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By James F. Welles, Ph.D

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# Stupidity in the Age of Reason

James F. Welles, Ph.D

*Abstract-* **The Age of Reason was marked by a decline in the theological basis of knowledge due to a rise of scientific explanations of natural phenomena—trends which reflected the application of reason to philosophy, astronomy (where it was most effective) and biology. However during this era, the political life of nations continued to be shaped by power while the cognitive life of people continued to be shaped by religion, tradition and emotion, which combined to make this period as unreasonable as any other.**

## I. Introduction

Unofficially, the Age of Reason began in 1555, when the Diet of Augsburg brought a truce in the religious strife consuming Europe. The new rule was "Whose region, his religion", with dissidents emigrating to a region ruled by a prince with a belief compatible with if not identical to their own. An accepted fact of the era was that neither Catholicism nor Protestantism in its many forms would triumph and dominate completely, and a corollary was that the Christian sects would have to learn to live together. It seemed that reason might be the means by which this process of religious accommodation would occur—that religious differences might be reconciled by Catholics and Protestants holding rational discussions about theology. Although that was a justifiable hope, the result was that people found intolerance was immune to logic. There are limits as to when and where reason can be applied, and after involved parties argued, albeit seldom reasonably, in dialogues of the deaf past each other, hostilities were inevitable.

One of the early manifestations of this was the St. Bartholomew Day massacre of about 7,500 Protestants by loving Catholics in France on Aug. 23, 1572. When the pope heard the news, he was overjoyed and organized a festive prayer to celebrate the blessed event. While we are properly appalled at contemporary Muslim sects devouring each other, we should bear in mind that on that one day about 450 years ago, Christians killed more Christians than had the Romans in all their persecutions spanning three centuries.[1]

However, the spirit of religious intolerance which had sparked and sustained the various inquisitions earlier was directed at first not into military actions against other Christian sects but toward legal action against heretics and witches. One of the few things upon which Catholics and Protestants agreed was that heresy and especially witchcraft had to be rooted out and expunged. As it turned out, concern with heresy faded in a morass of subjectivity while witch-mania continued to develop, and eventually, in this Age of Prejudice, even some of the especially devout were burned as witches.[2]

Witch hunting had its origins in the days of Rome,[3] festered in Middle Ages, grew as the medieval world crumbled in the 1400's[4] and became an obsession in the sixteenth century. Surprisingly, the zeal of the hunters seemed evenly matched by the number of witches: The more witches were hunted, the more there apparently were. Actually, the efforts to root out this evil seemed to increase it because, although officials could not see it at the time, the methods of investigation used were designed to produce confessions if not witches. With some 40,000 souls executed in Europe over three centuries,[5] the mania finally peaked in the mid-seventeenth century as a growing number of people became disturbed by the excessive cruelty used to elicit confessions from suspects and convinced that such admissions should not be used to justify the execution of the accused.[6]

When the ashes finally settled, it became clear that not only witches but facts had been tortured so that people could create and support an idiotic belief they wished to hold. The more people thought about witchcraft, the more they believed in it, and as the resultant positive feedback system went to excess, a mania went to madness. Indeed, in the American colonies, the insanity reached the point that a presumably innocent dog was tried and executed.

As insidious as it sounds, a sceptic who would not blindly swallow any storied allegation could be suspected of being in league with the devil,[7] and on this point it is noteworthy that canon law forbid *belief* in night flights: Apparently night flights on broomsticks themselves were OK; it was belief in them that was taboo.[8] If there was any irony in this whole tragedy, it was that the witch hunters, while they were inflicting agony on their victims, thought they were doing good. Fortunately, by the end of the 1600's this reign of goodness tapered off, and people were left more often alone with their private beliefs.[9]

Ironic or not, the witch hunts provided a tragic marker for the age, in that these grotesque persecutions in the cause of orthodoxy and the name of goodness were actually logically justified to those people who believed in witches. It is really quite reasonable for people who know what is right to want to stamp out

*Author:* *e-mail: JWelles103@aol.com*



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evil,[10] and, further, it is logical to extend righteousness to the nth degree. While we marvel at the use of scientific logic and math as means to help us unravel the mysteries of nature, we must not forget that rationalism can be so destructive when used by witch hunters and their ilk to dismiss or override basic human values.[a]

However, in the seventeenth century, rationalists thought these values were fixed: They did not have to be created and could not be destroyed.[11] Correct beliefs simply were to be applied, and people who had already discovered them felt morally justified in imposing them immediately[12] on others.[b] Those who were still searching for eternal (destructive?) truths, on the other hand, were convinced that logic by itself would lead the sane, rational intelligencia to discover the proper standards for judging right and wrong for everyone.[13] Hence, the guiding principle for the educated, informed, elitist leader in the Age of Reason might well have been, "I think, therefore, you don't have to". With theological disputes gradually being found to be basically unresolvable by any means—mental or military, intellectual elites shifted their focus to philosophy and science.

Although this new rationalism was a belief system (i.e., a belief in logic), it constituted a departure from religion in that it denied the supernatural and reduced God to the role of Logician Supreme. In addition, rationalism went beyond science, which limited itself to the objective, logical study of factual nature. Scientists did not ask the big questions about human values—what was right or wrong or good or bad—but restricted their concerns to the validation of their data and theories. However, rationalists believed they could find valid answers to questions about cultural intangibles like epistemology and ethics through logic. They usually based their reasoning on knowledge gained from Scripture, tradition and superstition, but an increas-ing number of thinkers included in their considerations scientific facts based on actual, physical, Lockian experience.[14] Unfortunately, they never came up with a defining righteousness, so, while the West became powerful, it remained amoral.

At the most abstract level, the general interest in both reason and fact resulted in the false but long-lived philosophical dispute between the rationalists and empiricists. Actually, these were not really opposites, as the rationalists merely emphasized the mental world while empiricists emphasized the material world. "Rationalists" like Descartes, Leibnitz and Hobbes all[c] thought the world made sense and assumed the universe was reasonable[15] as did liberal empiricist John Locke and natural philosopher Francis Bacon.

First and foremost among the rationalists was Rene Descartes (1596-1650), who attempted to build a completely new philosophy based on reason. His mathematical, mechanistic views were modified for people, who presumably had souls in their pineal glands (see below), but this fabrication notwithstanding, inve-terate Catholic Descartes was attacked because his ideas led to atheism. While he was living in Holland, the Prince of Orange saved him from persecution, and when the University of Leyden forbade all mention of him, he was again aided by the Prince, who told the University not to be silly.[16]

Nevertheless, the general message was clear: Reason would do well to compromise and accommodate itself to religion. Descartes might actually have changed his famous maxim to *Cognito ergo stupido–or Fatuo*[d] *ergo sum*–had he known his atheistic cosmology would be supplanted by Newton's not because that system was superior mathematically or provided a better theoretical framework for factual knowledge but because it required God to set the planets in motion. This was a classic example of how appeal can supersede logic when competing ideas confronted, confirmed or conformed to entrenched be-liefs.[17] Generally, a system of thought is judged not on its extrinsic merit (i.e., consistency with known facts) but to the degree that it supports or undercuts established, orthodox, popular doctrines.

Although Descartes was a devout Catholic who refused to publish anything that would disturb the Church,[18] his universe was hardly that of the Bible, in which a meddlesome God concocted unpredictable miracles. It was a chemist's nightmare of vast numbers of particles whirling around and combining to fool us with false common sense notions about the way they interact. He embodied the conflict between the rationalists's contempt for facts and the analyst's contention that the way to understand nature was by

a. This kind of thinking provides the basis for contemporary laws designed to protect immoral people from themselves. (McWillaims. 297.) It provided the logic for the totalitarian exterminations of the 20th cen-tury (Judt. 226. And see endnote 142.) and characterizes contemporary squabblers in Congress who know they are right and their opponents wrong, (Judt. p, 197.) Another example would be the neoconservatives (aka "The crazies". R. McGovern.) of the 1970's who imposed them-selves on everyone else. (Seahill. p. 8.)

b. This attitude is alive and well today in the form of those enthralled by big government. There was a time when the government had a very limited right to know what citizens did, and the citizens had an absolute right to know what the government did. Now it is the reverse: The government has a nearly unlimited right to know what the people are doing while they have at most only a limited right to know what it is doing for them–or more likely for itself. (E. Epstein. p. 47. re: knowledge elites.) The current idea is that the big grab of data will lead to an end of terrorism and crime. The danger is that the grabbers cannot perceive them-selves as threats to everyone else's right to be left alone. (Friedman, B. 259.)

c. All these were considered rationalists although, in all cases, their commitment to reason was qualified.

e. The Latin "F" word for sexual intercourse. Actually, any verb would do: E.g.,"I _ therefore I am." If you do anything, you must exist, as Augustine had noted–and traceable bac to the later Greek stoics.(See the Metaphysics of Herennios. Footnote on p. 277 of Windelband.)



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divining its underlying principles through the application of math to quantifiable measurements. That may have led to an understanding of nature and God, but as for appeal, people preferred a *just* God to a universe of amoral chaos.[19]

A throwback to Pythagoras, Rene led the mind away from the senses but not from God as the guarantor of cognition.[20] He sought the clarity and logical consistency of a mathematically perfect system[21] and was a naturist in the "Nature/nurture" battle–that is, knowledge is structured in our doubting brains.[22] Further, he transcended Plato's preoccupation with morality and established purely intellectual standards of clarity of thought and mental discipline for the sacred pursuit of truth.[23]

While Descartes was really something more than a misplaced Greek philosopher, he was also less than a modern scientist. Rivaling Aristotle as a polymath, he sought results which would confirm his mechanistic hypothesis for nature but was not disposed to adjust his ideas to conform to his findings and did not reason from experimental evidence to scientific conclusions. Knowledge of external things was to be attained by the conscious mind—not the senses, and truth was in the mind alone, with the body dismissed as a life support system for the brain.[24] In his love of mechanics, mathematics and the mind, he was both so extreme and so extremely successful that he threw doubt on the very existence of everything but doubt[e] and questioned even the existence of his probable, mechanistic world.[25]

Descartes was not so extreme, however, that he could not make a mockery of his whole system. He allowed the human soul in the pineal gland to alter material states by volition, thereby introducing free will (and stupidity) into his otherwise purely mechanical system. Thus, even the great rationalist could not bring himself to be consistent.[26] He had to have freedom, so although he retained God as Architect Supreme,[27] worshiped the goddess Reason in public and worked assiduously to overcome the limitations of classical (i. e., Aristotelean) and scholastic thought,[28] Catholicism's free will was the sacred idol he would not surrender.

More an extremist than anything else, Gottfried Leibnitz (1646-1716) went Descartes one better in that he did not just cast doubt on the existence of matter—he denied it altogether. A polymath[29] like Descartes, as a latter-day Parmenides, he was the great anti-empiricist of all time, although this did not make him a rationalist: He was a rationalist because he attempted to use reason to support whatever point he wanted to make. In this regard, his attempts to prove the existence of God are amusing examples of how even a great intellect can be perverted by a commitment to proving a favored assumption:[f] To wit, God must exist because it would be better if He did than if He did not, and abstract truths (like 2+2=4)[g] are always true, therefore God must exist.[30]

If Leibnitz's use of logic in cosmology and theology was odd to the point of being suspect, his application of reason to ethics and epistemology was bizarre if not insane. He conceded there is good and bad in the world but was certain God had created the best possible world with more good than evil.[31] The commonplace observation that there are more serfs suffering evil than nobles and kings enjoying good in no way affected his logic of values perhaps because he denied the real world existed. On such metaphysical issues, Leibnitz was all rationalist in favoring truths known by logic over those learned by experience. In epistemological matters, he was likewise quite willing to draw inferences from syntax to the real world to the point that "Naming a thing completes its essence",[32] so calling one-self a king creates a kingdom. Fortunately, with the growth of empiricism, this approach fell into disrepute as scientists reversed this process and reasoned from fact to theory[33] and from reality to words or, better yet, thoughts.

For all his abuse and misuse of logic, Leibnitz firmly believed in its importance and would have been the founder of mathematical logic had he but published his work. However, he abstained from publishing and retarded development in this field for 150 years for two reasons. First, he could not believe Aristotle was wrong on some points in his doctrine of the syllogism. In addition, since his philosophy was deterministic and considered incompatible with the Catholic doctrine of free will, he, like Descartes, refrained from publishing lest he offend someone. Once again, reason paled before reverence and deferred to orthodoxy.[34]

Only slightly less the rationalist was anti-democrat Thomas Hobbes (1588-1679), best known for his Leviathan (1651)–a generalization based on Thucydides' History of the Peloponnesian War.[35] Eschewing Divine intervention,[36] he rationalized a repressive, authoritarian government which derived its le-gitimacy from an implicit political contract which obligated the ruler to protect the lives of the citizens and

f. Anticipating Hume's commitment to certainty, he rejected as absolutely false anything about which he could entertain any doubt what so ever. Oddly, he trumped Newton and anticipated Einstein by asserting time and space are relative. (Bronowski p. 241.)

f. A couple of other gems were provided by Cicero's mouthpiece Balbus (45 B.C.<) in The Nature of the Gods. To wit (paraphrased) only a fool would imagine there is nothing in the world greater than himself. Therefore, there must be something greater than Man, who certainly is no fool, and that something must be God. And–arguing from design–someone better than us (i.e. God) must have made us. (McGregor translation: p.124.)

g. On the other hand, Pliny the Elder used the same kind of fact to demonstrate a limit to God's power–that He cannot make 2+2 equal anything but 4. (Natural History.) So, He exists but is limited. Btw the underlying assumption that 1+1=2 proves Russell and Whitehead existed.



