanding of every man, to speak many things which appear to differ from the absolute truth so far as the bare meaning of the words is concerned. But Nature, on the other hand, is inexorable and immutable; she never transgresses the laws imposed upon her, or cares a whit whether her abstruse reasons and methods of operation are understandable to men. For that reason it appears that nothing physical which sense-experience sets before our eyes, or which necessary demonstrations prove to us, ought to be called in question (much less condemned) upon the testimony of biblical passages which may have some different meaning beneath their words. For the Bible is not chained in every expression to conditions as strict as those which govern all physical effects; nor is God any less excellently revealed in Nature’s actions than in the sacred statements of the Bible. . . .

From this I do not mean to infer that we need not have an extraordinary esteem for the passages of holy Scripture. On the contrary, having arrived at any certainties in physics, we ought to utilize these as the most appropriate aids in the true exposition of the Bible and in the investigation of those meanings which are necessarily contained therein, for these must be concordant with demonstrated truths. I should judge that the authority of the Bible was designed to persuade men of those articles and propositions which, surpassing all human reasoning, could not be made credible by science, or by any other means than through the very mouth of the Holy Spirit.

Yet even in those propositions which are not matters of faith, this authority ought to be preferred over that of all human writings which are supported only by bare assertions or probable arguments, and not set forth in a demonstrative way. This I hold to be necessary and proper to the same extent that divine wisdom surpasses all human judgment and conjecture.

But I do not feel obliged to believe that that same God who has endowed us with senses, reason, and intellect has intended to forgo their use and by some other means to give us knowledge which we can attain by them.

**The Papal Inquisition of 1633: Galileo Condemned**

Not surprisingly, Galileo found his views under attack from a variety of corners, including important groups within the Church. Ultimately his defense of Copernicanism, which held that the earth was not the center of the universe, was formally condemned by the Church. When he argumentatively summarized these ideas again in his Dialogue Concerning the Two Chief World Systems (1632), he was brought before the Papal Inquisition, forced to recant his views, and confined to a villa on the outskirts of Florence. The following are some of the main charges against Galileo during his trial for heresy before the Inquisition in 1633.

**CONSIDER:** Why Galileo’s views were so threatening to the Church; some of the long-range consequences of such a stance by the Church toward these views.

We say, pronounce, sentence, and declare that you, the said Galileo, by reason of the matters adduced in trial, and by you confessed as above, have rendered yourself in the judgment of this Holy Office vehemently suspected of heresy, namely, of having believed and held the doctrine—which is false and contrary to the sacred and divine Scriptures—that the Sun is the center of the world and does not move from east to west and that the Earth moves and is not the center of the world; and that an opinion may be held and defended as probable after it has been declared and defined to be contrary to the Holy Scripture; and that consequently you have incurred all the censures and penalties imposed and promulgated in the sacred canons and other constitutions, general and particular, against such delinquents. From which we are content that you be absolved, provided that, first, with a sincere heart and unfeigned faith, you abjure, curse, and detest before us the aforesaid errors and heresies and every other error and heresy contrary to the Catholic and Apostolic Roman Church in the form to be prescribed by us for you.

Mathematical Principles of Natural Philosophy

Sir Isaac Newton

The greatest scientific synthesis of the seventeenth century was made by Isaac Newton (1642–1727), who was born in England and attained a post as professor of mathematics at Cambridge University. Newton made his most important discoveries early in life. By the beginning of the eighteenth century he was the most admired scientific figure in Europe. He made fundamental discoveries concerning gravity, light, and differential calculus. Most important, he synthesized various scientific findings and methods into a description of the universe as working according to measurable, predictable mechanical laws. Newton's most famous work, Mathematical Principles of Natural Philosophy (1687), contains his theory of universal gravitation. In the following selection from that work, Newton describes his four rules for arriving at knowledge.

CONSIDER: Why Newton's rules might be particularly useful for the experimental sciences; ways these rules differ from those of Descartes.

RULE I

We are to admit no more causes of natural things than such as are both true and sufficient to explain their appearances.


To this purpose the philosophers say that Nature does nothing in vain, and more is in vain when less will serve; for Nature is pleased with simplicity, and affects not the pomp of superfluous causes.

