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THE NEW PHILOSOPHY: BRUNO TO DESCARTES C. D. Broad. I have been asked to speak to-day on the 'new philosophy' which arose and gradually triumphed in the period between the birth of Bruno in and the death of Descartes in

Much of his work was concerned with the provision of a secure foundation for the advancement of human knowledge through the natural sciences. Fearing the condemnation of the church, however, Descartes was rightly cautious about publicly expressing the full measure of his radical views. The philosophical writings for which he is remembered are therefore extremely circumspect in their treatment of controversial issues. After years of work in private, Descartes finally published a preliminary statement of his views in the Discourse on the Method of Rightly Conducting the Reason Since mathematics has genuinely achieved the certainty for which human thinkers yearn, he argued, we rightly turn to mathematical reasoning as a model for progress in human knowledge more generally. Expressing perfect confidence in the capacity of human reason to achieve knowledge, Descartes proposed an intellectual process no less unsettling than the architectural destruction and rebuilding of an entire town. In order to be absolutely sure that we accept only what is genuinely certain, we must first deliberately renounce all of the firmly held but questionable beliefs we have previously acquired by experience and education. The progress and certainty of mathematical knowledge, Descartes supposed, provide an emulable model for a similarly productive philosophical method, characterized by four simple rules: Accept as true only what is indubitable. Divide every question into manageable parts. Begin with the simplest issues and ascend to the more complex. Review frequently enough to retain the whole argument at once. This quasi-mathematical procedure for the achievement of knowledge is typical of a rationalistic approach to epistemology. While engaged in such a comprehensive revision of our beliefs, Descartes supposed it prudent to adhere to a modest, conventional way of life that provides a secure and comfortable environment in which to pursue serious study. The stoic underpinnings of this "provisional morality" are evident in the emphasis on changing oneself to fit the world. Its general importance as an avenue to the contemplative life, however, is more general. Great intellectual upheavals can best be undertaken during relatively calm and stable periods of life. Anticipated Results In this context, Descartes offered a brief description of his own experience with the proper approach to knowledge. Significant knowledge of the world, Descartes supposed, can be achieved only by following this epistemological method, the rationalism of relying on a mathematical model and eliminating the distraction of sensory information in order to pursue the demonstrations of pure reason. Later sections of the Discourse along with the supplementary scientific essays with which it was published trace some of the more significant consequences of following the Cartesian method in philosophy. His mechanistic inclinations emerge clearly in these sections, with frequent reminders of the success of physical explanations of complex phenomena. In fact, Descartes declared, most of human behavior, like that of animals, is susceptible to simple mechanistic explanation. Cleverly designed automata could successfully mimic nearly all of what we do. But Descartes supposed that no matter how human-like an animal or machine could be made to appear in its form or operations, it would always be possible to distinguish it from a real human being by two functional criteria. Although an animal or machine may be capable of performing any one activity as well as or even better than we can, he argued, each human being is capable of a greater variety of different activities than could be performed by anything lacking a soul. In a special instance of this general point, Descartes held that although an animal or machine might be made to utter sounds resembling human speech in response to specific stimuli, only an immaterial thinking substance could engage in the creative use of language required for responding appropriately to any unexpected circumstances. My puppy is a loyal companion, and my computer is a powerful instrument, but neither of them can engage in a decent conversation. This criterion anticipated the more formal requirements of the Turing test.

Chapter 2 : SparkNotes: RenÃ© Descartes (â€“): Discourse on the Method, page 2

I have been asked to speak to-day on the 'new philosophy' which arose and gradually triumphed in the period between the birth of Bruno in and the death of Descartes in

The town of La Haye, which lies 47 kilometers south of Tours, has subsequently been renamed Descartes. When Descartes was thirteen and one-half months old, his mother, Jeanne Brochard, died in childbirth. But he did not neglect his birth place in La Haye: He followed the usual course of studies, which included five or six years of grammar school, including Latin and Greek grammar, classical poets, and Cicero, followed by three years of philosophy curriculum. By rule, the Jesuit philosophy curriculum followed Aristotle; it was divided into the then-standard topics of logic, morals, physics, and metaphysics. The Jesuits also included mathematics in the final three years of study. Aristotle himself frequently discussed the positions of his ancient predecessors. Within this framework, and taking into account the reading of Cicero, Descartes would have been exposed in school to the doctrines of the ancient atomists, Plato, and the Stoics, and he would have heard of the skeptics. Hence, although scholastic Aristotelian philosophy was dominant in his school years, it was not the only type of philosophy that he knew. His family wanted Descartes to be a lawyer, like his father and many other relatives. To this end, he went to Poitiers to study law, obtaining a degree in But he never practiced law or entered into the governmental service such practice would make possible Rodis-Lewis , 18â€” Instead, he became a gentleman soldier, moving in to Breda, to support the Protestant Prince Maurice against the Catholic parts of the Netherlands which parts later formed Belgium , which were controlled by Spainâ€”a Catholic land, like France, but at this point an enemy. Beeckman set various problems for Descartes, including questions about falling bodies, hydrostatics, and mathematical problems. Since antiquity, mathematics had been applied to various physical subject matters, in optics, astronomy, mechanics focusing on the lever , and hydrostatics. Beeckman and Descartes brought to this work a commitment to atoms as the basic constituents of matter; as had ancient atomists, they attributed not only size, shape, and motion but also weight to those atoms At this time, Descartes discovered and conveyed to Beeckman the fundamental insight that makes analytic geometry possible: Descartes himself did not foresee replacing geometrical constructions with algebraic formulas; rather, he viewed geometry as the basic mathematical science and he considered his algebraic techniques to provide a powerful alternative to actual compass-and-ruler constructions when the latter became too intricate. Descartes attended the coronation and was returning to the army when winter caught him in the small town of Ulm or perhaps Neuburg , not far from Munich. On the night of November 10, , Descartes had three dreams that seemed to provide him with a mission in life. The dreams themselves are interesting and complex see Sebba Descartes took from them the message that he should set out to reform all knowledge. He decided to begin with philosophy, since the principles of the other sciences must be derived from it 6: In , he recalled 3: Francisco Toledo â€”96 , Antonio Rubio â€” , and the Coimbran commentators active ca. And in he was able to rattle off the names of recent innovators in philosophy 1: He was in France part of the time, visiting Poitou to sell some inherited properties in and visiting Paris. He went to Italy â€” Upon his return he lived in Paris, where he was in touch with mathematicians and natural philosophers in the circle of his long-time friend and correspondent Marin Mersenne â€” While in Paris, he worked on some mathematical problems and derived the sine law of refraction, which facilitated his work on formulating mathematically the shapes of lenses later published in the Dioptrics. His major philosophical effort during these years was on the Rules, a work to convey his new method. In the Rules, he sought to generalize the methods of mathematics so as to provide a route to clear knowledge of everything that human beings can know. His methodological advice included a suggestion that is familiar to every student of elementary geometry: But he also had advice for the ambitious seeker of truth, concerning where to start and how to work up to greater things. Thus, Rule 10 reads: These faculties allow the seeker of knowledge to combine simple truths in order to solve more complex problems, such as the solution to problems in optics By the end of , Descartes had abandoned work on the Rules, having completed about half of the projected treatise. In that year he moved to the Dutch Netherlands, and after that he returned to France infrequently, prior to moving to

Sweden in In Summer, , an impressive set of parhelia, or false suns, were observed near Rome. When Descartes heard of them, he set out to find an explanation. He ultimately hypothesized that a large, solid ice-ring in the sky acts as a lens to form multiple images of the sun [6: This work interrupted his investigations on another topic, which had engaged him for his first nine months in the Netherlands 1: The metaphysical objects of investigation included the existence and nature of God and the soul 1: Subsequently, Descartes mentioned a little metaphysical treatise in Latinâ€”presumably an early version of the Meditationsâ€”that he wrote upon first coming to the Netherlands 1: While working on the parhelia, Descartes conceived the idea for a very ambitious treatise. This work eventually became The World, which was to have had three parts: Only the first two survive and perhaps only they were ever written , as the Treatise on Light and Treatise on Man. In these works, which Descartes decided to suppress upon learning of the condemnation of Galileo 1: These works contained a description of the visible universe as a single physical system in which all its operations, from the formation of planets and the transmission of light from the sun, to the physiological processes of human and nonhuman animal bodies, can be explained through the mechanism of matter arranged into shapes and structures and moving according to three laws of motion. In fact, his explanations in the World and the subsequent Principles made little use of the three laws of motion in other than a qualitative manner. After suppressing his World, Descartes decided to put forward, anonymously, a limited sample of his new philosophy, in the Discourse with its attached essays. It offered some initial results of his metaphysical investigations, including mindâ€”body dualism. It did not, however, engage in the deep skepticism of the later Meditations, nor did it claim to establish, metaphysically, that the essence of matter is extension. This last conclusion was presented merely as a hypothesis whose fruitfulness could be tested and proven by way of its results, as contained in the attached essays on Dioptrics and Meteorology. In his Meteorology, Descartes described his general hypothesis about the nature of matter, before continuing on to provide accounts of vapors, salt, winds, clouds, snow, rain, hail, lightning, the rainbow, coronas, and parhelia. He presented a corpuscularian basis for his physics, which denied the atoms-and-void theory of ancient atomism and affirmed that all bodies are composed from one type of matter, which is infinitely divisible 6: In the World, he had presented his non-atomistic corpuscularism, but without denying void space outright and without affirming infinite divisibility Indeed, Descartes claimed that he could explain these qualities themselves through matter in motion The four Aristotelian elements, earth, air, fire, and water, had substantial forms that combined the basic qualities of hot, cold, wet, and dry: For earth, that activity is to approach the center to the universe; water has the same tendency, but not as strongly. For this reason, Aristotelians explained, the planet earth has formed at the center, with water on its surface. This form then organizes that matter into the shape of a rabbit, including organizing and directing the activity of its various organs and physiological processes. Although in the World and Meteorology Descartes avoided outright denial of substantial forms and real qualities, it is clear that he intended to deny them 1: Two considerations help explain his tentative language: In , Descartes fathered a daughter named Francine. This was the Meditations, and presumably he was revising or recasting the Latin treatise from In the end, he and Mersenne collected seven sets of objections to the Meditations, which Descartes published with the work, along with his replies , Some objections were from unnamed theologians, passed on by Mersenne; one set came from the Dutch priest Johannes Caterus; one set was from the Jesuit philosopher Pierre Bourdin; others were from Mersenne himself, from the philosophers Pierre Gassendi and Thomas Hobbes, and from the Catholic philosopher-theologian Antoine Arnauld. As previously mentioned, Descartes considered the Meditations to contain the principles of his physics. Descartes and his followers included topics concerning the nature of the mind and mindâ€”body interaction within physics or natural philosophy, on which, see Hatfield Once Descartes had presented his metaphysics, he felt free to proceed with the publication of his entire physics. However, he needed first to teach it to speak Latin 3: He hatched a scheme to publish a Latin version of his physics the Principles together with a scholastic Aristotelian work on physics, so that the comparative advantages would be manifest. For this purpose, he chose the Summa philosophiae of Eustace of St. That part of his plan never came to fruition. His intent remained the same: Ultimately, his physics was taught in the Netherlands, France, England, and parts of Germany. The Principles appeared in Latin in , with a French translation following in He also presented an