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save them from the "Solitary, poor, nasty, brutish and short" lives[37] they created for themselves [38] Reacting to the chaos of civil war, Hobbes saw a strong ruler as humanity's salvation[39] and opined it could not only prevent unruly, power-driven people from hurting each other but might encourage them to help each other against common enemies [40] like hunger, disease and stupidity.[h] He regarded churchmen as a "Confederacy of Deceivers" who would control men "By dark, and erroneous Doctrines...."[41] Frederick the Great's Prussia in the mid-18th century brought this ideal[42] to life by providing Germanic order to counter the tendency of citizens to engage in Hobbes's presumed universal war of all-against-all–which the Treaty of Westphalia (1648) had rendered obsolete just before Hobbes enunciated it. He nevertheless is credited with providing the intellectual foundation for the emerging, strong, centralized modern state.[43] Unfortunately, Catholic Latin America historically has provided models of Hobbesian extremes anarchy topped by repressive, religious states.[44]

Nominally an English empiricist, Hobbes actually was an absolutist who came down on the side of reason, which presumably separated men from beasts.[45] He appreciated both empiricism and mathematics but clearly favored the logical certainty of math to the imprecise knowledge gained through the senses. Ideas to his mind were like meat to a cleaver so, as he was impatient with subtleties, his thinking was crude at best. Worse yet, he was always ready to sacrifice facts to his rough logic if they were in any way obstacles to a predetermined, desired conclusion.[46]

At the same time, Hobbes recognized the uncertain significance of the names for virtues and vices. As he so quaintly put it, "For one calleth wisdom, what another calleth fear; and one cruelty what another justice; one prodigality, what another magnanimity..." [47] Using whatever terms were at hand, he did his best to bury superstition, embraced rationalism[48] and was a rigid determinist to the point that he was suspected of atheism. After superstitions were aroused by the plague of 1665 and the Great Fire in London in 1666, the House of Commons appointed a committee to investigate atheistic writings, specifically mentioning Leviathan if not Hobbes. Thereafter, he could not have anything on controversial issues published in England.[49]

Meanwhile, as an antidote to Hobbes's absolutism, John Locke (1632-1704) was concocting a non-philosophy of liberal empiricism. Usually more sensible than rational, he could be open-minded, reasonable and sometimes both. Unlike Erasmus, he was so open-minded, he believed any nonsense reported by travelers to the new worlds then being discovered[50] but reasonable enough to find a consoling hiding place in the subjective nature and multiplicity of truths[51] Indeed, he introduced a new kind of personality on to the intellectual scene–the non-dogmatic, open-minded liberal: the progenitor of democracy. [52] Out-stripping even Plato as the least systematic of all major philosophers[53] and victimized to the point of impenetrability by his absurdly long sentences, he found peace with a diversity of opinions based on probable knowledge rather than in absolute certainty based on implacable logic.[54] None of his conclusions was new nor had their exposition demonstrated any originality or independence of thought. Agreeably transparant and eschewing all scholastic form and learned terminology, he glided skillfully away from or over all deep philosophical problems. [55]

Actually, the peace Locke found was partially due to his refusal to draw logical conclusions he did not like. As a cautious, middle-of-the-roader[56] and inveterate empiricist who was even more liberal than empirical, he could accept reason so long as it avoided paradoxes and led to conclusions which passed his personal acid test of common sense, but otherwise, he considered it expendable. Indeed, Locke rescued logic from the bin of metaphysics into which Descartes had consigned it and returned it to the common sensical people. [57] Basically, *he grounded knowledge in experience rather than reason*[58] but also showed awareness that sensual stimuli could be distorted to misperceptions by a mind biased by language. [59] His emphasis on experience nevertheless had immense implications for democracy and progress, in that everyone could learn from experience,[i] and by altering the environment, people could improve themselves and their institutions through education.[60] He hyped logic when opining, "Reason must be our judge and guide in all things"[61] but noted people use it when it promotes their particular cause; otherwise, it was expendable.[62] In his case, he avoided dogmatic thought and was willing to enunciate a general principle which would lead to some disturbing conclusion and then, rather than draw it, he would simply stop concluding. This aggravated logicians, but it showed sound judgment and a practical sense rare in intellectuals. While other philosophers were bending logic to desired conclusions, Locke ceased

h.This sentiment was echoed in the next century by David Hume, who espoused that, in framing government,"Every man ought to be supposed a *knave* and to have no other end in all his actions but *private interests* ". The task of government was not to stop selfishness but to harness it and turn it toward the general public good. (Chernow. p.60.) All this is, in turn, consistent with the thesis that people are born bad due to original sin. God's experiment of granting humans free will had gone awry when they followed his dictum to be fruitful and multiply. (Genesis. 1:28.)

i. In this regard, he was the philosophical descendant of Aristotle who regarded the brain of an infant as a blank slate/*tabula rasa*. The only modification I would make in this model is allowing for perfect pitch, a diamond cutter's eye and a predisposition for learning languages. JFW.



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philosophizing and bending if he was heading somewhere he would rather not go.[63]

When Locke did reach conclusions, he lucked out in that not only were his valid opinions useful but occasionally his errors as well.[64] For example, his philosophy as presented in his Essay Concerning Human Understanding (continually rewritten: 1670-1700) had merits as well as demerits, but most were functionally of value. The merits were untheological in that he unwittingly invented psychology by describing the mind as a collection of worldly experiences without reference to divine intervention:[65] People were held equal in ability to learn, with differences attributed to education. This profoundly undermined the church/state establishment which, with English alacrity, within 100 years, was promoting public education.[66]

Locke's demerits were theoretical, but as a sensible (i.e., pragmatic) empiricist, he was always willing to forgo logic rather than become paradoxical. On the issue of epistemology, for example, he defined (Bk IV, Chap I) and then redefined (Bk IV, Chap III) knowledge so as to allow empiricism. Pushing Aquinas, who averred everything in the mind was in the senses, Locke's key belief was that sensations have external causes,[67] but this was just a belief and was not known. In fact, a psychotic may perceive an object which does not exist (except in his own fevered imagination). The belief that sensations have outside causes can be maintained only on grounds independent of experience, and since Locke could not face the paradox that an empiricist cannot know how[j] he knows, he did not draw that conclusion and let his commitment to common sense blind him to his inconsistency[68] (i.e., that an empiricist must take his knowledge of reality on faith the way deists take their alleged knowledge of God).

Oddly enough, he then turned around and made knowledge a self-centered enterprise by denying, for example, that if a tree fell, it made no sound unless someone heard it.[69] The crux of this issue is the definition of sound–which is a noise that is heard. The crux of that issue is "Heard by whom or what"! Suppose a bear or woodpecker hears the tree fall. Does that count or not? Are we so self-centered that we define reality by what we know of it? Was he blind to the fact that we know something about the universe but not everything, and that trees have fallen for thousands of years without us knowing?

He was also presumably blind to the fact that in his Second Treatise on Government (1690), which was written/spun to rationalize the Dubious Revolution of 1688, he incongruously declared both the legislature and executive supreme. Apparently, the executive was the supremer of the two for he defined executive prerogative (read privilege) as "The power of doing public good without a rule" (e.g., Thomas Jefferson's extra-constitutional purchase of the Louisiana Territory from France in 1803)[k] and even "Sometimes too against the direct letter of the law"[70] (E.g., illegal wire tapping of Americans during WWII.)[71]. Continuing, "...a strict and rigid observation of the laws may do harm", so that "....the laws themselves should in some cases give way to the executive power", and [The executive must have] the power to act without the prescription of the law [and] *sometimes even against it*."[72] (Italics added) All[l] of this is covered by Publilius Synus's maxim: *Honesta turpitudo est pro causa bona*–"For a good cause, wrongdoing is virtuous" or in street parlance, "The end justifies being mean".[73]

About the only thing the executive could not do, according to Locke, was legislate because the legislature presumably had no power to transfer by subcontracting its authority to make laws to other hands. That may be a convincing, rational argument but nevertheless it is exactly what the parliament did in Mussolini's Italy[74] in the 1920's and the Reichstag in Hitler's Germany and Congress in FDR's New Deal did in the 1930's–although in that case, the move was slapped down by the Lockean Supreme Court. [75]

An unfortunate example of an error by Locke impeding understanding is his assertion in his Essay Concerning Human Understanding of what is now known as "Intelligent design".[m] He attributed the miracles of eyes and ears to an omniscient creator, to the later chagrin of Darwin *et al*. Taking this a step farther, he regarded atheists as irrational,[76] whereas they regarded him as merely psychotic–his evidence being, essentially, fantasy. On the other hand, atheists aside, he did establish the principle that religiously based truths were all equally unworthy and there were therefor no reasonable grounds for religious intolerance.[77] The

j. Nor what he knows. When you "Touch" something, there is no direct contact at all but separation by tiny atomic forces. (Kaku. p. 176.) To blur matters further, about 4% of the population are Fantasy-Prone personalities whose fantasy sensory experiences are as vivid as the real equivalent–sight, sound, smell, etc. (Wilson and Barber.)

k. Not only was it extra constitutional, but it saddled every person in the country with a debt of $4.36. (Johnson and Johnson. p. 7.) It ballooned to $11 per person by 1912 (Ibid. p. 69.) and $57,000 by 2016.

l. Fortunately, these principles did not find their way into our written laws. Jefferson and Madison cherry-picked Locke, who may* have inspired the Declaration of Independence but not the Constitution, not that it mattered. In the early 21st century, Attorney General Alberto Gonzalez bestowed upon the president the authority to break the law in the national interest. (Bazelon.)* The ideas attributed to Locke may have come from the Scottish Enlightenment. (Wills. 1978.)

m. Locke's fallacy lay in attributing the capacity for organizing and arranging the Creator's products to an intelligence rather than their nature. Things were created by a Big Bang (i.e., the collapse of matter of a previous universe) into energy which was instantaneously reformed anew into matter which then interacted according to its physical characteristics to form bigger bits of matter. Particles formed atoms forming molecules forming cells etc. There is no *need* to have a creator much less anintelligent one if we have a repeatedly expanding/collapsing universe.



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idea that a state should not be based on the dictates of a specific religion constitutes a defining dividing line between most Western and Eastern (i.e., Muslim) nations.

Although Locke's Second Treatise[78] provided the philosophical rationale for governmental repression as well as political revolutions galore, it is based on a monumentally fallacious assumption–perhaps adopted from Hobbes[79]–that equal people in a state of nature originally set their rulers over themselves. Contrary to Hobbes, who viewed primitive man engaged in constant strife, Locke saw him–like a Shoshone found as by Meriwether Lewis on his transcontinental trek in the early 19th century[80]–in a happy state of natural liberty.[81] Both agreed, however, all political societies began with a voluntary union of cave*men*–women had no standing in Locke's political philosphy [82]–freely acting in the choice of their governors and forms of government. No ruler should impose himself on others nor could anyone legally deprived others of their natural rights, and if a king presumed to deprive the people of their rights, they had the right to resist.[83]

The king was not God's representative on earth but rather all the philosophically disposed democrats sat around a fire and methodically and logically discussed the pros and cons of all possible forms of government before settling on the fact that the tribe needed a leader who would be selected by secret ballot from among the party nominees. This may be a reasonable account of events as befitting the age, but its Confucian smugness and Platonic idealism not only anticipates Rousseau's romanticism but makes anyone wonder as to its absurd imagery if not the certainty of its inaccuracy.

Equally confounding was his assertion that we are capable of knowing there is a God. If we are capable of knowing it, then how is it that we do NOT *know* it? Many believe it; some claim to know it (although when pressed, their "Knowledge" is always reducible to wishful belief) but no one can prove it. Is it because He does not exist or that Locke was wrong? Bertrand Russell pointed out the important thing is not what we believe but why we believe it,[84] and perhaps this falls in the intellectual neverland between knowledge and proof–that we can know something we cannot prove. However, this still begs the question, are we capable of knowing that God does not exist? The answer is, at best, uncertain, but we may have invented Him because it makes us if not Him feel good.

On the other hand, we owe to Locke the principle of "Tolerance" in our system of government. In an age when Protestants and Catholics were beating up on each other like so many 21st century Muslims in inter- and intrastate confrontations, he posited that what an individual believes is no business of the state's, which should limit itself to civil affairs and leave citizens alone to believe privately whatever they want to so long as they obey the law.[85] These private beliefs were to be enriched by pursuit of the truth, which would naturally lead to understanding. [86]

In more specific, concrete terms, when drawing up the constitution for Carolina, Locke, as secretary to one of the colony's "Lords Proprietor", had an opportunity for practical political impact and endorsed aristocracy, slavery and serfdom.[87] Echoing More, he wisely sought to ban lawyers–only to have this reasonable stricture ignored by the colonists.[88] Anticipating or contributing to the development of the enlightenment, he wrote "Rules of a Society which Met Once a Week for the Improvement of Useful Knowledge"[89]–the Franklinesque goal of promoting practical knowledge.