RULE II

Therefore to the same natural effects we must, as far as possible, assign the same causes.

As to respiration in a man and in a beast; the descent of stones in Europe and in America; the light of our culinary fire and of the sun; the reflection of light in the earth, and in the planets.

RULE III

The qualities of bodies, which admit neither intensification nor remission of degrees, and which are found to belong to all bodies within the reach of our experiments, are to be esteemed the universal qualities of all bodies whatsoever.

For since the qualities of bodies are only known to us by experiments, we are to hold for universal all such as universally agree with experiments; and such as are not liable to diminution can never be quite taken away.

RULE IV

In experimental philosophy we are to look upon propositions inferred by general induction from phenomena as accurately or very nearly true, notwithstanding any contrary hypotheses that may be imagined, till such time as other phenomena occur, by which they may either be made more accurate, or liable to exceptions.

This rule we must follow, that the argument of induction may not be evaded by hypotheses.

A Vision of the New Science

One of the most important figures of the Scientific Revolution was the astronomer and mathematician Johannes Kepler (1571–1630). Figure 6.1 shows a page from the front of one of his works, first printed in Nuremberg in 1627, in which the "edifice" of astronomy is presented allegorically. The older but still respectable pillars of astronomy of Hipparchus and Ptolemy give way to the new, sturdy pillars of Kepler's immediate predecessors, Copernicus and Tycho Brahe. In the lower left panel Kepler is pictured in his study; in the center panel is a map of the island where Brahe's observatory was located; in the right-hand panel is a picture of two people working on a printing press. Throughout are various instruments used in astronomy.

The picture reveals much about the Scientific Revolution. The instruments emphasize how important measurement and observation were to the new science. The depiction of the old and new pillars suggests that the new scientists were replacing if not necessarily challenging the old, accepted scientific authorities by building on the work of their immediate predecessors—here Brahe on Copernicus, and Kepler on Brahe and Copernicus. The importance of communication among scientists is indicated by tribute to the printing press.

CONSIDER: How this picture illustrates the ways in which seventeenth-century scientists were breaking with earlier scientific assumptions.

The Anatomy Lesson of Dr. Tulp

Rembrandt van Rijn

This 1632 painting by Dutch artist Rembrandt van Rijn (1606–1669; figure 6.2) shows Dr. Nicholaas Tulp using the body of a hanged criminal to give an anatomy lesson.
importance? Second, how should we characterize the philosophers? Who were they? What were their common psychological traits, their religious beliefs, and their interactions? Finally, how did Enlightenment thought affect eighteenth-century politics before the French Revolution? Was there such a phenomenon as “enlightened despotism,” and if so, what did it mean?

Together, the sources should reveal an intellectual movement still tied to the traditional society of the Ancien Régime but with strikingly modern characteristics. Toward the end of the eighteenth century, many of the ideas of the Enlightenment played an important role in the French Revolution—the subject of the next chapter.

Primary Sources

What Is Enlightenment?
Immanuel Kant

One of the most pervasive themes among Enlightenment thinkers was a self-conscious sense of a spirit of enlightenment. This is illustrated in the following excerpt from a short essay by Immanuel Kant (1724–1804) of Königsberg in East Prussia. Kant, one of the world’s most profound philosophers, is particularly known for his analysis of the human mind and how it relates to nature, as set forth in his Critique of Pure Reason (1781). In the following essay, written in 1784, Kant defines the spirit of the Enlightenment and describes some of its implications.

**CONSIDER:** What Kant means by “freedom,” and why he feels freedom is so central to the Enlightenment; how people can become enlightened and the appropriate environment to facilitate this enlightenment; what Kant would consider “mature,” how Kant relates enlightenment and politics.

Enlightenment is man’s leaving his self-caused immaturity. Immaturity is the incapacity to use one’s intelligence without the guidance of another. Such immaturity is self-caused if it is not caused by lack of intelligence, but by lack of determination and courage to use one’s intelligence without being guided by another. Sapere Aude! Have the courage to use your own intelligence! therefore the motto of the enlightenment.