image of the relations among the various parts of philosophy, in the form of a tree: Thus the whole of philosophy is like a tree. The roots are metaphysics, the trunk is physics, and the branches emerging from the trunk are all the other sciences, which may be reduced to three principal ones, namely medicine, mechanics and morals. His intent had been also to explain in depth the origins of plants and animals, human physiology, mindâ€"body union and interaction, and the function of the senses. In the end, he had to abandon the discussion of plants and animals Princ. Nonetheless, he was drawn into theological controversy with Calvinist theologians in the Netherlands. Already by , Gisbert Voetius â€" , a theologian at Utrecht, expressed his displeasure over this to Mersenne 3: Controversy brewed, at first between Regius and Voetius, with Descartes advising the former. The controversy simmered through the mids. Descartes replied with his Comments on a Certain Broadsheet In the mids, Descartes continued work on his physiological system, which he had pursued throughout the s. He allowed his Treatise on Man to be copied 4: During this period he corresponded with Princess Elisabeth, at first on topics in metaphysics stemming from her reading of the Meditations and then on the passions and emotions. Eventually, he wrote the Passions of the Soul , which gave the most extensive account of his behavioral physiology to be published in his lifetime and which contained a comprehensive and original theory of the passions and emotions. In , Descartes accepted the invitation of Queen Christina of Sweden to join her court. On the day he delivered them to her, he became ill. He died on 11 February Readers of the philosophical works of Immanuel Kant are aware of the basic distinction between his critical and precritical periods. Readers of the works of G. Leibniz are also aware of his philosophical development, although in his case there is less agreement on how to place his writings into a developmental scheme. In effect, he adopted a hypothetico-deductive scheme of confirmation, but with this difference:

Chapter 3 : RenÃ© Descartes (Stanford Encyclopedia of Philosophy)

Descartes presented his results in major works published during his lifetime: the Discourse on the Method (in French,), with its essays, the Dioptrics, Meteorology, and Geometry; the Meditations on First Philosophy (i.e., on metaphysics), with its Objections and Replies (in Latin, , 2nd edn.); the Principles of Philosophy, covering his metaphysics and much of his natural philosophy (in Latin,); and the Passions of the Soul, on the emotions (in French,).

The oldest child, Pierre, died soon after his birth on October 19, His sister, Jeanne, was probably born sometime the following year, while his surviving older brother, also named Pierre, was born on October 19, The Descartes clan was a bourgeois family composed of mostly doctors and some lawyers. Joachim Descartes fell into this latter category and spent most of his career as a member of the provincial parliament. The course of study was capped off with courses in metaphysics, natural philosophy and ethics. Descartes is known to have disdained the impractical subjects despite having an affinity for the mathematical curriculum. But, all things considered, he did receive a very broad liberal arts education before leaving La Fleche in But what is known is that during he received a degree and a license in civil and canon law at the University of Poiters. However, some speculate that from Descartes suffered a nervous breakdown in a house outside of Paris and that he lived in Paris from The story picks up in the summer of when Descartes went to the Netherlands to become a volunteer for the army of Maurice of Nassau. It was during this time that he met Isaac Beekman, who was, perhaps, the most important influence on his early adulthood. Descartes worked on and off on it for years until it was finally abandoned for good in During this time, he also worked on other, more scientifically oriented projects such as optics. In the course of these inquiries, it is possible that he discovered the law of refraction as early as It is also during this time that Descartes had regular contact with Father Marin Mersenne, who was to become his long time friend and contact with the intellectual community during his 20 years in the Netherlands. Descartes moved to the Netherlands in late and, despite several changes of address and a few trips back to France, he remained there until moving to Sweden at the invitation of Queen Christina in late He moved to the Netherlands in order to achieve solitude and quiet that he could not attain with all the distractions of Paris and the constant intrusion of visitors. This work was intended to show how mechanistic physics could explain the vast array of phenomena in the world without reference to the Scholastic principles of substantial forms and real qualities, while also asserting a heliocentric conception of the solar system. But the condemnation of Galileo by the Inquisition for maintaining this latter thesis led Descartes to suppress its publication. And, on a personal note, during this time his daughter, Francine, was born in , her mother being a maid at the home where Descartes was staying. But Francine, at the age of five, died of a fever in when he was making arrangements for her to live with relatives in France so as to ensure her education. A second edition published in also included a seventh set of objections and replies as well as a letter to Father Dinet in which Descartes defended his system against charges of unorthodoxy. These charges were raised at the Universities of Utrecht and Leiden and stemmed from various misunderstandings about his method and the supposed opposition of his theses to Aristotle and the Christian faith. This controversy led Descartes to post two open letters against his enemies. Descartes, however, was able to flee to the Hague and convince the Prince of Orange to intervene on his behalf. Although it was originally supposed to have six parts, he published it in with only four completed: The other two parts were to be on plant and animal life and on human beings, but he decided it would be impossible for him to conduct all the experiments necessary for writing them. Elizabeth probed Descartes about issues that he had not dealt with in much detail before, including free will, the passions and morals. Christina pressed Descartes on moral issues and a discussion of the absolute good. He arrived in Sweden in September where he was asked to rise at 5: His decision to go to Sweden, however, was ill-fated, for Descartes caught pneumonia and died on February 11, The Modern Turn a. Accordingly, if someone were to try to refute some main Aristotelian tenet, then he could be accused of holding a position contrary to the word of God and be punished. So, when Descartes argued for the implementation of his modern system of philosophy, breaks with the Scholastic tradition were not unprecedented. Descartes broke with this tradition in at least two fundamental ways. The first was his rejection of substantial forms as

explanatory principles in physics. A substantial form was thought to be an immaterial principle of material organization that resulted in a particular thing of a certain kind. The main principle of substantial forms was the final cause or purpose of being that kind of thing. For example, the bird called the swallow. This also means that any dispositions or faculties the swallow has by virtue of being that kind of thing is ultimately explained by the goal or final cause of being a swallow. Hence, on this account, a swallow flies for the sake of being a swallow. Although this might be true, it does not say anything new or useful about swallows, and so it seemed to Descartes that Scholastic philosophy and science was incapable of discovering any new or useful knowledge. Descartes rejected the use of substantial forms and their concomitant final causes in physics precisely for this reason. Hence, his point was to show that mechanistic principles are better suited for making progress in the physical sciences. Another reason Descartes rejected substantial forms and final causes in physics was his belief that these notions were the result of the confusion of the idea of the body with that of the mind. In the Sixth Replies, Descartes uses the Scholastic conception of gravity in a stone, to make his point. On this account, a characteristic goal of being a stone was a tendency to move toward the center of the earth. This explanation implies that the stone has knowledge of this goal, of the center of the earth and of how to get there. But how can a stone know anything, since it does not think? So, it is a mistake to ascribe mental properties like knowledge to entirely physical things. This mistake should be avoided by clearly distinguishing the idea of the mind from the idea of the body. Descartes considered himself to be the first to do this. The second fundamental point of difference Descartes had with the Scholastics was his denial of the thesis that all knowledge must come from sensation. The Scholastics were devoted to the Aristotelian tenet that everyone is born with a clean slate, and that all material for intellectual understanding must be provided through sensation. Descartes, however, argued that since the senses sometimes deceive, they cannot be a reliable source for knowledge. Furthermore, the truth of propositions based on sensation is naturally probabilistic and the propositions, therefore, are doubtful premises when used in arguments. Descartes was deeply dissatisfied with such uncertain knowledge. He then replaced the uncertain premises derived from sensation with the absolute certainty of the clear and distinct ideas perceived by the mind alone, as will be explained below. Although Descartes does not expand much more on this image, a few other insights into his overall project can be discerned. First, notice that metaphysics constitutes the roots securing the rest of the tree. This, in turn, grounds knowledge of the geometrical properties of bodies, which is the basis for his physics. Second, physics constitutes the trunk of the tree, which grows up directly from the roots and provides the basis for the rest of the sciences. Third, the sciences of medicine, mechanics and morals grow out of the trunk of physics, which implies that these other sciences are just applications of his mechanistic science to particular subject areas. Finally, the fruits of the philosophy tree are mainly found on these three branches, which are the sciences most useful and beneficial to humankind. However, an endeavor this grand cannot be conducted haphazardly but should be carried out in an orderly and systematic way. Hence, before even attempting to plant this tree, Descartes must first figure out a method for doing so. First, these premises are supposed to be known when, in fact, they are merely believed, since they express only probabilities based on sensation. Accordingly, conclusions derived from merely probable premises can only be probable themselves, and, therefore, these probable syllogisms serve more to increase doubt rather than knowledge Moreover, the employment of this method by those steeped in the Scholastic tradition had led to such subtle conjectures and plausible arguments that counter-arguments were easily constructed, leading to profound confusion. As a result, the Scholastic tradition had become such a confusing web of arguments, counter-arguments and subtle distinctions that the truth often got lost in the cracks. Descartes sought to avoid these difficulties through the clarity and absolute certainty of geometrical-style demonstration. In geometry, theorems are deduced from a set of self-evident axioms and universally agreed upon definitions. Accordingly, direct apprehension of clear, simple and indubitable truths or axioms by intuition and deductions from those truths can lead to new and indubitable knowledge. Descartes found this promising for several reasons. First, the ideas of geometry are clear and distinct, and therefore they are easily understood unlike the confused and obscure ideas of sensation. Second, the propositions constituting geometrical demonstrations are not probabilistic conjectures but are absolutely certain so as to be immune from doubt. This has the additional advantage that any proposition derived from

