**For more Enlightenment thinkers: http://www.historyguide.org/earlymod/lecture13c.html**

**René Descartes, 1596-1650**A firm grasp of the direct significance of new scientific knowledge was perhaps best expressed in the work of the French philosopher and mathematician, René Descartes. He was born of a noble family at La Haye, a small town in Touraine, France. Educated at the Jesuit college of La Flèche, he retained an admiration for his instructors but later claimed that he found little of substance in their instruction -- only mathematics had given him any certain knowledge. In 1618, Descartes was in Holland and served in the army of Maurice of Nassau and in this capacity he also traveled to Germany. It was at Ulm, on the night of November 10, after a day of reflection, that Descartes had certain dreams which he interpreted as a divine sign that it was his destiny to found a unified system of nature based on mathematics. He did not, however, begin to write on philosophy or science at this time but continued to travel widely. His first substantial work was the never-completed Regulae ad directionem ingenii (Rules for the Direction of the Mind,written 1628/29, published 1710).

[](http://www.historyguide.org/earlymod/descartes.html)In November 1628 [RENÉ DESCARTES](http://www.historyguide.org/intellect/descartes.html) was in Paris, where he distinguished himself in a famous confrontation with Chandoux whose views on science he attacked, arguing that only absolute certainty could serve as the basis of human knowledge. That year, Descartes retired to Holland where he remained until 1649.

In Holland, Descartes worked on his system, and by 1634 he completed the scientific work, Le Monde. When he heard of the condemnation of Galileo, however, Descartes quickly had his book suppressed. This is an important event to recollect since it demonstrates the caution and conciliation toward authority which Descartes exhibited throughout his life. In 1637, he published a book containing three treatises on mathematical subjects: the Geometry, the Dioptric and the Meteors (prefaced by his equally famous Discourse on the Method of Rightly Conducting the Reason and Seeking for Truth in the Sciences). The [Discourse on Method](http://www.literature.org/Works/Descartes/reason/) was remarkable in a number of ways: it was autobiographical, it presented a concise statement of Cartesianism, and it was composed in French. By writing in French, Descartes intended (like Galileo before him) to aim over the heads of the academic community and to reach educated men of good sense.

Descartes followed the Discourse in 1641 with a more metaphysical work, the six Meditations on First Philosophy, which were published with six (ultimately seven) sets of Objections from various authors, including Thomas Hobbes (see below), [Antoine Arnauld](http://www-groups.dcs.st-and.ac.uk/~history/Mathematicians/Arnauld.html) (1612-1694), and [Pierre Gassendi](http://www-groups.dcs.st-andrews.ac.uk/~history/Mathematicians/Gassendi.html)(1592-1655), and also with Descartes' Replies to the Objections.

In 1649, Descartes yielded to the request of Queen Christina of Sweden that he join a distinguished circle she was assembling in Stockholm and instruct her in philosophy. In this year he published The Passions of the Soul. In 1650, however, and as a result of the Swedish climate, and the fact that Queen Christina requested instruction at 4 AM, Descartes caught pneumonia and died.

Descartes' philosophic approach was purely mathematical. In that discipline he thought he had found the key to the secrets of the universe. As he once expressed it: "I am convinced that [mathematics] is a more powerful instrument of knowledge than any other which has been bequeathed to us by human agency, as being the source of all others." His greatest practical contribution was the creation of analytic geometry. Yet Descartes was no mathematical mystic. He had little use for "pure" mathematics. What interested him most was the mathematical method and its application.

Descartes is important in the western intellectual tradition mainly because of his contribution to philosophical and scientific method. In his Discourse on Method he set forth his body of principles. He asserted that the first step is to wipe away all earlier and accepted authority and to start with a clear and unbiased mind. The philosopher must never accept as true anything that cannot be proven so. Everything must be stated at the outset in the clearest and simplest form, gradually and logically advancing to more complex and involved formulations. Each specific problem must be divided into as many parts as may be necessary to solve it. Thoughts and perceptions must be arranged in an orderly sequence of ideas. In the end there must be a complete analysis and a sufficiently comprehensive review of the whole problem so that nothing is omitted.