Through laziness and cowardice a large part of mankind, even after nature has freed them from alien guidance, gladly remain immature. It is because of laziness and cowardice that it is so easy for others to usurp the role of guardians. It is so comfortable to be a minor! If I have a book which provides meaning for me, a pastor who has conscience for me, a doctor who will judge my diet for me and so on, then I do not need to exert myself. I do not have any need to think; if I can pay, others will take over the tedious job for me. The guardians who have kindly undertaken the supervision will see to it that by far the largest part of mankind, including the entire “beautiful sex,” should consider the step into maturity, not only as difficult but as very dangerous . . . .

But it is more nearly possible for a public to enlighten itself: this is even inescapable if only the public is given its freedom . . . .

All that is required for this enlightenment is freedom; and particularly the least harmful of all that may be called freedom, namely, the freedom for man to make public use of his reason in all matters . . . .

The question may now be put: Do we live at present in an enlightened age? The answer is: No, but in an age of enlightenment. Much still prevents men from being placed in a position or even being placed into position to use their own minds securely and well in matters of religion. But we do have very definite indications that this field of endeavor is being opened up for men to work freely and reduce gradually the hindrances preventing a general enlightenment and an escape from self-caused immaturity. In this sense, this age is the age of enlightenment and the age of Frederick (The Great) . . . .

I have emphasized the main point of enlightenment, that is of man’s release from his self-caused immaturity, primarily in matters of religion. I have done this because our rulers have no interest in playing the guardian of their subjects in matters of arts and sciences. Furthermore immaturity in matters of religion is not only most noxious but also most dishonorable. But the point of view of a head of state who favors freedom in the arts and sciences goes even farther; for he understands that there is no danger in legislation permitting his subjects to make public use of their own reason and to submit publicly their thoughts regarding a better framing of such laws together with a frank criticism of existing legislation. We have a shining example of this; no prince excels him whom we admire. Only he who is himself enlightened does not fear spectres when he at the same time has a well-disciplined army at his disposal as a guarantee of public peace. Only he can say what (the ruler of a) free state dare not say: Argue as much as you want and about whatever you want but obey!

The System of Nature

Baron d’Holbach

Most Enlightenment thinkers rejected traditional sources of authority such as the Church or custom. Instead, they argued that people should rely on reason, experience, and nature as their guides. Baron d’Holbach (1723–1789) exemplifies this in his varied writings. A German aristocrat and scientist who assumed French citizenship, d’Holbach is best known for his attacks on organized religion and his contributions to Diderot’s Encyclopedia. In the following selection from his System of Nature (1770), d’Holbach focuses on the meaning of enlightenment and what should be done to obtain this enlightenment.

CONSIDER: Why enlightenment is so important; whether “nature” has a meaning similar to God for d’Holbach; the views about the nature of enlightenment that Kant and d’Holbach share.

The source of man’s unhappiness is his ignorance of Nature. The pertinacity with which he clings to blind opinions imbied in his infancy, which interweave themselves with his existence, the consequent prejudice that warps his mind, that prevents its expansion, that renders him the slave of fiction, appears to doom him to continual error. He resembles a child destitute of experience, full of idle notions: a dangerous leaven mixes itself with all his knowledge: it is of necessity obscure, it is vacillating and false:—He takes the tone of his ideas on the authority of others, who are themselves in error, or else have an interest in deceiving him. To remove this Cimmerian darkness, these barriers to the improvement of his condition; to disentangle him from the clouds of error that envelop him, that obscure the path he ought to tread; to guide him out of this Cretan labyrinth, requires the clue of Ariadne, with all the love she could bestow on Theseus. It exacts more than common exertion; it needs a most determined, a most undaunted courage—it is never effected but by a persevering exertion to act, to think for himself; to examine with rigour and impartiality the opinions he has adopted. . . .

The most important of our duties, then, is to seek means by which we may destroy delusions that can never do more than mislead us. The remedies for these evils must be sought for in Nature herself; it is only in the abundance of her resources, that we can rationally expect to find antidotes to the mischiefs brought upon us by an ill-directed, by an overpowering enthusiasm. It is time these remedies were sought; it is time to look the evil boldly in the face, to examine its foundations, to scrutinize its super-structure: reason, with its faithful guide experience, must attack in their entrenchments those prejudices to which the human race has but too long been the victim. For this purpose reason must be restored to its proper rank,—it must be rescued from the evil company with which it is associated. . . .