some one or combination of these absolutely certain truths will itself be absolutely certain. The choice of geometrical method was obvious for Descartes given his previous success in applying this method to other disciplines like optics. But Descartes wanted to show that truths both intuitively grasped and deduced are beyond this possibility of doubt. His tactic was to show that, despite the best skeptical arguments, there is at least one intuitive truth that is beyond all doubt and from which the rest of human knowledge can be deduced. He first observes that the senses sometimes deceive, for example, objects at a distance appear to be quite small, and surely it is not prudent to trust someone or something that has deceived us even once. But maybe the belief of reading this article or of sitting by the fireplace is not based on true sensations at all but on the false sensations found in dreams. If such sensations are just dreams, then it is not really the case that you are reading this article but in fact you are in bed asleep. Since there is no principled way of distinguishing waking life from dreams, any belief based on sensation has been shown to be doubtful. This includes not only the mundane beliefs about reading articles or sitting by the fire but even the beliefs of experimental science are doubtful, because the observations upon which they are based may not be true but mere dream images. Therefore, all beliefs based on sensation have been called into doubt, because it might all be a dream. This, however, does not pertain to mathematical beliefs, since they are not based on sensation but on reason. Descartes continues to wonder about whether or not God could make him believe there is an earth, sky and other extended things when, in fact, these things do not exist at all. In fact, people sometimes make mistakes about things they think are most certain such as mathematical calculations. Then, in line with the skeptics, Descartes supposes, for the sake of his method, that God does not exist, but instead there is an evil demon with supreme power and cunning that puts all his efforts into deceiving him so that he is always mistaken about everything, including mathematics. In this way, Descartes called all of his previous beliefs into doubt through some of the best skeptical arguments of his day But he was still not satisfied and decided to go a step further by considering false any belief that falls prey to even the slightest doubt. However, it is important to realize that these doubts and the supposed falsehood of all his beliefs are for the sake of his method: The goal then is to find something that cannot be doubted even though an evil demon is deceiving him and even though he is dreaming. All sensory beliefs had been found doubtful in the previous meditation, and therefore all such beliefs are now considered false. This includes the belief that I have a body endowed with sense organs. But does the supposed falsehood of this belief mean that I do not exist? Moreover, even if I am being deceived by an evil demon, I must exist in order to be deceived at all. So imagination and sensation are faculties of the mind in a weaker sense than intellect and will, since they require a body in order to perform their functions. Now, since extension is the nature of body, is a necessary feature of body, it follows that the mind is by its nature not a body but an immaterial thing. Therefore, what I am is an immaterial thinking thing with the faculties of intellect and will.

Chapter 4 : Giordano Bruno: The Forgotten Philosopher

Thomas Jefferson closely followed European ideas and later incorporated some of the ideals of the Enlightenment into the Declaration of Independence One of his peers, James Madison , incorporated these ideals into the United States Constitution during its framing in It helped spread the ideas of the Enlightenment across Europe and beyond. The ideas of the Enlightenment played a major role in inspiring the French Revolution , which began in After the Revolution, the Enlightenment was followed by the intellectual movement known as Romanticism. His attempt to construct the sciences on a secure metaphysical foundation was not as successful as his method of doubt applied in philosophic areas leading to a dualistic doctrine of mind and matter. These laid down two distinct lines of Enlightenment thought: Both lines of thought were eventually opposed by a conservative Counter-Enlightenment , which sought a return to faith. The philosophic movement was led by Voltaire and Jean-Jacques Rousseau , who argued for a society based upon reason rather than faith and Catholic doctrine, for a new civil order based on natural law, and for science based on experiments and observation. The political philosopher Montesquieu introduced the idea of a separation of powers in a government, a concept which was enthusiastically adopted by the authors of the United States Constitution. While the Philosophes of the French Enlightenment were not revolutionaries and many were members of the nobility, their ideas played an important part in undermining the legitimacy of the Old Regime and shaping the French Revolution. Immanuel Kant â€" tried to reconcile rationalism and religious belief, individual freedom and political authority, as well as map out a view of the public sphere through private and public reason. She is best known for her work A Vindication of the Rights of Woman Science in the Age of Enlightenment Science played an important role in Enlightenment discourse and thought. Many Enlightenment writers and thinkers had backgrounds in the sciences and associated scientific advancement with the overthrow of religion and traditional authority in favour of the development of free speech and thought. Scientific progress during the Enlightenment included the discovery of carbon dioxide fixed air by the chemist Joseph Black , the argument for deep time by the geologist James Hutton and the invention of the steam engine by James Watt. The study of science, under the heading of natural philosophy , was divided into physics and a conglomerate grouping of chemistry and natural history , which included anatomy , biology, geology , mineralogy and zoology. Rousseau criticized the sciences for distancing man from nature and not operating to make people happier. Societies and academies were also the backbone of the maturation of the scientific profession. Another important development was the popularization of science among an increasingly literate population. Some historians have marked the 18th century as a drab period in the history of science. Scientific academies and societies grew out of the Scientific Revolution as the creators of scientific knowledge in contrast to the scholasticism of the university. Official scientific societies were chartered by the state in order to provide technical expertise. In reference to this growth, Bernard de Fontenelle coined the term "the Age of Academies" to describe the 18th century. Some poetry became infused with scientific metaphor and imagery, while other poems were written directly about scientific topics. Constitution and as popularised by Dugald Stewart , would be the basis of classical liberalism. Smith acknowledged indebtedness and possibly was the original English translator. Another prominent intellectual was Francesco Mario Pagano , who wrote important studies such as Saggi Politici Political Essays, , one of the major works of the Enlightenment in Naples; and Considerazioni sul processo criminale Considerations on the criminal trial, , which established him as an international authority on criminal law. This thesis has been widely accepted by Anglophone scholars and has been reinforced by the large-scale studies by Robert Darnton , Roy Porter and most recently by Jonathan Israel. The English philosopher Thomas Hobbes ushered in this new debate with his work Leviathan in Hobbes also developed some of the fundamentals of European liberal thought: Locke defines the state of nature as a condition in which humans are rational and follow natural law, in which all men are born

equal and with the right to life, liberty and property. However, when one citizen breaks the Law of Nature both the transgressor and the victim enter into a state of war, from which it is virtually impossible to break free. Therefore, Locke said that individuals enter into civil society to protect their natural rights via an "unbiased judge" or common authority, such as courts, to appeal to. Natural man is only taken out of the state of nature when the inequality associated with private property is established. This is embodied in the sovereignty of the general will , the moral and collective legislative body constituted by citizens. Locke is known for his statement that individuals have a right to "Life, Liberty and Property" and his belief that the natural right to property is derived from labor. The philosophes argued that the establishment of a contractual basis of rights would lead to the market mechanism and capitalism , the scientific method , religious tolerance and the organization of states into self-governing republics through democratic means. In this view, the tendency of the philosophes in particular to apply rationality to every problem is considered the essential change. In his An Essay on the History of Civil Society , Ferguson uses the four stages of progress, a theory that was very popular in Scotland at the time, to explain how humans advance from a hunting and gathering society to a commercial and civil society without "signing" a social contract. The most famous natural right formulation comes from John Locke in his Second Treatise, when he introduces the state of nature. These natural rights include perfect equality and freedom, as well as the right to preserve life and property. Locke also argued against slavery on the basis that enslaving yourself goes against the law of nature because you cannot surrender your own rights, your freedom is absolute and no one can take it from you. As a spillover of the Enlightenment, nonsecular beliefs expressed first by Quakers and then by Protestant evangelicals in Britain and the United States emerged. To these groups, slavery became "repugnant to our religion" and a "crime in the sight of God. Enlightened absolutism The Marquis of Pombal , as the head of the government of Portugal, implemented sweeping socio-economic reforms abolished slavery , significantly weakened the Inquisition , created the basis for secular public schools and restructured the tax system , effectively ruling as a powerful, progressive dictator The leaders of the Enlightenment were not especially democratic, as they more often look to absolute monarchs as the key to imposing reforms designed by the intellectuals. Voltaire despised democracy and said the absolute monarch must be enlightened and must act as dictated by reason and justice â€” in other words, be a "philosopher-king". These rulers are called "enlightened despots" by historians. Joseph was over-enthusiastic, announcing many reforms that had little support so that revolts broke out and his regime became a comedy of errors and nearly all his programs were reversed. In Poland, the model constitution of expressed Enlightenment ideals, but was in effect for only one year before the nation was partitioned among its neighbors. More enduring were the cultural achievements, which created a nationalist spirit in Poland. One view of the political changes that occurred during the Enlightenment is that the " consent of the governed " philosophy as delineated by Locke in Two Treatises of Government represented a paradigm shift from the old governance paradigm under feudalism known as the " divine right of kings ". In this view, the revolutions of the late s and early s were caused by the fact that this governance paradigm shift often could not be resolved peacefully and therefore violent revolution was the result. Clearly a governance philosophy where the king was never wrong was in direct conflict with one whereby citizens by natural law had to consent to the acts and rulings of their government. Alexis de Tocqueville proposed the French Revolution as the inevitable result of the radical opposition created in the 18th century between the monarchy and the men of letters of the Enlightenment. These men of letters constituted a sort of "substitute aristocracy that was both all-powerful and without real power". This illusory power came from the rise of "public opinion", born when absolutist centralization removed the nobility and the bourgeoisie from the political sphere. The "literary politics" that resulted promoted a discourse of equality and was hence in fundamental opposition to the monarchical regime. For moderate Christians, this meant a return to simple Scripture. John Locke abandoned the corpus of theological commentary in favor of an "unprejudiced examination" of the Word of God alone. He determined the essence of Christianity to be a belief in Christ the redeemer and recommended avoiding more detailed debate. According to Thomas Paine , deism is the simple belief in God the Creator , with no reference to the Bible or any other miraculous source. Instead, the deist relies solely on personal reason to guide his creed, [70] which was eminently agreeable to many thinkers of the time. Wilson and Reill note:

Rather, they were critics of orthodox belief, wedded rather to skepticism, deism, vitalism, or perhaps pantheism". That is, since atheists gave themselves to no Supreme Authority and no law and had no fear of eternal consequences, they were far more likely to disrupt society. He would be a god to himself, and the satisfaction of his own will the sole measure and end of all his actions. Separation of church and state and Separation of church and state in the United States The "Radical Enlightenment" [77] [78] promoted the concept of separating church and state, [79] an idea that is often credited to English philosopher John Locke â€" For Locke, this created a natural right in the liberty of conscience, which he said must therefore remain protected from any government authority. These views on religious tolerance and the importance of individual conscience, along with the social contract, became particularly influential in the American colonies and the drafting of the United States Constitution. He previously had supported successful efforts to disestablish the Church of England in Virginia [82] and authored the Virginia Statute for Religious Freedom. For example, in France it became associated with anti-government and anti-Church radicalism, while in Germany it reached deep into the middle classes, where it expressed a spiritualistic and nationalistic tone without threatening governments or established churches. In France, the government was hostile, and the philosophes fought against its censorship, sometimes being imprisoned or hounded into exile.

Chapter 5 : Age of Enlightenment - Wikipedia

The longstanding story about Descartes's creation of a "new philosophy" that broke radically with medieval "ways of thinking" and that marked "the dawn of modern times" was promoted.

Broad, "The New Philosophy: And I propose to begin by giving a fairly full, though necessarily very imperfect, synopsis of the old philosophy against which the new doctrines reacted and which they superseded. Thomas had elaborated on the basis of such knowledge of the works of Aristotle as was available to him. This, for example, is what Descartes would have learnt from his highly intelligent teachers at La Fleche; and it was the intellectual background of all educated men in our period. That which was then new and revolutionary has for generations been as familiar and unnoticed as the air which we breathe. As a result we are liable to be unfair to both. The old, taken out of its context, seems to be a mere childish fairy-tale too ridiculous to have ever been sincerely believed; and the new, when explicitly stated, seems so trite and trivial that we cannot understand why the innovators made such a fuss about it. Yet the Thomistic synthesis is one of the greatest achievements of the human mind; and the transition from the old to the new was, in many respects, the most radical change in theory and the most fruitful for good and for ill in practice of which we have any record. Let us begin with the old account of the structure and composition of the Macrocosm. Mazes intricate, eccentric, intervolved, yet regular -- Then most when most irregular they seem. Now the Greek astronomers set to themselves the problem of describing on a single uniform plan all the observed motions of all the heavenly bodies and of enabling their position at any assigned past or future date to be inferred. The problem was set under the following three conditions: The problem was solved by Hipparchus and Ptolemy by two devices, viz. According to the former theory it is not the earth itself, but a point at some distance from it and fixed with respect to it, which is the centre of all the ultimate uniform circulations. According to the latter, each member of the solar system circulates uniformly about a centre peculiar to it; this centre is not at rest, but itself circulates uniformly about another centre, which may in turn be circulating uniformly about another, and so on. Such a series ends with a centre which circulates uniformly about the fixed centre of the cosmos. The ultimate circles with this common fixed centre are called Deferents, the others are called Epicycles. By providing each heavenly body with enough epicycles, and by suitably choosing the rates of circulation in its deferent and in each of its epicycles, all the long-term geometrical and kinematic appearances of the heavens can be accounted for to any degree of approximation. Finally, the short-term appearances, which are due to the daily rotation of the earth on its own axis, are explained by supposing that the system of planets, luminaries, and fixed stars rotates as a rigid whole about an axis through the poles of the earth once in every twenty-four hours. In itself this scheme is simply a mathematical solution of a mathematical problem. As such, it is a marvellous achievement, and it can be criticized only on the ground that equally effective and much simpler schemes can be devised. This had been done in one way, just before our period, by Copernicus; and it was done in another way during our period by Tycho Brahe; though neither of them could dispense with epicycles. But unfortunately it was treated as a physical theory. The fixed stars were regarded as attached to the inside of a rotating spherical shell which encloses the universe, and the deferent of each planet was associated with a concentric spherical shell rotating on an axis whose axle-boxes are attached to the inside of the starry sphere. For reasons which need not be considered here two additional spheres -- the Crystalline Sphere and the Primum Mobile -- were assumed to be located outside that of the fixed stars. And for most purposes the theory of eccentrics was often ignored, and the centre of the earth was identified with that of the universe. Motion up is radial motion from the centre of the universe to its circumference; motion down is radial motion in the opposite direction. This divides the universe into a sublunary and a celestial region. It was held that there is a profound difference between sublunary substances and their changes, on the one hand, and celestial substances and their changes, on the other. The stars and planets and their spheres are composed of a superior kind of substance called the Fifth Element or Quintessence. This is not subject to generation or corruption. The only kind of change of which it is susceptible is perpetual circular motion with constant speed. So much for the structure of the Macrocosm; now for the composition of the sublunar world. Everything in this is ultimately

composed of four elements, to which the names Earth, Air, Fire and Water were given. In each of the four elements we can distinguish in thought two correlative factors, viz. The substratum of all four is the same and is called Materia Prima. The quality of each element is conceived in the following way. There are two fundamental pairs of opposite qualities, viz. Of these hot is considered positive as compared with cold, and moist is considered positive as compared with dry. This opinion was, no doubt, based on the fact that germination and growth are fostered by warmth and moisture and checked by cold and drought. Now there are four possible combinations of these qualities, viz. Each such combination characterizes one of the four elements. Earth is materia prima qualified by coldness and dryness. The corresponding qualities for the other elements are: Fire, hot and dry; Air, hot and moist; Water, cold and moist. It is impossible for any portion of materia prima to exist without being qualified by one or other of these four pairs of qualities; and it is equally impossible for these qualities to exist except as qualifying some portion of materia prima. Materia prima is ingenerable and indestructible, and it occupies continuously the whole sphere of the material universe. It might therefore be compared with the ether of the nineteenth-century physicists or the substantival absolute space of Newton. The elements can be and are transformed into each other and back again, but there is no loss or gain of stuff in this process. Each of the four elements has a certain natural position in the universe. When it is in that position it rests there quietly. When it is out of that position it has a natural tendency to move radially towards its proper place. The proper place of Fire is at the circumference of the universe, and so it tends to move upwards. The proper place of Earth is at the centre, and so it tends to move downwards. This is as much as I need say about the scholastic physics. I pass now to the metaphysics. This is formulated in terms of three pairs of correlates, viz. I will now try to give a rough account of them. Thus an essence defines a possible substance or species of substances. But there are possible substances, e. So in any actually existing substance we can distinguish in thought the two factors of essence and existence. Now there are two cases of the union of essence and existence to be considered. Generally the connexion between the two factors is contingent. There are lions and there are no dragons; but there is nothing in the essence of the lion to necessitate that there should be lions, and nothing in the essence of the dragon to make it impossible for there to be dragons. This contingent connexion between essence and existence is characteristic of all created substances. On the other hand, we can conceive that there might be an essence or essences which could not fail to be endowed with existence. Any substance whose essence was of this kind would be eternal. It would not just exist throughout unending time; its existence would be altogether non-temporal, and the two factors of essence and existence in it would be distinguishable but logically inseparable, like the equilateralness and the equiangularity of an equilateral triangle. There is one and only one substance of this kind, viz. God; and the existence of every other substance depends on the creative act by which God has instantiated its essence. We have already had an instance of them in the theory of the elements. I think that this notion arose from two kinds of empirical fact, and was then generalized into a metaphysical concept. The first fact is that a workman or artist can deliberately impose various forms, of which he already has ideas, on different portions of the same previously undifferentiated stuff. Thus he may make a coin, a kettle, and a ring out of a lump of copper. Then, in consequence of his idea and his desire for its external embodiment, a series of changes is set up which ends by the form being imposed on the stuff and a new kind of substance being produced. The second empirical fact is the reproduction, growth, and self-repair of living plants and animals. Corresponding to each species there is a characteristic shape, size, internal organization and so on. This constitutes the form of any member of the species. Now each such individual, beginning as an embryo, gradually acquires the adult form of its species by a certain characteristic process of development. Then it maintains this form for a longer or shorter time by continually converting foreign stuff, viz. Eventually it performs these operations less and less efficiently, and finally it fails to do so at all. The body then loses the form of a living plant or animal, and becomes a corpse. This is a mere aggregate of various kinds of informed stuff of a lower order, and it soon breaks down into its components. Generally while an individual is mature it reproduces others which go through the same cycle of growth, maturity, reproduction, decay, and dissolution. In these biological examples it cannot be said that the concept of the form is present in the mind of an external artificer. Yet everything proceeds as if each individual were striving, and for a time succeeding, and eventually failing to impose the form of its species on