The basis of Descartes' thinking was the omnipotence of rational consciousness, summed up in the famous maxim, cogito ergo sum ("I think, therefore I am" or, "I think, therefore I exist"). He thought that he could discover truth by deductive thinking in mathematical terms alone. In doing so, he created a completely mechanistic world view. From this mechanistic explanation he exempted two things: God and the soul of man. Man is the only being in nature who possesses a soul, and the latter is the only part of man which escapes mechanistic necessity. The lower animals he regarded as pure automatons -- mere machines. Man, thanks to his soul, is a conscious, reflective and directive machine.

Descartes is important because he assisted in breaking down the pretensions of authority. If he underestimated the more obscure storehouses of tradition, like the subconscious, and was inconsistent in both accepting and rejecting authority, he did manage to destroy some of the more obvious hindrances to clear thinking.

**Thomas Hobbes, 1588-1679**Born at Malmesbury prematurely on April 5, [THOMAS HOBBES](http://www.historyguide.org/earlymod/hobbes.html) was brought up by his uncle (his clergyman father having died after striking a colleague at the church door!), and at the age of fourteen, having translated Euripides' Medea into Latin, he studied at Magdalen Hall, Oxford. It was at Oxford that Hobbes was nauseated by the prevailing [Aristotelianism](http://www.utm.edu/research/iep/a/aristotl.htm). In 1603, he began his long tutorial association with the Cavendish family which [](http://www.historyguide.org/earlymod/hobbes.html)brought with it the benefits of an excellent library, the acquaintance of such men as [Francis Bacon](http://www.luminarium.org/sevenlit/bacon/) (1561-1626) and [Ben Jonson](http://www.luminarium.org/sevenlit/jonson/index.html) (1572-1637), and two tutorial journeys to Italy and France. The first of these (1610) was with William, later the 2nd Earl of Devonshire, and the second with the latter's son the 3rd Earl, during which he was introduced into the [Abbé Mersenne's](http://www-groups.dcs.st-andrews.ac.uk/~history/Mathematicians/Mersenne.html) (1588-1648) intellectual circle in Paris (1634), which included Gassendi and Descartes. He met with Galileo in Florence in 1636. It was Hobbes' introduction to Euclidean geometry while traveling as the tutor to the son of Gervase Clifton (1629-1631) that was his intellectual turning point. Would it not be possible to extend such deductive certainty to a comprehensive science of man and society?

Obsessed by the civil disorders of his time, Hobbes wrote [The Elements of Law](http://socserv2.socsci.mcmaster.ca/~econ/ugcm/3ll3/hobbes/elelaw) (1640, published 1650) in which he defended the king's prerogative on psychological and not on the theological grounds of divine right. When Parliament impeached Stafford and Laud, Hobbes took himself to Paris (1640), proud to have been "the first of all that fled." He soon immersed himself in a controversy with Descartes, arising out of his objections to the latter's Meditations. In 1642, Hobbes published [De Cive](http://socserv2.socsci.mcmaster.ca/~econ/ugcm/3ll3/hobbes/hobbes1), a fuller statement of his views on government, and in 1646, A Minute of First Draught of the Optiques, by which he sought to rival Descartes' views on optics. In 1646, he was mathematical tutor to the Prince of Wales, later Charles II. In 1651, he published his great work of political theory, [Leviathan, or The Matter, Form, & Power of a Commonwealth](http://www.orst.edu/instruct/phl302/texts/hobbes/leviathan-contents.html).

The basis of Hobbes' metaphysics is motion of bodies, attraction and repulsion in the wills of men. "Good" and "evil" are inconstant names applied haphazardly by different men to what attracts or repels them. This egotistical psychology makes the life of man in a pre-social state of nature, "nasty, brutish and short," a constant war of every man against every man. Rational, enlightened self-interest makes men want to escape the state of nature by the establishment of a contract in which they surrender the right of aggression, but not that of self-defense, to an absolute sovereign, whose commands are the law, freedom being relegated to the spheres not covered by the sovereign's commands. The social contract is binding only so long as the sovereign has power to enforce such a contract. Sovereignty may be vested in a person or an assembly, but it must not be indivisible, not a division of powers between Parliament and King, or Church and State.

