COURSE GUIDEBOOK

The Birth of the Modern Mind: The Intellectual History of the 17th and 18th Centuries

Part I

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The Birth of the Modern Mind: The Intellectual History of the 17th and 18th Centuries, Part I
Professor Alan Charles Kors

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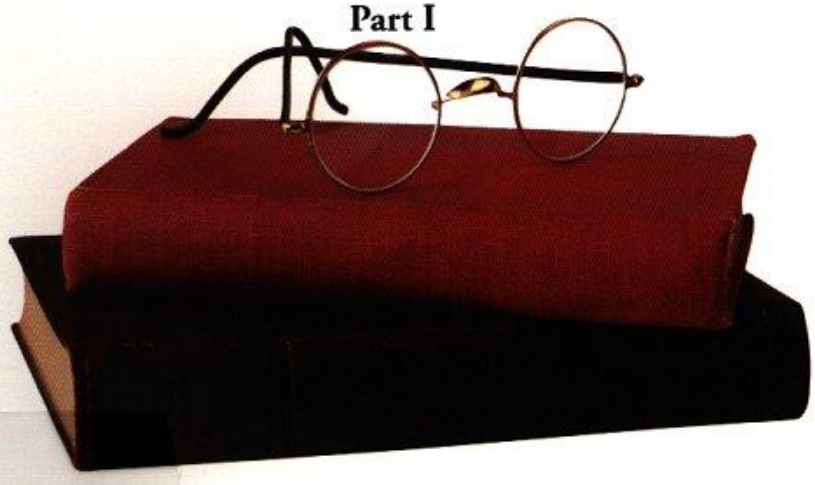
Part I



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The Birth of the Modern Mind: The Intellectual History of the Seventeenth and Eighteenth Centuries

Scope:

When the seventeenth century dawned in Europe, the world of learning and formal understanding was dominated by a belief in the presumptive authority of those past authors who had stood the test of time and in the system of thought—Aristotelian scholasticism—that had emerged from the fusion of those authorities and Christian doctrine. A series of fundamental assaults upon the inherited intellectual system dominated the intellectual life of the seventeenth century, just as the combined effects of growth in education and printing dramatically expanded the size and opportunities of the reading public. Those assaults constituted nothing less than a conceptual revolution among students of natural philosophy (the study of natural things by the natural mind), a revolution that altered the European relationship to thought, nature, and human possibility. In the eighteenth century, that conceptual revolution—associated most clearly with what we now term the "scientific revolution," but which was a transformation of all aspects of human inquiry and understanding—was popularized, translated into new media, and extended to areas of nature and human activity beyond those imagined by most seventeenth-century thinkers. By the end of the eighteenth century, the prestige of ancient thought and of the inherited system was a thing of the past. Educated Europeans believed that they had a new understanding—of thought and the human mind, of method, of nature, and of the uses of knowledge—with which they could come to know the world correctly for the first time in human history and with which they could rewrite the possibilities of human life. The goal of these lectures is to understand that conceptual and cultural revolution as a historical phenomenon, seeing the birth of modern thought in the dilemmas, debates, and extraordinary works of the seventeenth- and eighteenth-century mind.

The broad themes of the seventeenth century's intellectual revolution involved a rejection of the presumptive authority of the past in general and a diverse set of furious assaults upon the inherited Aristotelian synthesis in particular. In the place of that authority and system, thinkers proposed systems and outlooks that sometimes reinforced each other (in ways that we often find odd today but that were understandable to seventeenth- and eighteenth-century readers) and that often competed with each other as possible replacements of the increasingly discredited authorities. These new systems and outlooks included empiricism, experimentalism, rationalism, quantification of nature, mechanism, skepticism about philosophy and certainty, and the radical separation of theology and natural inquiry. Readers often evaluated theories in purely abstract terms, but the public also came to see theories as tested or embodied in concrete works of inquiry. The most dramatic such example was Newton's *Principia*

Mathematica, which so much of the culture came to believe had made the world comprehensible and coherent, and whose presumed system of inquiry became identified with the theory of knowledge advanced by John Locke in his *Essay Concerning Human Understanding*. The eighteenth century sought to take the models of Newton and Locke and apply them to the fullest possible range of human inquiry and endeavor.

The conceptual revolution of the seventeenth century was above all a series of philosophical clashes over abstract and fundamental issues, although its outcome was far from abstract. In the eighteenth century, the heirs of that conceptual revolution—the "new philosophers"—both popularized what they took to be the substance and implications of what had occurred in the seventeenth century and extended them to new areas of inquiry. They also dealt in various ways with the dramatic implications of the new philosophy for essential religious issues: miracle, revelation, supernaturalism, the authority of the priesthood, human nature, sin, and virtue. They sought to understand both society and religion in increasingly natural terms, to establish the rights of freedom of inquiry and belief, and to discredit, reform, or replace those authorities that could not justify themselves by the new criteria and proper uses of knowledge. In these endeavors, eighteenth-century thinkers effected a genuine cultural transformation more revolutionary than anything that occurred in the social or political life of eighteenth-century Europe. It would be false to attribute unintended consequences to the systems of thought from which these arose, but it is crucial to human understanding to know what have been, in fact, the consequences of ideas. This course will put us at the heart of the most far-reaching and consequential intellectual changes in the history of European civilization.

Objectives

Upon completion of this course, you should be able to:

1. Describe the major changes that occurred in the thought of the seventeenth and eighteenth centuries in terms of what the thinkers of this era most rejected in the intellectual inheritance with which this age began.
2. Summarize the main schools of seventeenth-century thought that influenced the cultural revolution of the eighteenth century.
3. Give an account of the revolution in epistemology (theories of knowledge) and ontology (theories of what exists as real) that most changed the ways in which European thought about their world.
4. Explain the so-called "scientific revolution" in terms of the debates and dilemmas of early modern thought.
5. Describe the problems posed by changes in thinking about nature and knowledge for the religious life of Europe.

6. Summarize which sides of seventeenth-century thinkers are appropriated and which sides are ignored by eighteenth-century thinkers.
7. Describe the conflicts that emerged in the eighteenth century between the "new philosophers" and the Church.
8. Explain how "the pursuit of happiness" became a compelling moral and political criterion for a religious culture.
9. Summarize the most striking unintended consequences of systems of thought in the seventeenth and eighteenth centuries.
10. Identify the most essential unresolved debates of the early modern period.

Lecture One

Introduction: Intellectual History and Conceptual Change

Scope: Although most generations and cultures view their own ways of thinking about the world as somehow "natural," ideas, including our most fundamental ways of thinking, change over time and have a particular history. Revolutions in ways of thinking are in many ways the most influential and far-reaching of all revolutions, because they affect our entire sense of legitimate authority, of the possible and the impossible, of right and wrong, and the potentials of human life. The revolution in thought that occurred in the seventeenth and eighteenth centuries was perhaps the most profound such transformation of European—if not human—life. Europe did nothing less than change its way of thinking about mind and knowledge themselves, about what is real in the world, and about how things happened. In short, Europe altered its relationship to knowledge and to nature. Political revolutions come and go, but this intellectual revolution has had enduring and profound effects. Our task is not to judge that revolution from various philosophical points of view, but to understand it as the seventeenth and eighteenth centuries understood it. Our goal is to observe and analyze the birth of the conceptual revolution of the seventeenth century and its popularization and extension in the cultural revolution of the eighteenth century.

Objectives — Upon completion of this lecture, the student should be able to:

1. Explain why human beings cannot understand their history without understanding the history of their thought and conceptualizations.
2. Distinguish between the analytic or judgmental history of philosophy, on the one hand, and intellectual history, on the other.
3. Describe what is meant by an intellectual "revolution."
4. Distinguish between the conceptual revolution of the seventeenth century and the more general cultural revolution of the eighteenth century.
5. Explain the intensity of reading for the educated mind of early modern Europe.

Outline

I. Abstract thought, as much or more than political, social, and economic behavior, has a history.
   A. Abstract thought (and, perhaps, a sense of the humorous) is a uniquely human characteristic.
      1. All higher species have relationships of power, social organization, and production. Human beings mediate all of those relationships by means of thought, which is why we have more than an evolutionary history.
      2. We change our thinking about the natural order—about what is out there (ontology, i.e., our speculation about kinds of existence and kinds of beings), why things happen (causality), and what knowledge itself is (epistemology).
   B. The history of our abstract thought is therefore an essential part of understanding ourselves as historical phenomena.
      1. Changes in our thinking and understanding alter our very relationship to nature (including to social phenomena).
      2. Every generation and civilization tends to think of its own way of thinking about the world (and about thinking itself) as somehow "natural." Intellectual history—the study of human intellectual behavior over time—teaches us, however, that our thought has a history, of which our way of thinking is the product. Learning that history, we see our own thought in relationship to its origins and to the often unintended consequences of those origins.
      3. If one were transported back to another time, one most easily would learn its relationships of power, production, social organization, and gender. The most foreign and difficult part of a past culture would be its way of thinking about the world and about thinking.
   C. Intellectual history is not the analytical or normative history of philosophy. Our goal is understanding the past as the past.
      1. The philosophical history of philosophy rightly asks about the truth value or power of prior ways of thought. Intellectual history explores the past in the spirit of the cultural anthropologist, not to judge of its merits or demerits, but to understand it, as much as is possible, on its own historical terms.
      2. We shall not ask, therefore, who was wise or foolish but, rather, how the world looked from different perspectives, what debates and dilemmas produced what new ways of thinking, what emerged in the seventeenth and eighteenth centuries.
      3. If we succeed, we should observe and understand more deeply nothing less than the birth of the modern mind.

II. The intellectual revolution of the seventeenth and eighteenth centuries was far more profound in its consequences for the human condition than any political or social revolution of the early modern period, and itself contributed crucially to revolutions in European life.
   A. If a culture changes the way it thinks about truth, nature, the knowable, the possible and impossible, and the causes of things, it will alter its expectations and behavior in almost all areas of human life.

B. If a culture changes the way it thinks about using mind properly, it changes the way that it thinks about almost everything.

C. A conceptual transformation is not confined to areas of thought alone. For example, to change one's evaluation of the force of inherited intellectual authority is to change one's whole attitude toward authority in general. To change one's attitude to the limits and possibilities of human life is to change one's expectations of and relationship to almost everything around one. This transformation occurs in the seventeenth and eighteenth centuries.

1. The seventeenth century brought a conceptual revolution in often very abstract terms. It initiated a struggle for who shall be the teachers of a civilization and what will be the lessons taught.
2. The eighteenth century brought a revolution in culture marked by the popularization of the conceptual revolution of the seventeenth century and by an extension of its consequences to new areas of human thought and activity.
3. A telling example involves how we get to "the pursuit of happiness" as the very purpose of human society.

III. The culture of the early modern intellectual revolution was very different from our own.

A. The subsistence economy of the time allowed only a few the necessary freedom from labor to study and think.

B. Travel was expensive and dangerous, and paintings were few. There were no media of mass communication to give one a window onto other times, places, and minds beyond one's provincial gaze.

C. Books brought with them an intense culture of close reading, logical argument, and pride in erudition and formal thought.

D. Our window onto the culture of that time is the texts that it produced, and the context in which those texts were written.

Essential Reading:

J.G.A. Pocock, *Politics, Language, and Time*, 1-41, 202-91.

Supplementary Reading:

Alan Charles Kors, *Atheism in France, 1650-1729: The Orthodox Sources of Disbelief.*

Questions for Discussion:

1. What do we gain or lose by suspending judgment and seeking to understand the past on its own terms?
2. Why do most people not realize that they have an implicit philosophical system?

Lecture Two

The Dawn of the Seventeenth Century: Aristotelian Scholasticism

Scope: Europe in the seventeenth century still had a traditionalist and subsistence culture. For that culture, past inheritances had a presumptive authority because they had stood the test of time and been successful parts of what had permitted mankind to survive. The term "innovator" was almost always a pejorative (usually preceded by the adjective "rash"). In the educated world, that intellectual inheritance was a fusion of Aristotelian (and other Greek) philosophy and of Christian theology; it was known as "scholasticism" or, more precisely, as Aristotelian scholasticism. Its means of teaching and persuasion was the *disputatio* (disputation), based upon (in order of importance) intellectual authorities, logical deduction from these authorities, and the appearances of the world. This system dominated the universities and schools of Europe. Thinkers believed that it brought coherence to the world, explaining the nature of all things in terms of their "material, formal, efficient, and final causes." By distinguishing among all beings in terms of the degrees of their "perfections," scholasticism created a "great chain of being" that permitted us to know contemplatively the value of all things. The science of final causes (teleology) permitted us to know contemplatively the purposes of things, and to grasp how, under God's design, all things strove for God's created order. The seventeenth century marked a momentous assault upon all aspects of the Aristotelian scholastic synthesis.

Objectives — Upon completion of this lecture, the student should be able to:

1. Describe the authority of tradition in the pre-modern intellectual world.
2. Explain the *disputatio* (disputation).
3. Describe the Aristotelian use of "perfections" and "forms."
4. Summarize the Aristotelian system of causes.
5. Explain teleology.
6. Describe the implications of the "great chain of being" for the kinds of knowledge that were most valued.
7. Explain why an attack on Aristotle's method threatened the whole edifice of early modern learning.