Truth speaks not to these perverse beings:—her voice can only be heard by generous minds accustomed to reflection, whose sensibilities make them lament the numberless calamities showered on the earth by political and religious tyranny—whose enlightened minds contemplate with horror the immensity, the ponderosity of that series of misfortunes with which error has in all ages overwhelmed mankind.

The civilized man, is he whom experience and social life have enabled to draw from nature the means of his own happiness; because he has learned to oppose resistance to those impulses he receives from exterior beings, when experience has taught him they would be injurious to his welfare.

The enlightened man, is man in his maturity, in his perfection; who is capable of pursuing his own happiness; because he has learned to examine, to think for himself, and not to take that for truth upon the authority of others, which experience has taught him examination will frequently prove erroneous. . . .

It necessarily results, that man in his researches ought always to fall back on experience, and natural philosophy: These are what he should consult in his religion—in his morals—in his legislation—in his political government—in the arts—in the sciences—in his pleasures—in his misfortunes. Experience teaches that Nature acts by simple, uniform, and invariable laws. It is by his senses man is bound to this universal Nature; it is by his senses he must penetrate her secrets; it is from his senses he must draw experience of her laws. Whenever, therefore, he either fails to acquire experience or quits its path, he stumbles into an abyss, his imagination leads him astray.

Prospectus for the Encyclopedia of Arts and Sciences

Denis Diderot

More than any other work, the Encyclopedia of Arts and Sciences, edited by Denis Diderot (1713–1784) and Jean-le-Rond d’Alembert (1717–1783), epitomizes the Enlightenment.

Written between 1745 and 1780, it presented to the public the sum of knowledge considered important by Enlightenment thinkers. The critical Enlightenment spirit underlying the Encyclopedia led traditional authorities to condemn it and to suppress it more than once. The following is an excerpt from the Prospectus that appeared in 1750, announcing the forthcoming Encyclopedia. The Prospectus was written by Diderot, a philosopher, novelist, and playwright who had already been in trouble with the authorities for his writings. The Prospectus apparently aroused widespread expectations; even before the first volume of the Encyclopedia appeared, more than a thousand orders for it had been received.

**Consider:** What a reader could hope to gain by purchasing the Encyclopedia and how these hopes themselves reflect the spirit of the Enlightenment; how this selection from the Prospectus reflects the same ideas expressed by Kant and d’Holbach; how the Enlightenment as described here related to the scientific revolution of the seventeenth century.

It cannot be denied that, since the revival of letters among us, we owe partly to dictionaries the general enlightenment that has spread in society and the germ of science that is gradually preparing men’s minds for more profound knowledge. How valuable would it not be, then, to have a book of this kind that one could consult on all subjects and that would serve as much to guide those who have the courage to work at the instruction of others as to enlighten those who only instruct themselves!

This is one advantage we thought of, but it is not the only one. In condensing to dictionary form all that concerns the arts and sciences, it remained necessary to make people aware of the assistance they lend each other; to make use of this assistance to render principles more certain and their consequences clearer; to indicate the distant and close relationships of the beings that make up nature, which have occupied men; to show, by showing the interlacing both of roots and of branches, the impossibility of understanding thoroughly some parts of the whole without exploring many others; to produce a general picture of the efforts of the human spirit in all areas and in all centuries; to present these matters with clarity; to give to each the proper scope, and to prove, if possible, our epigraph by our success: . . .

The majority of these works appeared during the last century and were not completely scorned. It was found that if they did not show much talent, they at least bore the marks of labor and of knowledge. But what would these encyclopedias mean to us? What progress have we not made since then in the arts and sciences? How many truths discovered today, which were not foreseen then? True philosophy was in its cradle; the geometry of infinity did not yet exist; experimental physics was just appearing; there was no dialectic at all; the laws of sound criticism were entirely unknown. Descartes, Boyle, Huyghens, Newton, Leibnitz, the Bernoullis, Locke, Bayle, Pascal, Corinne, Racine, Bourdaloue, Bossuet, etc., either had not yet been born or had not yet written. The spirit of research and competition did not motivate the scholars; another spirit, less fecund perhaps, but rarer, that of precision and method, had not yet conquered the various divisions of literature; and the academies, whose efforts have advanced the arts and sciences to such an extent, were not yet established. . . . At the end of this project you will find the tree of human knowledge, indicating the connection of ideas, which has directed us in this vast operation.