However, well before rationalists put their stamp on the age or liberals took refuge in uncertainty, Francis Bacon (1561-1626) laid out the course the Western mind would follow. Neither a good nor kindly man, he thirsted for wealth and power and as Lord Chancellor, he lacked scruples to the point of impeachment. He was a poor scientist but came as close as anyone to systematizing a natural philosophy,[90] and if he under-valued mathematics, at least he hated Aristotle who started with conclusions and then sought support for them[91]–and felt philosophy should be separate from theology and ancient texts. Indeed, he opined philosophy suffered from the "Blindness of tradition, the swirling bluster of arguments, or the turbulent waves of chance ".[92] Specifically, he made a summary statement of stupidity by attributing errors of the day in science to the fact that, "...men of capacity and intellect above the vulgar had been fain, for reputation's sake, to bow to the judgment of the time and the multitude".[93] Since the classics could no longer tell people what they needed to know,[94] he presumed to replace Scholastic abstractions with hard science.[95] This he did by developing a functional synthesis of empirical knowledge and reason based on evidence gathered by sense perception and organized by induction—i.e., building generalizations from observed facts.[96] Overcoming the intellectual snobishness of the Greeks, he eschewed top down knowledge and welcomed practical information gained by workers in the crafts and trades which would lead to an understanding of how things actually are rather than how we fancy them to be.[97] Anticipating Hegel, he envisaged logic building on facts[n] until reaching an ultimate truth.[98] If there was any weakness in his approach, it was his belief that accurately perceived

n. Not much of a case can be made for ignorance, but it does leave one "Open minded". With this in mind, Robert Boyle (1627-1691) deliberately delayed reading Descartes and Bacon until he was thirty lest their theories interfere with what his own experiences might lead him to conclude. (Boorstin. 1998. p. 181.) Likewise, Freud refrained from reading poets and philosophers lest they influence him. (Erickson. 2; p. 52.)



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facts would arrange themselves into knowledge if an observer just let them.[99]

On the other hand, the facts never had a chance if the observer was ignorant of or undervalued them, and, like Erasmus and Machiavelli, Bacon was unaware of or failed to appreciate some of the major breakthroughs of his time despite his universal interests. For example, he took no note of the invention of logarithms by John Napier and knew nothing of Gilbert's work on magnetism nor even Vesalius's in anatomy, which had been published well before his birth.[100] In addition, Bacon was animated by an "Anti-nature" attitude which amounted to a biblically sanctioned[101] attack on resources of the world–later reinforced by Locke's view that nature is a waste[102] and that the way to happiness was via its logical negation.[103]

Facts and attacks aside, purely as a theoretician, Bacon's devotion to induction unfortunately led him to slight deduction—the process by which a scientist reasons from a hypothesis to a consequence that is testable.[104] Actually, a scientist really needs both induction and deduction as (s)he usually gathers facts and frames a hypothesis from them via induction and then deduces a way to test that idea and perhaps then revises it in light of new data gathered by experimentation. The resultant idea then prevails until a better one, developed by the same intellectual process, comes along.

If Bacon came up short of appreciating and completely codifying the scientific circle (or spiral), at least he did identify five "Idols", or bad habits of mind, which contribute to if not cause stupidity. Idols of the tribe are inherent in human nature, with the example given being the human tendency to expect more of nature than can be found. Idols of the cave are personal prejudices. Idols of the market place are words, which can have a tyrannical hold on the mind. Idols of the theater are systems of thought like those of Aristotle or the Scholastics. Last, idols of the schools are blind rules, like syllogisms, which replace rational judgment.[105]

Although we continue to honor these idols,[o] we have since learned to temper our beliefs with experience thanks to the approach which Bacon advocated and which scientists developed and codified during this period. Known as the Age of Reason, this was also the Age of Fact—a time when knowledge was pitted against superstition (i.e., religion), the ancients or even reason as, for example, when Kepler realized planetary orbits were not circular but elliptical. (See below) Science combined reason and fact and progressed not by confirming everyday notions but by exposing paradoxes and advancing beyond innocent ignorance into the unknown.[106] It did so by evolving as a system of scientific discovery which permitted intellectual progress through the refinement and revision of rational theories according to factual discoveries.[107] Novelty became prized, and more and more often, science provided apparently "Peachable" truths which proved things were not always what they had seemed to be.[108]

This modern development of science was due to a number of liberating factors starting with the growth of capitalism. Business not only rewarded innovators who successfully applied knowledge to practical enterprises but provided the financial base for the seventeenth century equivalent of "Research and Development". A related psychological factor was the disposition of intellectuals to turn from religion and philosophy toward reality and science[p]—from the dignified, literary, world of theological pursuits and philosophical disputes to the grubby, dirty, sordid, factual world of weights, measures, fire and iron.[109] Specifically, Bacon noted in his time that, in the best tradition of Greece, the descent into mere practical matters was considered a "Dishonor unto learning".[110]

In addition, the new intellectuals willingly renounced their medieval respect for previous authority, especially Aristotle. Scientists in particular instituted the habit of checking their own ideas by experimental verification of theoretical explanations, and most thinkers were freed of the worst of the taboos, traditions and customs of the Middle Ages.[111] Consistent with this, Bacon called for sharing of information among scientists,[112] in contrast to the policy of physicians and German philosophers who kept their professional secrets to themselves.[113]

Pioneers in science were the astronomers and anatomists, who ironically made the greatest intellectual advances of this age while being circumscribed by theological authorities and criticized by medical "Experts" respectively for presuming to reshape classical and Biblical beliefs according to mere empirical facts.

Actually, the Ptolemaic schema of the universe had served quite well for a long time, with its minor irregularities easily explained away[q] by astronomers, who became adept at the practice. However, as facts gradually accrued, these explanations became increasingly complex until Copernicus opened the door to modern science unlatched by Nicholas of Cusa (1401-1464) and Regiomontanus (1436-1476) with the

o. A correlated consequence was that metaphysics was shelved as learned minds focused their attention on nature and ignored ethical issues like good and bad, right and wrong. Put another way, teleology was replaced by mechanics as "How?" replaced "Why?" (Booth. 2008. p. 30.) This trend was taken to the terrifying extreme that during WWII, a guard at Auschwitz informed an inquisitive prisoner, "There is no 'Why' here."(Rosenbaum. p. 252.)

p. When scientists linked up with artisans and craftsmen in England in the 18th century, they produced the Industrial Revolution. (Burns. 2013.p. 167. And Fukuyama. 2014. p. 44.)

q. This same kind of thinking–jimmy the system around rather than junk it–characterized the reaction of power companies ca. 1980 to accruing evidence conservation was the cost-effective way to go. (Roe. p. 188.)



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heliocentric hypothesis of planetary motion.[r] Conforming to factual observations and axioms of physics if not Aristotle and theology,[114] its basic tenets were that the earth revolved around the sun once a year and rotated on its axis once a day.[115]

Nicholas was educated at Padua and published numerous mathematical and scientific studies. There, he was exposed to Plato, who, along with Pythagoras, Aristarchus and Archimedes, believed the earth went around the sun.[116] He was cagy enough never to admit he believed the earth was not the center of the universe or was not at rest, nor that celestial bodies were perfect spheres which moved in circular orbits: He claimed he just found such a model useful for calculations.[117] His disciple, Regiomontanus (nee Johan Müller) knew the Ptolemaic system was nonsense. The intellectual equivalent of Newton, he anticipated Galileo in making telescopes to view the heavens and went beyond his mentor in declaring what Nicholas had suggested that the sun, not the earth, was the center of the universe (i.e., solar system) around which the planets dutifully revolved.[118]

Copernicus appropriated Regiomontanus's work when framing "His" system,[119] which gave rise to our modern term "Revolutionary". However, when his book Concerning Revolutions of the Heavenly Bodies was published in 1543, it caused little commotion. It was dedicated to the pope (Paul XIII), and for years before the Catholic Church attacked it, and even before it was published, the ideas contained in it had been denounced by leading Protestants.[s] In fact, even before 1530, Luther had dismissed Copernicus, whose views were already well known, as "An upstart astronomer" and a "Fool (who) wished to reverse the entire science of astronomy".[120] Just as Luther's antagonist, Leo X, had been half right about his monkish quarrel, Luther was half right about Copernicus: He did not want to reverse astronomy so much as correct it. He did not even claim his system to be true; rather, he maintained only that *it made better sense* of the facts than the orthodox model.[121] Further, Calvin joined Luther in dismissing the Copernican view of the heavens as unbiblical, citing Psalms 96 : 10 "The world also shall be established that it cannot be moved." (King James)[122] or, if you prefer The New English Bible, "He has fixed the earth firm, immovable."

Initially, Copernicus found his hypothesis scoffed at not only by the Protestant Bible clergy for lack of supporting biblical citations but also by astronomers for lack of supporting scientific evidence. For one thing, there was the absence of stellar parallax —i.e., the stars did not appear to shift positions as the earth moved in its orbit. Copernicus presumed correctly, as had Regiomontanus,[123] that the stars were too far away for this to be observed, and it was not until the nineteenth century that scientific instruments were refined enough to permit the confirming observations.[124]

In addition, critics alleged that an object propelled directly upward would land west of its starting point if the earth were rotating eastward. Copernicus's rebuttal[t] was that such an object would be "Part of the earth" (as are clouds, which critics also noted did not lag behind the spinning earth) and carried along with it.[125] Not until Newton framed his law of inertia was this issue was resolved[126] and the Copernican hypothesis accepted by the scientific community—about 150 years after its publication. However belated, this acceptance was a result of the greatest intellectual reformation of all: The realizations that ancient beliefs might be wrong and that truth could be established by the collection and rational analysis of empirical facts.[127]

The patient collector of facts who dispelled the ancient belief in Aristotelian dogma and provided the hard evidence for the Copernican hypothesis was Tycho Brahe (1546-1601), although he did not subscribe to that system himself. Aristotle had declared that change and decay were confined to earthly things, and like almost everything else he said about scientific matters, this became an obstacle to intellectual progress. However, Brahe's discovery of a supernova in 1572[128] and his observations on comets first undermined and then shattered this particular stumbling block to learning and understanding. In addition, his precise observations of heavenly bodies and careful record keeping provided Kepler with the data he would need to make his calculations and formulate his laws.[129]

Johannes Kepler (1571-1630) was the first to step through the door Copernicus had set a jar if not thrown open, and he sort of backed through with only one foot while the other remained firmly planted in Greek mysticism. His acceptance of Copernicanism was not the result of a reasonable analysis of facts but due to his view, anticipated by Regiomontanus,[130] of a symbolic analogy between the roles that the sun and the Divine Mind played in giving light.[131] Thus, by a fortuitous blind leap of faithakin to Copernicus's Platonic idea that the sun might be central because it was the ultimate good–he established his basic assumption that the sun must be the center of the universe (i.e., solar system) because it emits light.

If mysticism led Kepler to Copernicus, it was the sometimes silly but finally fruitful application of geometry which provided him with both a defense for and explanation of the heliocentric system. He was the first astronomer of any merit to defend this system, but he did so like a displaced Greek, recalling and then

r. Originally proposed by a number of ancients. (Montaigne. p. 429f.)

s. During the 1540's, the Catholic Church was working through the Counter-Reformation and was not yet as invincibly entrenched in dogma as it would be in the early seventeenth century.

t. Although Copernicus never admitted believing in his own system, he certainly did defend it.



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dismissing regular polyhedra and reviving and reveling in Pythagorean "Harmony of the spheres". [132] His abiding conviction throughout all his attendant intellectual travails was that truth (i.e., proof of his beliefs) would take the form of mathematical laws, and his particular truths eventually took the form of laws which delineated planetary motion in terms of ellipses.

