

## 1: Action Record - France in the age of the scientific state

*France desires the rapid expansion of scientific research and the development of close ties between the university and industry but fails to reduce the prerogatives of the professor, create truly autonomous and competitive universities, or reÅ- move the restrictions preventing close university-industry liaison.*

Science, Epistemology and Metaphysics in the Enlightenment In this era dedicated to human progress, the advancement of the natural sciences is regarded as the main exemplification of, and fuel for, such progress. It belongs centrally to the agenda of Enlightenment philosophy to contribute to the new knowledge of nature, and to provide a metaphysical framework within which to place and interpret this new knowledge. Descartes â€™ undertakes to establish the sciences upon a secure metaphysical foundation. The famous method of doubt Descartes employs for this purpose exemplifies in part through exaggerating an attitude characteristic of the Enlightenment. According to Descartes, the investigator in foundational philosophical research ought to doubt all propositions that can be doubted. The investigator determines whether a proposition is dubitable by attempting to construct a possible scenario under which it is false. With his method, Descartes casts doubt upon the senses as authoritative source of knowledge. He finds that God and the immaterial soul are both better known, on the basis of innate ideas, than objects of the senses. If our evidence for the truth of propositions about extra-mental material reality is always restricted to mental content, content before the mind, how can we ever be certain that the extra-mental reality is not other than we represent it as being? In fact, Descartes argues that all human knowledge not only knowledge of the material world through the senses depends on metaphysical knowledge of God. He attacks the long-standing assumptions of the scholastic-aristotelians whose intellectual dominance stood in the way of the development of the new science; he developed a conception of matter that enabled mechanical explanation of physical phenomena; and he developed some of the fundamental mathematical resources â€™ in particular, a way to employ algebraic equations to solve geometrical problems â€™ that enabled the physical domain to be explained with precise, simple mathematical formulae. Furthermore, his grounding of physics, and all knowledge, in a relatively simple and elegant rationalist metaphysics provides a model of a rigorous and complete secular system of knowledge. Cartesian philosophy also ignites various controversies in the latter decades of the seventeenth century that provide the context of intellectual tumult out of which the Enlightenment springs. Among these controversies are the following: If matter is inert as Descartes claims , what can be the source of motion and the nature of causality in the physical world? And of course the various epistemological problems: Spinoza develops, in contrast to Cartesian dualism, an ontological monism according to which there is only one substance, God or nature, with two attributes, corresponding to mind and body. Leibniz articulates, and places at the head of metaphysics, the great rationalist principle, the principle of sufficient reason, which states that everything that exists has a sufficient reason for its existence. This principle exemplifies the characteristic conviction of the Enlightenment that the universe is thoroughly rationally intelligible. The question arises of how this principle itself can be known or grounded. Wolff attempts to derive it from the logical principle of non-contradiction in his First Philosophy or Ontology, Criticism of this alleged derivation gives rise to the general question of how formal principles of logic can possibly serve to ground substantive knowledge of reality. Whereas Leibniz exerts his influence through scattered writings on various topics, some of which elaborate plans for a systematic metaphysics which are never executed by Leibniz himself, Wolff exerts his influence on the German Enlightenment through his development of a rationalist system of knowledge in which he attempts to demonstrate all the propositions of science from first principles, known a priori. Much the same could be said of the great rationalist philosophers of the seventeenth century. Through their articulation of the ideal of scientia, of a complete science of reality, composed of propositions derived demonstratively from a priori first principles, these philosophers exert great influence on the Enlightenment. But they fail, rather spectacularly, to realize this ideal. The enthusiasm for reason in the Enlightenment is primarily not for the faculty of reason as an independent source of knowledge, which is embattled in the period, but rather for the human cognitive faculties generally; the Age of Reason contrasts with an age of