### The Philosophe

Enlightenment thinkers often referred to themselves as “philosophes,” which is technically the French word for philosophers. The term had a special meaning bound up with the spirit of the Enlightenment. This is dealt with directly in the following selection, “The Philosopher,” from the Encyclopedia. It has traditionally been assumed that Diderot is the author of “The Philosopher,” but it may have been written by another person, perhaps Du Marsais. In any case, it is an authoritative treatment of the topic according to Enlightenment precepts.

**Consider:** The characteristics of the philosopher; how this compares to Kant’s definition of enlightenment and d’Holbach’s definition of a civilized or enlightened man; how a twentieth-century philosopher might differ with this definition of a philosopher.

Other men make up their minds to act without thinking, nor are they conscious of the causes which move them, not even knowing that such exist. The philosopher, on the contrary, distinguishes the causes to what extent he may, often anticipates them, and knowingly surrenders himself to them. In this manner he avoids objects that may cause him sensations that are not conducive to his well being or his rational existence, and seeks those which may excite in him affections agreeable with the state in which he finds himself. Reason is in the estimation of the philosopher what grace is to the Christian. Grace determines the Christian’s action; reason the philosopher’s.

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Other men are carried away by their passions, so that the acts which they produce do not proceed from reflection. These are the men who move in darkness; while the philosopher, even in his passions, moves only after reflection. He marches at night, but a torch goes on ahead.

The philosopher forms his principles upon an infinity of individual observations. The people adopt the principle without a thought of the observations which have produced it, believing that the maxim exists, so to speak, of itself; but the philosopher takes the maxim at its source, he examines its origin, he knows its real value, and only makes use of it, if it seems to him satisfactory.

Truth is not for the philosopher a mistress who vitiates his imagination, and whom he believes to find everywhere. He contents himself with being able to discover it wherever he may chance to find it. He does not confound it with its semblance; but takes for true that which is true, for false that which is false, for doubtful that which is doubtful, and for probable that which is only probable. He does more—and this is the great perfection of philosophy; that when he has no real grounds for passing judgment, he knows how to remain undetermined.

The world is full of persons of understanding, even of much understanding, who always pass judgment. They are guessing always, because it is guessing to pass judgment without knowing when one has proper grounds for judgment. They misjudge of the capacity of the human mind; they believe it is possible to know everything, and so they are ashamed not to be prepared to pass judgment, and they imagine that understanding consists in passing judgment. The philosopher believes that it consists in judging well: he is better pleased with himself when he has suspended the faculty of determining, than if he had determined before having acquired proper grounds for his decision.

The philosophic spirit is then a spirit of observation and of exactness, which refers everything to its true principles; but it is not the understanding alone which the philosopher cultivates; he carries further his attention and his labors.

Man is not a monster, made to live only at the bottom of the sea or in the depths of the forest; the very necessities of his life render intercourse with others necessary; and in whatsoever state we find him, his needs and his well-being lead him to live in society. To that reason demands of him that he should know, that he should study and that he should labor to acquire social qualities.

Our philosopher does not believe himself an exile in the world; he does not believe himself in the enemy's country; he wishes to enjoy, like a wise economist, the goods that nature offers him; he wishes to find his pleasure with others; and in order to find it, it is necessary to assist in producing it; so he seeks to harmonize with those with whom chance or his choice has determined he shall live; and he finds at the same time that which suits him: he is an honest man who wishes to please and render himself useful.

The philosopher is then an honest man, actuated in everything by reason, one who joins to the spirit of reflection and of accuracy the manners and qualities of society.

Philosophical Dictionary: The English Model

Voltaire

François Marie Arouet, who later adopted the name Voltaire (1694–1778), was certainly the most famous of the philosophes. Writing almost every type of literature, from drama and satire to history and essays, he exhibited most of the main elements of the Enlightenment. One of these was the philosophes' admiration for and idealization of England's political system. Voltaire gained familiarity with England during a three-year visit, from 1726 to 1729, and played an important role in popularizing the ideas of English scientists and the principles of the English political system. The following is an excerpt from his Philosophical Dictionary, first published in 1764.