Copernicus had also been a misplaced Pythagorean whose battle cry might well have been "Mathematics for the mathematicians",[133] and as a belated victim of Platonic ideals[134] (and in the absence of any data compelling him to do otherwise), he had made orbits circular. In order to compensate for resulting irregularities, he introduced "Loops"–his equivalents of Ptolemy's epicycle–into his system.[135] However, Kepler had Brahe's data which could not be made to fit a circular pattern at regular speeds. Rather, for each planet, they described an ellipse—an irregular pattern he referred to as a "Cartfull of dung" in a fit of disgust at its irrationality[136]–at irregular speeds. *This willingness to abandon a theory which failed to conform to facts distinguished Kepler, the scientist, from earlier philosophers.* Data had never restricted theorizing by the Greek rationalists nor the Scholastics, all of whom were given to analyzing words, thought or analysis itself and quite willing to bend logic and ignore inconvenient facts in order to reach culturally desired correct conclusions. Mathematics did not allow that. ☺

Although partially a prisoner of the past, Kepler was also a pioneer of modern physics in that by reducing Copernicus to mathematics,[137] he replaced celestial intelligence with forces, distances and speeds. This was the first major step in the shift of Western thought from immeasurable qualities (like will, perfection, etc.) to measurable quantities (like mass, velocity, etc.). After him, the solar system, at least, was quantified and found to obey the mathematical laws which he had discovered and described.[138]

The next to step through the door to the world of modern thought was Galileo Galilei (1564-1642). He was, at first, a closet Copernican, having adopted the heliocentric view because it explained the causes of many natural phenomena which were incomprehensible according to the prevailing homocentric theory. In his efforts to reduce the universe to reason, he collected many proofs of the new system but was deterred from publishing them because of the fate of Copernicus, who had been, as Galileo noted in a letter to Kepler in 1596, "Ridiculed and condemned by countless people (for very great is the number of the stupid)". [139]

Perhaps partly because there were, back in those days, so many stupid people, awareness of the Copernican system had not penetrated the public mind nor disturbed theologians. Over fifty years since Copernicus had published and perished, his hypothesis was still regarded as nonsense specifically, non-Aristotelian nonsense. Even in 1597, the year after Galileo wrote Kepler of his belief in the heliocentric system, he publicly professed support of the Ptolemaic system in a series of lectures at Padua. By the next year, he was a convert. He found Kepler's version of the Copernican system[u] even more appealing than the original as it passed well with his ideas of the tides.[140] Hence, in 1604, he went public with an explicit declaration of faith in the heliocentric hypothesis in a lecture at Pisa.[141]

Galileo finally became an out and out champion of the heliocentric hypothesis when his observations through his own 20X eventually stepped up to 30[142]–telescope, not rational thinking nor arguments, provided him with convincing evidence that Copernicus was right. Along with his heretical observation that the moon was not a perfect sphere but had mountains and valleys like the imperfect earth, his most astonishing discover[v] and revelation was that Jupiter had four moons. Although this did not prove the Copernican system, it did provide a miniature model of the solar system. In addition, the phases of Venus, which Galileo observed, lent plausibility to the cause, as they suggested that the planet revolved around the sun.[143]

While Galileo found his observations convincing, the learned world found them troubling. They failed to make as many converts as he expected, but their publication in March, 1610, shook the Ptolemaic view of the cosmos to its foundations and by echoing the Ionian cant that "Things above" could be interpreted in terms of "Things below", he cast doubt on traditional, Aristotelian scientific and religious dogma.[144]

One of the major obstacles Galileo faced in attempting to prove his case was the refusal of adherents of the old order to look through his telescope and view the evidence for themselves, although their position was theologically justified: What he was asking them to view could not, according to Scripture, existso why look at it to see that it did?[145] At best, the viewer would have to admit the Holy Bible was wrong, which was hardly a pleasing prospect to the clergy: "Well, I guess God blew it."

It is noteworthy that in this endeavor he had more difficulty with the professed intellectuals of the day than with the clergy. For example, at Padua, the principal professor of philosophy, Guilio Libri, was repeatedly requested and urged to look through Galileo's telescope but persistently refused to do so. In a letter to Kepler relating this affair, Galileo wrote, "Why are you not here? What shouts of laughter we should have at this glorious folly! And to hear the professor of

u. Astrophysicist Hamlet (ca. 1600) regarded the sun's stability as a given: "Doubt that the sun doth move".(II, 2, 115.)

v. Or"Rediscovery", as they had originally been observed by Chinese astronomer Gan De in 364 B.C. (Menzies, G. 2008. pp. 26 and 250.)



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philosophy at Pisa laboring before the grand duke with logical arguments, as if with magical incantations to charm the new planets (i.e., moons) out of the sky".[146] Thus, the Age of Reason was just beginning when logic, which had so recently been used by critics of the Church to refute dogma, was used by the opponents of learning to refute facts. It seems the great appeal of reason was not that it automatically led to truth but that anyone could use it in support of any cause whatsoever.[147]

In terms of getting opponents to use his telescope, Galileo had more success with Catholic authorities in Rome than he had with professor Libri but still to no effect. In April, 1611, he persuaded some of the them to look through his telescope, and they enjoyed what they saw but would not accept his interpretation of what their observations meant.[148] Ranking just below Socrates' discovery of ignorance, one of Galileo's greatest discoveries was that subjectivity is as intractable a foe of learning as are ignorance and agnosticism, and he never did persuade the Church to accept the obvious.

For all Galileo's brilliance in science, he lacked political acumen. [149] Talk about PC: he went from Florence to Rome in 1616 to find out what views were "Suitable"[150] and would have found his view acceptable had the matter been simply one of astronomy, but the Church considered it in terms of theological politics rather than scientific validity,[151] so he became a belated casualty of the Counter-Reformation. Protestant attacks on the Church had obliged Catholic officials to impress everyone with their commitment to the faith, and they presumed they could do this by preserving the purity of Christian dogma. As a Jesuit noted in 1624, "Faith must take first place among all the other laws of philosophy so that.....the word of God may not be exposed to falsity."[152]

Galileo, on the other hand, spoke for the primacy of the senses[153] and, presumably, reason, even when counter to orthodox authority. Hence, the Church mustered all the proper self-deprecating zeal it could in persecuting him: He had no copy of the charges or evidence against him and had no counsel to defend him.[154] In the finest fundamentalist tradition, the Church forbade him to write and publish a book comparing the Ptolemaic and Copernican doctrines unless his conclusion was consistent with Church doctrine–which was that *man cannot know how the world is made* because to do so would restrict God's omniscience[155]–which really is not strictly true: It would just be a matter of knowing God's methods not of limiting Her or them.

When, in 1632, Galileo published a book of dialogues honoring the Church's mandate but making the defender of Ptolemy a simpleton if not an idiot, it was a best seller which threatened to cause more harm than Luther and Calvin combined. The Church countered by "Discovering" a document which forbade Galileo from teaching or discussing Copernicanism in any way".[156] He was convicted in a show trial and on June 22, 1633 having been threatened with physical torture, was forced to abjure and curse his past errors in supporting Copernicus[157] and abandon publicly the "False opinion" that the earth is not the center of the universe.[158] Specifically, the Church denounced his views as "foolish, absurd, false in theology and heretical".[159] In thus stopping Galileo–who obediently maintained a loud silence–from teaching the Copernican theory by its stupid recourse to authority and force to counter an interpretation of indisputable scientific facts, the Church not only stunted the development of Italian science but damaged itself[160] by becoming the chief anti-intellectual antagonist to learning in Western Civilization.[w] E.g, on Aug. 1, 1632, it warned Jesuit professors not to teach atomic physics[161] so by 1670, atoms were out.[162]

With or without atoms, Galileo's greatest triumph was that of motion. The earth moved; things accelerated. The age-old model of constants no longer sufficed in a world now prepared for dynamic change, evolution and progress.[163]

Although Galileo, the champion of observation and reason, is well remembered for his battles against the stupidity of those who clung to the Aristotelian/Ptolemaic universe, he was not immune to the condition.[x] He had been captivated by Copernicus, so the earth remained the center of motion, if not the cosmos. For Galileo, natural "Inertial" motion was movement that neither rose nor fell: It was always equidistant from the center of the earth and therefore circular. Incredibly, even though he had Kepler's work on elliptical orbits at hand and admired it, he ignored it. Had he but dwelt on the "Dungcart", he might have overcome his love affair with the circle and realized that without gravity, rectilinear motion would carry objects off the face of the earth in straight lines to infinity.[164]

This failure is all the more surprising because he knew that forces act independently upon a body—e.g., that horizontal and vertical forces can be treated as vector quantities which do not modify each other. Despite this knowledge, which implied that an object moving along the earth's surface would take off on a tangent into space, Galileo rejected straight lines presumably because they would disrupt the beautiful order of things, meaning circles.[165] Perhaps he took gravity for granted, but because he ignored Kepler's

w. Never let it be said the Church is intransigent in its idiotic positions: It is just a bit slow to adapt. In 1822, the earth was given papal permission to revolve around the sun, and in Oct. 1992, the Church admitted Galileo had been right all along. Perhaps someday it will, in the cause of improved quality of life, adjust its current retropolicy on birth control.

x. Nor was Einstein, who created a fudge factor to keep an actually expanding universe static–consistent with his belief in it. (Novella. p. 130)



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dungcart, he left the unification of the universe to Sir Isaac Newton (1642-1727).

Newton was a mediocre student who was not well taught,[166] afrustrated alchemist,[167] and lousy teacher[y]–his students stayed away in droves while he lectured to empty rooms.[168] This may reflected his all but isolated, unloving rearing by his grandmother,[169] and he is rumored to have died a virgin. At the same time, as a scientist, he personified the ultimate in reason applied to the presumably flat universe.[170] He demonstrated an apparently divine order in astronomy and physics by analyzing observations of reality rather than reasoning from the Bible or asserting faith in God[171] or Aristotle. He unified the cosmos under mathematical laws and reduced God to the role of Prime Mover–aka, the inventor of the physical universal, gravity.[172] His overwhelming success in both regards was due to the fact that at least nonhuman objects behave reasonably, so the divine yielded itself to earthly research. God no longer reigned in heaven but in the human mind, and his laws could be discovered by deductive reason. Logic replaced faith, ushering in the modern era as old ideas were questioned and new possibilities deftly explored.[173]

Newton's three laws of motion (the first two of which are due to Galileo) showed that Kepler's laws are consistent with the proposition that every planet, at every moment, has anacceleration toward the sun which varies inversely as the square of its distance from the sun. He made Kepler's laws universal and made calculations to prove them.[174] His universal law of gravitation explained everything in planetary motion (except the perturbations of Mercury–which is so small and moves so fast that it is affected by the other planets). The only drawback to his success was that it was so encompassing and total that he became, like Aristotle and Galen, a barrier to further scientific progress. As it was, it took England one hundred years to free itself of his authority and resume creative work in astronomy and physics.[175]

Part of his appeal was that he bridged the ethereal Greek heavens with the reality-corrupted earth[176] by showing that everything behaves like a falling apple.[177] On the other hand, as he thought we would always be ignorant of the inner essence of bodies, he shied away from fundamental explanations of "Whys", which tend to imply not only causes but a perhaps divine purpose.

In his own professional experience, Newton also found that reason was usually misapplied when used as a means to convert opponents[z] to one's point of view.[aa] He learned this lesson the hard way when trying to persuade the scientific community that his theory about sunlight being a combination of colors was correct. For centuries, the axiom had been that light was simple and primary. His critics, including some of the greats in science of this era, found his attempted explanations more confusing than convincing, and they persisted in their dubius belief that the colors he saw were modifications light suffered as it passed through his prism.[178] Their tenacious commitment to cerebral habit left him thoroughly frustrated, and he therefor resolved not to publish anything until he could prove it conclusively, thus delaying the dissemination of some of his contributions for years.

When Newton finally did get his message (Principia) out in 1687, it was so overwhelmingly convincing that it reshaped the philosophical basis of Western Civilization. It drew Descartes's law of inertia, Galileo's ideas on acceleration and Kepler's laws of planetary motion into one, grand mathematical synthesis,[179] and its effects were as profound as its sources were varied. First of all, animism was removed from physics: Movement was no longer taken as a sign of life but eternally inherent in material objects as they interacted with each other so, most profoundly of all, Aristotle's Prime Mover (i.e., God) was unnecessary[180]–although most diplomatically and gratuitously retained Him to start things off. Second, the idea of purpose changed in that it had no place in scientific explanations of the universe: No divine force intervened in the workings of the solar system nor had a place in astronomical calculations. Nor could God be expected to concern Himself greatly over the doings of "An advanced breed of monkeys on a minor planet of a very average star"[181] so at most, human purpose was self-generated. Last, although our place in the Copernican system was humbling, our discovery of its mechanics was construed as a triumph of the human mind and contributed to a growing sense of pride in European culture and faith not so much in God and religion as in scientific analysis and reason.[182] If there was any drawback to all of this, it was the minimizing of non-quan-tifiable but very human emotions, feelings and spiritual values in a barren universe.[183]

Not only did he apply reason with great success to the solar system, but he set a limit on its scientific application and discovered a further limitation on the range of mathematics when his extended study of the Bible proved to be a fruitless effort to quantify Divine

y. Just as, fifty years later, Rousseau was a lousy tutor. (Purnell. p. 33.)

z. A notable exception was Father Ignatius Pardies, who remains one of the few people in history ever to have understood an opponent's argument and therefore changed his mind. Another was Senator Arthur Vandenberg of Michigan–an ardent "America Firster" who, in 1945, converted to internationalism.(Slaughter. p. 160.)

aa. Beyond mere obtuseness, censorship and fear of reprisals were such concerns that some writers wrote at two levels: one for the average reader and one for insiders, who understood the "Meta-meaning". (Toland.1720. p. 95) For those few who eschewed subtlety, the price could be high: Thomas Aiken head was executed in Edinburgh, in 1697, for, among other things, expressly admiring the stupidity of the world for being deluded by the nonsense of the scriptures. (Hunter.)