The Leviathan offended the royal exiles at Paris and the French government by its reduction of the status of religious obedience, and so in 1652 Hobbes returned to England and settled in London. Hobbes managed to become embroiled in numerous controversies for the remainder of his life. At the [Restoration](http://vos.ucsb.edu/browse.asp?id=2738), Charles II gave his old tutor a pension and probably used his influence to quash a bill aimed at Hobbes' writings, after the Plague and Fire of London (1665-1666) had been explained as God's wrath against England for harboring such an atheist. Hobbes wrote an important dialogue against the defenders of Common Law, Behemoth, a history of his times and an autobiography in Latin verse. At the age of eighty-six, and because, as he said, he had nothing better to do, he set about to compose verse translations of Homer's Iliad and Odyssey (earlier in his career he translated the The Peloponnesian War of Thucydides), all published in 1682. Hobbes died at Hardwick Hall, Derbyshire.

Hobbes abandoned the obscurantism and dualism of Descartes and the so-called rationalists and applied the new mathematical and mechanical principles to mind as well as matter. He thus destroyed the contradictory and confusing dualism in Cartesianism and established mechanical empiricism. He believed that all materials of positive knowledge are the direct result of the impact of bodily particles on sense organs. Whereas Descartes regarded the basic physical fact as extension, Hobbes viewed it as motion. He held that "all that exists is body (matter); all that occurs is motion.

There are two kinds of bodies ruled by the fundamental principle of motion: the natural bodies of the physical and organic world and artificial bodies, or social groups, culminating in the State. Man is a representative of both. As an organism he is a natural body; as a member of the state he lives in an artificial body. Mind is the link which connects the natural and artificial bodies. Three branches of philosophy are needed to study all of these -- physics which studies natural bodies; psychology which investigates man as an individual; and politics which deals with artificial bodies.

Hobbes imposed impressive limitations on philosophical knowledge. It can never be possible for us to know the external world. The latter may be real, but if so we cannot detect or prove its reality. All we can know about it is the result of stimuli coming from the motions of the external world and acting upon the substance of our brains. The resulting sense perceptions are all that we can be conscious of, and they reveal only our reactions to external stimuli, not the external world as it really is.

Both contemporary and later writers were strongly influenced by the ideas of Thomas Hobbes, not only because his logic was compelling, but because he functioned like a scientist. From his observations of man and society, he generated propositions about human behavior and from these he deduced his political theory. Furthermore, he applied a mechanistic view to man, thus reducing all that men do to simple appetites and aversions. In doing so, Hobbes contributed to the popularity of the mechanistic view of the universe, a theory derived, in part, from Descartes' philosophy.

**John Locke, 1632-1704**It is clear that philosophers like Descartes and Hobbes, impressed as they were with mathematics, were both interested in erecting complete systems of philosophy by utilizing the knowledge of the new science. In the case of John Locke, the subjects treated were still diverse, but Locke concentrated mainly on the faculty of knowledge, or the problem of how we come to know.

Born August 29 at Wrington, Somerset, [JOHN LOCKE](http://www.historyguide.org/earlymod/locke.html) was educated at Westminster School under Richard Busby and at Christ Church, Oxford, where he found the prevailing Aristotelianism "perplexed with obscure terms and useless questions." He [](http://www.historyguide.org/earlymod/locke.html)was elected to a life studentship there, which was withdrawn in 1684 by order of the king. His dislike of the Puritan intolerance of the College divines prevented him from taking orders. Instead, he dabbled in medicine and scientific experimentation and discussion and became known as Doctor Locke. In 1667 he became the physician of the household of [Anthony Ashley Cooper](http://www.utm.edu/research/iep/s/shaftes.htm) (1671-1713), later first Earl of Shaftesbury (and author of Characteristicks, 1714). After successfully operating upon the latter for an abscess in the chest (1668) he became Ashley's close confidential advisor in political and scientific matters and was elected Fellow of the Royal Society (F.R.S.). The latter directed Locke's interests towards philosophy. A small club for the discussion of theological and philosophical questions was founded by Locke and at such a gathering in the winter (1670-71), the group welcomed Locke's suggestion that before attempting to solve any such questions, they should first of all discover what the human understanding was fitted to deal with.