Outline

I. We begin with an overview of the intellectual inheritance of the seventeenth century.

- **A.** At the dawn of the seventeenth century, the dominant philosophical system was Aristotelian scholasticism—the philosophy of Aristotle as interpreted and adopted by the Christian schools of Europe.
- **B.** This system linked Aristotelian philosophy to Christian doctrine and provided the intellectual world of the seventeenth century with answers to fundamental questions such as: When should I be convinced? What should I find persuasive? When must I say, "Yes, I have to believe that?"

II. In Aristotelian scholasticism, philosophical arguments took the form of the *disputatio* (disputation). The *disputatio* emphasized three factors that compelled belief: authority, reason, and experience.

- **A.** Authority was either supernatural or natural.
  1. Supernatural authority was based on Scripture, as correctly understood by appropriate authorities.
  2. Natural authorities were based on the presumptive authority of the past (what had stood the test of time) —above all, the Greeks.
  3. The authority of ancient authors and texts was integrated into Christian theology and intellectual life, especially when the thought of those ancient authorities helped to explicate the truths of the Christian faith.
- **B.** Reason—and especially the principle of non-contradiction—was another source of belief.
  1. There are two modes of reason: inductive and deductive.
  2. The model appropriate to the practice of the early seventeenth century was deductive reason, by which one derived what follows logically from things known by authority.
- **C.** Experience was viewed not as the stuff of inductive logic, nor as a systematic means of inquiry, but instead as an illustration of things known by authority and logical deduction.

III. The Aristotelian system of causality gave the Western mind a sense of coherence, of knowing how and why things happen and what those things are.

- **A.** According to Aristotle, there are four components to the system of causality.
  1. The material cause is the stuff from which something is made (e.g., the marble of a marble statue).
  2. The formal cause is the particular form (e.g., the statue of Alexander the Great) realized from the stuff of the material cause (e.g., the marble).

3. The efficient cause is what brings the form into actual existence from the matter (e.g., the sculptor with hammer and chisel).
4. The final cause is the reason or purpose of the action (e.g., the end pursued by the sculptor). The science of final causes is "teleology."

B. Operating principles allow us to distinguish among these causes.
1. From distinctions among the essences brought into being in forms, we have a scale of perfections, at the top of which is God. We have a measure of the value and importance of everything.
2. Thus, the immutable is higher and more important than the mutable.
3. The goal of knowledge is the contemplative understanding of and appreciation of perfections and purposes.

IV. Aristotelian scholastic perspectives confer a distinct understanding of the world.

A. Under God's design, all things strive for His order, for the fulfillment of His purposes.

B. The world is a Great Chain of Being, a hierarchy of perfections. Given the mutable things of the earth and the immutable things of the heavens, there is a fundamental divide between sublunar and celestial beings and phenomena.

C. There is an essential hierarchy of "souls" governing "substantial forms."
1. God is incorporeal and pure actuality.
2. Angels are incorporeal and pure intellect, but unlike God they are imperfect.
3. Man has a reasoning soul and a corporeal body; he is endowed with free will to choose between good and evil.
4. Animals have an animal soul and physical senses. They have neither reason nor freedom of the will.
5. Plants have a vegetative soul and undergo purposeful growth. They have no reproduction, no learning, and no choice.
6. Stones are wholly body and lack soul and its behaviors.

V. Conclusion: The system and its consequences.

A. In such a system, what should a mind capable of study know?
1. It should have a deep knowledge of the system as a whole and its lessons.
2. It should have knowledge of perfections and purposes, above all, contemplative classification yielding wisdom of God's creation and of our place in it. It should dwell on higher, not lower, things.

B. This is the system that had emerged officially triumphant after all the intellectual wars of the Renaissance and the sixteenth century, enshrined in the official curricula of the secondary schools and universities of Western Europe.

C. With Francis Bacon began the momentous assault on the predominance of this system of thought. Bacon sought:
1. A reordering of the categories of the disputation.
2. The overturning of the presumptive authority of the past.
3. The separation of natural philosophy from theology.

Essential Reading:

Aristotle, *Metaphysics*, 1-39, 61-86, 169-199, 221-247.

Supplementary Reading:

Aristotle, *Physics.*

Questions for Discussion:

1. What would be the appeal of this Aristotelian system to Christian thinkers?
2. How does the scholastic system encourage or discourage certain kinds of inquiry?

Lecture Three

The New Vision of Francis Bacon

Scope: From the end of the sixteenth century until his death, the politician and philosopher Francis Bacon (1561-1626) undertook to criticize the Western intellectual inheritance, to transform the human quest for knowledge, and to put knowledge at the service of gaining power over the forces of nature upon which our suffering or well-being depended. For Bacon, the many causes of error (the Idols of the Mind) hindered us from understanding the world as created by God. The key to overcoming error was correct method, which for Bacon meant induction from the particulars of nature to general principles that could be tested experimentally. Nature, not the errant mind, should determine the truth or falsity of our beliefs. Unable to refute Aristotelianism on its own terms, he appealed to the charity and power inherent in his model and his redefinition of knowledge, and he highlighted the advantages that would accrue to both faith and natural philosophy if each were restricted to its proper sphere. His most essential work, *The New Organon*, argued that such an inductive, experimental science, free from the dead weight of the past, could yield a new kind of knowledge that would be dynamic, cumulative, and useful. His ultimate vision was that human beings, if governed by charity, could use knowledge to alter their relationship to nature and society on behalf of "the effecting of all things possible."

Objectives — Upon completion of this lecture, the student should be able to:

1. Explain Bacon's dissatisfaction with the Aristotelian system and the European philosophical inheritance.
2. Summarize Bacon's theory of error, the "Idols of the Mind."
3. Describe Bacon's goals for human knowledge.
4. Explain the importance of "method" to Bacon's vision.
5. Explain why Bacon saw his philosophy as more pious than that of the scholastics.
6. Summarize the four essential themes of Bacon's *New Organon.*

Outline

I. Bacon was dissatisfied with the Aristotelian scholastic orthodoxy that reigned in the universities of sixteenth-century Europe.

- **A.** Bacon's life reflected the changes occurring in the audience of higher education. He entered Cambridge University at the end of the sixteenth century, encountering the traditional Aristotelian education but brimming with worldly ambitions and concerns.
- **B.** A contemporary wrote that it was at Cambridge that Bacon "first fell into the dislike of the philosophy of Aristotle. . .being a philosophy only strong for disputations and contentions, but barren of the production of works for the benefit of mankind."
- **C.** Bacon argued that the European philosophical tradition stood condemned on two main grounds.
  1. It had mixed religion and natural philosophy, to the confusion of both.
  2. It had substituted concern for words in place of concern for things.
- **D.** For Bacon, European thought had become enslaved to the systems of five or six Greeks. These systems had infected Europe's relationship with nature.

II. Bacon sought in two fundamental ways to win readers to his redefinition of the goals of human knowledge.

- **A.** New kinds and methods of knowledge would make possible an expansion of human empire over the phenomena on which our suffering or well-being depend.
- **B.** The Christian ethic entails knowledge in the service of charity, which means that the fruits of knowledge must permit one to enhance the condition of one's fellow creatures.

III. Bacon's *New Organon*—his new instrument or method for acquiring useful knowledge—was his most essential work. In it he set forth his "Great Instauration."

- **A.** The *New Organon* had four essential and profoundly influential themes.
  1. Knowledge is human power.
  2. Natural philosophy (science) is separate from theology.
  3. Scientific knowledge requires the method of induction, from particulars to generalizations, always tested by experiment and open to revision.
  4. Science is a dynamic, cooperative, and cumulative enterprise.
- **B.** Bacon cautioned Christians against worshiping false "Idols of the Mind" rather than God's actual creations.
  1. Idols of the Tribe are sources of error inherent in human nature.
  2. Idols of the Cave are the particular biases of individual men.
  3. Idols of the Marketplace result from the ambiguity of words.
  4. Idols of the Theatre are our received philosophical tradition, worshipped under the notion of authority, especially that of Aristotle.

IV. In the *New Atlantis,* Bacon examined the place of natural knowledge in society.

A. In Bacon's utopian vision, all human beings would govern their relationship to nature and society on behalf of their own interest in human well-being.

B. The instrument of mankind's betterment was knowledge methodically drawn from patient observation and experiment, "to the [end of] effecting of all things possible."

Essential Reading:

Francis Bacon, *Novum Organum* (*The New Organon*), Introduction and Book One.

Supplementary Reading:

Francis Bacon, *The New Atlantis.*

Questions for Discussion:

1. Why, for Bacon, is fundamental philosophy so essential to charity?
2. When later scientists, including Newton, described themselves as "Baconian," what parts of his system did they in fact take or not take as their own?

Lecture Four

The New Astronomy and Cosmology

Scope: Astronomy—the study of the immutable heavens—was an eminent science in the seventeenth century, and it is not accidental that so much of the challenge to scholasticism began in that field of inquiry. The astronomy adopted by the Aristotelian scholastics was that of Claudius Ptolemy (second century A.D.), which fit wonderfully with their system. Among the challenges to Aristotelianism in the early modern era was neo-Pythagorean thought, which viewed the universe in terms of mathematics and geometry, not in terms of Aristotelian "qualities," and which saw the sun as an emblem of God's divinity. Copernicus in the sixteenth century, and Johannes Kepler (1571-1630) in the seventeenth century, sought to create a more harmonious view of the heavens by placing the sun at the center of the system. Kepler, driven by neo-Pythagorean passions and possessing better data about the heavenly bodies than his predecessors had, devised his three laws of planetary motion which he believed disclosed God's mathematical order in the universe. Galileo (1564-1642) did not accept Kepler's laws (which would not be proven until Newton), but he did polemicize for the heliocentric astronomy and for a quantitative rather than qualitative view of nature. He castigated the scholastics for adhering blindly to human books rather than inquiring into God's book of nature; he criticized the use of Scripture as a scientific textbook; and he urged observation, reason, mathematical proofs, and attention to the quantities of nature as the means to know God's creation. Kepler and Galileo exemplified the great enthusiasm that seventeenth-century thinkers felt upon believing that they, for the first time, were observing and understanding God's actual work.

Objectives — Upon completion of this lecture the student should be able to:

1. Describe the appeal of the Ptolemaic astronomy to the scholastics.
2. Summarize the essential features of the neo-Pythagorean challenge to Aristotelian thought.
3. Explain why Kepler's metaphysical commitments must be taken into account in order to explain his astronomy.
4. Describe Kepler's own sense of his accomplishment.
5. Distinguish between primary and secondary qualities in Galileo's system.
6. Explain the implications of the quantitative philosophy for Aristotelian conceptions.

7. Describe Galileo's sense of why Scripture could not be used to contradict the truths of natural philosophy.

Outline

I. The Aristotelian scholastics had adopted the astronomy of the Greek astronomer Ptolemy.
   - **A.** Ptolemaic astronomy seemed wonderfully consistent with the scholastics' philosophical and theological systems.
   - **B.** It held that the earth was at the center of the universe. The moon, planets, sun, and an orb of fixed starts revolved around the earth in perfect circular motion.

II. Among the intellectual movements that arose to challenge Aristotelian scholasticism was neo-Pythagorean thought. Where the scholastics viewed God's creation in terms of perfections and purposes, the neo-Pythagoreans viewed it in terms of mathematics and geometry.
   - **A.** The world-view of Aristotelian scholasticism was qualitative, not quantitative, in its conception of the universe and of natural phenomena. It was essentialistic and teleological in its view of motion.
   - **B.** For the neo-Pythagoreans, the mind of God expressed itself in the order, harmonies, and ratios of the creation. Reality emanated from the Divinity itself and was numerical and geometrical.
   - **C.** Neo-Pythagoreans saw the sun—a luminous, perfect circle—as an emblem of the Divinity.

III. The work of Johannes Kepler reveals both the fusion of neo-Pythagorean numbers mysticism and natural philosophy on the one hand, and the fruitfulness of a quantitative science on the other.
   - **A.** Copernicus advanced an unproven heliocentric hypothesis.
   - **B.** Kepler believed that with the sun at the rightful center of the universe, the quantitative and geometrical harmonies and ratios of God's creation would be disclosed.
   - **C.** After going through an ordeal of mathematical hard labor, Kepler arrived at his first two laws of planetary motion.
     1. His first law held that the planets, including the earth, described elliptic, not circular, orbits around the sun.
     2. His second law held that the line joining a planet to the sun—the radial vector—sweeps out equal areas in equal times.
   - **D.** Kepler loathed the "imperfect" ellipses.
     1. For ten more years, he engaged in a computational struggle to find God's harmony in this universe of ellipses.
     2. In 1619, he found it in his third law of planetary motion: the square of the period of revolution of a planet is proportional to the cube of its average distance from the sun.

IV. Like Kepler, Galileo viewed reality in quantitative terms.
   - **A.** Although Galileo rejected Kepler's laws as too speculative, he shared Kepler's sense that nature was to be understood quantitatively and not in terms of perfections or purposes.
   - **B.** Galileo's most revolutionary assault upon Aristotelian scholasticism was not his Copernican astronomy, but his rejection of qualitative perfections and his distinction between secondary and primary qualities.
     1. Secondary qualities, in which category he placed almost all of the Aristotelian qualities, were not real in the objects thus described, but depended upon human perception (e.g. sweetness, color, immutability).
     2. Primary qualities defined what truly existed apart from perception, the qualities of objects themselves, the reality of God's natural creation. These were all quantitative: dimension, shape, the measurable.
     3. "Perfections" were human projections upon a natural world that was quantity in motion, a world to be understood in terms of mathematical law.
     4. Empirical observation, mathematical ordering, and mathematical test lead to laws of motion. Motion describes the relationship of bodies to time and distance; it does not express the perfections or purposes of things.