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Will.[184] Newton's writings in theology exceed his scientific works in bulk but not in brilliance, as he misapplied mathematics to theology. Certainly reason can be applied in theological and philosophical arguments, but neither theology nor metaphysics can be quantified and analyzed mathematically because they cannot be measured. Nevertheless, as an orthodox, fundamentalist mystic, Newton attempted to prove the date of the Second Coming mathematically and tried to determine the ratio between the highest attainable earthly happiness and a believer's reward of bliss in Paradise.[185]

Not surprisingly, in the same way physicists had to overcome preconceptions in order to understand the universe, biologist had to overcome folk a theological taboo against curiosity and extent "Wisdom" about life in order to learn about ourselves. The Church considered curiosity a sin to be resisted.[186] Further, accumulated folklore constituted a barrier to knowledge in general, and this was especially true in anatomy—a matter in which everyone had some first hand knowledge. Before the sixteenth century, professional ignorance in general was stored in learned languages and surrounded by an aura of the occult,[187] and in the field of medicine in particular, it was stored in the works of Claudius Galen (130?-201?), who was deified to the point that his works became obstacles to further learning. This happened to both Aristotle and Newton in the mechanics of motion and happened to Galen: For almost 1400 years, his work stood as a barrier to real knowledge of human anatomy.[188] This occurred despite his warning to readers of his works to be wary of pedantic medicine."If anyone wishes to observe the works of Nature, he should put his trust not in books on anatomy but in his own eyes...", he wrote, and he thought himself an experimental physician who constantly appealed to experience. Unfortunately, the Church thought humans should rise above the body,[189] so the customs of his day forbade the dissection of humans. Ergo, the main source of Galen's experience was not the human body but those of monkeys, pigs[190] and, in one grand case, an elephant.[191]

Not until about 1300 were human bodies dissected for learning and teaching anatomy. Around 1490, Leonardo turned his attention to anatomy,[192] although at that time, the world of medicine was dichotomic: Books were separated from bodies, knowledge from experience and healers from the ill. Actually, this was based on a happy cultural confluence: Professors had a vested interest in protecting traditional lore and accepted dogma while the public had a vested interest in assurance that they did not practice any of it. The situation could hardly improve while those on the inside who knew the trade secrets remained committed to the status quo. The profession could advance only

When a pioneer would willingly defy convention and oppose the canons of his own guild. Such a person would have to be impassioned more for knowledge than popularity and be more daring than prudent. Such a person would have to be a reckless missionary who would shriek rather than speak. Such a person was Paracelsus.[193]

Aureolus Philippus Theophrastus Paracelsus (1493-1541) was a self-taught physician who succeeded in getting appointed to the medical faculty at the University of Basel but failed in his efforts to use that position to become the Luther of medicine. On June 24, 1527, he threw a copy of Galen's works into a student bonfire and announced that his courses would be based on his own experience with patients and taught in the local Schweizerdeutsch dialect. Although the book burning was, in this instance, almost justified, the medical community regarded it as an act of blasphemy and turned on him as a medical heretic.[194]

And well they should, for Paracelsus challenged everything that was academic–especially medicine.[195] Unfortunately, in turning against Paracelsus, the doctors and their hidebound allies were turning against progress in understanding disease. Indeed, as bad and misleading as Galen's work in anatomy was, his impact on physiology was even worse. The prevailing notion of disease at the time was that Galen's imbalance of four "Humors",[196]– black bile, yellow bile, blood and phlegm, all of which have nothing to do with health[197] could presumably be rectified by sweating, purging, bloodletting or induced vomiting. Into the 18th century, illness was attributed to an imbalance of these, and pregnancy was confused with rheumatism, consumption (TB) and pleurisy.[198] Paracelsus championed the radical theory that disease was caused by outside agents. How-ever, it was unfortunate for everyone that he saw these outside agents not as living germs but as minerals and poisons carried in the atmosphere from the stars.[199]

Paracelsus's commitment to medical astrology undoubtedly detracted from his potential impact and distracted attention from his historic contributions to the medial profession. He recognized that the causes of disease lay outside the body and insisted on uniformity of causes and specificity of diseases. Further, he believed there were no incurable diseases—only ignorant physicians[200]—and diplomatically noted uneducated peasants cured more people than all of them with their books and gowns.[201] Irksome by nature, he hurt his cause somewhat when, after announcing he would reveal the greatest secrets of medicine, he produced a bowl of shit.[202]

His own books were not published in his lifetime,[203] and his colleagues (whose pedagogical practices he questioned), the druggists (whose excessive profits and ignorance he denounced) and students (who ridiculed his passion for his cause) all joined forces against him and drove him out of the medical establishment.[204] The profession was not to be reformed by emotional appeals to the ethical principles of practitioners.



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A more effective professional reformer was Andreas Vesalius (1514-1564), who rewrote the books on anatomy. As a professor thereof, he dissected cadavers himself, thus departing from the custom of his day, which was to read to medical students from Galen while a barber-surgeon pulled organs out of the body. Students were told there were three chambers to the heart and that the liver had five lobes, but they were not close enough to the action[bb] to challenge such statements or question the authority of the teachers who were leading them[205] down the pathway of invalidity.

Vesalius introduced the use of drawings as study aids, thus engendering the opposition of professors who felt students should be reading rather than wasting time looking at pictures. For his part, Vesalius thought students could learn more anatomy at the butcher shop than from professors sitting in their high chairs talking about things they had never seen but simply memorized out of faulty books. He came to insist that students see, feel and learn for themselves what the human body really was, and it turned out that he was the greatest student of them all.[206]

At first, in his Six Anatomical Tables, Vesalius unwittingly continued the Galenic tradition of leaping from animal to human anatomy. However, in 1538, while teaching from Galen's text, he realized[cc] that what he was reading was really only a compendium of statements about animal anatomy in general. His greatest revelation was that "Anatomical dissection might be used to check speculation". His greatest work, On the Structure of the Human Body (1543—the same year as Copernicus's book) rectified Galen's most flagrant errors by honoring what he *actually saw*.[207] As he continued to learn from further dissections, he continually revised his own works, thus constantly upgrading his schema according to new discoveries and observations.

Unfortunately, one of his more pedestrian discoveries led him afoul of the Church. He found that, contrary to Genesis 2:22, all humans have the same number of ribs. According to the authoritative Bible, men have one less than women because Eve was created from one of Adam's. Not only may this sound like a rather dubious trade off–a whole rib for just a wife, but it does not happen to be true nor square with simple anatomical observation. This sent the Church atwerking and accusing Vesalius of being a revisionist heretic for twisting infallible scriptures to serve his own end–the truth. He narrowly escaped with his life for stating what anyone could have verified.[208] He was blasted not only for attacking the work of a revered, unerring God but for his irreverence toward the revered, if fallible Galen as well. Fortunately, his disciples carried on his commitment to produce accurate works on human anatomy.[209]

Although Galen's mistakes in anatomy were thus corrected, his errors in physiology remained. His physiological system was a *pneumatology*, built upon the three "Souls" which Plato had said governed the body: The rational brain, the emotional heart and the nutritional liver. The chief virtue of this system was that its vocabulary provided ample opportunity for debate among philosophically minded doctors. At its heart was the heart, and before doctors would discard their "Spirits" and *pneuma*, someone had to find something for it to do.[210] That someone was the king's physician William Harvey (1578-1657), another scientist who successfully coupled fact with reason albeit to the aggravation of the reigning cognoscenti.

Like any great student of life, Harvey sought his own unifying vital phenomenon. For Galen, it had been Plato's *pneuma*; for Harvey, it was the circulation of the blood. His conclusion that the heart pumped the blood in a circular movement throughout the body[211] was based not on biblical, Aristotelean, metaphysical or emotional argumentation but on reasoning from a number of anatomical and physiological observations and facts not all of which were his own.[212] These suggested Galen's notion that blood ebbed and flowed from both the heart and liver with a kind of tidal motion in the vessels was incorrect.[213] Circa 1615, Harvey finally freed himself from this idea by posing a simple quantitative question—i.e., how much blood flows through the heart (in a given time period)? The answer in, De Motu Cordus (1628), was "So much that it could not possibly be synthesized new from ingested food but had to be the same blood continually recycled in a circulatory system".[214]

Harvey correctly anticipated hostility from orthodox Galenists so was not surprised when he was denounced for overturning accepted dogma. He suffered the fate of any genius who, having overcome some fool idea, then was forced to endure violent opposition for having done so.[215] However, it is noteworthy he was criticized not because of his observations but because he reasoned and calculated from measurements. He was accused of sullying his reputation as an anatomist by playing mathematician. His pettifogging, quantitative approach was regarded as an attempt to pursue facts which could not be known by investigating things which were incalculable and inexplicable. Worse yet, he was charged with accusing Nature[dd] of stupidity.[216]

Although Harvey's temper was as sharp as his views were original, he was almost modest in insisting

bb. A scene recreated by T. Lester. 2012. p. 166.

cc. Almost fifty years earlier, Leonardo had realized what was taught as human anatomy was flat-out wrong, although he did not know why. (Lester, T. 2012. pp. 166-167.)

dd. Even I have not done that—JFW! ☺ (But for someone who did, see These. Williams. 1938.)



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what he described was only simple fact. If he was on firm ground scientifically in relying on observations rather than ancient writings as the starting point for reason, and despite the fact that his efforts to quantify medicine seemed as absurd to his colleagues as Newton's misguided efforts to quantify religion seem to us, he was vulnerable on one point: He failed to close the circle. Blood went from the veins to the heart and thence (after a refreshing side trip to the lungs) to the systemic arteries.[217] However, Harvey deduced a link between the arteries and veins would eventually be found,[218] and it was, three years after his death, when microscopist Marcello Malpighi (1628-1694) discovered capillaries.[219]

Malpighi not only squared Harvey's circle but discovered a vast array of anatomical details invisible to the naked eye. With his "Flea glass", he viewed taste buds on the tongue and the infrastructure of the brain and put his name on parts of the skin, spleen and kidney. As he did so, he founded microanatomy and checked the assertions of Aristotle and Galen by "Sensory criteria". Further, by studying insects and other animals (his work on the capillaries had been done on frogs and confirmed in turtles), he converted comparative anatomy from the field of errors it had been for Galen into a source of knowledge for everyone.[220]

Of course, those committed to errors did not give up without a fight, so Malpighi encountered resistance to the use of his microscope similar to that Galileo had encountered to the use of his telescope. In 1689, he found his works condemned and himself formally indicted by the same Church that had condemned Galileo and his works fifty-six years earlier. In this case, Malpighi's works were declared useless and false according to four criteria devised by one of his own open-minded students: 1.) His work was on so small scale as to be useless to physicians—so microscopes were out; 2.) humors were not separated by sieve-like structures—meaning capillaries and lungs did not exist; 3.) comparative anatomy would not help physicians—so it was unnecessary; and 4.) the *only* useful study of anatomy was directed toward learning about pathology—so general anatomical research was not necessary.[221]

Critics who did look through the microscope objected to the distortions of shapes, additions of colors and general counterfeiting of reality. [222] Although some of these criticisms were perhaps justified, they did not mean that all microscopic observations were false but just that care and caution were needed to promote accuracy when using such instruments.

Much of this medieval opposition to interjecting man-made devices between objects to be observed and God-given senses was overcome by Anton van Leeuwenhoek (1632-1723). A successful cloth merchant turned microsleuth, he made a 500X microscope with the power to resolve many disputes. Like Malpighi, he had no research program except to look at everything he could. It was a decided loss to science that, in the worst spirit of alchemy and instrument making, he kept his best microscopes and techniques to himself.[223]

While science was stirring up storms of controversy throughout the seventeenth century,[ee] nationalism was growing by the silent, continuous process of unconscious learning. It was education rather than reason that produced the Merrie Englishman and the Oedipal Russian. In each land, people took themselves and their views seriously as well as for granted and usually passed their ideas on to the next generation[224] along with some minor self-serving embellishments about obeying elders. In the process, God became a constitutional monarch[225] the stand in source for morality trumping both tradition and experience as the basis for obedience among the many.[226]

In the normal day-to-day functioning of society, most people centered their lives around their immediate acquaintances. A basic supposition was that all people were like their neighbors and would think and behave "Rationally", meaning "As expected". With the political establishment accepted as a "Given", very few people wondered much less asked *why* anything happened, and it was only when people became aroused that they would question and challenge their sacred governments and revered secular institutions.[227]

As faith in heaven was replaced by faith in the state, Unity, Hegemony and Glory became nationalism's Holy Trinity and Destiny the new Virgin Mother. With nations more committed to getting ahead than people were to getting to heaven, the "Ambitions of Prussia" and "Designs of France" came to preoccupy the minds of leaders, and monarchies came to dominate Europe in something akin to the not so holy spirit of Christian "Botherhood".[228]

It mattered little to ministers (of state) that the national entities that structured their thoughts in this Age of Confusion were largely fictitious. Russia was (and remains) an incongruous assembly of incompatible Cossacks, Tartars, Ukrainians, Muscovites, etc. France included Burgundy and German Alsace, suppressed the Huguenots and sweated its peasants. England created Great Britain by alienating the Scots, Welsh and Irish Catholics. Sweden,[229] Prussia, Poland and Austria expanded and contracted like gigantic amoebas

ee. As impressive as the advances in science in the 17th century were, the Western intellectual world in 1700 was one of confusion: Alchemy was mixed with chemistry; magic with medicine; astrology with astronomy; mysticism with mathematics. It took the Enlightenment to sort these out. (Grayling. p. 183.) By 1800, the distinctions were clear. More specifically, the language was not there. Leeuwenhoek was the first person to see spermatazoa, but he labeled them animals, because that is what critters viewed under a microscope were called. (Dolnick. P. 117.)