religious faith, not with an age of sense experience. If the founder of the rationalist strain of the Enlightenment is Descartes, then the founder of the empiricist strain is Francis Bacon " The tendency of natural science toward progressive independence from metaphysics in the eighteenth century is correlated with this point about method. The rise of modern science in the sixteenth and seventeenth centuries proceeds through its separation from the presuppositions, doctrines and methodology of theology; natural science in the eighteenth century proceeds to separate itself from metaphysics as well. Newton proves the capacity of natural science to succeed independently of a priori, clear and certain first principles. The characteristic Enlightenment suspicion of all allegedly authoritative claims the validity of which is obscure, which is directed first of all against religious dogmas, extends to the claims of metaphysics as well. While there are significant Enlightenment thinkers who are metaphysicians " again, one thinks of Christian Wolff " the general thrust of Enlightenment thought is anti-metaphysical. A main source of its influence is the epistemological rigor that it displays, which is at least implicitly anti-metaphysical. Locke undertakes in this work to examine the human understanding in order to determine the limits of human knowledge; he thereby institutes a prominent pattern of Enlightenment epistemology. In the *Treatise on Sensations*, Condillac attempts to explain how all human knowledge arises out of sense experience. Locke and Descartes both pursue a method in epistemology that brings with it the epistemological problem of objectivity. Both examine our knowledge by way of examining the ideas we encounter directly in our consciousness. Though neither for Locke nor for Descartes do all of our ideas represent their objects by way of resembling them. The way of ideas implies the epistemological problem of how we can know that these ideas do in fact resemble their objects. How can we be sure that these objects do not appear one way before the mind and exist in another way or not at all in reality outside the mind? George Berkeley, an empiricist philosopher influenced by John Locke, avoids the problem by asserting the metaphysics of idealism: Thomas Reid, a prominent member of the Scottish Enlightenment, attacks the way of ideas and argues that the immediate objects of our sense perception are the common material objects in our environment, not ideas in our mind. The defense of common sense, and the related idea that the results of philosophy ought to be of use to common people, are characteristic ideas of the Enlightenment, particularly pronounced in the Scottish Enlightenment. This oddity is at least softened by the point that much skepticism in the Enlightenment is merely methodological, a tool meant to serve science, rather than a position embraced on its own account. Given the negative, critical, suspicious attitude of the Enlightenment towards doctrines traditionally regarded as well founded, it is not surprising that Enlightenment thinkers employ skeptical tropes drawn from the ancient skeptical tradition to attack traditional dogmas in science, metaphysics and religion. However, skepticism is not merely a methodological tool in the hands of Enlightenment thinkers. The skeptical cast of mind is one prominent manifestation of the Enlightenment spirit. The influence of Pierre Bayle, another founding figure of the Enlightenment, testifies to this. Bayle was a French Protestant, who, like many European philosophers of his time, was forced to live and work in politically liberal and tolerant Holland in order to avoid censorship and prison. The form of the book is intimidating: Rarely has a work with such intimidating scholarly pretensions exerted such radical and liberating influence in the culture. It exerts this influence through its skeptical questioning of religious, metaphysical, and scientific dogmas. It is the attitude of inquiry that Bayle displays, rather than any doctrine he espouses, that mark his as distinctively Enlightenment thought. He is fearless and presumptuous in questioning all manner of dogma. While it is common to conceive of the Enlightenment as supplanting the authority of tradition and religious dogma with the authority of reason, in fact the Enlightenment is characterized by a crisis of authority regarding any belief. Hume articulates a variety of skepticisms. Hume also articulates skepticism with regard to reason in an argument that is anticipated by Bayle. Hume begins this argument by noting that, though rules or principles in demonstrative sciences are certain or infallible, given the fallibility of our faculties, our applications of such rules or principles in demonstrative inferences yield conclusions that cannot be regarded as certain or infallible. On reflection, our conviction in the conclusions of demonstrative reasoning must be qualified by an assessment of the likelihood that we made a mistake in our reasoning. Hume also famously questions the justification of inductive reasoning and causal reasoning. Hume concludes that we have no rational justification for our causal or inductive judgments. The Enlightenment begins by unleashing skepticism in