V. Galileo struggled with the Aristotelians.
   - **A.** Galileo argues explicitly against Aristotle and against the principle of intellectual authority. He reminded scholastics of Aristotle's commitment to induction: "If Aristotle were here today, he would agree with me."
   - **B.** In response to critics of the new astronomy who insisted that Copernican hypotheses were contradicted by Scripture, Galileo distinguished between the two revelations from God: His book of nature (our source of knowledge about the creation) and His book of Scripture (our source of knowledge about salvation and things beyond nature).
   - **C.** For Galileo, our senses, intellect, reason, and mathematical proofs are from God. Experience and mathematical logic are irrefutable because God's creation is the ultimate test.
   - **D.** Rejecting authority, seventeenth-century authors believed that for the first time, with proper method, the human mind was looking upon God's work with understanding.

Essential Reading:

Stillman Drake, ed., *The Discoveries and Opinions of Galileo,* 1-20, 58-85, 104-119, 173-216, 229-280.

Supplementary Reading:

Galileo, *Dialogue Concerning the Two Chief World Systems.*

Questions for Discussion:

1. Modern scientists often believe that seventeenth-century scientists were practical experimentalists just like themselves. How different are Kepler and Galileo from modern scientists in their thought and work?
2. Why is astronomy such a dramatic field for anti-Aristotelian thought?

Lecture Five

Descartes's Dream of Perfect Knowledge

Scope: From (at least) the time of Plato, it has been a dream of Western philosophy to know things as they truly are, in and of themselves, undistorted by the human senses, passions, and perspective. In the seventeenth century, Descartes embodied that dream. He created a coherent philosophical system that posed, on the Continent, the major challenge to the scholastic hegemony, arousing great enthusiasms and projects. Descartes sought to demonstrate that we could establish a criterion of truth, and, with it, know with certainty the real nature and the real causes of things. For his legions of disciples, Descartes's work accomplished this and more: it freed philosophy from authority and from the Aristotelians; it explained the nature of ideas, knowledge, and the source of error; it refuted the skeptics who denied the possibility of certainty; it proved the existence of God and the immortality of the soul; it demonstrated that the physical world was matter in motion according to the laws of mechanics, making possible a rigorous new quantitative science of all physical reality; and it established the absolute distinction between body and mind—that is, between matter and spirit. In all of these things, it challenged scholasticism in the most fundamental ways and altered the nature and problems of Western philosophy and science.

Objectives — Upon completion of this lecture, the student should be able to:

1. Explain why Descartes could appeal simultaneously to physicists and mystical theologians.
2. Describe how Descartes seeks to overcome "hyperbolic doubt" and establish a criterion of certainty.
3. Summarize Descartes's two proofs of God.
4. Explain Descartes's theory of extension and its implications for explaining nature.
5. Describe the nature of Cartesian dualism.

Outline

I. René Descartes sought to reconstruct all of human knowledge. His Cartesian philosophy posed the greatest challenge to Aristotelian scholasticism during the seventeenth century, above all on the Continent.
   A. The ultimate vision of Western philosophy was encapsulated in Plato's image of the cave (knowing things in themselves, as they really are).

B. Descartes's dream was to attain perfect knowledge of being and of causes.

C. Descartes appealed to both mechanistic scientists and mystical theologians.

II. Why does a thinker come to define the options of an intellectual age?

A. Many things vital or troubling to the period converged in Descartes's work.

B. Cartesian philosophy responded to five principal problems.

1. The first was the epistemological crisis brought about by the Reformation.
2. The second was the revival and appeal of classical skepticism during the sixteenth century.
3. The third was the specter of libertinism and the new Pyrrhonism.
4. The fourth was the neo-Pythagorean revival.
5. The fifth was the assault on Aristotle.

III. Descartes's *Meditations* described his quest for certainty.

A. He applied hyperbolic doubt; he propounded a skepticism that went beyond that of the skeptics and their critics.

B. Descartes offered a single indubitable proposition: "*cogito ergo sum.*" His criteria of the truth of ideas were clarity and distinctness.

C. Descartes had to show that his system could prove the existence of God. He offered two proofs that he regarded as self-evident and indubitable.

1. Every idea has an object that is its cause. The idea of an infinitely perfect God can come only from a perfect Being.
2. Existence is a necessary property of God as a perfect Being.

D. We know that an external reality corresponds to our ideas because God is not a deceiver.

IV. Descartes's physics caused at least as much intellectual excitement as did his metaphysics.

A. Descartes' distinction between the essences of soul and body leads to Cartesian dualism: immaterial soul and material body.

B. The essence of soul is thought; the essence of body is extension in height, width, and breadth.

C. What can be known about extension? Descartes reached basically the same conclusion reached by Galileo: the physical world is dimension, motion, and the mechanisms of matter touching and communicating force to matter.

D. Given God's will, nature operates according to fixed mechanical laws of motion, from which Descartes deduces inertia. The task of a new science is to discover the laws, mechanisms, and effects of matter in motion.

V. Four element constitute the Cartesian legacy.

A. Dualism: we inhabit a universe composed of two distinct substances—mind and matter.

B. All matter is governed by natural mechanisms that science must understand.

C. The mind-body problem: according to Cartesian philosophy, the two substances should not interact, but in fact they do. This problem will haunt Descartes, his followers, and Western philosophy.

D. Cartesians reject all beliefs, such as superstition and witchcraft belief, holding that matter is affected by immaterial forces.

VI. Conclusion

A. Descartes' philosophy raised important problems: how to explain the interaction of spirit and matter in human life; the Eucharist; and the concept of miracle?

B. The implications for authority, Aristotle, and natural knowledge are dramatic. Descartes holds that all knowledge begins with radical doubt.

C. Descartes leaves his followers with the great dream of perfect knowledge (complete and evident).

Essential Reading:

René Descartes, *Meditations on First Philosophy.*

René Descartes, *The Passions of the Soul.*

Supplementary Reading:

René Descartes, *Discourse on Method*

Questions for Discussion:

1. In the final analysis, does Descartes's system strengthen or weaken the relationship between theological and scientific questions?
2. The debate between Cartesians and Aristotelians will dominate seventeenth-century intellectual life. What are the issues that most separate them?

Lecture Six

The Specter of Thomas Hobbes

Scope: Thomas Hobbes (1588-1679) attracted few disciples, but the force and threat of his philosophical arguments set much of the debate in the century that followed him. He brought together sensationalistic empiricism, deterministic mechanism, materialism, and ethical relativism into one powerful philosophical alternative to scholasticism and Cartesianism. Rejecting Descartes's dualism of mind and body, Hobbes argued that we only can conceive and know of material things, and that all language of immateriality is nonsensical and insignificant. The world, including the entire realm of human experience, was matter in motion according to fixed, mechanical laws. There was no freedom of the will, and all things were the necessary results of prior causes. Human beings were governed by the pursuit of pleasure and the flight from pain (ego-psychology), which had produced a condition in which life was "nasty, poor, solitary, brutish, and short." The great task of both philosophy and the state was to save us from such an unwanted condition. Philosophy could do this by giving us real knowledge of the actual causes of our well-being and suffering and a real understanding of how to alter the world .

Objectives — Upon completion of this lecture, the student should be able to:

1. Explain how a thinker without many disciples could be quite influential.
2. Describe Hobbes's view of the goal of philosophy.
3. Explain Hobbes's rejection of Cartesian dualism.
4. Summarize Hobbes's sense of why a sensationalistic empiricism leads to a materialistic philosophy.
5. Give an account of Hobbes's view of human nature.
6. Explain what Hobbes means by "good" and "evil."

Outline

I. Hobbes' philosophy haunted the second half of the seventeenth and the first half of the eighteenth centuries. Even without many followers, Hobbes set the terms of many debates.
   A. Formal thought did not abandon the field to Hobbes. It became the test of a system of philosophy to appear to overcome the problems posed by Hobbes.
   B. It became useful to philosophers to brand their opponents as "Hobbists," and to find similarities between Hobbes and their rivals.

   C. Hobbes became, in effect, a set of objections and a set of unacceptable conclusions.

II. While Hobbes is most widely read today for his political philosophy, his theories of knowledge, language, being, and ethics set the early modern world on edge.
   A. The political doctrines of *Leviathan* follow from his general philosophy, and they can only be understood in that context.
   B. According to Hobbes, the goals of both philosophy and the state are survival and civil peace.

III. Hobbes' metaphysics is based on empiricism, materialism, and determinism.
   A. Hobbes's objection to Descartes: " I think, therefore matter is capable of thought."
   B. We can conceive only of corporeal (material) entities and their behaviors, and our language and our ontology (theory of being) must follow from that knowledge.
   C. Epistemology (theory of knowledge) produces a coherent materialist ontological language.
      1. All ideas enter the mind through the senses, which are physical.
      2. What affects the physical senses does so through physical contact, and thus it must be physical.
      3. Thus all coherent ideas are caused by bodies and their actions affecting the five senses.
   D. Materialism is the only alternative to speaking nonsense.
      1. Words are signs or marks that represent physically caused sensory impressions.
      2. A word without a material sensory referent is a "mere sound," "nonsense" (literally and figuratively), whatever emotions it evokes in us. It signifies nothing and thus is "insignificant speech."
      3. Notions such as "soul," "ghost," or "immaterial being" either are metaphors for material entities or they are gibberish.
      4. Thus there is no understanding of God. Reverence of the incomprehensible is an appropriate religious response.
   E. Hobbes holds to deterministic mechanism.
      1. Number and geometry, which are fixed and necessary relationships, govern quantitative relations, and all matter exists as quantity and shape.
      2. Thus, the laws of nature are both mechanistic and determined. There is no uncaused event, and there is no "chance."

IV. Hobbes' philosophy of man rests upon materialism and ethical relativism.
   A. Materialist and mechanistic determinism extends to human life.
      1. The brain is a physical agent governed by the laws of nature.
      2. What we experience as free will is in fact a profit-loss calculation.

B. Pleasure and pain: ego-psychology is the cause of human action.
   1. All organisms seek pleasure and feel pain (or, more precisely, seek what they believe will cause pleasure and flee what they believe will cause pain).
   2. Without the threat of punishment for harming others, this drive to pleasure produces "the war of all against all," in which life is "nasty, poor, solitary, brutish, and short."
   3. Given the unbearability of that condition, we seek knowledge and social relations that will reduce our danger and enhance our well-being.
   4. Again, this is the goal both of philosophy and of the state.

C. Good and evil: ego-psychology is the cause of relativistic human ethics.
   1. All that we mean by "good" is that which we deem conducive to our happiness.
   2. All that we mean by "evil" is that which we deem conducive to our suffering.
   3. Thus there is no goodness or evil in and of themselves, but only in relationship to the human condition.

D. This honest knowledge of ourselves and our natural condition can lead to the improvement of the human condition.

Essential Reading:

Thomas Hobbes, *Leviathan*, Books I, II, and IV.

Supplementary Reading:

Thomas Hobbes, *Metaphysical Writings*, 1-41, 52-80, 113-162.

Questions for Discussion:

1. May one read Hobbes as a religious believer, or must one "translate" his religious references into his materialism?
2. Is Hobbes merely talking about epistemology (what we may know), or is he as much of an ontological realist (with a theory about the real nature of being) as Descartes?

Lecture Seven

Skepticism and Jansenism: Blaise Pascal

Scope: Philosophical skepticism is the belief that we may know nothing with certainty. When it is used to humble human reason and demonstrate our dependence upon religious faith, it was termed "fideism." In the seventeenth century, fideism is yet another systematic assault on the dominant Aristotelian scholasticism. One of the two most influential fideists (the other, Pierre Bayle, is the subject of a later lecture) was Blaise Pascal (1623-1662), who abandoned a brilliant career in mathematics and the physical sciences to devote himself to piety and religious polemics. Pascal was a member of the Jansenist movement within French Catholicism, which stressed an Augustinian view of the catastrophic effects of the Fall upon the human will. Jansenism argued for the need for salvation by faith alone, a state achievable only by God's grace. Pascal's *Pensées*, his unfinished thoughts on religion, became one of the publishing sensations of the seventeenth century. It stressed the misery and absurdity of man and human life without God, the insufficiency of intellectual knowledge of God (especially without Christ), and the role of grace and the heart in faith. In the light of such faith, Pascal found that what seemed incoherent and self-contradictory about the world fell into place, like certain paintings looked at from the appropriate perspective.

Objectives — Upon completion of this lecture, the student should be able to:

1. Explain the concept of "fideism."
2. Summarize the essential views of Jansenism on sin and salvation.
3. Explain what Pascal means by the "contradictions" and "misery" of human life.
4. Distinguish Pascal's "wager" from a "proof" of God.
5. Describe Pascal's view of faith and its effects.

Outline

I. Skepticism is another systematic philosophical assault upon the dominance of Aristotelian scholastic thought.
   A. There are deep skeptical strains in the seventeenth century about the claims of human knowledge.
   B. Fideism was the dominant form of seventeenth-century skepticism.
      1. It held that human knowledge cannot attain significant certainty.

2. It held that this weakness should convince us of our dependence upon faith and grace.

C. Two influential models of seventeenth-century fideism were provided by the Catholic Blaise Pascal and the Protestant Pierre Bayle.