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sprawling across the map of Europe as transcendent power, not reason, imposed itself on the weak and meek.[230]

While civilization at least appeared to be advancing on every other front, on the political scene there was clear regression from the medieval ideal of a universally accepted supernatural law and divinely inspired order. Overall, the basic principle of political rule was absolutism. However, in Germany, the only absolute was chaos. In Holland and England, absolutism was compromised, while in France (and Russia and Italy too), it went to excess. In all cases, reason had less to do with the use than the abuse of power because while logic was essentially useless as a means of persuasion,[231] it tended to carry reasoning people to dangerous extremes.

It really cannot be said that in Germany nothing worked because there was no Germany: There was just chaos–some 2,000 dukedoms and duchies in 1650 (which consolidated through purchase and kinship to about 300 in 1800) peopled by Bavarians, Hanoverians, Saxons, Hessians, etc. who became Germans only when they traveled abroad.[232] The root cause of this condition was the failure of unification through Christianity, but the Protestant revolt had made that impossible. The various German states still might have unified behind a German king had there been one, but there was none. Charles V became Spanish in spirit, and the Austrian Hapsburgs were Catholics and often oriented toward Hungary and Turkey, thus having little in common with northern Germans, who were Protestant and oriented toward the Baltic and the west. The resultant Thirty Years' War between the Protestant nobles and Catholic Crown was a civil war which everyone lost,[233] with the prevailing form of government shifting from one of roving bandits during the war to one of stationary thieves in its aftermath.[234]

The first modern break in the absolutist tradition of domination by a personal prince who controlled both religion and politics occurred in Holland,[ff] where the Dutch successfully resisted their Spanish King, Philip II (1556-1598), when he sought support for his war against France. William the Silent, Prince of Orange, led the resistance, and Philip countered by dispatching 10,000 Spanish troops under the Duke of Alva—one of those ruthless "Strongmen" whose witless use of power wrecks everything. If all one's sympathy were not used up on his victims, one could almost feel sorry for him, as all his mur-dering of nobles, sacking and massacring was not only in vain but counter-productive. By 1567, the sensual carnage of his ironheaded rule had induced open revolt.[235]

As a paragon of Hispanic virtue, Alva was fanatical in his detestation of Protestant heresy and capable of great cruelty based on xenophobic bigotry. He was suspicious of Dutch nobility and viewed the general population with contempt.[236] Providing a perfect example of Newton's Third Law of History–that every action begets an equal but opposite reaction, popular revolts erupted in 1579 throughout the Netherlands. Alva's response was brutal retaliation "Justified" by a kangaroo court, the Council of Troubles, and characterized by devastating massacres which stretched on for four years.

Ironically, it was at this time (1579) that the Dutch discovered the advantages of tolerance and enshrined the principle of religious freedom–later espoused by Locke–in the Republic's founding charter, the Union of Utrecht, which mandated that "Each person shall remain free in his religion, and...no one shall be investigated or persecuted because of his religion." Thus, as Alva's fanaticism ended, Holland became a refuge for industrious immigrants from all over and sprang on their upwardly mobile backs to become the richest nation in the world.[237]

Throughout the struggle and with William as their *de facto* king, the rebels maintained the myth that Philip was their *de jure* king, if only he would be a reasonable, limited king. However, the idea of being a reasonable and limited monarch was generally unacceptable to the royalty of the day as it would spoil both the fun and idea of being royal, so Philip tactlessly proceeded to drive Holland (i.e., the United Provinces) to their republican independence effective as of 1609.[238]

In the emerging modern world, Philip personified the power of belief in oneself as a major source of stupidity. No failure of his regal policy like that in Holland could shake his faith in its essential excellence.[239] He firmly believed that, as king, he could do no wrong, since he was convinced that all his labors were for the service of God.[240] His selection of the Duke of Medina-Sidonia as Admiral of the Armada was done against the Duke's protestations of his own ill-health, inexperience and lack of qualifications.[241] Philip disregarded these protests and, in 1588, the fleet suffered the disaster he courted. For his role in the debacle, the Duke was promoted to rank of Supreme Commander in Politics and War by his headstrong king.

While the English triumphed over the Spanish Armada, absolute idiocy continued its successful reign in England, where the throne had never been more powerful than it was at the start of the seventeenth century. Achieving cultural heights known to but a few since the days of Greece,[242] Elizabethans were limited only by their imagination. Trying to outdo Shakespeare, Hamlet spoke for the age when lauding man as "....noble in reason".[243] A new world all but begged for regal imperialism,[244] but, in their long-standing battle against private property at home, the reason-able English kings had to contend with Parliament and could not accept the fact that England had become a legal rather than a regal state. Hence, when James I

ff. The special case of Iceland 's Althinig excepted.



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ascended to the throne in 1603, he saw himself as a king with a divine right to do as he pleased because, as he wrote, "The king was above the law".[245] During his reign, the confrontation between the Crown and Parliament was conducted reasonably by everyone but to no avail as nothing basic was settled[246] by parties who persistently reasoned past each other.

His son and successor, Charles I (1625-1649), was not only probably the meanest and most treacherous but also the stupidest of all English monarchs[247]–which is really saying something.☺ He did not know his subjects (although he had lived in England since the age of four), was generally narrow-minded and clung obstinately to any course of action once embarked upon it. On the issue of kingship, his ideas were more exalted than those of his father,[248] and he acted upon them.[249] In this and practically every way, he was unprepared to cope with the situations which confronted him. If he was prepared to do anything, it was to take such situations and make them worse.

He proceeded to do so when he had to go to Parliament for funds to conduct a war against France and Spain. It refused support so he dismissed it in 1629 and raised some money illegally. Later, when war in Scotland broke out, Charles once again had to call a Parliament, but by this time (1640), the principle of accountability in government had developed in legislative guise[250] that no amount of reason could save England from itself (i.e., civil war).[251] Once the fighting started, both sides were hampered by moderates who subscribed to the "Virgin strategy" of warfare —they did not want to go too far. However, when Oliver Crom-well proved to be a consummate general, the king became a pri-soner of the parliamentary forces.[252]

At this point, Charles might still have remained a compromised monarch, but he could not perceive himself as sort of king. Doomed by his character, he could neither see that his own excesses had caused the conflict nor control much less stop his incessant scheming. He continued his policy of driving to extremes people who wanted to be secure in their rights under a modern (i.e., reasonable) ruler who himself accepted and lived by English rules.[253]

The problem once the king had been subdued was that there no longer were any rules. However, the pursuit of liberty and triumph of anarchy led to political slavery. The puritanical hypocrites who imposed their rigid rule upon the land considered themselves to be the elect rather than the elected—chosen by God rather than the people, predisposing us to forgive God. As agents of God's will, they peppered their iniquities with fervent prayers, somehow refrained from blushing in their piety and tried to disguise, in the Lord's name, the violent cruelty they visited on their countrymen.[254]

Not only was the king beheaded, but vengeance was visited upon a number of peers, many of whom were imprisoned and some of whom were executed. Soldiers who mutinied in the causes of popular sovereignty or manhood suffrage were hunted down and dispatched without mercy. Would-be cultivators of the common lands were chased away, and echoing Calvin in the cause of virtue, sports were banned on Sundays. It was a crime on any day to dance around a maypole or to swear, and a child under twelve caught swearing could be whipped. Fornicators were imprisoned, and adultery was a capital offense.[255] In a fit of righteousness, Cromwell led an inglorious crusade against Catholic Ireland which has left a legacy of bitterness and hatred down to the present day. [256]

By the time Cromwell died in 1658, England had suffered all the righteousness it could endure and wanted to be merrie again, so, after dancing in the streets to celebrate King Oliver Killjoy's passing,[257] Englishmen welcomed back Charles II, son of the "Martyr". He cannily sold English foreign policy to Louis XIV for a pension of £100,000. However, when his brother James II ascended to the throne in 1685, the issue between Parliament and Crown flared again[gg] because once again the king was too stupid to recognize the limitations of the English monarchy. In 1688, the nobles staged a proper, dignified and terribly English revolution and RSVPed another king—William of Orange —to replace the tyrannical, Catholic James,[258] who had enough sense to flee to France, where absolutism reigned extreme. [259]

In fact, Louis XIV (1643-1715) carried the dogma of the divine right of kings to absolute excess.[260] Although somewhat restricted by tradition and a commitment to consistency, he ruled arbitrarily by a word or a smile[261] and recklessly by frittering away the tax money wrung from his oppressed subjects on his lavish court and exhaustive wars–deemed to be means to regal glory.[262] These expenditures created an insurmountable public debt which his descendants would parlay into the French Revolution.[263] This reaction against absolutism was all the more devastating when it came because it had been pent up by the fatal alignment of the nobles and clergy with the crown.

Louis's legacy of bitter poverty to the people of France was a consequence of his indulgence in splendor and his pursuit of the image of the Holy Roman Empire. In the sunlight, he lavished the money on his supporters everywhere while in the shadows, hatred was building and waiting.[264] In the cause of national unity, he opposed the spirit of independence, and throughout the 1660's and into the 1680's, intolerance became persecution as he made legal war on French Protestants.[265] This drove many diligent Huguenots

gg. Democratic ideas that the Levellers proposed–rule by consent, extended suffrage, equality before the law and religious tolerance–were 200 years ahead of themselves but lay like buried seeds waiting to sprout when conditions were right for cultivation. (J. Bartlett. p. 310.)



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abroad, to the economic detriment of the mother country and benefit of her competitors and opponents.[266]

To his credit, in his commitment to gaudy unity, Louis did not neglect the intellectuals as he did the common man. However, this was at best a mixed blessing in that while the arts and sciences were patronized, most cultural life was centered around the court, so French writers were self-consciously obliged to kiss the hand that fed them. Thus, there was no French Bunyan nor dissenting spirit to liberate a French Milton. Intellectual life was correct and limited under the eye of the clerical schoolmaster and the scholarly critic. The French Academy (incorporated in 1635) remained the bastion of cultural orthodoxy, and if anything went to excess, it was intellectual restraint, as substance was subordinated to style.[267]

The court thus became the major, artificial, tragic drama of the age as Louis–a better evaluator of information than a judge of character[268]–and his chosen supporting characters played out their superficial roles as misplaced Romans writ small suffering from the education and cultural mentality of an exclusive caste totally out of touch with the heart and soul of the people.[269] The irony of France's greatest ruler was that he concentrated on being a great ruler and forgot his subjects. He was justified in believing (although he did not say), "*L'état, c'est moi*",[270] but if it was not, he nevertheless referred to himself as if it were.[271]

The philosophical antidote to such political absolutism was not reason—for even despots can be reasonable—but liberalism. Born in the limited monarchies of Holland and England, liberalism began with religious toleration and became the philosophy of parliamentary democracy and laissez faire capitalism. Its vocabulary was that of resistence to arbitrary authority and its appeal to the individual's right to make up his own mind. It opposed everything medieval, especially theories used to sanction the powers of the Church and Crown. It encouraged permissiveness, discouraged fanaticism and regarded religious wars as silly. At the expense of the monarchy and aristocracy, it favored commerce, industry and the rising middle class. It respected the rights of property and directed energy toward business as well as science. With prosperity increasing, optimism was the order of the new day, and narrow-minded bigotry was gradually replaced by open-minded individualism.[272]

The seventeenth century was characterized more by faith in reason rather than by reason itself. Although organized religions declined in influence during this era, stupidity remained by shifting to a secular base. This was aptly expressed by Locke, who flouted his commitment to common sense and dismissed Hobbes by he idealizing, "Men living together according to reason...is properly the state of nature." This was his description not of life among savages but his conjured Eden of Rousseauian virtuous "Anarchrists" who needed neither police nor courts of law because reason was presumably superegoish natural law.[273]

The age was likewise less an age of reason than of restraint. It produced no great martyr willing to burn for his conscience, and although Galileo came close, he had enough sense to swallow his pride and lie about being wrong. As the witch hunters burned themselves out, humanity embarked on no great efforts to improve itself or the future. Stability was assumed by everyone even while the Thirty Years' War raged in Germany and England suffered the throes of a civil war and political revolution. Despite such disruptions, kings were still monarchial, nobles privileged, merchants suspect, bankers despised and the poor oppressed. In a word, everything remained "Natural" if not reasonable.