the alien materials which it ingests and to propagate it in new individuals which will take its place. In the elements this unconscious striving takes the specially simple form of a tendency in each to move towards its appropriate sphere, if displaced from it, and to rest there. Now in every substance known to us, including ourselves, there are the two factors of stuff and form. But there can be, and, according to the Scholastics, there are in fact, substances which are pure forms without stuff. The stuff-factor is absent, not only in God, but also in a whole series of created intelligent beings, viz. In each angel there are the two factors of existence and essence, and these are not merely two inseparable though distinguishable aspects, as they are in God. For angels, like men, are finite created beings; and it is logically possible that God should never have endowed with existence that essence which is the nature of a certain angel, e. Gabriel, whom he has in fact created. But an angel, though composite in respect of essence and existence, has nothing in it corresponding to that factor of stuff which is the vehicle of form in all lower creatures. The fact that most of us think of angels only as epicene winged figures on Christmas cards, whilst they play an indispensable part in the Scholastic philosophy, is a typical example of the breach between the medieval and the modern Weltanschauung. Every substance has certain powers and dispositions, active or passive, original or acquired, which are characteristic of it. Each of these may remain latent or may manifest itself in a certain number of alternative and mutually exclusive possible ways. The circumstances which prevail at any moment within the substance itself and in its neighbours determine whether a disposition shall manifest itself or remain latent. If they determine that a certain disposition shall be manifested at a certain moment, they determine also which one of its alternative possible manifestations shall then be actualized.

Chapter 6 : THE NEW PHILOSOPHY: BRUNO TO DESCARTES

Reprint of the ed. published by Routledge & K. Paul, London, in series: International library of psychology, philosophy, and scientific method Includes index Sir Isaac NewtonJohn LockeHenry SidgwickJohn McTaggart Ellis McTaggartWilliam Ernest JohnsonThe philosophy of Francis BaconThe new philosophy: Bruno to DescartesLeibniz's last controversy with the Newtonians.

Over the course of the next decade, Descartes worked on a large number of problems in both science and mathematics, with particular emphasis on the theory of light, mechanics including hydrostatics , and the free-fall of terrestrial bodies. By the beginning of the s, however, Descartes embarked on a more ambitious plan to construct a systematic theory of knowledge, including physics. In the s, the publication of the Geometry, the Optics, and the Meteorology, along with a philosophical introduction, Discourse on the Method further presented Cartesian hypotheses on such topics as the law of refraction, vision, and the rainbow. Yet, besides a brief sketch of his metaphysics and physics in the Discourse Parts IV and V , a comprehensive treatment of his physics had to await the publication of the Principles of Philosophy. As an embodiment of his mature views, the Principles will thus form the basis of our examination of Cartesian physics. A concise survey of Cartesian physics can be found in Garber b. The scientific career of Descartes, with special emphasis on his physics, is presented in Shea ; see also Gaukroger, Schuster, Sutton for the many aspects of his natural philosophy. Gaukroger examines the Principles of Philosophy, especially the physics, whereas Slowik focuses primarily on Cartesian space and relational motion. The Strategy of Cartesian Physics Like many of his contemporaries e. A quantity of matter, for example, possesses weight, color, texture, and all of the other bodily properties, only in virtue of being conjoined with a determinate form of a billiard ball, chair, etc. Descartes admits that he had earlier held such a view of gravity, envisioning the substantial form as a kind of goal-directed teleological mental property of bodies: In a revealing passage from The World, Descartes declares the Scholastic hypothesis to be both an unintelligible and inadequate methodological approach to explaining natural phenomena: If you find it strange that I make no use of the qualities one calls heat, cold, moistness, and drynessâ€¦, as the philosophers [of the schools] do, I tell you that these qualities appear to me to be in need of explanation, and if I am not mistaken, not only these four qualities, but also all the others, and even all of the forms of inanimate bodies can be explained without having to assume anything else for this in their matter but motion, size, shape, and the arrangement of their parts AT XI 25â€” These supposedly basic facts thereby provide the requisite metaphysical foundation for his physical hypotheses: This method of conducting science is quite contrary to the modern approach, needless to say, since modern scientists do not first engage in a metaphysical search for first principles on which to base their work. Part I recapitulates the arguments well-known from the Meditations for the existence of God, mental substance, and other metaphysical topics; whereas the remaining Parts proceed to explain the nature of material substance, physics, cosmology, geology, and other branches of science, supposedly based on these fundamental metaphysical truths. As he argued in the Rules for the Direction of the Mind , pure mathematicians are only concerned with finding ratios and proportions, whereas natural philosophers are intent on understanding nature AT X â€” While some philosophers, such as Telesio, Campanella, and Bruno, held space to be always filled with matter i. Consequently, there cannot exist a space separate from body Pr II 16 , since all spatial extension simply is body and he rejects the possibility of a vacuum that is not extended. If, for example, God removed the matter within a vessel such that nothing remained , then the sides of the vessel would immediately become contiguous but not through motion; Pr II We attribute a generic unity to the extension of the space [of a body], so that when the body which fills the space has been changed, the extension of the space itself is not considered to have been changed or transported but to remain one and the same; as long as it remains of the same size and shape and maintains the same situation among certain external bodies by means of which we specify that space. Also like the Scholastics, Descartes rejects any form of atomism, which is the view that there exists a smallest indivisible particle of matter. Rather, he holds that since any given spatially extended length is divisible in thought, thus God has the power to actually divide it Pr II Descartes notes that the vulgar

concept of motion allows a body to simultaneously take part in many possibly contradictory motions, as when a sitting passenger on a ship views himself as at rest relative to the parts of the ship, but not at rest relative to the shore Pr II Yet, when motion is viewed as a translation of the contiguous neighborhood, a body can only partake in one motion, which dispels the apparent contradiction since the body must either be at rest, or in translation away from, its contiguous neighborhood. Yet, as will be discussed in a later section, Descartes also holds that rest and motion are different bodily states, a view that is incompatible with a strict relationism as regards motion. Therefore, Cartesian reciprocity of transfer only satisfies relationism along with its ban on individual bodily states of motion for moving bodies i. Many of the difficulties associated with Cartesian physics can be traced to the enormous ontological burden that Descartes places on his hypothesis of motion. The problem, of course, is that Descartes has defined motion as a change of contiguous bodies, and then proceeds to define body as that which moves translates, transports. Although this circularity threatens the entire edifice of Cartesian physics, it is possible that Descartes intended both motion and body to possess an equal ontological importance in his theory, such that neither is the more fundamental notion which serves as the basis for constructing or defining the other notion. Yet, their intrinsic interrelationship entails that any attempted definition of one must inevitably incorporate the other. In addition, Descartes rejects any explanation of the solidity of a body that employs a bond among its particles since the bond itself would be either a substance or property, and thus the solidity of the bond would presumably need to be explained; Pr II A macroscopic material body is, essentially, held together just by the relative rest of its constituent material parts. This raises the obvious difficulty that the impact of such bodies should result in their dispersion or destruction for there is nothing to hold them together. If, as Descartes believes, substances are not dependent on other things in order to exist Pr I 51 , then any part of extension which is a body, via Pr II 10, as explained above would not qualify as a substance since it depend on its contiguous neighbors to delimit and define its boundary. Yet, Descartes often declares that individual bodies are substances; e. The problem with this attempted solution, however, is that it lacks textual support, as is evident in the Pr I 51 quotation above. Along these same lines, some scholars e. Descartes, on the contrary, takes matter or body as primary and space as a derived, abstract concept: Whereas space is a genus or species concept for Descartes which is a universal; Pr I 59 , space is the individual for the supersubstantivalist, and thus ascribing supersubstantivalism to Descartes violates his nominalism Pr II 8. Indeed, the reason that Descartes seeks to equate bodily and spatial extension in this part of the Principles is that he strives to reject any view that treats space as a separate, usually incorporeal, entity that is independent of matter e. By declaring that motion and rest are primitive states of material bodies without need of further explanation, and that bodies only change their state when acted upon by an external cause, it is not an exaggeration to claim that Descartes helped to lay the foundation for the modern theory of dynamics which studies the motion of bodies under the action of forces. Descartes, on the other hand, interpreted the phenomena of motion in an entirely new light, for he accepts the existence of inertial motion uniform or non-accelerating motion as a natural bodily state alongside, and on equal footing with, the notion of bodily rest. That is, rest and motion are opposite or contrary states, and since opposite states cannot via the Scholastic principle transform into one another, it follows that a body at rest will remains at rest and a body in motion will remains in motion. In short, the third law addresses the behavior of bodies under the normal conditions in his matter-filled world; when they collide: In the following sections of the Principles, Descartes makes explicit the conserved quantity mentioned in this third law: We must however notice carefully at this time in what the force of each body to act against another or resist the action of that other consists: This force must be measured not only by the size of the body in which it is, and by the [area of the] surface which separates this body from those around it; but also by the speed and nature of its movement, and by the different ways in which bodies come in contact with one another. Pr II 43 As a consequence of his first law of motion, Descartes insists that the quantity conserved in collisions equals the combined sum of the products of size and speed of each impacting body. To give an example, if a body B of size 3 and speed 5 collides with a body C of size 2 and speed 4, then the total quantity of motion of the system is 23, a quantity which remains preserved after the collision even though the bodies may possess different speeds. Moreover, Descartes envisions the conservation of quantity of motion as one of the fundamental governing principles of