For reasons of health, Locke spent the politically troublesome years (1675-79) in Montpelier and Paris, where he made contact with the circle of [Gassendi](http://www-groups.dcs.st-andrews.ac.uk/~history/Mathematicians/Gassendi.html) and[Arnauld](http://www-groups.dcs.st-and.ac.uk/~history/Mathematicians/Arnauld.html). Shaftesbury, after a short spell in the [Tower](http://www.toweroflondontour.com/), was restored to favor and Locke re-entered his service. In 1683, however, Locke found it necessary to follow his master to Holland. Locke settled in Amsterdam and struck up an intimate friendship with many liberal theologians. In 1687, he moved to Rotterdam and joined the English supporters of William of Orange. His famous [*Two Treatises on Government*](http://www.lonang.com/exlibris/locke/) (1689), published anonymously, were not written to justify the [Glorious Revolution](http://www.thegloriousrevolution.com/) of 1688. In fact, there is evidence that the Treatises may have been written as early as 1681 -- both Treatisesattack the divine right theory of Sir Robert Filmer's [*Patriarcha*](http://www.constitution.org/eng/patriarcha.htm) (1680) and the political philosophy of Thomas Hobbes.

Locke also built up his political theory from the weaknesses of an imagined pre-civil society, which for Hobbes was simply a war of all against all. Locke, however, insisted on the natural morality of pre-social man. Hence, contracting into civil society by surrendering personal power to a ruler and magistrates is for Locke a method of securing natural morality more efficiently. The ruling body, if it offends against natural law, must be deposed. This sanctioning of rebellion, together with Locke's doctrine of private property, became for the American colonists and the French revolutionaries in the next century, in the words of Michael Oakeshott, "a brilliant abridgement of the political habits of Englishmen."

Locke's last years were spent at Oates, Essex, at the home of Sir Francis and Lady Masham, an admirer, the daughter of [Ralph Cudworth](http://www.utm.edu/research/iep/c/cudwor.htm) (1617-1688). Locke died October 28, 1704, and was buried in the churchyard of High Laver.

Locke's argued that philosophy should pretend to deal only with problems and conceptions that the human mind is capable of encompassing. Admitting definite limitations to the human mind, he excluded from consideration many issues which earlier philosophers and theologians had attempted to meddle with. Locke directed his heaviest fire against the doctrine of innate ideas, that is, against the dogma that ideas are inherent at birth in the human mind and that they are not to be tampered with except on pain of upsetting the natural constitution of society. In attempting to combat this notion, he used the notion of the tabula rasa (blank slate) to signify the condition of the mind at birth.

Locke turned to the problem of how we come to possess the ideas with which the mature human mind is stocked. He contended that these are the product of experience and reflection on experience, that is, reason. He thus expressed his famous theory in his [Essay Concerning Human Understanding](http://www.ilt.columbia.edu/Publications/CESdigital/locke/conduct/title.html) in the following manner:

Let us then suppose the mind to be. . . white paper, void of all characters, without any ideas; how comes it to be furnished? Whence comes it by that vast store which the busy and boundless fancy of man has painted on it with an almost endless variety? Whence has it all the materials of reason and knowledge? To this I answer, in one word, from experience; in that all our knowledge is founded, and from that it ultimately derives itself. Our observation employed either about external sensible objects, or about the internal operations of our minds, perceived and reflected on by ourselves, is that which supplies our understandings with all the materials of thinking. These two are the fountains of knowledge, from whence all the ideas we have, or can naturally have, do spring.

By the rational elaboration of simple ideas we arrive at complex ideas. The processes involved are the uniting of simple ideas, synthesizing activity, and abstracting activity. Simple ideas are valid when they agree with observed reality. Complex ideas, naturally, cannot resemble things, but they correspond to things. By employing derived ideas in thinking we can reflectively test the validity of our concepts and discover whether the combination of qualities implied is to be found in experience.

Among the numerous and important personalities who managed to create the great 18th century Enlightenment, John Locke was rivaled only by [Pierre Bayle](http://www.philosophypages.com/ph/bayl.htm) (1647-1706) and surpassed only by Voltaire (the latter of whom helped popularize both Newton and Locke on the Continent). John Locke was the most popular philosopher of his generation and perhaps the most influential as well. He created a new and progressive type of psychology, led the fight against intolerance, defended reason against faith in a period when this was more more dangerous than a century later, started the revolt in education against pedantry and classicism, and was the most important figure of the age in systematizing the type of political theory that would dominate the western intellectual tradition in the next century. If Locke did not go as far as [Voltaire](http://www.voltaire.ox.ac.uk/) (1694-1778), the path of the latter was made much easier because of Locke's work.

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