attacking limited, circumscribed targets, but once the skeptical genie is out of the bottle, it becomes difficult to maintain conviction in any authority. Thus, the despairing attitude that Hume famously expresses in the conclusion to Book One of the *Treatise*, as the consequence of his epistemological inquiry, while it clashes with the self-confident and optimistic attitude we associate with the Enlightenment, in fact reflects an essential possibility in a distinctive Enlightenment problematic regarding authority in belief. The enthusiasm for the scientific study of humanity in the period incorporates a tension or paradox concerning the place of humanity in the cosmos, as the cosmos is re-conceived in the context of Enlightenment philosophy and science. But if our conception of nature is of an exclusively material domain governed by deterministic, mechanical laws, and if we at the same time deny the place of the supernatural in the cosmos, then how does humanity itself fit into the cosmos? On the one hand, the achievements of the natural sciences in general are the great pride of the Enlightenment, manifesting the excellence of distinctively human capacities. On the other hand, the study of humanity in the Enlightenment typically yields a portrait of us that is the opposite of flattering or elevating. Instead of being represented as occupying a privileged place in nature, as made in the image of God, humanity is represented typically in the Enlightenment as a fully natural creature, devoid of free will, of an immortal soul, and of a non-natural faculty of intelligence or reason. The very title of J. The methodology of epistemology in the period reflects a similar tension. As noted, Hume means his work to comprise a science of the mind or of man. Immanuel Kant explicitly enacts a revolution in epistemology modeled on the Copernican in astronomy. As characteristic of Enlightenment epistemology, Kant, in his *Critique of Pure Reason*, second edition undertakes both to determine the limits of our knowledge, and at the same time to provide a foundation of scientific knowledge of nature, and he attempts to do this by examining our human faculties of knowledge critically. Even as he draws strict limits to rational knowledge, he attempts to defend reason as a faculty of knowledge, as playing a necessary role in natural science, in the face of skeptical challenges that reason faces in the period. According to Kant, scientific knowledge of nature is not merely knowledge of what in fact happens in nature, but knowledge of the causal laws of nature according to which what in fact happens must happen. But how is knowledge of necessary causal connection in nature possible? The generalized epistemological problem Kant addresses in the *Critique of Pure Reason* is: Put in the terms Kant defines, the problem is: Certain cognitive forms lie ready in the human mind – prominent examples are the pure concepts of substance and cause and the forms of intuition, space and time; given sensible representations must conform themselves to these forms in order for human experience as empirical knowledge of nature to be possible at all. We can acquire scientific knowledge of nature because we constitute it a priori according to certain cognitive forms; for example, we can know nature as a causally ordered domain because we originally synthesize a priori the given manifold of sensibility according to the category of causality, which has its source in the human mind. Kant saves rational knowledge of nature by limiting rational knowledge to nature. Through the postulation of a realm of unknowable noumena things in themselves over against the realm of nature as a realm of appearances, Kant manages to make place for practical concepts that are central to our understanding of ourselves even while grounding our scientific knowledge of nature as a domain governed by deterministic causal laws. Many of the human and social sciences have their origins in the eighteenth century e. The emergence of new sciences is aided by the development of new scientific tools, such as models for probabilistic reasoning, a kind of reasoning that gains new respect and application in the period. Despite the multiplication of sciences in the period, the ideal remains to comprehend the diversity of our scientific knowledge as a unified system of science; however, this ideal of unity is generally taken as regulative, as an ideal to emerge in the ever-receding end-state of science, rather than as enforced from the beginning by regimenting science under a priori principles. As exemplifying these and other tendencies of the Enlightenment, one work deserves special mention: The work aims to provide a compendium of existing human knowledge to be transmitted to subsequent generations, a transmission intended to contribute to the progress and dissemination of human knowledge and to a positive transformation of human society. The orientation of the *Encyclopedia* is decidedly secular and implicitly anti-authoritarian. The collaborative nature of the project, especially in the context of state opposition, contributes significantly to the formation of a shared sense of purpose among the wide variety of intellectuals who belong to the French Enlightenment. It is

a striking feature of the Encyclopedia, and one by virtue of which it exemplifies the Baconian conception of science characteristic of the period, that its entries cover the whole range and scope of knowledge, from the most abstract theoretical to the most practical, mechanical and technical. The era is marked by three political revolutions, which together lay the basis for modern, republican, constitutional democracies: Enlightenment philosophers find that the existing social and political orders do not withstand critical scrutiny. Existing political and social authority is shrouded in religious myth and mystery and founded on obscure traditions. The criticism of existing institutions is supplemented with the positive work of constructing in theory the model of institutions as they ought to be. We owe to this period the basic model of government founded upon the consent of the governed; the articulation of the political ideals of freedom and equality and the theory of their institutional realization; the articulation of a list of basic individual human rights to be respected and realized by any legitimate political system; the articulation and promotion of toleration of religious diversity as a virtue to be respected in a well ordered society; the conception of the basic political powers as organized in a system of checks and balances; and other now-familiar features of western democracies. However, for all the enduring accomplishments of Enlightenment political philosophy, it is not clear that human reason proves powerful enough to put a concrete, positive authoritative ideal in place of the objects of its criticism. As in the epistemological domain, reason shows its power more convincingly in criticizing authorities than in establishing them. Here too the question of the limits of reason is one of the main philosophical legacies of the period.

## 2: Project MUSE - France in the Age of the Scientific State

*Charles de Gaulle has often warned France and other European nations of the threat they face from advanced scientific and technological countries such as the United States and the Soviet Union. Robert Gilpin examines this "technological gap," which France fears, and the efforts France is making to.*