While reason remained mostly a theoretical ideal, it was primarily science—the application of logical analysis to facts— which transformed the outlook of the educated people of this era into something like the modern mentality. Although the rise in knowledge seemed to be accompanied by a decline in morality to the point that, in 1697, Leibnitz hoped the stoic Chinese might send some missionaries to Europe to save the West,[274] most thoughtful people at that time still looked to science as the means to salvation. Liberalism was nice and democratic, but because it made everyone's answer equally good, it settled nothing. Science alone seemed to hold the hope of bringing certainty back into Western life. If the methodology of the natural sciences (i.e., reason) could but be applied to society, understanding would come, corruption end and perfection begin as logical people would then behave properly and despots benignly.

## Notes

1. Harari, Y. Sapiens. Harper; New York. 2015. p. 216.
2. Mackay, C. Extraordinary Popular Delusions and the Madness of Crowds. 1852. [Republished by Harmony Books; New York. 1980. pp. 479-480.] One of the few other issues on which Protestants and Catholics agreed was that the Anabaptists had to go. (Cahill. 2013. p. 265.) Lost on nearly everyone was Shakespeare's insight that the one who lit the fire was the heretic. (The Winter's Tale. 1611. II, 3, 115.) Equally lost was the subtlety that the Hebrew word "Chasapah"–translated as "Witch"–also means "Poisoner".☹ (Rooney. p. 179.)
3. Demos, J. The Enemy Within. Viking; New York. 2008. Chap. 1.
4. Watson, B. Salem's dark hour: Did the Devil make them do it? Smithsonian; 23, #1, 119. Apr. 1992. Floyd. pp. 115-117.
5. Blanning, T. The Pursuit of Glory. Penguin; New York. 2007. p. 464.



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6. Mackay. op. cit. p. 540.
7. Keysler, J. 1729<. Cited on page 466 of Blanning.
8. Roberts, J. The New History of the World. Oxford University Press; New York. 2003. p. 674.
9. Mackay. op. cit. pp. 552-555. The last witchecution in Europe was in Ireland in 1895. (Blanning. p. 465.) Sad to say,on Aug. 8, 2015, five women accused of witchcraft were beaten to death by mobs in India. (AOL. AP.)
10. Sagan, C. The Demon-Haunted World: Science as a Candle in the Dark. Ballantine Books; New York. 1996. p. 413. Sagan is a bit given to hype here. A biblical injunction against witches is found in Exodus 22:18. In a more general sense, this is the Christian version of Islam's Mu'tazilism, which rationalizes the use of force in the cause of righteousness (Bauer. 2010. pp. 450-451.)–boding ill for heretics.
11. Blackstone, W. Commentaries on the Laws of England. 1: 59-60.
12. Frank, A. Ca. 1944. A quotation on page 773 of P. McWilliams's Ain't Nobody's Business If You Do. Prelude Press; Los Angeles, CA. 1993. The ill-fated Ms. Frank noted that no one need wait to begin improving the world, but it is too bad for her that Hitler did not wait a little longer to do so.
13. Brinton, C. The Shaping of the Modern Mind. Mentor; New York. 1953. p. 110.
14. Hales, J. Quoted in English Political Thought, 1603 to 1660 by J. Allen. London. 1938. p. 237.
15. Brinton. op. cit. p. 99.
16. Russell, B. A History of Western Philosophy. Simon and Schuster; New York. 1945. pp. 557-560. Descartes actually agreed with the Church, which objected to his method of agree ment rather than his findings. The Church saw itself as right because it said so and did not like a rationalist coming along proving it was right by logic. In this regard, the Church was carrying on its venerable anti-logic tradition begun in the 6th century when it found itself ill at ease with newly translated Aristotle, who offered a way without God to truth. (Bauer. 2013. p. 6.) However, by the mid-18th century, French censors sometimes condemned books not only for heresies but for weak logic, especially if it undermined otherwise acceptable conclusions. (Darnton. p. 51.) Btw, re the pineal gland, ancient Chinese called it the Celestial Eye, and Hindus regard it as the window of Brahma, whatever that means. (Rooney. pp 76-77) The facts that it is buried deep in the center of the brain and had no known function probably had something to do with various cultures attributing special properties to it. It is now known to respond to light levels (Burnett. p. 19.) and secrete hormones which regulate sleep patterns and daily and seasonal cycles. (Wikipedea.)
17. Russell. op. cit. p. 563.
18. Fischer, K. Descartes and His School. Unwin; London. 1887. p. 231.
19. Bartels, L. Unequal Democracy. Princeton University Press; Princeton, NJ. 2016. p. 124.
20. Blanning. op. cit. p. 457.
21. Brinton. op. cit. p. 97.
22. Roberts. op. cit. p. 687. The original "Naturist" was Greek poet Pindar–ca. 500 B.C. (McMahon. p. 16.) Descartes anticipated Kant.
23. Erickson, S. Philosophy as a Guide to Living. The Teaching Company; Chantilly, V A. 2006. Part 2; p. 33
24. Francis, G. Adventures in Being Human. Basic Books; New York. 2015. p. 85.
25. Russell. op. cit. pp. 565-567.
26. Ibid. p. 568.Descartes provided the first model of stupidity by alleging the pineal gland was an accidental crossover point for the dual corporal and metaphysical worlds producing perturpationes animi, leading to abuses of freedom attributed to the body rather than to God. (Windelband. pp. 413-414.)
27. McMahon. op. cit. p. 68.
28. Boorstin, D. 1998. The Seekers. Vintage; New York. p. 167. The Catholic Church had a problem with philosophy, the occult and science. Generally, these were protestant movements, with Catholic contributors reluctantly making compromises with their consciences. (Grayling. pp. 184-185.)
29. Hodgkinson, T and H. v. d. Bergh. How to Sound Cul-tured. 2015. Publishers Group West; Berkeley, CA. p. 131.
30. Russell. op. cit. pp. 585-588.
31. Ibid. p. 589. Leaving Voltaire to ponder, "If this is the best of possible worlds, what then are the others?" (Candide. Chap. 6. 1759.)
32. Leibniz, G. Undated quotation on page 229 of Blanning. op. cit.
33. Russell. op. cit. p. 595.
34. Ibid. pp. 591-593.
35. Walzer, M. Just and Unjust Wars. Basic Books; New York. 1977. p. 4.
36. Mortimer, I. Millennium. Pegasus; NY. 2016. p. 181.
37. Hecht, J. Doubt: A History. HarperOne; New York. 2003. p. 322.
38. Mansfield, H. Machiavelli's Virtue. University of Chicago Press; Chicago, IL. 1996. pp. 281-294.




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39. Lacey, R. Great Tales from English History. Back Bay Books; New York. 2007. p. 271.
40. Hobbes, T. Leviathan. Chap. 26. 1651.
41. Ibid. Chap. 44. pp. 33-34.
42. Ferguson, N. 2011. Civilization: The West and the Rest. Penguin. New York. p. 73.
43. Butler-Bowdon, T. 50 Politics Classics. Nicholas Brealey; Boston, MA. 2105. p. 198.
44. Ferguson. op. cit. p. 109.
45. Burns, J. Fire and Light. St. Martin's Press; New York. 2013. p. 12.
46. Russell. op. cit. p. 546.
47. Hobbes. op. cit. Chap. IV.
48. Middlekauff, R. The Glorious Cause. Oxford; New York. p. 15.
49. Russell. op. cit. p. 548.
50. Shaftesbury, A. Soliloquy, or Advice to an Author. In Characteristics of Men, Manners, Opinions, Times. (Ed.) L. Klein. Cambridge University Press; Cambridge, England. 1999. pp. 154-155n. Some of the stuff was pretty incredible. (See Chapter 2 of Morison. 1971.)
51. Russell. op. cit. 607. For Locke, truth meant a Protestant Parliament. (Simms. p. 70.)
52. Ebenstein, W. Modern Political Thought. Rinehart & Co.; New York. 1954. p. 5.
53. Boorstin. op. cit. p. 180.
54. Locke, J. Essay Concerning Human Understanding. 1690. Book IV, Chap. XVI, Sec. 4. Long sentences were in vogue at the time. (See Army Council. Agreement. Nov. 1647.)
55. Windelband, W. A History of Philosophy. [MacMillan. 1901.] Paper Tiger; Creskill, NJ. 2001. p. 452.
56. Brinton. op. cit. pp. 114-115.
57. Ibid. p. 113.
58. Wood, G. The Idea of America. Penguin; New York. 2011. p. 276.
59. Windelband. op. cit. p. 451.
60. Wood. op. cit. p. 277.
61. Locke, J. Undated. Quoted on p. 75 of Pocock, J. ed. Three British Revolutions: 1641, 1688, 1776. Princeton University Press; Princeton, NJ. 1980.
62. Locke, J. Quoted on p. 130 of John Locke: Resistance, Religion and Responsibility edited by J. Marshall. Cambridge University Press; Cambridge, England. 1994.
63. ssell. op. cit. p. 606.
64. Ibid.
65. Watson, P. The German Genius. HarperCollins; New York. 2010. p. 68.
66. Burns. op. cit. p. 35.
67. Cahill, T. Mysteries of the Middle Ages. Anchor Books; Random House, New York. 2006. p. 198n.
68. Russell. op. cit. pp. 611 612.
69. Rooney, A. The 15-Minute Philosopher. Arcturus; London. 2014. p. 23.
70. Mansfield, H. May 2, 2007. The Wall Street Journal (online version). The case for a strong executive.
71. Athan. G. and J. Cox. The Boss: J. Edgar Hoover and the Great American Inquisition. Temple University Press; Philadelphia, PA. 1988. pp. 169-171.
72. Locke, J. 1690. Second Treatise on Government. Self-published. (Bobbs-Merrill; Indianapolis, IN. 1952.) Chap. XIV: paragraphs 159 and 160. During WWII, Sept. 7, 1942, FDR claimed an invented right of executive nullification of the Constitution. Upon victory, the usurped powers would and presumably did revert to the people, (Leuchtenburg. p. 219.) as did powers assumed by Lincoln during the Civil War. A few years after the Watergate scandal, expresident Nixon asserted that whatever the president does is, by definition, legal. (The New York Times. 5/20/77.)
73. Syrus, P. Maxim 244. Ca 50 B. C.
74. Katznelson, I. Fear Itself. Liveright; New York. 2013. p. 109.
75. Leuchtenburg, W. The American President. Oxford University Press; New York. 2015. p. 184.
76. kousen, C. 5000 Year Leap. 1981. National Center for Constitutional Studies; Malta, ID. pp. 95-96.
77. Mortimer. op. cit. p. 182.
78. Locke, J. Two Treatises on Government. 1689. (Originally published anonymously.) Awnsham Churchill; London. The work had essentially no impact for about 80 years, when it was picked up by Voltaire, Rousseau, Jefferson and Madison. (Butler-Bowdon. p. 169.)
79. Burns. op. cit. p. 12.
80. Moulton, G. The Journals of the Lewis & Clark Expe-dition. University of Nebraska Press; Lincoln, NB. 1983-2001. 5, 119-120.
81. Ferguson. op. cit. p. 108. An image which morphed to one of savage brutes when he beheld some successful hunters tear into a freshly killed deer and eat the kidneys, spleen and liver raw on the spot while blood trickled down from the corners of their mouths. (Moultron. 5, pp. 95 and 103.)
82. Kerrison, C. Jefferson's Daughters. Ballantine; New York. 2018. p. 121. Ditto Thomas Jefferson. p. 122.
83. Butler-Bowdon, op. cit. p. 171.
84. Grayling, A. The Age of Genius. Bloomsbury; New York. 2016. p. 240.
85. Locke, J. A Letter Concerning Toleration. 1689.
86. Skousen. op. cit. p. 111.