CONSIDER: What Voltaire admires about the English constitution; the implied criticism of the French political system; whether Voltaire idealizes the English system.

The English constitution has, in fact, arrived at that point of excellence, in consequence of which all men are restored to those natural rights, which, in nearly all monarchies, they are deprived of. These rights are, entire liberty of person and property; freedom of the press; the right of being tried in all criminal cases by a jury of independent men—the right of being tried only according to the strict letter of the law; and the right of every man to profess, unmolested, what religion he chooses, while he renounces offices, which the members of the Anglican or established church alone can hold. These are denominated privileges. And, in truth, invaluable privileges they are in comparison with the usages of most other nations of the world! To be secure on lying down that you shall rise in possession of the same property with which you retired to rest; that you shall not be torn from the arms of your wife, and from your children, in the dead of night,
to be thrown into a dungeon, or buried in exile in a desert; that, when rising from the bed of sleep, you will have the power of publishing all your thoughts; and that, if you are accused of having either acted, spoken, or written wrongly, you can be tried only according to law. These privileges attach to every one who sets his foot on English ground. A foreigner enjoys perfect liberty to dispose of his property and person; and, if accused of any offence, he can demand that half the jury shall be composed of foreigners.

I will venture to assert, that, were the human race solemnly assembled for the purpose of making laws, such are the laws they would make for their security.

A Vindication of the Rights of Woman

Mary Wollstonecraft

While the Enlightenment was dominated by men, there were possibilities for active involvement by women. Several women played particularly important roles as patrons and intellectual contributors to the gatherings of philosophers and members of the upper-middle-class and aristocratic elite held in the salons of Paris and elsewhere. It was, however, far more difficult for a woman to publish serious essays in the Enlightenment tradition. Indeed, Enlightenment thinkers did little to change basic attitudes about the inferiority of women. One person who managed to do both was Mary Wollstonecraft (1759–1797), a British author who in 1792 published A Vindication of the Rights of Woman. The book was a sharply reasoned attack against the oppression of women and an argument for educational change. In the following excerpt Wollstonecraft addresses the author of a proposed new constitution for France that, in her opinion, does not adequately deal with the rights of women.

Consider: Why education is so central to her argument; the ways in which this argument reflects the methods and ideals of the Enlightenment.

Contending for the rights of woman, my main argument is built on this simple principle, that if she be not prepared by education to become the companion of man, she will stop the progress of knowledge and virtue; for truth must be common to all, or it will be ineffectual with respect to its influence on general practice. And how can woman be expected to co-operate unless she knows why she ought to be virtuous? unless freedom strengthens her reason till she comprehends her duty, and sees in what manner it is connected with her real good. If children are to be educated to understand the true principle of patriotism, their mother must be a patriot; and the love of mankind, from which an orderly train of virtues spring, can only be produced by considering the moral and civil interest of mankind; but the education and situation of woman at present shuts her out from such investigations.

In this work I have produced many arguments, which to me were conclusive, to prove that the prevailing notion respecting a sexual character was subversive of morality, and I have contended, that to render the human body and mind more perfect, chastity must more universally prevail, and that chastity will never be respected in the male world till the person of a woman is not, as it were, idolised, when little virtue or sense embellish it with the grand traces of mental beauty, or the interesting simplicity of affection.

Consider, sir, dispassionately these observations, for a glimpse of this truth seemed to open before you when you observed, "that to see one-half of the human race excluded by the other from all participation of government was a political phenomenon, that, according to abstract principles, it was impossible to explain." If so, on what does your constitution rest? If the abstract rights of man will bear discussion and explanation, those of woman, by a parity of reasoning, will not shrink from the same test; though a different opinion prevails in this country, built on the very arguments which you use to justify the oppression of woman—prescription.

Consider—I address you as a legislator—whether, when men contend for their freedom, and to be allowed to judge for themselves respecting their own happiness, it be not inconsistent and unjust to subjugate women, even though you firmly believe that you are acting in the manner best calculated to promote their happiness? Who made man the exclusive judge, if woman partake with him of the gift of reason?