July 7, The document incorporated many Enlightenment ideas. Architect of the Capitol The Enlightenment, also known as the Age of Reason, was a philosophical movement that took place primarily in Europe and, later, in North America, during the late 17th and early 18th century. Its participants thought they were illuminating human intellect and culture after the "dark" Middle Ages. Characteristics of the Enlightenment include the rise of concepts such as reason, liberty and the scientific method. Enlightenment philosophy was skeptical of religion – especially the powerful Catholic Church – monarchies and hereditary aristocracy. Enlightenment philosophy was influential in ushering in the French and American revolutions and constitutions. The Enlightenment culminated in the French Revolution and was followed by the Romantic period. The Scientific Revolution "The origins of the philosophical ideas that would lead to the Enlightenment began during the Thirty Years War," said Susan Abernethy, a Colorado-based historian and writer. Men started to question and criticize the concepts of nationalism and warfare. This movement is known as the Scientific Revolution. With each new scientific discovery, the accepted Judeo-Christian understanding of the universe changed. Gradually, thinkers embraced the Copernican-Newtonian paradigm. This paradigm holds that while the God created the universe, science defined it, and it is through science that humans can understand it, according to Indiana University Northwest. Intellectuals began to see the universe as possibly infinite and full of motion. Philosophical concepts "During the Enlightenment, there was more emphasis on scientific methods, secularization of learning, religious tolerance, universal education, individual liberty, reason, progress and the separation of church and state," said Abernethy. Some key Enlightenment concepts are: Enlightenment philosophers believed that rational thought could lead to human improvement and was the most legitimate mode of thinking. They saw the ability to reason as the most significant and valuable human capacity, according to PBS. Reason could help humans break free from ignorance and irrationality, and learning to think reasonably could teach humans to act reasonably, as well. Enlightenment intellectuals thought that all human endeavors should aim to increase knowledge and reason, rather than elicit emotional responses. They advocated for universal education and secularized learning, said Abernethy. Rather than being content with blind faith, Enlightenment thinkers wanted proof that something was true. Enlightenment intellectuals were skeptical of the divine right of kings and monarchies in general, scientific claims about the natural world, the nature of reality and religious doctrine. The deist movement became popular during the Enlightenment. Deism holds that God exists but does not intervene on Earth. The universe proceeds according to natural, scientifically based laws. Though skeptical of religious institutions, many Enlightenment thinkers believed that people should be free to worship as they wished. The centuries before the Enlightenment were characterized by rapid changes, from the discoveries of the Scientific Revolution to the exploration of the world and the advancement in art technique during the Renaissance. Largely because of this, Enlightenment thinkers believed that the human condition was improving over time. Philosophers like David Hume and Adam Smith, both Scotsmen, tied Enlightenment ideals to politics, economic policies and more, according to the Stanford Encyclopedia of Philosophy. Empiricists argued that all human knowledge comes through the senses and sensory experiences. Rationalists, who lived primarily in continental Europe, argued that senses were untrustworthy and knowledge came from the mind, through conceiving of or intuiting ideas, according to Loyola University New Orleans. Toward the end of the period, philosophers began to consider exactly what they meant by the term "enlightenment. Have the courage to use your own understanding," is therefore the motto of the enlightenment. Major figures Abernethy discussed the following men who made significant contributions to the Enlightenment: John Comenius was a Czech intellectual who espoused universal education and practical instruction. He was instrumental in introducing pictorial textbooks written in the vernacular of the student rather than Latin. He advocated for lifelong learning and the development of logical

thinking as opposed to memorization by rote. He wanted education to be given to women and impoverished children. The Dutchman Hugo Grotius was a prodigious intellectual who laid the foundation for international law based on the concept of natural law. He was one of the pioneers in putting forth the idea of a society of states governed not by force and warfare but by laws and mutual agreement to enforce those laws. He also espoused the idea of religious tolerance. Englishmen who were influential in the Enlightenment include Thomas Hobbes and John Locke. Hobbes championed absolutism for the sovereign but he believed in the right of the individual and the equality of all men. He stated that political communities should be based on a "social contract" meaning individuals consent either explicitly or tacitly to surrender some of their freedoms and submit to the authority of the ruler or to the decision of the majority in exchange for the protection of their remaining rights. Locke promoted the opposite type of government, which was a representative government. The French Philosophes philosophers took the Enlightenment to new heights. Charles-Louis de Secondat, better known as the Baron de Montesquieu, developed the work of John Locke and espoused the concept of the separation of power by creating divisions in government. He wrote attacks on the Catholic Church and exposed injustices. He promoted the concepts of freedom of religion, freedom of expression and the separation of church and state. His writings were popular and reached many readers. Jean-Jacques Rousseau wrote the book "The Social Contract," in which he championed for a form of government based on small, direct democracy, which openly signifies the will of the population. Denis Diderot was not as interested in inciting revolution but wanted to collect and disseminate Enlightenment knowledge. He embarked on a mammoth project to create the "Encyclopaedia, or a Systemic Dictionary of the Sciences, Arts, and Crafts. David Hume was a Scottish philosopher who gained fame as an essayist, according to the Stanford Encyclopedia of Philosophy. He was a highly influential empiricist who argued that humans were a bundle of sensations with no true selves this is called the Bundle Theory and that ethics were based on emotion rather than moral principles. Immanuel Kant was a German philosopher central to the Enlightenment. He synthesized rationalism and empiricism through his theories about human autonomy and set the stage for later philosophical movements, according to the Stanford Encyclopedia of Philosophy. Adam Smith, a close friend of Hume, was a Scottish philosopher and economist most famous for his theory of the "invisible hand of the market," according to the Stanford Encyclopedia of Philosophy. His book "The Wealth of Nations" laid the foundation for free market economics. Isaac Newton was an English mathematician and physicist who laid the foundation for classical mechanics and calculus. Newton developed the laws of motion and universal gravitation, which led to improvements in understanding the Copernican heliocentric universe, according to the Isaac Newton Institute for Mathematical Sciences. Thomas Jefferson, an American Founding Father, was heavily influenced by Enlightenment philosophy and spent several years in France. He wrote the Declaration of Independence, which stressed Enlightenment ideas such as liberty, fundamental human rights and equality though not for slaves, according to the Thomas Jefferson Foundation. Enlightenment approach to science The Enlightenment and the Scientific Revolution "saw a vast expansion in our knowledge about the world, and in the accuracy of this knowledge," said UK-based historian and writer Robert Wilde. Thanks to increased literacy and the falling cost of books, the means of spreading results of science experiments improved, as did the willingness of thinkers and scientists to discuss them and adopt them, Wilde told Live Science. How the Enlightenment changed the world "It cannot be stressed enough how instrumental the Enlightenment ideas were in changing history and society around the globe," said Abernethy. We still hold many Enlightenment ideals dear. Some of the scientific theories have evolved, but many remain as their Enlightenment authors wrote them. The concepts of liberty, reason and equality influenced early feminist Mary Wollstonecraft [mother of Mary Shelley, author of "Frankenstein"], American abolitionist Frederick Douglass and other seminal leaders. As the power of the church waned, societies like the Freemasons and the Illuminati gained traction. Literary salons and coffeehouses emerged as new places to socialize and discuss ideas. Education for children became more widespread, and more universities were founded. Literacy rates increased dramatically, and public libraries and museums were introduced. Afterwards, the English Parliament ratified a new Bill of Rights granting more personal freedoms for Englishmen. They gave less power to the government and more power to the people. She added that they also established universal education in America. In , [this desire]