II. Pascal and Jansenism

A. Pascal was a child prodigy in mathematics, and he began a brilliant scientific career. He did ground-breaking work on conic sections, cycloid curves, barometrics, fluid dynamics, pneumatics, and the mathematical calculus of probability.

B. He abandoned his scientific career following his encounter with Jansenism, which expressed the age-old contest between piety and natural knowledge.

C. Within Catholicism, Jansenism was a continuation of the contest between Augustinianism and Thomism.

1. Jansenism emphasized the catastrophic effects of the Fall upon will and reason.
2. It stressed the absolute dependence of all human beings on God's grace, which comes through a personal encounter with Christ rather than through the sacraments.
3. Antoine Arnauld decried the scandal of frequent communion.

D. Jansenism became the religious and political underground of France. The Jansenist convent at Port Royal was a center of moral and ecclesiastical revolt.

E. Pascal became one of the foremost apologists of Jansenism, Catholicism, and Christianity.

III. Pascal's unfinished work of Christian apologetics—The *Pensées*—was edited and arranged by his Jansenist friends at Port-Royal.

A. The *Pensées*—Pascal's thoughts on religion—electrified his own and later generations.

B. The *Pensées* stressed the following themes.

1. Pascal stresses man's misery without God, and his avoidance of the deepest question: Who am I, and what is my fate?
2. He laments the simultaneous realism and absurdity of the human condition (e.g., hatred and war; symbolism and power).
3. Mankind is a mass of inexplicable contradictions (e.g., genius and ignorance, science without morality, energy without purpose, reason and arbitrary custom).
4. We are creatures of intellectual weakness. We use reason without sincerity, we are swayed by passions and prejudices, and we cannot grasp the infinitely large or the infinitesimally small.

5. Pascal's "wager" is intended to incite the listener to believe in God. Knowing all of the above, and given the stakes, we should wish for the deepest answers, for the eternal, and for the existence of God.
6. Knowledge of God, however, is insufficient without knowledge of Christ.
7. One believes by means of one's heart, if it has been touched by grace. The heart has reasons that reason cannot understand.
8. With faith, our contradictions and unhappiness, our greatness and depravity, all fall into place.
9. Inner peace and salvation are the goals of life.

Essential Reading:

Blaise Pascal, *Pensées* (*Thoughts on Religion*).

Supplementary Reading:

Blaise Pascal, *Provincial Letters*

Questions for Discussion:

1. Why would many theologians, as they did, find Pascal's fideism, for all of its piety, dangerous to religion?
2. Is Pascal appealing to a religious (and moral) experience that is as much "data" about the world as are the objects of Bacon's, Galileo's, or Descartes's inquiries?

Lecture Eight
Newton's Discovery

Scope: Isaac Newton played a magisterial role in the intellectual and scientific revolutions of the seventeenth century, but he was a product and culmination of those phenomena. Inspired by Bacon, Descartes's mathematics, and the progress of experimental and mechanistic science, many anti-Aristotelian intellectuals were in communication with each other by the mid-seventeenth century. In England there emerged the Royal Society, which conducted experiments and observations, presented reports, and published *Transactions*, vastly enlarging the participants in and the audience of the new experimental science. It was also the first to publish Newton's scientific work. Shortly after receiving his bachelor's degree at Cambridge, Newton—in one eighteen-month stretch—formulated the law of gravity, laid the foundations of modern physics in his laws of motion, transformed the entire science of optics, and created the calculus. Not until two decades later, however, was his work on physics and astronomy communicated to the world. The great astronomer Edmund Halley saw at once the scope of Newton's accomplishments and underwrote the publication in 1687 of Newton's *Philosophiae Naturalis Principia Mathematica*—the Mathematical Principles of Natural Philosophy.

Objectives — Upon completion of this lecture, the student should be able to:

1. Explain the significance of the growth of scientific academies and societies outside of the universities.
2. Describe the emergence and composition of the Royal Society.
3. Explain the importance of Cartesianism to Newton's intellectual formation.
4. Summarize the accomplishments of Newton during his eighteen months at Woolesthorpe.
5. Explain why Edmund Halley was so astonished and exhilarated by Newton's papers on universal gravitation.

Outline

I. Introduction: The emergence of Isaac Newton.
   A. Europe in the mid-seventeenth century witnesses the growth, apart from universities, of societies of mathematically and mechanistically oriented empirical natural philosophy.
      1. The universities continued to be dominated by Aristotelian physics.
      2. Those drawn to new ways of thinking founded new institutions outside of academia.

   B. Beginning in the 1640s, intellectuals met in England to discuss non-Aristotelian natural philosophy. A generation arose that was excited by the work of Bacon and the progress of the mechanistic sciences.
   C. Bacon's work gave profound inspiration to later generations of scientists.

II. The Royal Society patronized the new philosophy and especially the work of Isaac Newton.
   A. The Royal Society was devoted to "physico-mathematico-experimental reasoning." It conducted experiments, presented reports, and published transactions, which were eagerly awaited by the public.
   B. It was chartered in 1662 by Charles II.
   C. In 1664 the Royal Society divided into eight committees: mechanical, astronomical and optical, anatomical, chemical, agricultural, history of trade, recording of hitherto unobserved or unrecorded phenomena, and correspondence.
   D. Bacon's *New Atlantis* defined the self-image of the Royal Society.
   E. The publication of Isaac Newton's "Optics" in the *Transactions* of the Royal Society was a major event in the history of Western science.

III. The scientific career of Isaac Newton.
   A. Newton entered Trinity College, Cambridge University in 1661. Unlike the rest of the university, which was dominated by Aristotelians, Trinity College was a Cartesian stronghold.
   B. Newton was introduced to Cartesian thought and to higher mathematics.
   C. Shortly after receiving his degree, Newton spent an unparalleled eighteen months in the countryside to avoid the plague, during which time he altered the history of the world.
      1. He discovered the law of gravity, which allowed him to explain inertial circular motion.
      2. He posited the three essential laws of mechanics that would govern Western physics.
      3. He invented the infinitesimal calculus.
      4. He founded modern optics (the science of light) with his experimental discovery of the composition of light.
   D. In 1684, the magnitude of Newton's accomplishments was revealed when he was invited to contribute his views to a gathering of the great scientific minds of the time: Edmund Halley, Sir Christopher Wren, and Robert Hooke.
      1. Newton astonished them with his mathematical proof of the law of gravitation.
      2. At Halley's urging and expense, Newton further developed his general system of the laws of motion, which he published in 1687

as the *Philosophiae Naturalis Principia Mathematica*, better known simply as the *Principia.*

Essential Reading:

Alexandre Koyre, *Newtonian Studies.*

Supplementary Reading:

Alexandre Koyre, *Metaphysics and Measurement.*

Questions for Discussion:

1. What does it tell us that the new experimental natural philosophy is finding a home apart from the universities?
2. Are Newton's extraordinary accomplishments in his eighteen months at Woolesthorpe indicative of anything in the culture beyond the prodigious brilliance of Isaac Newton?

Lecture Nine

The Newtonian Revolution

Scope: The publication of Newton's *Principia* was not merely a major event in the history of Western science, but a watershed in the history of Western culture. A mathematical demonstration of the Copernican hypothesis as proposed by Kepler, the *Principia* convinced the majority of its readers (and the readers of those who popularized and explained it) that the world was ordered and coherent, and that the human mind, using Baconian method and mathematical reasoning, could understand that order. The enthusiasm for Newton, based often on the success of his predictions, extended far beyond those who could understand his work. The Newtonian triumph, however, was not immediate. The work was opposed by the Cartesians, whose physics had itself triumphed over the Aristotelians. To the Cartesians, Newton's description of occult action at a distance (gravity) violated the clarity and logic of mechanistic explanation. Cartesian-Newtonian debate went to the heart of what we mean by scientific explanation, and it raised vital issues of theology as well. Newton at first had sought a mechanistic explanation of gravity, but he made a virtue out of necessity by insisting that science should not feign hypotheses, that it should be limited in its ultimate claims. Newton (and the Newtonians) also believed that natural philosophy proved the existence of God (and His omnipotence) from the order and contingency of the world. The Newtonian synthesis gave to the culture a great confidence in inductive science, the mathematization of motion, and natural theology.

Objectives — Upon completion of this lecture, the student should be able to:

1. Explain why Kepler's laws of planetary motion were not proven until Newton's *Principia.*
2. Describe the enthusiastic reception of Newton's work by the learned world.
3. Explain why the Cartesians saw Newton's gravitational force as a return to the occult forces and mysterious explanations of the Aristotelians.
4. Summarize Newton's conclusions about scientific explanation.
5. Explain the religious issues raised and addressed by Newton.
6. Summarize Newton's non-scientific legacy to early-modern culture.

Outline

I. The publication of Newton's *Principia* was a watershed in the history of science and culture.
   A. Newton's *Principia* was a mathematical demonstration of the Copernican hypothesis as proposed by Kepler.
   B. It also convinced the culture that the world was ordered and lucid and that the human mind was capable of understanding the architecture and design of God in the creation.
   C. Newton's work generated great enthusiasm; his predictions convinced even those who could not understand the arguments.
      1. Edmund Halley said of Newton, "Nearer the gods no mortal may approach."
      2. In the words of Alexander Pope: "Nature and nature's laws lay hid in night. God said, 'Let Newton be,' and all was light."

II. Newtonians Versus Cartesians
   A. Cartesians explained the physical world in terms of matter contacting matter.
   B. Newtonian gravity—and the phenomenon of action at a distance—appeared to the Cartesians as a quasi-Aristotelian occult force.
   C. Newton and his followers made a virtue out of a necessity. They explained *that* a certain force operates, not *why* or *how*.
   D. Science should not feign hypotheses in the absence of knowledge.
   E. He counseled the admission of ignorance absent data (this constituted his link to Locke).
   F. The following were additional Newtonian goals.
      1. Newton's system underscored God's omnipotence and freedom, in contrast to the "necessary" acts of God deduced by Cartesian rationalism.
      2. Design: Newton believed that his system offered empirical and inductive proofs of God.
      3. One can see, through nature, to nature's laws and their author, God.
      4. This meant, of course, that nature was lawful and knowable: all knowledge was a piety.
      5. The greatest legacy of Newtonianism was a sense of order and clarity.

III. Conclusion.
   A. The method of Newton's achievement inspired great confidence: observation, induction, mathematization of motion, quantitative rather than qualitative knowledge, predictive value, and experiment.
   B. God did not intend us for ignorance. We now had a method by which to use our minds.
   C. For many, this model could be extended to the whole of knowledge.

Essential Reading:

Isaac Newton, *Newton's Philosophy of Nature*, pp. 1-67, 116-134.

Supplementary Reading:

Isaac Newton, *The Mathematical Principles of Natural Philosophy*

Questions for Discussion:

1. How is it possible for a work that few readers understand to change the way a culture thinks about the world?
2. Looking at current thinking about cosmology, astronomy, and physics, is it obvious that the Newtonians won all of the arguments that they had with the Cartesians?

Lecture Ten

John Locke: The Revolution in Knowledge

Scope: Philosophers today may not read John Locke with great attention or enthusiasm, but his influence upon the late seventeenth and the entire eighteenth century can scarcely be overestimated, because he changed the way that the culture thought about knowledge. The classic distinction between Locke's "empiricism" and Descartes's "rationalism" is overdrawn, however, because both thinkers display elements of each tendency. Locke's empiricism resides above all in his view of the origin of our ideas and in his sense of the implications of identifying that source. Whereas Descartes held that ideas are innate *and* yield truth about the real qualities of the world, Locke held that they are acquired and that we have knowledge only of our experience of the world. Ideas arise either from sensation (the senses) or reflection (the mind's awareness of its own behaviors), with simple sensations and simple reflections combining to form complex ideas. Our knowledge is thus limited strictly to our experience, and we must humbly admit our ignorance of the real essences of things. Locke appears to lean toward Cartesian mind-body dualism, but he believes the philosophical issue to be unprovable. The problem for Locke is not to know *what* the world is—we are not made for such knowledge—but to know *how* the world behaves.

Objectives — Upon completion of this lecture, the student should be able to:

1. Explain why Locke is more important to twentieth-century intellectual historians than to twentieth-century philosophers.
2. Compare Locke and Descartes on the criterion on truth.
3. Summarize Locke's explanation of the origin of ideas (sensation and reflection).
4. Explain Locke's distinction between real and nominal essence.
5. Give an account of why Locke insists that philosophy often must admit ignorance.

Outline

I. Although Locke is not highly thought of by twentieth-century philosophers, his role in intellectual history is almost incalculable in its importance.

- **A.** For one hundred years, Locke was the reigning epistemological authority in Europe, where his thought wielded great influence.
- **B.** One's epistemology (theory of knowledge) sets the foundation and framework of one's thinking about all areas of human thought.
- **C.** Locke provided the epistemological foundations for the scientific achievements of the seventeenth century.