The Age of Reason: Deism

Thomas Paine

Many Enlightenment thinkers were strongly opposed to traditional religious institutions and ideas. Yet only a few went so far as to profess atheism. More typical was some form of deism, a belief in a God who created a rational universe with natural laws but who no longer intervene in the course of events. A good example of this belief is found in the following excerpt from Thomas Paine's Age of Reason (1794). Paine (1737–1809) was an unusually international person. Born in England, he became an American patriot and later a

member of the French Convention (1792–1793). His most famous works are Common Sense and The Rights of Man, in both of which he justifies revolution. In The Age of Reason Paine places himself within the tradition of Enlightenment thought and summarizes his religious views.

**Consider:** Why Paine is so opposed to traditional religious institutions; how this opposition is consistent with other Enlightenment thought; how a sincere, sophisticated member of the Catholic Church might have responded to this.

As several of my colleagues, and others of my fellow-citizens of France, have given me the example of making their voluntary and individual profession of faith, I also will make mine; and I do this with all that sincerity and frankness with which the mind of man communicates with itself.

I believe in one God, and no more; and I hope for happiness beyond this life.

I believe the equality of man, and I believe that religious duties consist in doing justice, loving mercy, and endeavouring to make our fellow-creatures happy.

But, lest it should be supposed that I believe many other things in addition to these, I shall, in the progress of this work, declare the things I do not believe, and my reasons for not believing them.

I do not believe in the creed professed by the Jewish church, by the Roman church, by the Greek church, by the Turkish church, by the Protestant church, nor by any church that I know of. My own mind is my own church.

All national institutions of churches, whether Jewish, Christian, or Turkish, appear to me no other than human inventions set up to terrify and enslave mankind, and monopolize power and profit.

I do not mean by this declaration to condemn those who believe otherwise; they have the same right to their belief as I have to mine. But it is necessary to the happiness of man, that he be mentally faithful to himself. Infidelity does not consist in believing, or in disbelieving; it consists in professing to believe what he does not believe.

It is impossible to calculate the moral mischief, if I may so express it, that mental lying has produced in society. When a man has so far corrupted and prostituted the chastity of his mind, as to subscribe his professional belief to things he does not believe, he has prepared himself for the commission of every other crime. He takes up the trade of a priest for the sake of gain, and, in order to qualify himself for that trade, he begins with a perjury. Can we conceive anything more destructive to morality than this?

Soon after I had published the pamphlet Common Sense, in America, I saw the exceeding probability that a revolution in the system of government would be followed by a revolution in the system of religion. The adulterous connection of church and state, wherever it had taken place, whether Jewish, Christian, or Turkish, had so effectually prohibited, by pains and penalties, every discussion upon established creeds, and upon first principles of religion, that until the system of government should be changed, those subjects could not be brought fairly and openly before the world; but that whenever this should be done, a revolution in the system of religion would follow. Human inventions and priest-craft would be detected; and man would return to the pure, unmixed, and unadulterated belief of one God, and no more.

The Social Contract

**Jean Jacques Rousseau**

More than anyone else, Jean Jacques Rousseau (1712–1778) tested the outer limits of Enlightenment thought and went on to criticize its very foundations. Born in Geneva, he spent much of his life in France (mainly in Paris), where he became one of the philosophers who contributed to the Encyclopedia. Yet he also undermined Enlightenment thought by holding that social institutions had corrupted people and that human beings in the state of nature were purer, freer, and happier than they were in modern civilization. This line of thought provided a foundation for the growth of Romanticism in the late eighteenth and early nineteenth centuries. Rousseau’s most important political work was The Social Contract (1762), in which he argued for popular sovereignty. In the following selection from that work, Rousseau focuses on what he considers the fundamental argument of the book—the passage from the state of nature to the civil state by means of the social contract.

**Consider:** Rousseau’s solution to the main problem of The Social Contract: the advantages and disadvantages of the social contract; what characteristics of Enlightenment thought are reflected in this selection.