produced a Third Estate, which broke away from royal rule, and triggered the French Revolution.

### 3: European History/Scientific Revolution and Enlightenment - Wikibooks, open books for an open world

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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. 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 1789. 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 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*. 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 " 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 17th and early 18th centuries 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 " 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.

## 4: Enlightenment (Stanford Encyclopedia of Philosophy)

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Education for girls Legislative Commission, which reported to her on the state of the Russian people Trained and educated her grandson Alexander I so that he could progress in society because of his merit rather than his blood line She was friends with Diderot, Rousseau, Voltaire. However, Catherine also took a number of decidedly unenlightened actions. She conceded more power to the nobles and eliminated state service. Also, serfdom became equivalent to slavery under her. Foreign Policy[ edit ] Catherine combated the Ottoman Empire. In , Russia gained a warm water port on the Black Sea. He extended education to all classes, and established a professional bureaucracy and civil servants. He created a uniform judicial system and abolished torture. During his tenure, Prussia innovated agriculture by using potatoes and turnips to replenish the soil. Also, Frederick established religious freedom in Prussia. Joseph II Habsburg [ edit ] Joseph II Habsburg also spelled as Habsburg of Austria could be considered perhaps the greatest enlightened ruler, and he was purely enlightened, working solely for the good of his country. He was anti-feudalism, anti-church, and anti-nobility. He famously stated, "The state should provide the greatest good for the greatest number. Under Joseph II a uniform law code was established, and in he abolished serfdom and in ordered the General School Ordinance, which required compulsory education for Austrian children. England[ edit ] As a result of the Glorious Revolution of , England already had a Parliament and thus the concept of enlightened ruler did not take hold in England. Like his predecessor, he was an absolute monarch who enacted mercantilism. As a result of the influence and control of absolutism in France, France also did not encounter an enlightened ruler. In peace came at the Treaty of Aix la Chapelle. The treaty preserved the balance of power and the status quo ante bellum. Austria survived but lost Silesia, which began "German Dualism" or the fight between Prussia and Austria over who would dominate and eventually unite Germany. The Seven Years War[ edit ] The peace in was recognized as temporary by all, and in Austria and France allied in what was known as the Diplomatic Revolution. The purpose of the war was to annihilate Prussia, and took place at a number of fronts: At the Peace of Paris in , the war concluded, and Prussia retained all of its territory, including Silesia. It did, however, get to keep its West Indies colonies. At this point, Great Britain became the supreme naval power and it began its domination of India. The Partitioning of Poland[ edit ] Poland was first partitioned on February 19, , between Russia, Austria, and Prussia, in an agreement between them to gain more land and power in Europe. Poland was able to be partitioned because it was weak and had no ability to stop the larger and more powerful nations. The balance of power was not taken into consideration by France or England because the partitioning did not upset the great powers of Europe. The second partition involved Russia and Prussia taking additional land from Poland. After the second partition, which occurred on January 21, , the majority of their remaining land was lost to Prussia and Russia. The third partition of Poland took place in October of , giving Russia, Prussia, and Austria the remainder of the Polish land. Russia ended up with , square kilometres, Austria 47, square kilometres, and Prussia 55, square kilometres. This took Poland off of the map. Science and Technology[ edit ] The Enlightenment was notable for its scientific revolution, which changed the manner in which the people of Europe approached both science and technology. This was the direct result of philosophic enquiry into the ways in which science should be approached. The most important figures in this change of thinking were Descartes and Bacon. However, Sir Francis Bacon introduced a new method of thought. He suggested that instead of using deductive reasoning, people should use inductive reasoning - in other words, they should gather evidence and then reach a conclusion based on the evidence. This line of thought also became known as the Scientific Method. Changes in Astronomy[ edit ] The Scientific Revolution began with discoveries in astronomy, most importantly dealing with the concept of a solar system. These discoveries generated controversy, and some were forced by church authorities to recant their theories. Aristotle and Ptolemy[ edit ] The geocentric earth-centred view of the universe had been taught since the days of Aristotle. Surprisingly a Greek philosopher called Aristarchus BC - ca. The early christian church c. The