II. Rationalism Versus Empiricism—Descartes Versus Locke

- **A.** The distinction between Descartes's rationalism and Locke's empiricism has been overdrawn. For example, Descartes advances a mechanistic and empirical natural science, and Locke advances a rationalistic criterion of truth.
- **B.** The real debates between them have to do with:
  1. The goal of fundamental natural philosophy.
  2. The source of our ideas, and what follows from identifying that source.
- **C.** What is the goal of fundamental natural philosophy?
  1. According to Descartes, its goal is truth about the real qualities of the world.
  2. According to Locke, its goal is knowledge of our experience of the world. We cannot know things in themselves.
- **D.** What is the source of our ideas?
  1. According to Descartes, all of our ideas are innate.
  2. According to Locke, all of our ideas are acquired through experience.
- **E.** For Locke, if the issue is certain rational truth, the criterion is intuitive certainty. Our knowledge of the world, however, is known only by acquired ideas.

III. The Role of Experience.

- **A.** For Locke, all ideas are acquired by two kinds of experience.
  1. Sensation—From our sense experience we acquire ideas about the external world.
  2. Reflection—The mind is aware of its own experience in operating upon ideas derived from sensation. From reflection, we derive all ideas relating to volition.
- **B.** Simple sensations or reflections combine to form complex ideas, just as molecules are constructed from atoms (reflecting the influence of Pierre Gassendi).
- **C.** There are no innate ideas; thus, our knowledge is limited to our experience of the world and our own minds.
- **D.** We have no knowledge of what underlies experience.
  1. We have no rational knowledge of mind and matter.
  2. Locke distinguishes between nominal and real essence.

E. For Locke, this admission of ontological incapacity is proper humility.
   1. Although Locke leans toward dualism, he denies that we have knowledge of that dualism.
   2. We need to admit ignorance.
   3. We need to abate and lessen the claims of philosophy.
   4. Those who claim that matter is incapable of thought are impiously denying the omnipotence of God.

IV. Conclusion: The Lockean agenda.

A. The problem, then, is not to know what mind is, but how, in experience, mind behaves. The problem is not to know what matter is, but how, in experience, the world behaves.

B. Since such knowledge is based not on logic but on experience, it is always open to correction by further experience.

Essential Reading:

John Locke, *An Essay Concerning Human Understanding*, Book II.

Supplementary Reading:

John Locke, *An Essay Concerning Human Understanding*, Book I.

Questions for Discussion:

1. In what ways is Locke more optimistic, and in what ways is he more pessimistic, than Descartes concerning the prospects of human knowledge?
2. In what ways is Locke "Baconian" and in what ways not?

Lecture Eleven

The Lockean Moment

Scope: Locke's epistemology shapes the thinking of the entire eighteenth century, occasioning and reinforcing a revolution in the culture's sense of the nature (and limits) of knowledge. In Locke's view, the mind begins as a blank slate on which experience prints ideas via the senses and via reflection. Propositions about the world depend upon those acquired ideas, which in turn depend upon their relationship to experience. We cannot know what is not within our experience, and because experience is not logically determined, our knowledge of the world is merely probable.

For early modern readers and thinkers, Locke's model demystifies the world of knowledge and ideas. However complex a proposition or system, if it is based upon reality it can be broken down into its component ideas, all grounded in experience, and those ideas may be tested against the behavior of the world. Although some later authors will attempt to mechanize Locke's model of mind, that model insists that the mind is an active agency.

The implications of Locke are dramatic: we learn our ethical ideas from experience; we are products of our environment, which, if changed, would change the kinds of human beings it produces; our character and senses of world are therefore relative to time, place, circumstance, and experience. Locke does not regard the implications of his system as dangerous for religion, and he undertakes a work of empirical Christian apologetics, *The Reasonableness of Christianity*, to demonstrate that the truth of Christianity follows empirically from the evidence of the historicity of Christ's miracles and from the evidence of the fulfillment of prophecies.

Objectives — Upon completion of this lecture, the student should be able to:

1. Summarize Locke's notions of *tabula rasa* and active mind.
2. Explain the implications of Locke's system for the testing of claims of knowledge.
3. Describe the implications of Locke's system for our understanding of the development of character, beliefs, and morals.
4. Distinguish Locke's ego-psychology from that of Hobbes.
5. Explain Locke's "empirical" defense of Christianity.

Outline

I. Locke's epistemology will become the dominant theory of knowledge in the eighteenth century, effecting a vast revolution in the culture's sense of the nature and limits of natural knowing. What were its essential qualities?

- **A.** In Locke's model, the mind is a *tabula rasa*—a blank slate—on which nature imprints ideas via sensations and in which the mind becomes aware of its own operations on sensations, via reflection.
- **B.** Some ideas attract each other (association).
- **C.** Mind is active, and by abstraction and combination it forms complex ideas.
- **D.** From these ideas it forms propositions, but propositions about the world may be only probable, and they depend for their probability upon their relationship to experience.

II. Locke's model leads to a demand for analysis, clarity, and confirmation.

- **A.** In theory, any proposition may be analyzed into its component ideas, then into its component sensations and reflections, and it may be judged in relationship to actual experience.
- **B.** The world of real knowledge becomes, by analysis and experimental confirmation, a lucid world, an accessible and unmystifying world, devoid of obscurity.
- **C.** Take what was complex, and analyze it into its simple parts; confirm or disconfirm propositions about the world by comparing them to the behavior of the things described.
- **D.** These become, in many ways, the mission of the eighteenth century.

III. The Implications of Locke's Model

- **A.** Some in the eighteenth century will try to mechanize Locke's view of the mind and knowledge (e.g., Helvetius, "to sense is to judge"). This view distorts Locke, however, as Rousseau will see clearly.
- **B.** For Locke, sensation means merely to acquire an idea. There is no direct route from sensation to human judgment; the mind is an active agency.
- **C.** For Locke, we also learn ethical ideas by experience. We call good what causes well-being; we call evil what causes pain. This model, if not joined by Providence, would be subversive.
- **D.** According to Locke, Divine Providence governs what causes us well-being or pain. God has so constructed the world that we learn of good and evil through experience.

- **E.** This ethical theory has the following implications:
  1. Environmentalism—people's ethical perceptions will hinge on what the environment rewards or punishes.
  2. Relativism—if our ideas are limited by experience, then all are relative to the circumstances of our own lives.
  3. Character *develops*; there is no essential, fixed character.
- **F.** Locke bequeaths two problems to the eighteenth century:
  1. The specter of philosophical Idealism: if we know only our ideas, does anything exist in the external world that corresponds to our ideas?
  2. Locke's epistemology raises a dramatic question: how to base religious belief upon empirical knowledge.
- **G.** Locke's own empiricist apologetics was entitled *The Reasonableness of Christianity* (1695).

Essential Reading:

John Locke, *An Essay Concerning Human Understanding*, Book IV.

Supplementary Reading:

John Locke, *An Essay Concerning Human Understanding*, Book III.

John Locke, *The Reasonableness of Christianity.*

Questions for Discussion:

1. Why would readers find Locke's epistemology to be the theory of knowledge embodied in Newton and other experimental scientists?
2. For many readers, Locke removed the danger of Hobbes from empirical philosophy and from the belief that ethics were learned by experience of pleasure and pain. Were they correct?

Lecture Twelve

Skepticism and Calvinism: Pierre Bayle

Scope: Despite his obscurity for most twentieth-century readers, the fideist Pierre Bayle was one of the most influential authors of the late seventeenth and early eighteenth centuries. The fate of Bayle's reputation in the eighteenth century reveals the paradox of urging fideism and the incompatibility of reason and faith in an age of growing confidence in reason. Seen in the context of his Huguenot (French Calvinist) setting, first in France and then in the Huguenot refuge in Holland, Bayle's religious itinerary permits us to understand his themes in the terms of his own commitments. For Bayle, as revealed, for example, in his discussions of the ethics of King David and of the problem of evil under an infinitely good God, human reason is simultaneously vital and critical, on the one hand, and, on the other, incapable of understanding the mysteries of the faith, especially those regarding God's ways with mankind (which is precisely why they are mysteries and precisely why there is need for faith). The arrogance of reason and the avoidance of a simple, peaceful faith, Bayle believes, lead to superstition, intolerance, and cruelty. The irony of Bayle's work is that despite his pious intent, he was increasingly read as irreligious because his fideism confronted a learned world that was ever more naturalistic and committed to reason.

Objectives — Upon completion of this lecture, the student should be able to:

1. Describe the changes and reversals of Bayle's reputation.
2. Describe Bayle's relationship to Calvinism and the Huguenot community.
3. Explain the theological and political problems addressed by Bayle's article on King David, including the problem of justification and sanctification.
4. Summarize Bayle's arguments for the insolubility of the problem of evil.
5. Explain the difficulty of maintaining fideism in an age of increasing commitment to the powers of human reason.

Outline

I. Although he is not widely known today, Pierre Bayle was one of the most influential authors of the seventeenth century. His appeal lasted throughout the first half of the eighteenth century, when he was one of the most widely-read figures of the age.

- **A.** The case of Pierre Bayle is remarkable and illustrative of seventeenth-century tensions and dilemmas.
- **B.** Bayle was known in his own time as an extremely erudite and pious Huguenot. Later, he was adopted by the French Enlightenment thinkers as one of their own.
- **C.** The revision of that view began in the mid-twentieth century.
- **D.** Bayle had extraordinary influence. His *Historical and Critical Dictionary* was the most widely owned book in private libraries in France throughout the eighteenth century.
- **E.** Bayle has a pious but problematic goal: in order to humble reason and to show our absolute dependence upon faith, he seeks to demonstrate the incompatibility of reason and faith.

II. Knowledge of Bayle's career allows us to place his intellectual work in context.

- **A.** Bayle's religious career demonstrates his intimate ties to Huguenot Calvinism.
  1. He was born into a Huguenot family but converted from Protestantism to the Catholic faith.
  2. After a few years, he reconverted dangerously to the Reformed faith.
  3. He spent long years as a Calvinist teacher.
  4. He had an ongoing role as a leading Calvinist polemicist while in exile in Rotterdam.
- **B.** Bayle's publishing career reveals his central position in seventeenth-century erudition and debate.
  1. Catholics saw him as a Calvinist apologist, while among Calvinists he offended the factions to which he did not belong.
  2. The *Historical and Critical Dictionary* had extraordinary success.

III. Bayle's intellectual itinerary.

- **A.** Critical reason prepares one for faith. Faith must not fear critical reason or erudition.
  1. Bayle writes, for example, that King David was favored by God despite his manifest sinfulness.
  2. In response to Pierre Jurieu and the Huguenot community in Rotterdam, who advocated a Protestant crusade against Louis XIV, Bayle urged pacifism.
  3. King David, as depicted in Bayle's article, was uncomfortably reminiscent of Louis XIV.
- **B.** Bayle raised the following religious issues.
  1. The mystery of salvation—God's decisions regarding whom to save surpass all human understanding.
  2. Justification and sanctification.

C. Bayle raised the following intellectual issues.
   1. One should rely only on faith, whatever the scandal.
   2. For there to be faith, there must be an obligation to natural judgment.
   3. The problem of evil (addressed in three articles): neither logic nor evidence can overcome someone who doubts the goodness of God. Natural reason cannot explain why God allows evil.

D. Bayle stages a debate between Christianity and Manicheanism. Reason is not sufficient to defeat the Manicheans. Only faith resolves the paradoxes.
   1. For Bayle, all areas of human belief show the incapacity of reason and the need for faith; e.g., the Trinity, the problem of motion, Zeno's paradoxes. Bayle's skepticism is directed against all intellectual confidence.
   2. The resolution of Bayle's tensions: humility, tolerance, quiet belief by faith and conscience.

IV. Conclusion.

A. Opposed by outraged theologians, Bayle attempts to criticize the very foundations of his culture's intellectual inheritance, trying to show that Christianity becomes superstitious when it departs from simple faith.
   1. Bayle decries fear of comets and witchcraft belief; the denigration of universal consent; he defends the reality of virtuous atheists.
   2. Always, for Bayle, one must avoid overextension of human claims and hold to simple faith.

B. A tidal change was occurring in the culture, however, that affected perceptions of Bayle.
   1. Bayle was increasingly read as irreligious, given the growing commitment to rational and evidential belief.
   2. Bayle's "David" gives rise to Voltaire's "David," despite the extraordinary difference in their two religious worlds.
   3. Fideism persists in Europe, but it is occurring on a wave of naturalization and rational commitment.
   4. A religious culture rapidly is abandoning the belief that the world is clearer if reason's light is diminished.

Essential Reading:

Pierre Bayle, *Historical and Critical Dictionary* (Richard H. Popkin, editor and translator), pp. 45-63, 144-153, 166-209, 350-388, 396-444.

Supplementary Reading:

Walter Rex, *Essays on Pierre Bayle and Religious Controversy*.

Questions for Discussion:

1. By the eighteenth century, many readers viewed Pascal's fideism as sincere and Bayle's fideism as insincere. Is there something about Bayle's arguments that encouraged that reading?
2. Why should the traditional argument that the wisdom of the Christian is foolishness to the world cause such scandal in the late seventeenth century?