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87. Walbert, D. 2008. A little kingdom in Carolina.
88. Locke, J. Mar. 1669. The Fundamental Constitutions of Carolina. In 1658, Virginia forced all lawyers to leave the colony, only stupidly rescinding the law in 1680. (Foster. 79.)
89. Isaacson, W. Benjamin Franklin. Simon & Schuster; New York. 2003. p. 59.
90. Brinton. op. cit. p. 89. He is also a serious contender to have written Shakespeare, (Brands. 2010. p. 494.) although it is more likely Shakespeare wrote Bacon. (Windelband. p. 380fn.)
91. Burns. op. cit. p. 13.
92. Bacon, F. Novum Organum. 1620.
93. Bacon, F. Preface to Instauratio Magna (The Great Renewal). 1620. Quoted on p. 173 of Durant, W & A. 1961.
94. Morris, I. Why the West Rules–For Now. Farrer, Straus and Giroux; New York. 2010. p. 469.
95. Burns. op. cit.
96. Bacon, F. op. cit. Unfortunately, fictional Sherlock Holmes misused the term "Deduction" in his cases. He should have said, "Induction, my dear Watson" when moving from observation to hypothesis.
97. Bacon, F. Great Instauration, 'Plan'. 1620. On the other hand, in real life, he had a successful political career under Elizabeth and James I serving as Lord High Chancellor until he was convicted of venality–i.e., corruptability. (Windelband. p. 380fn.)
98. Burns. op. cit.
99. Russell. op. cit. pp. 542-544. Mill, J. System of Logic. 1843. Bacon's commitment to practicality blinded him to mathematics as the ultimate language of science. (Windelband. 387)
100. Boorstin. op. cit. p. 161.
101. Genesis 1: 28-29. (Subdue the earth; rule over the ani-mals; own the plants.)
102. Locke, J. Second Treaties on Civil Government. Chap-ter V. Section 40. 1690. (Providing an anti-green philosphical rationale for exploitation.)
103. Strauss, L. Natural Right and History. University of Chicago; Chicago, IL. 1950. Quotation by Locke. p. 315. In this sense, he anticipated Schopenhauer.
104. Russell. op. cit. p. 545.
105. Durant, W. The Story of Philosophy. Simon and Schuster; New York. 1926/1961. pp. 100-102.
106. Boorstin, D. The Discoverers. Vintage; New York. 1983. p. 294.
107. Muller, H. J. The Uses of the Past. Mentor; New York. 1952. p. 295.
108. Boorstin. op. cit. p. 294.
109. Brinton. op. cit. pp. 86-87.
110. Bacon, F. Undated. In The Advancement of Learning and the New Atlantis. (Oxford University Press; New York. 1956. pp. 84-85.)
111. Brinton. op. cit. p. 87. Nevertheless, scientists were regarded with suspicion in this age of celestial miracles. (Manchester, W. A World Lit by Fire. Back Bay Books; Boston, MA. 1992. p. 291.)
112. Bacon, F. Advancement of Learning. 1605.
113. Grayling. op cit. p. 189. In this regard, physicians can be forgiven for abiding by the original Hippocratic Oath, which was directed primarily toward the retention of trade secrets within the guild. (There is now a modern version of the oath.)
114. Boorstin. op. cit. p. 295.
115. Russell. op. cit. p. 526.
116. Axelrod, A. Profiles in Audacity. Sterling; New York. 2006. p. 70.
117. Hecht. op. cit. p. 277.
118. Ibid. p. 145. For a thorough account of the whole Copenican/Church episode, see Grayling, pp. 242-253.
119. Swerdlow, N. The Derivation and First Draft of Copernicus's Planetary Theory". Proceedings of the American Philosophical Society; 117, #6. Dec. 31, 1973.
120. Luther, M. Table Talk (i.e., Tischrede. A collection of Luther's lectures/papers.) ca. 1530. # 69. In Fosdick, H. Great Voices of the Reformation. Modern Library; New York. 1952. p. xviii.
121. Grayling. op. cit. p. 239.
122. Ergang, R. Europe from the Renaissance to Waterloo. Heath; Boston, MA. 1954. p. 361. See also Psalm 104:5 and Joshua re the sun and moon standing still for a dayalthough if the sun stood still for a day, how would anyone know it? ☺
123. Menzies, G. 1434. HarperCollins; NY. 2008. p. 146.
124. Russell. op. cit. p. 527.
125. Durant, W. The Reformation. Simon and Schuster; New York. 1957. p. 861.
126. Russell. op. cit. p. 527. (Russell refers to Galileo's law of inertia but meant Newton's.)
127. Ibid. p. 528.
128. Ritter, M. Scientists Solve 16th Century Sky Mystery. Science News. New York. 1:05 PM, Dec. 4, 2008. AP. AOL. For some reason, eleven reports of comets in the Anglo Saxon Chronicle between 679 and 1114 (Collins, P. p. 338.) made no impact on prevailing astronomical theory.
129. Russell. op. cit. p. 529.
130. Regiomontanus. Folio 47 v. Ca. 1470. "Because the Sun is the source of heat and light, it must be at the centre of the planets, like the King in his Kingdom, like the heart in the body." One must




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wonder if Kepler got the idea from him. (Perhaps this is the origin of Louis XIII's appellation the "Sun King".)
131. Santillana, G. de. The Age of Adventure. Mentor; New York. 1956. p. 210.
132. Ibid. p. 205.
133. Boorstin. op. cit. p. 319.
134. Stark, R. How the West Won. ISI; Wilmington, DE. p. 37.
135. Ibid. p. 178.
136. Gillispie, C. The Edge of Objectivity. Princeton University Press; Princeton, NJ. 1960. p. 37. The difference between a circle and a planetary ellise can be minimal. In the case of earth, if you have a drawing with the sun at the (epi)center and earth's orbit approximately 4 inches in diameter, the variance for an ellipse fits within the thickness of the drawn orbital line. (E. Rogers. Lecture on Kepler. Fall, 1960.)
137. Bronowski, J. The Ascent of Man. Little, Brown & Co.; Boston, MA. 1973. p. 221.
138. Boorstin. op. cit. p. 311.
139. Kesten, H. Copernicus and His World. Ray; New York. 1945. p. 348.
140. Boorstin. op. cit. p. 319. In fact, Galileo was off in attributing tidal motion to the earth's relation to the sun rather than the moon. (Axelrod. op. cit. p. 71.)
141. Durant, W. and Durant, A. The Age of Reason Begins. Simon and Schuster; New York. 1961. p. 603.
142. Bronowski. op. cit. p. 204.
143. Boorstin. op. cit. pp. 320-321.
144. Ibid. p. 319. And Bronowski. op. cit. 212.
145. Grayling. op. cit. p. 76.
146. Rogers, E. Physics for the Inquiring Mind. Princeton University Press; Princeton, NJ. 1960. p. 281.
147. Montaigne, M. Ca. 1576. The Complete Essays of Montaigne. (Translated by D. Frame. Stanford University Press; Stanford, CA. 1958. pp. 320-321.) Mills, C. Wright. Culture and Politics in the Fourth Epoch. The Listener. Mar. 12, 1959. His point was that, in the 20th century, an excess of raw reason led to the Holocaust as well as the development of atomic weapons. That is, we became inhumanely reasonable.
148. Boorstin. op. cit. p. 321.
149. Bronowski. op. cit. p. 205.
150. Inquisitor [Vatican]. Apr. 12, 1633. Bronowski. p. 213.
151. Bronowski. op. cit. p. 198.
152. Redondi, P. Galileo Heretic. (Italian. 1983.) Translated by R. Rosenthal. Princeton University Press; Princeton, NJ. 1987. p. 132.
153. Greenblatt, S. The Swerve. Norton; New York. p. 254.
154. Bronowski. op. cit. p. 211.
155. Menzies. op. cit. p. 249.
156. Ibid.
157. Ibid. p. 250.
158. Boorstin. op. cit. pp. 323-325. Not only Galileo's conclusions, most of which the Church agreed with–although it had not yet worked out ways to square them with scripture, but his publishing them in vernacular Italian rather than lofty Latin undercut and thus really upset the religious establishment. (Firestein. p. 170.)
159. Inquisition of Galileo. (Quoted on pages 76 and 250 of
160. Grayling. See also: Sobel, D. A More Perfect Heaven. New York. 2011. Chap. 7; pp. 1-4.)
161. Russell. op. cit. p. 534. In the 19th century, Thomas Huxley denounced the Church as "The one great spiritual organization which is able to resist, and must resist, the progress of science and modern civilization". (Manchester. op. cit. p. 117.) I think Islam and maybe all theologies qualify as well. JFW.
162. Davidson, N. "Unbelief and Atheism in Italy, 1500-1700" in Atheism from the Reformation to the Enlightenment edited by M. Hunter and D. Wooton. Clarendon; Oxford, England. 1992. p. 61.
163. Ibid. pp. 83-84.
164. Russell, B. Philosophy and Politics. Cambridge University Press; London. 1947.
165. Gillispie. op. cit. p. 51.
166. Santillana. op. cit. p. 227.
167. Bronowski. op. cit. p. 222.
168. Grayling. op. cit. p. 143. It is striking to note that as brilliant as Newton was, he could not distinguish between genuine and spurious knowledge. Further, he was convinced the Bible was written in a code which he failed to crack.
169. Lacey. op. cit. pp. 291-292.
170. Bronowski. op. cit. p. 222.
171. Ibid. p. 240. In the 21st century, the man in the street still lives in a Newtonian universe. (Dr. Mark Young. Undated.)
172. Brinton. op. cit. p. 95.
173. Bronowski. op. cit. p. 222.
174. Lacey. op. cit. p. 292.
175. Boorstin. op. cit. p. 405.
176. Russell. 1945. op. cit. p. 535.
177. Blanning. op. cit. p. 470. Consistent with this, understanding is common sensicle: i. e., as A. Einstein (1936) ironically opined, science is refined, everyday thinking.
178. Gillispie. op. cit. p. 121.
179. 179. Ibid. pp. 124-125.
180. 180. Hecht. op. cit. p. 326.
181. 181. Ibid. p. 336.



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182. Hawking, S. Quoted on p. 12 of USMagazine.Com. Dec. 8, 2014.
183. Russell. op. cit. pp. 537-538.
184. Whitehead, A. Science and the Modern World. Free Press; New York. 1967.
185. Boorstin. op. cit. p. 407.
186. Clark, G. The Seventeenth Century. Oxford University Press; Oxford. 1929. p. 249. Failed predictions of the second coming include those in the fourth century, 1000, the Crusades, 17th century, prerevolutionary New England, the Civil War, WWI and 2000. (K. Phillips. 2006. p. 125.)
187. Dolnick, E. The Seeds of Life. Basic Books; New York 2017. p. 40.
188. Boorstin. op. cit. p. 338.
189. Saladin, K. Anatomy & Physiology. 6th Ed. McGraw-Hill; New York. 2012. p. 4.
190. Dolnick. op. cit. p. 40.
191. Boorstin. op. cit. pp. 344-348. Throw in some gladiators, although the great anatomist remained unconvinced that athletes had brains. (Claxton. p. 17.)
192. Dolnick. op. cit. p. 38. Something of a carnival barker showman, Galen often performed dissections in public in front of swarms of gawkers.
193. Ibid. p. 42.
194. Boorstin. op. cit. pp. 338-339.
195. . Ibid. pp. 339-340.
196. Bronowski. op. cit. p. 141.
197. Cantor, N. In the Wake of the Plague. Harper; New York. 2001. p. 119. Francis. op. cit. p. 2.
198. Johnson, Steven. Wonderland. Riverhead Books; New York. 2016. p. 134.
199. Kerrison. op. cit. p. 322.
200. Boorstin. op. cit. p. 342. As farfetched as it seems, this idea has been echoed in Diseases From Space (1979) and Our Place in the Cosmos (1993), both by Fred Hoyle and Chanadra Wickramasinghe.
201. Boorstin. op. cit. p. 342.
202. Ibid. p. 344.
203. Ball, P. The Devil's Doctor. London. 2006.
204. Boorstin. op. cit. p. 344.
205. Ibid. p. 340. (See also Durant, W. The Reformation. Simon & Schuster; New York. 1957. pp. 875-881.)
206. Mortimer. op. cit. p. 135.
207. Boorstin. op. cit. pp. 351-355.
208. Francis. op. cit. p. 134.
209. Hilton, B. Undated citation on page 337f of McWilliams.
210. Boorstin. op. cit. pp. 359-360.
211. Ibid. pp. 361-362. While names and labels are necessary for verbal communication, they can be misleading if not useless. The Greek pneuma corresponds roughly to the Chinese qi, the Nigerian ase, the Polynesian mana and the Algonkien [i.e., North American] manitou. All mean life or spirit of life. (C. Mann. p. 164.)
212. Dolnick. op. cit. p. 1.
213. Boorstin. op. cit. pp. 364-365. Likewise, Watson and Crick were led, in 1953, to their model of DNA by an X-ray defraction photo taken by Rosalind Franklin. She was working at the time with a Maurice Wilkins, who, without her permission, showed Watson and Crick the picture. For that indiscretion, he shared a Nobel Prize with them. She got nothing except end notes like this and a fatal dose of cancer probably induced by her work with X-rays. (Saladin. p. 117.)
214. Durant, W. and Durant, A. The Age of Reason Begins. Simon & Schuster; New York. 1961. p. 168.
215. Boorstin. op. cit. p. 366.
216. Einstein, A. Undated quotation on page 774 of McWilliams. op. cit.
217. Boorstin. op. cit. p. 368.
218. Doby, T. Discoverers of Blood Circulation. Schuman; NY. 1963. p. 194.
219. Dolnick. op. cit. p. 86.
220. Durant and Durant. op. cit. p. 169.
221. Boorstin. op. cit. pp. 380-381.
222. Ibid. p. 382.
223. Ibid. p. 381.
224. Ibid. p. 330.
225. Al-Ma'arri. Ca. 1025. Cited in Reynolds, A. Studies in Islamic Poetry. Cambridge University Press; Cambridge, England. 1920. p. 176.
226. Manchester. op. cit. p. 291.
227. Fichte, J. Versuch einer Kritik aller Offengarung. 1792.
228. Wells, H. G. The Outline of History. 1920. (Cassel; London. 4th ed. Revised by R. Postgate. 1961. p. 829.)
229. Ibid. pp. 827-828.
230. Terdoslavich, W. Charles the Mad vs. Peter the Great. Chap. 18 of Fawcett. 2016.
231. Wells. op. cit. p. 828.
232. Grayling. op. cit. p. 76.
233. Barzun. J. 2000. From Dawn to Decadence. Perennial; NY. pp. 393-395.
234. Wells. op. cit. p. 812.




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