Enlightenment, which is also referred to as the Age of Reason, was a period when European philosophers emphasized the use of reason as the best method for learning the truth. Nicolaus Copernicus [ edit ] Heliocentric solar system During the Renaissance, study of astronomy at universities began. Regiomontanus and Nicolas of Cusa developed new advances in mathematics and methods of calculation. Copernicus, although a devout Christian, doubted whether the views held by Aristotle and Ptolemy were completely correct. Using mathematics and visual observations with only the naked eye, he developed the Heliocentric , or Copernican, Theory of the Universe, stating that the Earth revolves around the sun. Johannes Kepler [ edit ] Kepler was a student of Brahe. With this tool, he proved the Copernican Theory of the Universe. Galileo spread news of his work through letters to friends and colleagues. Although the Church forced him to recant his ideas and spend the rest of his life under house arrest, his works had already been published and could not be disregarded. Sir Isaac Newton Isaac Newton [ edit ] Newton is often considered the greatest scientific mind in history. Newton also had a great influence outside of science. For example, he was to become the hero of Thomas Jefferson. Developments in Medicine[ edit ] Andreas Vesalius [ edit ] Vesalius studied human cadavers, a practice forbidden by church doctrine. His writing *The Structure of the Human Body* renewed and modernized the study of the human body. He was a doctor and an anatomist. Society and Culture[ edit ] As a result of new learning from the Scientific Revolution, the world was less of a mystical place, as natural phenomena became increasingly explainable by science. According to Enlightened philosophers: The universe is a fully tangible place governed by natural rather than supernatural forces. Rigorous application of the scientific method can answer fundamental questions in all areas of inquiry. The human race can be educated to achieve nearly infinite improvement. Perhaps most importantly, though, Enlightened philosophers stressed that people are all equal because all of us possess reason. Precursors[ edit ] There were a number of precursors to the Enlightenment. One of the most important was the Age of Science of the 17th century, which presented inductive thinking, and using evidence to reach a conclusion. The ideas of Locke and Hobbes and the notion of the social contract challenged traditional thinking and also contributed to the Enlightenment. Scepticism, which questioned traditional authority and ideas, contributed as well. Finally, the idea of moral relativism arose - assailing people for judging people who are different from themselves. The Legacy of the Enlightenment[ edit ] The Enlightenment began in France, as a result of its well-developed town and city life, as well as its large middle class that wanted to learn the ideas. It rejected the traditional attitudes of the Catholic Church. Many "philosophers," or people who thought about subjects in an enquiring, inductive manner, became prominent. Salons were hosted by upper-middle class women who wanted to discuss topics of the day, such as politics. The Enlightenment stressed that we are products of experience and environment, and that we should have the utmost confidence in the unlimited capacity of the human mind. It stressed the unlimited progress of humans, and the ideas of atheism and deism became especially prominent. Enlightened despots such as Catherine the Great and Joseph II replaced absolute monarchs and used their states as agents of progress. Education and literacy expanded vastly, and people recognized the importance of intellectual freedoms of speech, thought, and press. Conflict with the Church[ edit ] Although the ideas of the Enlightenment clashed with Church dogma, it was mostly not a movement against the Church. Most Enlightened philosophers considered themselves to be followers of deism, believing that God created an utterly flawless universe and left it alone, some describing God as the "divine clockmaker. John Locke John Locke [ edit ] specifically refuted Hobbes humanity is only governed by laws of nature, man has right to life, liberty, and property there is a natural social contract that binds the people and their government together; the people have a responsibility to their government, and their government likewise has a responsibility to its people Two Treatises on Civil Government justified supremacy of Parliament *Essay Concerning Human Understanding* - *Tabula rasa* - human progress is in the hands of society.