Timeline

1543.....Publication of Copernicus's heliocentric theory

1561.....Birth of Francis Bacon

1564.....Birth of Galileo

1571.....Birth of Kepler

1588.....The defeat of the Spanish Armada; the birth of Thomas Hobbes

1596.....Birth of Descartes

1598.....Edict of Nantes in France grants limited toleration to the Huguenots (French Calvinists)

1605.....Publication of Bacon's *Advancement of Learning*

1609.....Kepler publishes his *Astronomia Nova*, asserting the elliptical orbit of Mars

1618.....Bacon becomes Lord Chancellor of England; beginning of the Thirty Year War in Europe

1620.....Publication of Bacon's *Novum Organum*

1621.....Bacon disgraced for bribery and returns to private life and thought

1623.....Birth of Pascal

1626.....Death of Francis Bacon

1628.....Death of Kepler

1632.....Birth of Locke

1637.....Publication of Descartes's *Discourse on Method*

1641.....Publication of Descartes's *Meditations on First Philosophy*

1642.....Civil War begins in England; Galileo's death in his ninth year of home imprisonment

1643.....Birth of Newton

1647.....Birth of Bayle

1649.....Execution of King Charles I in England

1650.....Death of Descartes

1651.....Publication of Hobbes's *Leviathan*

1654.....Deep ties of Pascal with Jansensim; he moves to the community at Port-Royal

1660.....Restoration of the Stuart monarchy in England; Hobbes returns to favor

1662.....Death of Pascal; discovery of his notes for a defense of the Christian faith, soon published as his *Pensées*

1663.....Formation of the Royal Society in England

1666-1668....Newton's 18 months in Woolesthorpe, changing the history of human thought

1679.....Death of Hobbes.

1681.....Bayle takes refuge among French Huguenots in Rotterdam, all fleeing from persecution of Protestantism in France

1685.....Revocation of the Edict of Nantes, formally and officially ending all toleration of Protestantism in France

1687.....Publication, in Latin, of Newton's *Mathematical Principles of Natural Philosophy*

1689.....Birth of Montesquieu

1690.....Publication of Locke's *Essay Concerning Human Understanding* and of his *Two Treatises of Government*

1692.....Birth of Joseph Butler

1694.....Birth of Voltaire (François-Marie Arouet)

1695.....Publication of Locke's *The Reasonableness of Christianity*

1697.....Publication of the first edition of Bayle's *Historical and Critical Dictionary*, which will be frequently revised and republished

1704.....Death of Locke

1706.....Death of Bayle

1709.....Birth of La Mettrie

1711.....Birth of Hume

1712.....Birth of Rousseau

1713.....Birth of Diderot

1715.....Death of Louis XIV in France

1721.....Publication and great success of Montesquieu's *Lettres Persanes*

1726.....Publication of Butler's *Sermons on Human Nature*

1727.....Death of Newton; buried in Westminster Abbey

1734.....Publication and scandal of Voltaire's *Philosophical Letters*

1736.....Concerned about the growth of disbelief, Butler publishes his *Analogy of Religion, Natural and Revealed, to the Constitution and Course of Nature*

1738.....Butler elevated to bishop in the Church of England; birth of Beccaria in Milan

1740.....Publication of Hume's *A Treatise of Human Nature*

1746.....Diderot becomes editor of the *Encyclopedie*

1747.....Publication of La Mettrie's *L'Homme Machine*

1748.....Publication of Montesquieu's *Spirit of the Laws* and of Hume's *An Enquiry Concerning Human Understanding*

1750.....Publication of Rousseau's First "Discourse," *on the Arts and Sciences*

1751.....Publication of Voltaire's *History of the Century of Louis XIV,* of d'Alembert's *Discours Preliminaire,* and of Hume's *An Enquiry Concerning the Principles of Morals.*

1751-1772....Publication of the *Encyclopedie*

1752.....Death of Butler

1755.....Death of Montesqueiu; publication of Rousseau's Second "Discourse," *On the Origins of Inequality*

1759.....Publication of Voltaire's *Candide*

1762.....Rousseau publishes both *Emile* and *The Social Contract*; he must flee from Paris because of his criticism of Christianity in the *Emile*

1764.....Publication Beccaria's *On Crimes and Punishments*

1770.....Publication of the baron d'Holbach's explicitly atheistic *System of Nature*

1773.....Catherine the Great of Russia offers lifetime financial assistance to Diderot

1776.....Death of Hume; outbreak of the American War of Independence

1778.....Death of Voltaire amidst celebrations honoring him in Paris

1778.....Death of Rousseau

1784.....Death of Diderot

1789.....Outbreak of the French Revolution

1794.....Death of Beccaria

Glossary

anthropomorphism: the attribution to God of the qualities of human beings.

anticlericalism: the belief that the religious, social, or political influence of the clergy is harmful and should be restrained.

apologetics: defense by argument, most often of the Christian faith.

Cartesian: pertaining to Descartes or to his followers.

corporeal: relating to matter and to physical properties.

deduction: reasoning from the general to the particular or from premises to what follows logically from those premises.

determinism: the philosophical doctrine that all actions, including all human actions, are controlled absolutely by prior causes and are not subject either to chance or to free will.

disputatio: the model of teaching, examination, and argument that dominated medieval and early modern universities in Europe, based upon authority and logical deduction from received authorities.

dualism: the philosophical opinion that reality, and, in particular, the human being, is divided into two distinct and irreconcilable substances, body and soul.

empiricism: the philosophical doctrine that all knowledge arises from experience and that what cannot be confirmed by experience is not known (or naturally known).

epistemology: the theory or science of the origins, nature, limits, and validity of knowledge.

essence: the property or properties without which a thing would cease to be what it is.

fatalism: the belief that events are predetermined and that no human action can alter the course of things.

fideism: a religious form of philosophical skepticism that views the uncertainty and weakness of natural human knowledge as an indication of the necessity of faith.

geocentric: a system of astronomy in which the earth is the center of the cosmos.

heliocentric: a system of astronomy in which the sun is the center.

hyperbolic: excessive.

idealism: the philosophical doctrine that thought has as its object ideas rather than material objects.

immutable: not subject to or incapable of natural change.

induction: reasoning from the particular to the general or from a number of common facts to a general conclusion.

Jansenism: a movement within early modern European Catholicism that emphasized the texts of Saint Augustine that most stressed predestination and the need for personal and unmerited grace.

Latitudinarianism: a movement within the early modern Church of England that accepted the appropriateness of wide differences of belief, ritual, and Scriptural interpretation within Christianity.

malleability: the quality of being changed in form or ways of being by external influences.

Manichean heresy: the belief that the universe is governed by opposing and equal forces of good and evil.

materialism: the philosophical theory that matter is the only (or only knowable) substance in the universe.

mechanism: in the seventeenth and eighteenth centuries, the philosophical theory that the operations of the universe can be explained by matter-in-motion acting according to the laws of physics.

metaphysics: the branch of philosophy dealing with first principles and the real nature of things.

mutable: subject to or capable of natural change.

naturalism: in philosophy, the belief that there are no supernatural beings or causes in the world.

objective being: in Cartesian philosophy, that which is represented by an idea.

occult force: in certain systems of philosophy, and particularly in scholasticism, a natural cause (of a phenomenon) that is beyond the range of perception.

ontology: the theory or science of being and of the essence of things.

optics: the science of the nature and laws of light.

Pyrrhonism: named after the Greek skeptic Pyrrho, an extreme form of philosophical skepticism, best known for its doubt that even the proposition "Nothing can be known with certainty" could be known with certainty.

qualitative: pertaining to quality, and, in early modern philosophy, essence.

quantitative: pertaining to quantity and measurement.

rationalism: the philosophical doctrine that all true knowledge is found by reason alone, independent of the senses.

relativism: the philosophical doctrine that what we know and believe about things is relative to time, place, and circumstance.

scholasticism: a system of thought arising from the fusion of Aristotelian philosophy and Christian theology that dominated the schools of Europe from the late fourteenth century until the end of the seventeenth century.

sensationalism: the philosophical doctrine that all ideas (or all knowledge) are acquired by means of the senses.

skepticism: the philosophical theory that nothing can be known with certainty.

substance: the stuff or material of which a thing is made.

tabula rasa: a blank slate (the Lockean view of the human mind at birth).

teleology: the theory or science of "final causes," that is, of purposes or ends served.

theodicy: philosophical justification of God's goodness (and justice) in spite of the existence of evil and suffering.

utility: the moral criterion of the effect of actions or things upon human happiness (and the reduction of suffering).

Biographical Sketches

Francis Bacon (1561-1626). Statesman and philosopher, Bacon undertook a fundamental revision of human inquiry and knowledge. The son of a powerful Tudor politician, Bacon studied at Trinity College, Cambridge, became a barrister, and rose to the position of Lord Chancellor of the kingdom, becoming the Baron Verulam and the Viscount of St. Albans. He was dismissed from power in 1621 for bribery, a common charge in the perilous world of Tudor-Stuart politics, and he spent the final years of his life working on his great philosophical project, the *Instauratio Magna*, of which one vital part, the *Novum Organum* became his most influential legacy.

Pierre Bayle (1647-1706). Erudite scholar, religious controversialist, and ardent Huguenot (French Calvinist), Bayle shook the learned world of the late seventeenth century with his critique of intellectual arrogance, superstition, and religious intolerance. After a brief conversion to Catholicism, Bayle returned to his Calvinist origins and taught philosophy at the Protestant Academy of Sedan. He also taught philosophy and history to the growing number of persecuted Huguenots who took refuge there. Bayle feuded with the Huguenot leader, Pierre Jurieu, on matters of political theology, and he was stripped of his professorship in 1693. He served as editor a leading journal of the European learned world, wrote major works on tolerance and on religious belief, and authored a celebrated *Dictionnaire historique et critique* (1697, the first of many editions).

Joseph Butler (1690-1752). Bishop of the Church of England, confessor and preacher at the royal court, and an admired preacher, Butler was one of the foremost moral philosophers of his age. His "Sermons on Human Nature," given at the Rolls Chapel in London, were of great influence in shaping eighteenth-century discussion of nature and ethics. Increasingly concerned with Deistic unbelief, Butler published an immensely popular defense of Christianity in 1736, *The Analogy of Religion, Natural and Revealed, to the Constitution and Course of Nature.* Butler's ecclesiastic career was a series of successes: head chaplain to Caroline, the wife of King George II; bishop of Bristol; and bishop of Durham, after declining the offer of the primacy of the Church of England.

Cesare Beccaria (1738-1794). A Milanese reformist nobleman, Beccaria, at the age of 26, wrote *On Crimes and Punishments* (1764), one of the most influential texts of the European Enlightenment. Beccaria was part of an intellectual society in Milan that read authors of the French Enlightenment and that worked on plans of fiscal, administrative, and legal reform in northern Italy. *On Crimes and Punishments* earned Beccaria international fame. The work was translated into French (selling seven editions in the first six months), German, Dutch, Polish, Spanish, and English (in which form it deeply influenced Jeremy Bentham and the philosophical radicals). Beccaria remained a public official until his death,

concerned with issues of economics and education, and holding a chair in Public Economy at the Palatine School in Milan.

René Descartes (1596-1650). Descartes became the most influential Continental philosopher of the seventeenth century. Between 1618 and 1628, he travelled and studied throughout Europe while on military service, writing and publishing foundational works of mathematics and philosophy. In 1628, he moved to Holland, where censorship was far less severe than in his native France. He visited Paris in 1647 and 1648, however, meeting leading European philosophers of his age. A series of works published between 1637 and 1649—the *Discourse on Method*, the *Meditations on First Philosophy*, the *Principles of Philosophy*, and the *Treatise on the Passions*—earned him ardent disciples, and his system of philosophy soon challenged Aristotle's for dominance among European thinkers. Posthumously-published works only added to his fame. He was attacked bitterly for his challenges to the Aristotelian system, but his defenders and acolytes included both eminent theologians and eminent natural philosophers.

Denis Diderot (1713-1784). The son of a provincial artisan who came to Paris to study theology, Diderot became the foremost materialistic and atheistic thinker of the eighteenth century. He was best known, however, as the editor of the extraordinary publishing accomplishment of his age, the *Encyclopedie*, on which he worked from 1745 until 1772. He was a prolific author, writing novels (some quite experimental), art criticism, theater, natural philosophy, science, political theory, and a remarkably wide range of essays. In 1773, he received the patronage of Catherine the Great, Empress of Russia, who purchased his library and appointed him its librarian with an annual salary for life. After his death, the wide range of his interests became apparent from posthumous publications, and his reputation has grown steadily ever since.

Galileo Galilei (1564-1642). Mathematician, astronomer, inventor, and physicist, Galileo both laid the foundations of the scientific revolution of the seventeenth century and polemicized with astute effectiveness against the prevailing Aristotelian scholastic philosophy. In 1589, he became a lecturer in mathematics at the University of Pisa, and in 1592 he was awarded a chair in mathematics at the University of Padua, a position that he held for eighteen years. His development of an effective astronomical telescope in 1609 and his telescopic discoveries, published in 1610, made him a European celebrity. An early defender of the Copernican heliocentric theory, he was charged with heresy and theological error in 1633, forced to recant his Copernicanism, and placed under house arrest on his own estate, where he died in 1642. Although forbidden from writing during his arrest, he completed and smuggled out to the public his foundational work on the new physics.

Thomas Hobbes (1588-1679). An Oxford graduate who became private tutor to the powerful Cavendish family, Hobbes elaborated a complex, controversial, and widely influential system of philosophy that embraced knowledge, physics, human nature, politics, and the state. Leading the sons of the Cavendish family

on the "Grand Tour" of the Continent, Hobbes had conversations with Galileo and with leading Cartesians. He published three works of central philosophical importance between 1642 and 1658, *De Corpore* (*On Body*), *De Homine* (*On Man*), and *De Cive* (*On Society*), the last of which grew into his monumental work of political philosophy, the *Leviathan*. Although his views on determinism and materialism earned him great enmity from the Church, his friendship with King Charles II (whose mathematics tutor he had been during the exile of the royal court in France during the English civil war) secured his safety. Nonetheless, after the House of Commons began investigating him in 1666, he ceased writing on human nature and devoted himself to translations from the Greek.