the entire cosmos. When God created the universe, he reasons, a certain finite amount of motion quantity of motion was transmitted to its material occupants; a quantity, moreover, that God continuously preserves at each succeeding moment. It is obvious that when God first created the world, He not only moved its parts in various ways, but also simultaneously caused some of the parts to push others and to transfer their motion to these others. So in now maintaining the world by the same action and with the same laws with which He created it, He conserves motion; not always contained in the same parts of matter, but transferred from some parts to others depending on the ways in which they come in contact. Fourth, if the body C were entirely at rest,â€¦and if C were slightly larger than B; the latter could never have the force to move C, no matter how great the speed at which B might approach C. Rather, B would be driven back by C in the opposite direction: Consequently, there would always be more force in C to resist than in B to drive, â€¦. Pr II 49F Astonishingly, Descartes claims that a smaller body, regardless of its speed, can never move a larger stationary body. While obviously contradicting common experience, the fourth collision rule does nicely demonstrate the scalar nature of speed, as well as the primary importance of quantity of motion, in Cartesian dynamics. Descartes conserves the joint quantity of motion by equipping the stationary object C with a resisting force sufficient to deflect the moving body B, a solution that does uphold the quantity of motion in cases where C is at rest. That is, since B merely changes its direction of inertial motion, and not its size or degree of speed and C equals zero throughout the interaction , the total quantity of motion of the system is preserved. In the same way that a particular shape can be partitioned into diverse component figures, so a particular determination can be decomposed into various constituent directions. If a ball is propelled downwards from left to right at a 45 degree angle, and then pierces a thin linen sheet, it will continue to move to the right after piercing the sheet but now at an angle nearly parallel with the horizon. Diagram from the Optics. In a letter to Clerselier February 17th, , Descartes explains: When two bodies collide, and they contain incompatible modes, [either different states of speed, or different determinations of motion] then there must occur some change in these modes in order to make them compatible; but this change is always the least that may occur. In other words, if these modes can become compatible when a certain quantity of them is changed, then no larger quantity will change AT IV This principle can be illustrated with respect to our previous example involving the fourth collision rule. If both B and C were to depart at the same speed and in the same direction after impact, it would be necessary for the smaller body B to transfer at least half of its quantity of motion to the larger stationary body C. Yet, Descartes reasons that it is easier for B in this situation to merely reverse it direction than to transfer its motion: When C is the larger [body], B cannot push it in front of itself unless it transfers to C more than half of its speed, together with more than half of its determination to travel from left to right in so far as this determination is linked with its speed. Instead it rebounds without moving body C, and changes only its whole determination, which is a smaller change than the one that would come about from more than half of this determination together with more than half of its speed AT IV One of the most problematic instances involves the relational compatibility of the fourth and fifth collision rules. From a relational standpoint, however, rules four and five constitute the same type of collision, since they both involve the interaction of a small and large body with the same relative motion or speed difference between them. One might be tempted to appeal to the basic Cartesian tenet that motion and rest are different intrinsic states of bodies, or the reciprocity of transfer thesis, to circumvent this difficulty see section 3: The problem with this line of reasoning, however, is that it only works if one presupposes that the two bodies are approaching one another, and this is not a feature of the system that can be captured by sole reference to the contiguous neighborhood of each individual body. Even if there is reciprocity of transfer between a body and its neighborhood, it is still not possible to determine which collision rule the impact will fall under, or if the bodies will even collide at all, unless some reference frame is referred to that can compute the motion of both bodies relative to one another. Suppose, for instance, that a certain spatial distance separates two bodies, and that one of the bodies is, and the other is not, undergoing a translation relative to its neighboring bodies. Given this scenario, it is not possible to determine if; i the translating body is approaching the non-translating body, or ii the spatial interval between them remains fixed and the translating body simply undergoes a change of neighborhood i. The context of the collision rules also supports the view that the motions of the impacting bodies are determined

from an external reference frame, rather than from the local translation of their contiguous neighborhoods. In The World, he states: In order to better grasp the specific role of Cartesian force, it would be useful to closely examine his theory of centrifugal effects, which is closely associated with the second law of nature. At first glance, the second law might seem to correspond to the modern scientific dissection of centrifugal force: Yet, as stated in his second law, Descartes contends wrongly that the body tends to follow a straight line away from the center of its circular trajectory. By his reckoning, the tendency to follow a tangential path exhibited by a circling body, such as the flight of the stone upon release from the sling, can be constructed from two more basic or primary inclinations: Diagram that accompanies Pr III Hence, while determinations necessitate a span of several instants, tendencies towards motion are manifest only at single instants. This is a crucial distinction, for it partitions Cartesian dynamics into two ontological camps: In many parts of the Principles, moreover, Descartes suggests that quantity of motion is the measure of these bodily tendencies, and thus quantity of motion has a dual role as the measure of non-instantaneous bodily motion as well as the instantaneous bodily tendencies see Pr III In a letter, six years before the Principles , he concludes: I do not recognize any inertia or natural sluggishness in bodiesâ€¦; and I think that by simply walking, a man makes the entire mass of the earth move ever so slightly, since he is putting his weight now on one spot, now on another. All the same, I agree â€¦that when the largest bodies such as the largest ships are pushed by a given force such as a wind , they always move more slowly than others. On the other hand, he is willing to acknowledge the commonly observed fact that larger objects are much harder to set in motion than smaller objects. As the concluding sections of the Principles state: Since inertial forces are a consequence or a by-product of motion, as the product of the size times speed of bodies, Descartes apparently did not object to incorporating these phenomena within the discussion of the modes of material substance. Yet, even if Descartes described force as an intrinsic fact of material interactions, the exact nature of the relationship between force and matter remains rather unclear. In particular, is force a property actually contained or present within bodies? Or, is it some sort of derivative phenomenal effect of the action of speed and size, and thus not present within extension? Garber suggests that we view Cartesian force as a sort of shorthand description of the dynamical regularities maintained in the world by God, and not as some form of quality internal to bodies:

Chapter 7 : The Ideas Which Made Freemasonry Possible

The reactionary Descartes "saw himself as presenting a new philosophy, both natural and metaphysical, to take the place of Aristotle's and St. Thomas Aquinas's" (ibid:1). Aquinas was undeniably a partisan of Aristotle, but he accommodated the Greek philosopher to a Christian theological setting in medieval Scholasticism.

It is not intended to be--and should not be used as--a source of modern, up-to-date information regarding atheistic issues. The Forgotten Philosopher by John J. Although, he spent the greater part of his life in hostile and foreign countries he was drawn back to his home at the end of his travels and after he had written nearly twenty books. When he was thirteen years old he began to go to school at the Monastery of Saint Domenico. It was a famous place. Thomas Aquinas, himself a Dominican, had lived there and taught. Within a few years Bruno had become a Dominican priest. It was not long before the monks of Saint Dominico began to learn something about the extraordinary enthusiasm of their young colleague. He was frank, outspoken and lacking in reticence. It was not long before he got himself into trouble. It was evident that this boy could not be made to fit into Dominican grooves. One of the first things that a student has to learn is to give the teacher the answers that the teacher wants. The average teacher is the preserver of the ancient land marks. The students are his audience. They applaud but they must not innovate. They must learn to labor and to wait. He ran away from school, from his home town, from his own country and tried to find among strangers and foreigners a congenial atmosphere for his intellectual integrity that he could not find at home. It is difficult not to get sentimental about Bruno. He was a man without a country and, finally, without a church. Bruno was interested in the nature of ideas. Although the name was not yet invented it will be perfectly proper to dub Bruno as an epistemologist, or as a pioneer Semanticist. He takes fresh stock of the human mind. It is an interesting fact that here, at the close of the 16th Century, a man, closed in on all sides by the authority of priestly tradition, makes what might be termed a philosophical survey of the world which the science of the time was disclosing. It is particularly interesting because it is only in the 20th Century that the habit of this sort of speculation is again popular. Bruno lived in a period when philosophy became divorced from science. Perhaps it might be better to say that science became divorced from philosophy. Scientists became too intrigued with their new toys to bother about philosophy. They began to busy themselves with telescopes and microscopes and chemical glassware. In Bruno went to Paris and began to give lectures on philosophy. It was not an uncommon thing for scholars to wander from place to place. He made contacts easily and was able to interest any group with whom he came in contact with the fire of his ideas. His reputation reached King Henry III who became curious to look over this new philosophical attraction. Bruno had made a reputation for himself as a magician who could inspire greater memory retention. Bruno satisfied the king that his system was based upon organized knowledge. Bruno found a real patron in Henry Ill and it had much to do with the success of his short career in Paris. In these books he held that ideas are only the shadows of truth. The idea was extremely novel in his time. In the same year a third book followed: Brief Architecture of the Art of Lully with its Completion. Lully had tried to prove the dogmas of the church by human reason. Bruno denies the value of such mental effort. He points out that Christianity is entirely irrational, that it is contrary to philosophy and that it disagrees with other religions. He points out that we accept it through faith, that revelation, so called, has no scientific basis. In his fourth work he selects the Homeric sorcerer Circi who changed men into beasts and makes Circi discuss with her handmaiden a type of error which each beast represents. In the year , at the age of 34 he wrote a play Il Candelajo, The Chandler. He thinks as a candle-maker who works with tallow and grease and then has to go out and vend his wares with shouting and ballyhoo: I need not instruct you of my belief. Time gives all and takes all away; everything changes but nothing perishes. One only is immutable, eternal and ever endures, one and the same with itself. With this philosophy my spirit grows, my mind expands. Whereof, however obscure the night may be, I await the daybreak, and they who dwell in day look for night Rejoice therefore, and keep whole, if you can, and return love for love. He went to England to begin over again and to find a fresh audience. He failed to make scholastic contact with Oxford. Oxford, like other European universities of this time, paid scholastic reverence to the authority of Aristotle. A great deal has been