## 5: Enlightenment - HISTORY

*Charles de Gaulle has often warned France and other European nations of the threat they face from advanced scientific and technological countries such as the United States and the Soviet Union.*

Universities[ edit ] The original building at Yale , â€” The number of universities in Paris remained relatively constant throughout the 18th century. Europe had about universities and colleges by North America had 44, including the newly founded Harvard and Yale. The universities themselves existed primarily to educate future physicians , lawyers and members of the clergy. A notable exception were universities in Spain , which under the influence of Catholicism focused almost entirely on Aristotelian natural philosophy until the mid 17th century; they were among the last universities to do so. Another exception occurred in the universities of Germany and Scandinavia , where University of Halle professor Christian Wolff taught a form of Cartesianism modified by Leibnizian physics. Before the 18th century, science courses were taught almost exclusively through formal lectures. The structure of courses began to change in the first decades of the 18th century, when physical demonstrations were added to lectures. Experiments ranged from swinging a bucket of water at the end of a rope, demonstrating that centrifugal force would hold the water in the bucket, to more impressive experiments involving the use of an air-pump. Beginning around 1733, the Hats party in Sweden made propositions to reform the university system by separating natural philosophy into two separate faculties of physics and mathematics. The propositions were never put into action, but they represent the growing calls for institutional reform in the later part of the 18th century. However, the reform did not survive beyond the Third Partition. The United Kingdom of the Netherlands employed the same system in 1763. However, the other countries of Europe did not adopt a similar division of the faculties until the mid 19th century. The contributions of universities in Britain were mixed. On the one hand, the University of Cambridge began teaching Newtonianism early in the Enlightenment, but failed to become a central force behind the advancement of science. On the other end of the spectrum were Scottish universities, which had strong medical faculties and became centres of scientific development. Most of the new institutions emphasized mathematics as a discipline, making them popular with professions that required some working knowledge of mathematics, such as merchants, military and naval officers, and engineers. After a tremendous number of official academies and societies were founded in Europe and by there were over seventy official scientific societies. Around the start of the 18th century, the Academia Scientiarum Imperialis in St. Petersburg. Regional and provincial societies emerged from the 18th century in Bologna , Bordeaux , Copenhagen , Dijon , Lyons , Montpellier and Uppsala. The development of unchartered societies, such as the private the Naturforschende Gesellschaft of Danzig and Lunar Society of Birmingham â€” , occurred alongside the growth of national, regional and provincial societies. Official scientific societies were chartered by the state in order to provide technical expertise. Most societies were granted permission to oversee their own publications, control the election of new members, and the administration of the society. In some societies, members were required to pay an annual fee to participate. For example, the Royal Society depended on contributions from its members, which excluded a wide range of artisans and mathematicians on account of the expense. A dialogue of formal communication also developed between societies and society in general through the publication of scientific journals. Periodicals offered society members the opportunity to publish, and for their ideas to be consumed by other scientific societies and the literate public. Scientific journals, readily accessible to members of learned societies, became the most important form of publication for scientists during the Enlightenment. At the beginning of the 18th century, the Philosophical Transactions of the Royal Society , published by the Royal Society of London, was the only scientific periodical being published on a regular, quarterly basis. The Paris Academy of Sciences, formed in 1666, began publishing in volumes of memoirs rather than a quarterly journal, with periods between volumes sometimes lasting years. Smaller periodicals, such as Transactions of the American Philosophical Society , were only published when enough content was available to complete a volume. At one point the period extended to seven years. Independent periodicals were published throughout the Enlightenment and excited scientific interest in the general public. First, they increased in number and