David Hume (1711-1776). Educated at the University of Edinburgh in his native Scotland, Hume became one of Europe's most influential, controversial, and revered philosophers. During an extended stay in France from 1734 to 1737, he wrote his *A Treatise of Human Nature*, which was published upon his return to Britain in 1739-1740. Its reception disappointed Hume, and his systematic views did not receive the deep attention of his age until the publication of his *An Enquiry Concerning Human Understanding* in 1748. His *Enquiry Concerning the Principles of Morals* (1751) also earned him celebrity. Suspicions about Hume's views on religion prevented him from obtaining the expected Chair of Moral Philosophy at Edinburgh, but he was made Keeper of the Advocates Library at Edinburgh, and, from 1763 to 1766, he served as secretary to the British Embassy in Paris, where he became a welcome participant in French intellectual and salon life. He devoted himself increasingly to history in his later years, publishing a deeply influential *History of England*. He spent the final ten years of his life among friends and admirers in Edinburgh.

Johannes Kepler (1571-1630). Astronomer, astrologer, mathematician, and mystic, Kepler altered the history of Western science. A student of theology and astronomy at the University of Tubingen, he joined Tycho Brahe's astronomical researchers in 1600, near Prague, under the patronage of the Holy Roman Emperor. After Brahe's death in 1601, Kepler was named Imperial Mathematician. Heir to Brahe's astronomical data, Kepler became convinced that the sun must be at the center of the system, and he deduced his three laws of planetary notion. He published extensively on the Copernican astronomy and on his own laws. Seeking greater freedom to write, he established his own printing press in Silesia in 1628. His work was essential to the Newtonian synthesis of the late seventeenth century.

Julien Offroy de La Mettrie (1709-1751). Controversialist, naturalist, and philosopher, La Mettrie was persecuted both for his views of the French medical profession and for his anti-spiritualist philosophy. He studied at the University of Leiden with the great life-scientist Herman Boerhaave, some of whose works he translated for the French public. He served as a surgeon to the French army. Deeply dissatisfied with the "science of man" as he found it, he undertook in a series of works to ground both medicine and theories of human nature in a

naturalistic materialism, writing of mind, will, and happiness without reference to an immaterial soul. Forced to flee France, he found temporary refuge in Holland, but he was called in 1748 to the court of Frederick the Great of Prussia, where he was appointed to the Academy of Science in Berlin. He died of ptomaine poisoning at Frederick's court, giving rise in France to the story that he killed himself by his materialistic gluttony. An edition of his works was published very shortly after his death.

John Locke (1632-1704). A foundational thinker in modern theories of epistemology, political philosophy, education, scriptural interpretation, and religious toleration, Locke was educated at Christ Church College, Oxford, where he was early interested in the new experimental sciences. He spent a great deal of time abroad, first on diplomatic missions, then during a four-year stay in France (where he furthered his interest in the new empirical sciences), and finally in Holland during a difficult political period from 1683 until 1689. He returned to England in 1689, a leading political theorist of the Glorious Revolution of 1688. Locke was and is best known for his *Essay Concerning Human Understanding*, *Second Treatise on Government*, *The Reasonableness of Christianity*, and *A Third Letter Concerning Toleration*.

Charles-Louis de Secondat, baron de Montesquieu (1689-1755). Son and heir of an aristocratic family of the *parlement* de Bordeaux (the supreme provincial law court), and educated first by the Oratorians and then in the Law, Montesquieu became one of the most influential and widely-read political theorists of the eighteenth century, with an international influence. Participating early in the academies of Bordeaux and then in the *Academie Francaise*, Montesquieu came to prominence with his satiric and probing *Lettres Persanes* in 1721, a work on the greatness and decline of Rome, published in 1734, and his pathbreaking work *L'Esprit des loix* (*The Spirit of the Laws*) in 1748, a book that earned him the widest range of criticism and admiration and that many believe lay the foundation of sociological thinking.

Isaac Newton (1643-1727). Originally destined to follow his father into commercial farming, Newton distinguished himself at Trinity College, Cambridge University, and he became the foremost scientific mind of the early modern era. When Cambridge was closed because of the plague, in 1666-1668, Newton returned to Woolesthorpe, in Lincolnshire, where, in eighteen months, he developed the foundations of the calculus, derived the inverse square law upon which the theory of gravitation would be based, derived his laws of motion and of planetary motion, and developed the modern theory of light. In 1669, he became Lucasian professor of mathematics at Trinity College, keeping almost all of his other discoveries to himself. His theory of the world, *The Mathematical Principles of Natural Philosophy*, was published in Latin in 1687 (translated into English in 1729), and his *Opticks* in 1704. He was knighted for his contributions to knowledge, and he was buried in Westminster Abbey.

Blaise Pascal (1623-1662). A child prodigy in mathematics, Pascal abandoned, with periods of activity interspersed, a breathtaking scientific career as a young man to devote himself primarily to the religious life, including religious controversies and apologetics. In mathematics and science, he won international acclaim for his work on cycloid curves, barometrics, geometry, and hydrodynamics, and the mechanics of calculation. After an intense conversion to Jansenism, he lived a generally ascetic and devout life, writing an immensely successful Augustinian criticism of Jesuit casuistry, *Les Provinciales* (*The Provincial Letters)*, and an unfinished apologia of Christianity, published posthumously as his *Pensées*, a work of immediate and enduring influence and popularity.

Jean-Jacques Rousseau (1712-1778). A self-educated refugee in France from Geneva (from which he fled an unhappy apprenticeship to an engraver), Rousseau became one of the most beloved and one of the most hated thinkers of the eighteenth century, and a thinker of immediate and ongoing importance. In Paris from the 1740s until 1756, he moved in Enlightenment circles, but he offered foundational criticism of the *philosophes'* belief in progress and what he saw as their overreliance upon reason. From 1756 to 1761, he lived outside of Paris, writing a variety of genres with great success. In 1762, the year that his influential works *Emile* and *The Social Contract* were published, he was banished from Paris for his criticisms of Christianity in the *Emile*, and he fled to Switzerland where he was the subject of Protestant persecution. He spent an unhappy stretch in England, returning to France in 1767, and composing major works of self-examination, including his celebrated *Confessions.*

Voltaire [François-Marie Arouet] (1694-1778). Educated by the Jesuits and destined by his father for an administrative career, Voltaire became the most prolific and influential of all authors of the French Enlightenment. He earned early celebrity as a poet and dramatist, spent a period of exile in England (writing the *Philosophical Letters*, published in 1734), and became internationally renowned for (in addition to his theater and poetry) his histories, didactic and mordant philosophical tales, popularizations of natural philosophy and science, criticism, and, with most influence, his campaign on behalf of religious toleration. The *Philosophical Letters* led to his banishment from Paris, and he worked from 1734 until 1749 at Cirey, with Madame du Chatelet, writing above all on science, history, and religion. At the invitation of Frederick the Great, he spent a few unhappy years at the Prussian court, and settled eventually on an estate at Ferney that straddled the French and Genevan borders. There, he wrote prolifically, intensifying his campaign for toleration, and he aided young Enlightenment authors. Ferney became a kind of intellectual court for the learned and even, at times, for the powerful. He was received and feted in 1778 in Paris, his banishment having been lifted, and he died in the midst of great official and unofficial celebrations in his honor. Perhaps more than even has been the case with any other author, his pen actually may have been mightier than most swords.

Comprehensive Bibliography

I. Essential Reading:

d'Alembert, Jean le Rond, *Preliminary Discourse to the Encyclopedia of Diderot*. Translated by Richard N. Schwab, with the collaboration of Walter Rex. Indianapolis: Bobbs-Merrill, 1963. This work is a window into the mind of the Enlightenment just as the movement begins to comes of consciousness of itself.

Aristotle, *Metaphysics.* Edited and translated by Richard Hope. Ann Arbor: University of Michigan Press, 1960. This is an outstanding translation (first published by Columbia University Press in 1952) of the essential Aristotelian work, and it includes appropriate selections from Aristotle's *Physics* in helpful sequence.

Bacon, Francis, *Novum Organum.* Translated and edited by Peter Urbach and John Gibson. Chicago: Open Court, 1994. In Bacon's "Introduction" and in Book One, you will find his clearest presentation of his vast project for a new knowledge. The later seventeenth century was deeply inspired and influenced by this work, and the seventeenth and eighteenth centuries are almost incomprehensible without a familiarity with the vision offered in this work.

Bayle, Pierre, *Historical and Critical Dictionary.* Translated and edited by Richard H. Popkin. Indianapolis: Hackett, 1985. Bayle's *Dictionary* was of monumental importance in the history of philosophy and critical erudition. The selection here illuminates Bayle's sense of the conflict between faith and reason when reason addresses areas beyond its ken, and it includes Bayle's important "Clarifications" in which he defends himself against charges of impiety and indecency.

Beccaria, Cesare, *On Crimes and Punishments, and other writings.* Edited by Richard Bellamy. Translated by Richard Davies, with Virginia Cox and Richard Bellamy. Cambridge and New York: Cambridge University Press, 1995. In addition to the text of its central work, which influenced European and American legal reform for more than two generations, this edition includes important works included in the French translation of 1766 and other works that illustrate Beccaria's broader Enlightenment concerns.

Butler, Joseph, *Five Sermons, Preached at the Rolls Chapel and A Dissertation upon the Nature of Virtue.* Edited by Stephen L. Darwall. Indianapolis: Hackett, 1983. Bishop Butler's sermons on human nature were simultaneously broadly representative of the naturalizing tendency within Anglican moral theology in the eighteenth century and exceptionally influential in forming a Christian school of moral theology that stressed the providential harmony of happiness and virtue.

Descartes, René, *Meditations on First Philosophy.* Edited and translated by John Cottingham. Revised edition. New York: Cambridge University Press, 1996. This is an excellent edition of Descartes's immensely influential and controversial work of fundamental metaphysics, and it includes the "Objections and Replies" published in the first seventeenth-century edition, which permits the reader to understand how Descartes was read (and objected to) in his own lifetime and how he defended his positions.

_____. *The Passions of the Soul.* Translated by Stephen Voss. Indianapolis: Hackett, 1989. This work reveals how far Descartes goes in explaining human phenomena physiologically and mechanistically, and, though vital, how minimal a role he assigns to any immaterial agency in man. It is important to read *The Passions of the Soul* with the *Meditations*, in order to have a full sense of the Cartesian agenda.

Diderot, Denis, *D'Alembert's Dream,* in *Rameau's Nephew/D'Alembert's Dream.* Translated by Leonard Tancock. London: Penguin Books, 1966. This is Diderot's most speculative work, in which he extends the boundaries of naturalistic explanation as far as he can (literally) imagine. You should read it as speculative work, not as a scientific opus, despite its evolutionary theories and its anticipation of genetic replication. Diderot is imagining what form explanations without God or spirit might take; he is not writing from scientific knowledge. His moral speculations in the third dialogue are among the frankest of the Enlightenment.

Galileo, *Discoveries and Opinions of Galileo.* Translated and edited by Stillman Drake. New York: Anchor Books, 1957. This is an important and historically dramatic compilation of major works by Galileo, accomplished by Stillman Drake, one of the century's most eminent scholars and translators of Galileo's works. It includes, among other works, *The Starry Messenger*, in which Galileo announced some of his most startling discoveries (since he perfected the astronomical telescope), the *Letter to the Grand Duchess Christina*, in which he articulated his profoundly influential views of the relationship between science and scripture, and a significant excerpt from *The Assayer*, in which he attacks, with verve, the natural philosophy of the Aristotelians. Drake links them together with an interesting narrative. Reading these pieces, one encounters not merely the scientific and philosophical Galileo, but also the bitterly anti-Aristotelian intellectual brawler.

Hobbes, Thomas, *Leviathan.* Edited by C.B. Macpherson. London: Penguin Books, 1985. This work is not only one of the great classics of political theory, but, more deeply, an entire philosophical project based upon a theory of knowledge, human nature, and human motivation. Everyone reads the political theory of Book II; you should read, above all, the theory of human nature in Book I and the reflections on religion, philosophy, and politics in Books III and IV.

Hume, David, *Dialogues Concerning Natural Religion and the Posthumous Essays.* Edited by Richard H. Popkin. Indianapolis: Hackett, 1980. Hume's *Dialogues*, published posthumously in the eighteenth century, were and are a remarkable exploration and examination of the arguments for and against the claim that we know of God from the study of nature by the natural human faculties. This edition includes two essays that Hume withheld from his earlier philosophical works, "Of the Immortality of the Soul," and "Of Suicide," that also critically examine deeply held Christian beliefs.

Kors, Alan Charles and Korshin, Paul, editors, *Anticipations of the Enlightenment in England, France, and Germany.* In this work an international group of authors argues that so much of what historians generally attribute to the mid to late eighteenth century was present in the intellectual life of the generation from 1680 to 1715.

Koyre, Alexandre, *Newtonian Studies.* Cambridge, Mass.: Harvard University Press, 1965. Koyre was a singularly deep, astute, and influential scholar, with a remarkable sense both of Newton's mind and method, on the one hand, and of Newton's relationship to the long-term history of Western philosophy and religion, on the other.