“The problem is to find a form of association which will defend and protect with the whole common force the person and goods of each associate, and in which each, while uniting himself with all, may still obey himself alone, and remain as free as before.” This is the fundamental problem of which The Social Contract provides the solution.

The clauses of this contract are so determined by the nature of the act that the slightest modification would make them vain and ineffective; so that, although they have perhaps never been formally set forth, they are everywhere the same and everywhere tacitly admitted.

and recognised, until, on the violation of the social compact, each regains his original rights and resumes his natural liberty, while losing the conventional liberty in favour of which he renounced it.

These clauses, properly understood, may be reduced to one—the total alienation of each associate, together with all his rights, to the whole community; for, in the first place, as each gives himself absolutely, the conditions are the same for all; and, this being so, no one has any interest in making them burdensome to others.

Moreover, the alienation being without reserve, the union is as perfect as it can be, and no associate has anything more to demand: for, if the individuals retained certain rights, as there would be no common superior to decide between them and the public, each, being on one point his own judge, would ask to be so on all; the state of nature would thus continue, and the association would necessarily become inoperative or tyrannical.

Finally, each man, in giving himself to all, gives himself to nobody; and as there is no associate over whom he does not acquire the same right as he yields others over himself, he gains on equivalent for everything he loses, and an increase of force for the preservation of what he has.

If then we discard from the social compact what is not of its essence, we shall find that it reduces itself to the following terms—

Each of us puts his person and all his power in common under the supreme direction of the general will, and, in our corporate capacity, we receive each member as an indivisible part of the whole.

The passage from the state of nature to the civil state produces a very remarkable change in man, by substituting justice for instinct in his conduct, and giving his actions the morality they had formerly lacked. Then only, when the voice of duty takes the place of physical impulses and right of appetite, does man, who so far had considered only himself, find that he is forced to act on different principles, and to consult his reason before listening to his inclinations. Although, in this state, he deprives himself of some advantages which he got from nature, he gains in return others so great, his faculties are so stimulated and developed, his ideas so extended, his feelings so ennobled, and his whole soul so uplifted, that, did not the abuses of this new condition often degrade him below that which he left, he would be bound to bless continually the happy moment which took him from it for ever, and, instead of a stupid and unimaginative animal, made him an intelligent being and a man.

Let us draw up the whole account in terms easily commensurable. What man loses by the social contract is his natural liberty and an unlimited right to everything he tries to get and succeeds in getting; what he gains is civil liberty and the proprietorship of all he possesses. If we are to avoid mistake in weighing one against the other, we must clearly distinguish natural liberty, which is bounded only by the strength of the individual, from civil liberty, which is limited by the general will; and possession, which is merely the effect of force or the right of the first occupier, from property, which can be founded only on a positive title.

We might, over and above all this, add, to what man acquires in the civil state, moral liberty, which alone makes him truly master of himself; for the mere impulse of appetite is slavery, while obedience to a law which we prescribe to ourselves is liberty. But I have already said too much on this head, and the philosophical meaning of the word liberty does not now concern us.

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Visual Sources

Frontispiece of the Encyclopédie

This illustration (figure 8.1) appeared at the beginning of the 1751 edition to the Encyclopédie. A description guided the reader to its allegorical meanings. In the center and above all other figures stands Truth, "wrapped in a veil, radiant with a light which parts the clouds and disperses them." Close on her left is Reason, who lifts a veil from Truth; below her, Philosophy pulls the veil away. Throning, holding a Bible, kneels at the feet of Truth. On Truth's right is Imagination, "preparing to adorn and crown Truth." Below them are figures representing Geometry, Physics, Astronomy, Optics, Botany, Chemistry, Agriculture, History, and the arts. At the bottom are practitioners who will use the guides above them to make progress. As a whole and in its allegorical detail, this illustration represented the optimistic spirit of the Encyclopédie and the Enlightenment.

Consider: The meaning of the Enlightenment as represented by this illustration; the connections between first, the ideals of truth, reason, and imagination, second, the sciences and arts, and third, the practitioners depicted in this illustration.

Experiment with an Air Pump

Joseph Wright

Few paintings provide a better image of the Enlightenment than Experiment with an Air Pump (1768) by the British artist Joseph Wright (figure 8.2). The experiment takes place in the