size. There was also a move away from publishing in Latin in favour of publishing in the vernacular. Experimental descriptions became more detailed and began to be accompanied by reviews. The journal allowed new scientific developments to be published relatively quickly compared to annuals and quarterlies. A third important change was the specialization seen in the new development of disciplinary journals. Volumes tended to focus more strongly on secular affairs, particularly science and technology, rather than matters of theology. Along with secular matters, readers also favoured an alphabetical ordering scheme over cumbersome works arranged along thematic lines. Published in , the *Lexicon technicum* was the first book to be written in English that took a methodical approach to describing mathematics and commercial arithmetic along with the physical sciences and navigation. The folio edition of the work even included foldout engravings. The *Cyclopaedia* emphasized Newtonian theories, Lockean philosophy, and contained thorough examinations of technologies, such as engraving , brewing , and dyeing. It had three main branches: The *Marperger Curieuses Natur-, Kunst-, Berg-, Gewerkund Handlungs-Lexicon* explained terms that usefully described the trades and scientific and commercial education. *Jablonksi Allgemeines Lexicon* was better known than the *Handlungs-Lexicon*, and underscored technical subjects rather than scientific theory. For example, over five columns of text were dedicated to wine, while geometry and logic were allocated only twenty-two and seventeen lines, respectively. It was the goal of universal encyclopedias to record all human knowledge in a comprehensive reference work. The work, which began publication in , was composed of thirty-five volumes and over 71 separate entries. A great number of the entries were dedicated to describing the sciences and crafts in detail. As a *Reasoned Dictionary of the Sciences, Arts, and Trades*, it is to contain the general principles that form the basis of each science and each art, liberal or mechanical, and the most essential facts that make up the body and substance of each. Both areas of knowledge were united by philosophy, or the trunk of the tree of knowledge. An increasingly literate population seeking knowledge and education in both the arts and the sciences drove the expansion of print culture and the dissemination of scientific learning. The new literate population was due to a high rise in the availability of food. This enabled many people to rise out of poverty, and instead of paying more for food, they had money for education. With the establishment of coffeehouses, a new public forum for political, philosophical and scientific discourse was created. In the midth century, coffeehouses cropped up around Oxford , where the academic community began to capitalize on the unregulated conversation that the coffeehouse allowed. Education was a central theme and some patrons began offering lessons and lectures to others. As coffeehouses developed in London , customers heard lectures on scientific subjects, such as astronomy and mathematics, for an exceedingly low price. The public, on the other hand, gained both knowledge and entertainment from demonstration lectures. Class sizes ranged from one hundred to four or five hundred attendees. Courses were offered at virtually any time of day; the latest occurred at 8: One of the most popular start times was 6: Generally, individuals presenting the lectures did not adhere to any particular brand of physics, but rather demonstrated a combination of different theories. In the demonstration, a young boy would be suspended from the ceiling, horizontal to the floor, with silk chords. An electrical machine would then be used to electrify the boy. Essentially becoming a magnet, he would then attract a collection of items scattered about him by the lecturer. More formal works included explanations of scientific theories for individuals lacking the educational background to comprehend the original scientific text. The book was produced specifically for women with an interest in scientific writing and inspired a variety of similar works. A similar introduction to Newtonianism for women was produced by Henry Pemberton. Extant records of subscribers show that women from a wide range of social standings purchased the book, indicating the growing number of scientifically inclined female readers among the middling class. Sarah Trimmer wrote a successful natural history textbook for children entitled *The Easy Introduction to the Knowledge of Nature* , which was published for many years after in eleven editions. Some poetry became infused with scientific metaphor and imagery, while other poems were written directly about scientific topics. Other antiscience writers, including William Blake , chastised scientists for attempting to use physics, mechanics and mathematics to simplify the complexities of the universe, particularly in relation to God. The character of the evil scientist was invoked during this period in the romantic tradition. For example, the characterization of the scientist as a nefarious manipulator in the work of Ernst Theodor Wilhelm Hoffmann.

During the Enlightenment era, women were excluded from scientific societies, universities and learned professions. Women were educated, if at all, through self-study, tutors, and by the teachings of more open-minded fathers. In fact, restrictions were so severe in the 18th century that women, including midwives, were forbidden to use forceps. Over the course of the 18th century, male surgeons began to assume the role of midwives in gynaecology. Some male satirists also ridiculed scientifically minded women, describing them as neglectful of their domestic role. To be pleasing in his sight, to win his respect and love, to train him in childhood, to tend him in manhood, to counsel and console, to make his life pleasant and happy, these are the duties of woman for all time, and this is what she should be taught while she is young. Two notable women who managed to participate in formal institutions were Laura Bassi and the Russian Princess Yekaterina Dashkova. Bassi was an Italian physicist who received a PhD from the University of Bologna and began teaching there in 1743. Her personal relationship with Empress Catherine the Great r. Caroline Herschel began her astronomical career, although somewhat reluctantly at first, by assisting her brother William Herschel. On August 1, 1781, Herschel discovered her first comet, much to the excitement of scientifically minded women. Many other women became illustrators or translators of scientific texts. Englishwoman Mary Delany developed a unique method of illustration. Her technique involved using hundreds of pieces of coloured-paper to recreate lifelike renditions of living plants. German born Maria Sibylla Merian along with her daughters including Dorothea Maria Graff were involved in the careful scientific study of insects and the natural world. Using mostly watercolor, gouache on vellum, She became one of the leading entomologist of the 18th century. They were also one of the first female entomologists who took a scientific trip to Suriname to study plant life for a total of a five year span. Noblewomen sometimes cultivated their own botanical gardens, including Mary Somerset and Margaret Harley. Scientific translation sometimes required more than a grasp on multiple languages.

### 6: - France in the Age of the Scientific State by Robert Gilpin

*In lieu of an abstract, here is a brief excerpt of the content. Chapter 4 Â· The Heritage of the Napoleonic System Take interest, I beseech you, in those sacred institutions which we designate under the expressive name of laboratories.*

### 7: What Was the Enlightenment?

*France in the Age of the Scientific State by Robert Gilpin, , available at Book Depository with free delivery worldwide.*

### 8: 17TH Century Europe

*France in the Age of the Scientific State. Robert Gilpin www.enganchecubano.comton University Press, Princeton, N.J., xii + pp., illus. \$*

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