La Mettrie, Julien Offray de, *Machine Man and Other Writings.* Translated and edited by Ann Thomson. Cambridge and New York: Cambridge University Press, 1996. There has been a recent flurry of critical editions of La Mettrie's works, including an important work by Thomson herself, but this is by far the best and most welcome compilation of La Mettrie's thought, offering not only *Machine Man*, but other works on the human being, on ethics, on the Stoics and Epicureans, and on philosophy in general.

Locke, John, *An Essay Concerning Human Understanding.* Abridged and edited by A.D. Woozley. New York: Meridian, 1974. Locke's *Essay* dominated Western notions of knowledge for a century, and understanding the *Essay* is essential for understanding both the seventeenth and eighteenth centuries. Woozley's abridgement does justice to Locke's essential arguments and language.

Montesquieu, Charles de Secondat, baron de, *The Persian Letters.* Translated by C.J. Betts. London: Penguin Books, 1973. This is a superb translation of Montesquieu's exotic, philosophical, best-selling work, one of the true publishing sensations of the eighteenth century. It exposes the reader not only to Montesquieu's quest for universals among the relativistic beliefs and practices of mankind, but to his wit and social criticism.

Newton, Isaac., *Newton's Philosophy of Nature: Selections from His Writings.* Edited by H.S. Thayer. New York: Hafner, 1953. This excellent anthology of Newton's writings exposes the readers to the heart of his discoveries, and his views of method, hypothesis, experiment, mathematical reasoning, and God in natural philosophy. It also includes the preface by Cotes to the first English

edition of Newton's *Principia*, which demonstrates how Newton's thought was explained and popularized.

Pascal, Blaise, *Pensées.* Translated by A.J. Krailsheimer. London: Penguin Books, 1966. Despite Pascal's often marginalized place in seventeenth-century religious debates, being a Jansenist in revolt against the worldliness of other forms of Catholicism, the *Pensées* were an instant best-seller in France, beloved across a wide spectrum of beliefs, and they have stood as one of the most influential religious writings of Western civilization.

Pocock, J.G.A., *Politics, Language, and Time.* Revised edition. Chicago: University of Chicago Press, 1989. Almost every essay in this volume in a gem, including the self-criticism added in 1989, but the first essay, "Languages and their Implication," although it uses the history of political thought as its subject, is a magisterial lesson on the nature of an empirical and contextual intellectual history, on the multivalence of ideas, and on the study of fundamental change in human thought.

Rousseau, Jean-Jacques. *The Social Contract and Discourse on the Origin of Inequality.* Edited by Lester G. Crocker. New York: Simon and Schuster, 1967. This edition uses an excellent (and anonymous) 1761 English translation of the *Discours* and the superb Henry J. Tozer nineteenth-century translation of the *Contrat Social.* The *Discourse* establishes Rousseau's view of the catastrophic cost that we have paid for civilization, and *The Social Contract* offers one of Rousseau's senses of how we might repair a major portion of that damage. It is enlightening, thus, to read the two works together.

Tindal, Matthew, *Christianity as Old as the Creation.* Stuttgart: Friedrich Frommann, 1957. This is a facsimile publication of the 1730 edition of Tindal's celebrated and notorious work, termed "The Bible of Deism" by opponents and admirers. Tindal's work struck a nerve, eliciting more than a hundred refutations and inspiring a generation of freethinkers.

Voltaire, *Candide and Other Writings.* Edited by Haskell M. Block. New York: Random House [The Modern Library], 1956. Using a variety of excellent translations, many of them improved by Haskell Block, this is a rich compilation of a great diversity of Voltaire's writings. It will permit the reader to experience Voltaire's pen in many genres, and where it excerpts works, it does so well.

_____. *Philosophical Letters.* Translated by Ernest Dilworth. New York: Macmillan, 1961. The great early twentieth-century scholar Gustave Lanson termed this work the opening round of the French Revolution (two generations later). It should be read in its entirety, giving the reader rich exposure to the thought of the still young Voltaire on religion, politics, society, literature, and the world of learning. It had an electric effect in France, where it was a *cause célèbre* and the occasion of Voltaire's virtually lifelong banishment from Paris.

Waring, E. Graham, editor, *Deism and Natural Religion: A Source Book.* New York: F. Ungar, 1967. This outstanding anthology offers both sides of the "deist controversies" in England. It includes significant excerpts from deists, Christian natural religionists, and Christian defenders of supernatural faith against the deists. It truly exposes the reader to the broadest range of English deistic and Christian debate about the place of nature and reason in religion.

II. Supplementary Reading:

Aristotle, *Physica.* Translated by R.P. Hardie and R.K. Gaye. Volume II of *The Works of Aristotle.* Edited by W.D. Ross. Oxford: Oxford University Press, 1930. To understand fully the revolution in seventeenth-century notions of physics and nature, one must understand the foundation of the system against which the new philosophy directed its criticisms; this was that foundation.

Bacon, Francis, *The Complete Essays of Francis Bacon, Including The New Atlantis. Edited by Henry LeRoy Finch.* New York: Washington Square Press, 1963. This work provides the reader not only with Bacon's visionary *The New Atlantis*, in which he offers a utopian view of a society organized around the charitable use of a new human knowledge derived from a new experimental science, but also his *Essays or Counsels Civil and Moral*, which offer much insight into the more worldly thinking of this Elizabethan and Tudor statesman.

Betts, C.J., *Early Deism in France. From the so-called 'deistes' of Lyon (1564) to Voltaire's 'Lettres Philosophiques' (1734).* The Hague and Boston: Martinus Nijhoff, 1984. This is a learned and interesting history of the emergence of anti-Christian deistic thinking in France, with an excellent bibliography.

Chastellux, François-Jean, *An Essay on Public Happiness.* 2 vols. New York: A.M. Kelley, 1969. This is a reprint of the 1774 English translation of this classic work, first published, in French, in 1770. Voltaire (perhaps in a moment of weakness) called this book "greater than Montesquieu's *Spirit of the Laws*), which may not be the judgment of posterity, but which tells us something of Chastellux's place in the eighteenth century. The book is a window onto the thinking of the French Enlightenment about utility, the theoretical problem of reconciling public and private happiness, and the role of the Church in society.

Descartes, René, *Discourse on Method.* There are scores of editions and translations of this profoundly influential work, a discourse that altered the course of the seventeenth century and, indeed, of European philosophy. Read any unabridged edition.

_____. *Treatise of Man.* French text with translation by Thomas Steele Hall. Cambridge, Mass: Harvard University Press, 1972. This work deeply influenced the thought of the second half of the seventeenth century and did much to bridge the "scientific" and the "philosophical" study of human beings.

Galileo, *Dialogue Concerning the Two Chief World Systems–Ptolemaic and Copernican.* Translated by Stillman Drake. Forward by Albert Einstein. Second edition. Berkeley: University of California Press, 1970. In theory, this was Galileo's neutral exposition of the two great systems; in fact, it was a sustained polemical and scientific work on behalf of the Copernican system. Although many of its arguments on behalf of Copernicus did not survive scrutiny, its refutation of the Ptolemaic and scholastic astronomy was profoundly effective and influential.

Peter Gay, editor, *Deism: An Anthology.* New York: Van Nostrand, 1968. This compilation offers examples of deistic writing from deism's precursors in the seventeenth century to deism's flowering in England, on the continent, and in America in the eighteenth century. Unlike Waring's anthology (see above), the reader is not exposed to Christian replies, but Gay's anthology offers a more geographically and intellectually broad sampling of deistic authors.

Haakonssen, Knud, *Natural Law and Moral Philosophy from Grotius to the Scottish Enlightenment.* Cambridge and New York: Cambridge University Press, 1996. This is a quite stunning analytic survey of the development of thinking about natural law in moral philosophy, with a broad scope, many compelling individual discussions, and a rich bibliography.

Halevy, Elie, *The Growth of Philosophic Radicalism.* Translated by May Morries. Boston: Beacon Press, 1966. This is a classic study of utilitarianism: its birth in the eighteenth century and its adoption by English reformers in the late eighteenth and in the nineteenth centuries. It understands the central role of French Enlightenment works in this development. This work, first published in French earlier in the century, has become a touchstone for almost all later work on utilitarianism.

Hazard, Paul, *The European Mind, 1680-1715.* New York: World Publishing, 1963. First published, in French, in 1935 (under the title *La crise de la conscience européenne, 1690-1715*, a more dramatic title than in its English translation), Hazard's work is a classic and a common point of reference for all later historians.

Hobbes, Thomas, *Metaphysical Writings.* Edited by Mary Whiton Calkins. New edition. Chicago: Open Court, 1989. This is an outstanding compilation of major excerpts from Hobbes's *Elements of Philosophy Concerning Body* and from his treatise on *Human Nature*, and will permit the reader to situate the project of the *Leviathan* in the context of Hobbes's broader philosophical concerns.

Hume, David, *Writings on Religion.* Edited by Antony Flew. Chicago: Open Court, 1992. This is an outstanding compilation of Hume's scattered writing on religion, and it includes his crucial work *A Natural History of Religion.* Flew is a first-rate philosopher, and he adds astute observations.

Kors, Alan Charles, *Atheism in France, 1650-1729: The Orthodox Sources of Disbelief.* Princeton: Princeton University Press, 1990. The opening chapters lay out an agenda for a contextual intellectual history. A later section, "The Fratricide," focuses on the intensity of Aristotelian-Cartesian debate.

_____. "The Atheism of d'Holbach and Naigeon," in Michael Hunter and David Wootton, editors, *Atheism from the Reformation to the Enlightenment.* Oxford and New York: Oxford University Press, 1992, pp. 273-300. A presentation of the origins and nature of the materialistic thought of two thinkers who went beyond their friend Diderot in proselytism for atheism.

Koyre, Alexandre, *Metaphysics and Measurement: Essays in Scientific Revolution.* Cambridge, Mass.: Harvard University Press, 1968. For students wishing to understand the central role of the new mathematics and philosophy of quantification in the scientific revolution of the seventeenth century, there is no more provocative, concise book.

Locke, John, *The Reasonableness of Christianity with A Discourse of Miracles and part of A Third Letter Concerning Toleration.* Edited and abridged by I.T. Ramsey. Stanford: Stanford University Press, 1958. Locke's *Reasonableness* was simultaneously an expression of the new naturalizing tendencies of Christianity under the influence of the new philosophy, one of the most extreme examples of that tendency, and, given Locke's immense philosophical prestige, one of the most widely-debated such works. The letter on toleration, with its notion of the voluntary nature of a church, was and is a landmark in Western thinking about civil tolerance.

Leibniz, Gottfried Wilhelm, *Theodicy: Essays on the Goodness of God, the Freedom of Man, and the Origin of Evil.* Leibniz's work, so ferociously satirized in Voltaire's *Candide*, is a powerful work of natural philosophy that lay at the heart of so much of eighteenth-century philosophical and theological optimism. To understand the crisis in confidence of the mid-eighteenth century, one should understand the height of that confidence in its earlier forms.

Montesquieu, Charles de Secondat, baron de, *The Spirit of the Laws.* Translated and edited by Anne M. Cohler, Basia Carolyn Miller, and Harold Samuel Stone. Cambridge and New York: Cambridge University Press, 1989. This work was profoundly influential in the eighteenth century, and, in many minds, set the foundations of Western comparative thinking about societies across geography and time. One should not leave the eighteenth century without reading it.

Newton, Isaac, *The Mathematical Principles of Natural Philosophy.* Translated and edited by Florian Cajori. 2 vols. Berkeley: University of California Press, 1934. This superb edition, now in paperback, is the ultimate source for Newton's natural philosophy and for the watershed accomplishment of the seventeenth century's revolution in science and method. The mathematics remain daunting, but the reader will encounter the birth of a model of thinking about nature that would dominate the following centuries.

Pascal, Blaise, *The Provincial Letters*. Translated by J. Krailsheimer. Baltimore: Penguin Books, 1967. Pascal's mordant and blistering attack on what he took be the moral theology of Jesuit casuistry was one of the most successful polemical works of the seventeenth century. For the reader, it is a captivating window onto Jansenist thought in general, and into the passions of the seventeenth century on issues of sin and grace in particular.

Rex, Walter, *Essays on Pierre Bayle and Religious Controversy*. The Hague: M. Nijhoff, 1965. This is the best book on Bayle in English, and it was part of the revolution in Bayle scholarship that restored him to his Calvinist and fideistic origins. It is a book that reveals how understanding context changes the way one reads a text.

Rousseau, Jean-Jacques, *Emile*. Translated and edited by Allan Bloom. New York: Basic Books, 1979. Rousseau's seminal treatise on education established an influential view of original human nature, a "natural" education that would minimize the depredation of artificial society, and a model of learning that would follow the Lockean model of human knowledge and motivation. A section on religious education earned him official persecution.

Voltaire, *Micromegas* and the "Poem on the Lisbon Earthquake," both in *Candide and Other Writings* (see above), and both indispensable to understanding, in the first work, Voltaire's sense of the limits of human knowledge (and of human nature), and, in the second work, the Voltairean crisis that led to the writing of *Candide*.

Wade, Ira O., *The Intellectual Development of Voltaire*. Princeton: Princeton University Press, 1969. This is a magnificent study of Voltaire's intellectual development by the foremost Voltaire scholar of the twentieth century. It is a classic. It is an encyclopedic work, but it is exceptionally well organized, and the reader may read selectively by interest to his or her great profit.