written about the Middle Ages being throttled by the dead hand of Aristotle. It was not the methods of Aristotle nor the fine mind of Aristotle which were so much in question as it was the authority of Aristotle. A thing must be believed because Aristotle said it. In his work The Ash Wednesday Supper, a story of a private dinner, being entertained by English guests, Bruno spreads the Copernican doctrine. A new astronomy had been offered the world at which people were laughing heartily, because it was at variance with the teachings of Aristotle. Bruno was carrying on a spirited propaganda in a fighting mood. Between the year and there was hardly a teacher in Europe who was persistently, openly and actively spreading the news about the "universe which Copernicus had charted, except Giordano Bruno. A little later on another and still more famous character was to take up the work: Galileo never met Bruno in person and makes no mention of him in his works, although he must have read some of them. We may not blame Galilee for being diplomat enough to withhold mention of a recognized heretic. Galilee has often been criticized because he played for personal safety in the matter of his own difficulties. We demand a great deal of our heroes. While in England Bruno had a personal audience with Queen Elizabeth. This was treasured against him when he was later brought to trial as an atheist, an infidel and a heretic. Queen Elizabeth did not think highly of Bruno. She thought him as wild, radical, subversive and dangerous. Bruno found Englishmen rather crude. Bruno had no secure place in either Protestant or Roman Catholic religious communities. He carried out his long fight against terrible odds. He had lived in Switzerland and France and was now in England and left there for Germany. He translated books, read proofs, and got together groups and lectured for whatever he could get out of it. It requires no great stretch of the imagination to picture him as a man who mended his own clothes, who was often cold, hungry and shabby. There are only a few things that we know about Bruno with great certainty and these facts are the ideas which he left behind in his practically forgotten books, the bootleg literature of their day. After twenty years in exile we picture him as homesick, craving the sound of his own native tongue and the companionship of his own countrymen. But he continued to write books. There is no absolute up or down, as Aristotle taught; no absolute position in space; but the position of a body is relative to that of other bodies. Everywhere there is incessant relative change in position throughout the universe, and the observer is always at the center of things. This "ass," says Bruno, is to be found everywhere, not only in the church but in courts of law and even in colleges. In yet another book The Threefold Leas and Measure of the Three Speculative Sciences and the Principle of Many Practical Arts, we find a discussion on a theme which was to be handled in a later century by the French philosopher Descartes. The book was written five years before Descartes was born and in it he says: One of his last works, The Fastenings of Kind, was unfinished. It is easy to get an impression of the reputation which Bruno had created by the year in the minds of the clerical authorities of southern Europe. He had written of an infinite universe which had left no room for that greater infinite conception which is called God. He could not conceive that God and nature could be separate and distinct entities as taught by Genesis, as taught by the Church and as even taught by Aristotle. He preached a philosophy which made the mysteries of the virginity of Mary, of the crucifixion and the mass, meaningless. He was so naive that he could not think of his own mental pictures as being really heresies. He thought of the Bible as a book which only the ignorant could take literally. After 14 years of wandering about Europe Bruno turned his steps toward home. Perhaps he Was homesick. Some writers have it that he was framed. For Bruno to go back to Italy is as strange a paradox as that of the rest of his life. He was invited to Venice by a young man whose name was Mocenigo, who offered him a home and who then brought charges against him before the Inquisition. The case dragged on. He was a prisoner in the Republic of Venice but a greater power wanted him and he was surrendered to Rome.

Chapter 8 : Descartes: Method

Bruno lived in a period when philosophy became divorced from science. Perhaps it might be better to say that science became divorced from philosophy. Scientists became too intrigued with their new toys to bother about philosophy. They began to busy themselves with telescopes and microscopes and chemical glassware.

Indeed, these differences can be conceived in more abstract terms as the contrast between empiricism and rationalism. This theme dominated the philosophical controversies of the 17th and 18th centuries and was hardly resolved before the advent of Immanuel Kant. Less an original metaphysician or cosmologist than the advocate of a vast new program for the advancement of learning and the reformation of scientific method, Bacon conceived of philosophy as a new technique of reasoning that would reestablish natural science on a firm foundation. In the Advancement of Learning , he charted the map of knowledge: To reason, however, Bacon assigned a completely experiential function. Fifteen years later, in his Novum Organum , he made this clear: His concept of fact and his belief in the primacy of observation led him to formulate laws and generalizations. Also, his conception of forms was quite un-Platonic: His enduring place in the history of philosophy lies, however, in his single-minded advocacy of experience as the only source of valid knowledge and in his profound enthusiasm for the perfection of natural science. With the first he shared a strong concern for philosophical method, with the second an overwhelming interest in matter in motion. His philosophical efforts, however, were more inclusive and more complete than those of his contemporaries. He was a comprehensive thinker within the scope of an exceedingly narrow set of presuppositions, and he produced one of the most systematic philosophies of the early modern periodâ€”an almost completely consistent description of humankind, civil society, and nature according to the tenets of mechanistic materialism. As method, philosophy is simply reasoning or calculating by the use of words as to the causes or effects of phenomena. When a person reasons from causes to effects, he reasons synthetically; when he reasons from effects to causes, he reasons analytically. His dogmatic metaphysical assumption was that physical reality consists entirely of matter in motion. The real world is a corporeal universe in constant movement, and phenomena, or events, the causes and effects of which it is the business of philosophy to lay bare, consist of either the action of physical bodies on each other or the quaint effects of physical bodies upon minds. Physics is the science of the motions and actions of physical bodies conceived in terms of cause and effect. And civil philosophy deals with the concerted actions of people in a commonwealthâ€”how, in detail, the wayward wills of human beings can be constrained by power i. But there are also elements in it that make it characteristically English. Empiricism has been a basic and recurrent feature of British intellectual life, and its nominalist and sensationalist roots were already clearly evident in both Bacon and Hobbes. A crucial figure in the history of philosophy, Descartes combined however unconsciously or even unwillingly the influences of the past into a synthesis that was striking in its originality and yet congenial to the scientific temper of the age. In the minds of all later historians, he counts as the progenitor of the modern spirit of philosophy. National Library of Medicine, Bethesda, Maryland From the past there seeped into the Cartesian synthesis doctrines about God from Anselm and Aquinas, a theory of the will from Augustine, a deep sympathy with the Stoicism of the Romans, and a skeptical method taken indirectly from Pyrrho and Sextus Empiricus. But Descartes was also a great mathematicianâ€”he invented analytic geometry â€”and the author of many important physical and anatomical experiments. Each of the maxims of Leonardo, which constitute the Renaissance worldview, found its place in Descartes: Bacon and Descartes, the founders of modern empiricism and rationalism, respectively, both subscribed to two pervasive tenets of the Renaissance: The metaphor is revealing, for it indicates that for Descartesâ€”as for Bacon and Galileoâ€”the most important part of the tree was the trunk. In other words, Descartes busied himself with metaphysics only in order to provide a firm foundation for physics. Thus, the Discourse on Method, which provides a synoptic view of the Cartesian philosophy, shows it to be not a metaphysics founded upon physics as was the case with Aristotle but rather a physics founded upon metaphysics. Thus his metaphysics in essence consisted of three principles: To employ the procedure of complete and systematic doubt to eliminate every belief that does not pass the test of indubitability skepticism.

