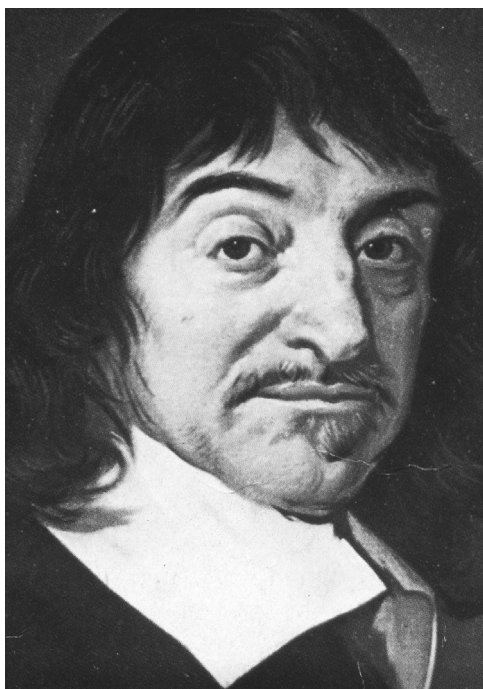


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## INTRODUCTION



### Who Was René Descartes?

René Descartes was born in 1596 in a small town nestled below the vineyards of the Loire in western France; at that time the town was called La Haye, but it was later renamed Descartes in his honor. His early life was probably unhappy: he suffered from ill health, his mother died a year after he was born, and he didn't get on well with his father. (When René sent his father a copy of his first published book, his father's only reported reaction was that he was displeased to have a son "idiotic enough to have himself bound in vellum."<sup>1</sup>) At the age of about 10 he went to the newly founded college of La Flèche to be educated by the Jesuits. Descartes later called this college "one of the best schools in Europe," and it was there that he learned the medieval "scholastic" science and philosophy that he was later decisively to reject. Descartes took a law degree at the University

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1 Vellum is the parchment made from animal skin that was used to make books.

of Poitiers and studied mathematics and mechanics; then, at 21, he joined first the Dutch army of Prince Maurice of Nassau and then the forces of Maximilian of Bavaria. As a soldier he saw little action, traveling around Europe supported by his family's wealth.

During this period, he resolved "to stop seeking any other science except one which could be found inside myself or in the great book of the world," developing an intense interest in mathematics, which stayed with him for the rest of his life. In fact, Descartes was one of the most important figures in the development of algebra, which is the branch of mathematics that allows abstract relations to be described without using specific numbers, and which is therefore capable of unifying arithmetic and geometry:<sup>2</sup>

I came to see that the exclusive concern of mathematics is with questions of order or method, and that it is irrelevant whether the measure in question involves numbers, shapes, stars, sounds, or any other object whatsoever. This made me realize that there must be a general science which explains all the points that can be raised concerning order and measure irrespective of subject matter. (from *Rules for the Direction of Our Native Intelligence* [1628])

This insight led Descartes directly to one of the most significant intellectual innovations of the modern age: the conception of science as the exploration of abstract mathematical descriptions of the world.

It was also during this time—in 1619—that Descartes had the experience said to have inspired him to take up the life of a philosopher. Stranded by bad weather near Ulm on the river Danube, Descartes spent the day in a *poêle* (a stove-heated room<sup>3</sup>) engaged in intense philosophical speculations. That night he had three vivid dreams which he later described as giving him his mission in life. In the first dream Descartes felt himself attacked by phantoms and then a great wind; he was then greeted by a friend who gave him a message about a gift. On awaking after this first dream, Descartes felt a sharp pain which made him fear that the dream was the work of some deceitful evil demon. Descartes eventually fell back asleep and immediately had the second dream: a loud thunderclap, which woke

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2 He invented the method still used to quantify locations on a graph: Cartesian coordinates (that adjective is derived from the Latin version of his name, 'Cartesius').

3 Sometimes Descartes's words are taken in what might be their literal meaning, that he spent time in a stove. Although there is other evidence of his eccentricity, this seems an uncharitable translation. Often his phrase is taken to mean a stove-heated room; sometimes a small compartment attached to a masonry stove, with bedding, used for sleeping in cold weather.

him in terror believing that the room was filled with fiery sparks. The third and last dream was a pleasant one, in which he found an encyclopedia on a table next to a poetry anthology, open to a poem which begins with the line “Which road in life shall I follow?” A man then appeared and said “*Est et non*”—“it is and is not.” While still asleep, Descartes apparently began to speculate about the meaning of his dreams and decided, among other things, that the gift of which his friend spoke in the first dream was the gift of solitude, the dictionary represented systematic knowledge, and “*Est et non*” spoke of the distinction between truth and falsity as revealed by the correct scientific method. Descartes concluded that he had a divine mission to found a new philosophical system to underpin all human knowledge.

In 1628, at the age of 32, Descartes settled in the Netherlands (at the time the most intellectually vibrant region of Europe), where he lived for most of his remaining life. It was only then that he began sustained work in metaphysics and mathematical physics. His family was wealthy enough that Descartes, who cultivated very modest tastes, was free of the necessity to earn a living and could devote his time to scientific experimentation and writing. By 1633 he had prepared a book on cosmology and physics, called *Le Monde (The World)*, in which he accepted Galileo’s revolutionary claim that the Earth orbits the sun (rather than the other way around), but when he heard that Galileo had been condemned by the Inquisition of the Catholic Church, Descartes withdrew the work from publication.<sup>4</sup> In 1637 he published (in French) a sample of his scientific work, *Optics, Meteorology, and Geometry*, together with the *Discourse on the Method for Reasoning Well and for Seeking Truth in the Sciences*. Criticisms of this methodology led Descartes to write *Meditations on First Philosophy* in 1641. In 1644 he published a summary of his scientific and philosophical views, the *Principles of Philosophy*, which he hoped would become a standard university textbook, replacing the medieval texts used at the time. His last work, published in 1649, was *The Passions of the Soul*, which attempted to extend his scientific methodology to ethics and psychology.

Descartes never married, but in 1635 he had a daughter, Francine, with a serving woman called H el ene Jans. He made arrangements to care for and educate the girl but she died of scarlet fever at the age of five, a devastating shock for Descartes.

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4 Descartes was very aware of the Catholic authorities’ opposition to his ideas, and afraid of it. After his death, the Church placed all his works on the Index of Prohibited Works, with the note that they would remain there “until corrected.” (The Church announced in 1966 that the prohibition of items on this list was no longer to be considered law, but the Index was retained as a moral guide, with Descartes and many other famous philosophers still on it.)

In 1649 Descartes accepted an invitation to visit Stockholm and give philosophical instruction to Queen Christina of Sweden. He was required to give tutorials at the royal palace at five o'clock in the morning. Ever since he was a sickly schoolboy, he stayed in bed until 11 a.m., and it is said that the strain of this sudden break in his habits and the harsh Swedish winter caused him to catch pneumonia; he died in February 1650. His dying words are said to have been, "*mon âme, il faut partir*"—"my soul, it's time we must leave." His body was returned to France but, apparently, his head was secretly kept in Sweden; in the 1820s a skull bearing the faded inscription "René Descartes" was discovered in Stockholm and is now on display in the Museum of Natural History in Paris.

### What Was Descartes's Overall Philosophical Project?

Descartes lived at a time when the accumulated beliefs of centuries—assumptions based on religious doctrine, straightforward observation, and common sense—were being gradually but remorselessly stripped away by exciting new discoveries. (The most striking example of this was the evidence mounting against the centuries-old belief that an unmoving Earth is the center of the universe, orbited by the moon, sun, stars, and all the other planets.) In this intellectual climate, Descartes became obsessed by the thought that no lasting scientific progress was possible without a systematic method for sifting through our preconceived assumptions and distinguishing between those that are reliable and those that are false. Descartes's central intellectual goal was to develop just such a reliable scientific method, and then to construct a coherent and unified theory of the world and of humankind's place within it. This theory, he hoped, would replace scholasticism, the deeply flawed medieval system of thought based on the science of Aristotle and Christian theology.

A key feature of Descartes's system is that all knowledge should be based on utterly reliable foundations, discovered through the systematic rejection of any assumptions that can possibly be called into doubt. Then, as in mathematics, complex conclusions could be reliably derived from these foundations by chains of valid reasoning—of simple and certain inferences. The human faculty of *reason* was therefore of the greatest importance. Furthermore, Descartes urged that scientific knowledge of the external world should be rooted, not in the deceptive and variable testimony of the senses, but in the concepts of pure mathematics. That is, Cartesian science ("Cartesian" being the adjective derived from Descartes's name) tries to reduce all physics to "what the geometers call *quantity*, and take as the object of their demonstrations, i.e., that to which every kind of division, shape, and motion is applicable" (*Principles of Philosophy* 1644). (There is, however, for Descartes, a place for empirical investigation in