To accept no idea as certain that is not clear , distinct, and free of contradiction mathematicism. From the indubitability of the self, Descartes inferred the existence of a perfect God; and, from the fact that a perfect being is incapable of falsification or deception, he concluded that the ideas about the physical world that God has implanted in human beings must be true. Cartesian metaphysics is the fountainhead of rationalism in modern philosophy, for it suggests that the mathematical criteria of clarity, distinctness, and logical consistency are the ultimate test of meaningfulness and truth. This stance is profoundly antiempirical. Yet for Descartes the understanding is vastly superior to the senses, and only reason can ultimately decide what constitutes truth in science. Cartesianism dominated the intellectual life of continental Europe until the end of the 17th century. It was a fashionable philosophy, appealing to learned gentlemen and highborn ladies alike, and it was one of the few philosophical alternatives to the Scholasticism still being taught in the universities. Precisely for this reason it constituted a serious threat to established religious authority. Only in the liberal Dutch universities, such as those of Groningen and Utrecht, did Cartesianism make serious headway. Certain features of Cartesian philosophy made it an important starting point for subsequent philosophical speculation. As a kind of meeting point for medieval and modern worldviews, it accepted the doctrines of Renaissance science while attempting to ground them metaphysically in medieval notions of God and the human mind. Thus, a certain dualism between God the Creator and the mechanistic world of his creation, between mind as a spiritual principle and matter as mere spatial extension, was inherent in the Cartesian position. An entire generation of Cartesiansâ€”among them Arnold Geulincx , Nicolas Malebranche , and Pierre Bayle â€”wrestled with the resulting problem of how interaction between two such radically different entities is possible. The rationalism of Spinoza and Leibniz The tradition of Continental rationalism was carried on by two philosophers of genius: In certain respects Spinoza had much in common with Hobbes: Yet Spinoza introduced a conception of philosophizing that was new to the Renaissance; philosophy became a personal and moral quest for wisdom and the achievement of human perfection. But the philosophical form is deceptive. Leibniz was a mathematician he and Sir Isaac Newton independently invented the infinitesimal calculus , a jurist he codified the laws of Mainz , a diplomat, a historian to royalty, and a court librarian in a princely house. Yet he was also one of the most original philosophers of the early modern period. His chief contributions were in the fields of logic , in which he was a truly brilliant innovator, and metaphysics, in which he provided a rationalist alternative to the philosophies of Descartes and Spinoza. Leibniz conceived of logic as a mathematical calculus. He saw clearly that, as the first kind of proposition is governed by the principle of contradiction a proposition and its negation cannot both be true , the second is governed by the principle of sufficient reason nothing exists or is the case without a sufficient reason. True reasoning depends upon necessary or eternal truths, such as those of logic, numbers, geometry, which establish an indubitable connection of ideas and unfailing consequences. Literary forms and sociological conditions The literary forms in which philosophical exposition was couched in the early modern period ranged from the scientific aphorisms of Bacon and the autobiographical meditations of Descartes to the systematic prose of Hobbes and the episodic propositional format of Leibniz. Two basic tendencies, however, can be discerned: The early Renaissance commitment to the dialogue form already noted , inspired by the rediscovery of the Platonic dialogues. The later prevalence of the systematically ordered treatise, undoubtedly influenced by the enormous prestige of deductive mathematics. The concept of serial order stressed by geometry, in which the reasoner passes deductively from the universal axioms to the particular theorems , influenced, in turn, the style of Hobbes, Descartes, and Spinoza. Medieval philosophy was characteristically associated with the medieval university. It is a singular fact, therefore, that from the birth of Bacon in to the death of the Scottish philosopher David Hume in â€”i. As the age of the saint passed into that of the gentleman, the changing social, political, and economic conditions were naturally reflected in the titles, social status , and economic situation of philosophers. Bacon was a lawyer, judge, and attendant upon the royal court; Hobbes was the tutor and companion of young noblemen; Descartes, the son of a noble family, traveled and studied at leisure, eventually retiring to Holland on an inherited income; and Leibniz, courtier, diplomat, and scholar, was a privy councillor and baron of the Holy Roman Empire. Some philosophers also associated with the great monarchs and administrators of the age: Descartes gave philosophical instruction to Queen Christina of

Sweden, Leibniz was an intimate of the electress Sophia Charlotte of Prussia â€” , and Spinoza enjoyed the personal friendship of the Dutch politician Johan de Witt â€” Thus, in the early modern period, philosophers often belonged to the lesser nobility or were closely associated with the higher nobility, to whomâ€”like poetsâ€—many of them dedicated their works. Thus philosophy in the 16th and 17th centuries was clearly the preoccupation of a widely scattered elite. This meant that, despite the existence of printing, much philosophical communication took place within a small and informal circle. Treatises were circulated in manuscript, comments and objections were solicited, and a vast polemical correspondence was built up. Prior to its publication, Descartes prudently sent his Meditations to the theologians of the Sorbonne for comment; after its publication, his friend Marin Mersenne â€” sent it to Hobbes, Antoine Arnauld â€”94 , and Pierre Gassendi, among others, who returned formal objections to which Descartes in turn replied. The rich philosophical correspondence of the 17th century is exemplified by the letters that passed between Descartes and the scientist Christiaan Huygens â€—95 , between Leibniz and Arnauld, and between Leibniz and Samuel Clarke â€— , which were published in Throughout the early modern period, creative philosophy was sharply separated from formal centres of learning. Hobbes expressed extreme contempt for the Aristotelianism of Oxford; Descartes, despite his prudence , scorned the medievalists of the Sorbonne; and Spinoza refused the offer of a professorship of philosophy at Heidelberg with polite aversion. It was to be another years before philosophy returned to the universities. The Enlightenment Although they both lived and worked in the late 17th century, Sir Isaac Newton and John Locke â€— were the true fathers of the Enlightenment. Newton was the last of the scientific geniuses of the age, and his great Philosophiae Naturalis Principia Mathematica ; Mathematical Principles of Natural Philosophy was the culmination of the movement that had begun with Copernicus and Galileoâ€—the first scientific synthesis based on the application of mathematics to nature in every detail. Isaac Newton, portrait by Sir Godfrey Kneller, It is impossible to exaggerate the enormous enthusiasm that this assumption kindled in all of the major thinkers of the late 17th and 18th centuries, from Locke to Kant. The new enthusiasm for reason that they all instinctively shared was based not upon the mere advocacy of philosophers such as Descartes and Leibniz but upon their conviction that, in the spectacular achievement of Newton, reason had succeeded in conquering the natural world. Classical British empiricism Two major philosophical problems remained: Hobbes and Spinoza had each produced a metaphysics. They had been interested in the real constitution of the physical world. Moreover, the Renaissance enthusiasm for mathematics had resulted in a profound interest in rational principles, necessary propositions, and innate ideas. As attention was turned from the realities of nature to the structure of the mind that knows it so successfully, philosophers of the Enlightenment focused on the sensory and experiential components of knowledge rather than on the merely mathematical. Thus, whereas the philosophy of the late Renaissance had been metaphysical and rationalistic, that of the Enlightenment was epistemological and empiricist. To discover the origin of human ideas. To determine their certainty and evidential value. To examine the claims of all knowledge that is less than certain. What was crucial for Locke, however, was that the second task is dependent upon the first. Following the general Renaissance custom, Locke defined an idea as a mental entity: Thus, an intrinsic criterion of truth and validity was replaced with a genetic one. Although he distinguished between ideas of sensation and ideas of reflection , the thrust of his efforts and those of his empiricist followers was to reduce the latter to the former, to minimize the originative power of the mind in favour of its passive receptivity to the sensory impressions received from without. The basic outcome of his epistemology was therefore: That the ultimate source of human ideas is sense experience. That all mental operations are a combining and compounding of simple sensory materials into complex conceptual entities. Although Berkeley was a bishop in the Anglican church who professed a desire to combat atheistic materialism, his importance for the theory of knowledge lies rather in the way in which he demonstrated that, in the end, primary qualities are reducible to secondary qualities. His empiricism led to a denial of abstract ideas because he believed that general notions are simply fictions of the mind. Science, he argued, can easily dispense with the concept of matter: With this important reduction of substance to quality , Berkeley became the father of the epistemological position known as phenomenalism , which has remained an important influence in British philosophy to the present day.

Chapter 9 : RenÃ© Descartes Facts

The consequences of this new philosophy are wide-ranging and radical because this new vision of the cosmos changes our relationship with the divinity, and this, in Bruno's eyes, transforms the very meaning of human.

Falling under suspicion of heresy, he was cast out of the Order, and began a disturbed life of wandering, during which he roamed over half of Europe. He was at Geneva, Paris, Oxford, Frankfurt, everywhere teaching and writing and engaging in heated controversy. There he was denounced as a heretic to the tribunal of the Inquisition by the very nobleman who had sponsored him. At Venice, during the course of his trial, Bruno acknowledged that he had fallen into heresy and declared himself disposed to amend. Consigned by the Republic of Venice to the Inquisition in Rome, he was again subjected to trial. This time he refused to retract and hence was condemned to death as an obstinate heretic. The sentence of death was carried out at Rome on February 17, Under the apparent confusion of his teaching lies the unity and organic wholeness of monistic immanentism, of which Bruno was the principal protagonist during the Renaissance period. According to Bruno, the universe is infinite, full of a plurality of heliocentric solar systems which are broken up and recomposed according to the theory of Democritus. The fundamental principles of the universe are two: Both represent two aspects of a single substance, two indistinguishable powers of a single principle, in which they are reconciled and united, and in which their differences are annulled, according to the principle of coincidence of opposites of Nicholas of Cusa. The soul of the universe is conceived of as intelligent, the ordinator of the world itself, the interior force of everything. Such a force is not transcendent, but immanent; it adheres in things. It is God, conceived of as "Natura naturans," producing all and ordaining all to its end; it is infinite. The world, the work of "Natura naturans," is "Natura naturata," which, as the effect of an infinite cause, is also infinite. Individual souls and not only the human soul, but the soul of every individual essence, since for Bruno everything is animate are the passing shades of the eternal becoming of the world. Bruno calls them monads. Birth is the individuation of the infinite in the finite; death indicates the return of the finite to the infinite. Thus far the concept of Bruno is decidedly monistic immanentism. Nevertheless, besides the mens imbedded in all things, that is, the soul of the world immanent in the universe, Bruno admits also the mens super omnia, that is, God, who transcends the world. But this God quite different from the Christian God, because the world does not depend upon Him is the object of faith and not of science; Bruno admits this in order to overcome the materialistic pantheism of his system. In such a materialistic concept of the universe, any positive religion, including Christianity, is impossible. Religion for Bruno has practical but not theoretical value; it is an efficacious means of educating the ignorant masses through the symbolism of forms. The end which man must realize is limited to the present life; it consists in the participation of the individual in the life of the universe. The system of Bruno is a theoretical expression of Humanism, and his thought was to have a great influence on modern philosophy.