

The Incarnation and Modern Science

I believe in one God, the Father Almighty, maker of heaven and earth, and of all things visible and invisible; And in one Lord Jesus Christ, the only-begotten Son of God, begotten of his Father before all worlds, God of God, Light of Light, very God of very God, begotten, not made, being of one substance with the Father; by whom all things were made; who for us men and for our salvation came down from heaven, and was incarnate by the Holy Ghost of the Virgin Mary, and was made man; and was crucified also for us under Pontius Pilate; he suffered and was buried; and the third day he rose again according to the Scriptures, and ascended into heaven, and sitteth on the right hand of the Father; and he shall come again, with glory, to judge both the quick and the dead; whose kingdom shall have no end ...¹

Axioms, or Laws of Motion – Law 1: Every body perseveres in its state of rest, or of uniform motion in a right line, unless it is compelled to change that state by forces impressed thereon.²

In the 20th century, God blessed the Catholic³ Church with many men; each called into the kingdom for such a time and each performing a unique service for the kingdom. I want to note three men in particular (primarily because of their impact on my life and thinking). Two men are familiar to the readers of this publication, Cornelius Van Til (1895-1987) and Rousas John Rushdoony (1916-2001). I never met Dr. Van Til, but I had the extraordinary privilege of personally interacting with Dr. Rushdoony on several occasions. Both men strongly embraced historical, orthodox Christianity in its distinctive Reformation thrust. Van Til brought to the plate presuppositional analysis based upon the self-authenticating nature of Scripture and the transcendental argument for the existence of God. Based upon Van Til's devastating critique of human autonomy, Rushdoony exposed 20th century Christendom to a full-orbed and comprehensive faith in his application of the whole Word of God to every sphere of life.

An Assessment of Jaki

The third man may be unknown to some readers of this publication simply because he is a fully committed Roman Catholic. His name is Stanley L. Jaki (1924-), a Hungarian-born Benedictine priest holding two Ph.D. degrees (one in systematic theology and the other in nuclear physics). In the past 35 years, he has written close to 60 books/booklets and a multitude of scholarly essays. His area of expertise, of which this essay will attempt to explicate and of which those of the Protestant tradition must thoroughly grasp, is the history of science and its relationship to foundational Christian tenets.⁴ I first read Jaki in 1986. I have since attempted to read everything he has written (I'm batting about .600 in that regard). I have also had the privilege of talking to the incredibly gracious Dr. Jaki via telephone and letter.

Reading Jaki is pure delight (even when he throws jabs at Protestants⁵). The man is adeptly "at home" with the English language (plus six others). He has a formidable grasp of Roman Catholic theology,⁶ science, and philosophy.⁷ His reading of history is extensive and his capacity for sustained scholarly

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work is awe-inspiring.⁸ It befits us, as heirs of the Reformed tradition, to be “catholic” in our spirit with respect to Jaki. We certainly disagree with his understanding of the true nature of Catholicism and personal salvation.⁹ We would also disagree with his scorn of Creation Science.¹⁰ *We certainly can sit at his feet and learn from his insightful and masterful analysis of the conceptual development of modern science.*

In the modern world, many meanings have been affixed to the word “science.” I am taking the meaning of this word as it was understood in the 17th century (Newton’s time). To Newton and his compatriots, science (or more specifically, physics) meant the study of motion in all of its forms (e.g., motion of the moon, projectile motion, free-fall motion, motion of sound waves, motion of light waves, motion of heat, etc.). To simplify matters, the first law of motion (also called the law of inertia or the theory of impetus) is the inaugurating conception for the enterprise that we now call modern science.¹¹

Duhem’s Medieval “Treasure Hunt”

The importance of Stanley Jaki’s historical work is in his calling to our attention the scientific investigations of the French theoretical physicist, Pierre Duhem (1861-1916).¹² In his day, Duhem was *the* world authority on chemical thermodynamics (the study of the *motion* of heat). As part of his study, Duhem sought to understand the historical development of the science of dynamics.¹³ He assumed that he would start with the mechanical theories of Archimedes (ca. 287-212 BC) and “long jump” two millennia to the dynamical theories of Galileo Galilei (1564-1642). He would have ignored these 1,800 years would it not have been for his study, initiated around 1904, of the immediate antecedents of Galileo. Those predecessors made obscure references to a 13th century individual by the name of Jordanus.¹⁴ Jordanus and his school developed a number of significant and “modern” mechanical ideas. One has been called the “axiom of Jordanus.” It states that the motive power which can lift a given weight a certain height can lift a weight x times heavier to $1/x$ times the height. This is the germ of the modern scientific principle of virtual displacements or virtual velocities.¹⁵

Duhem’s interest was piqued. He began to meticulously ransack medieval manuscripts, most written in a form of Latin shorthand that varied from region to region.¹⁶ He discovered that Jordanus was part of the Sorbonne (founded in 1257), a building attached to the University of Paris, one of the premier medieval universities. And, to his utmost surprise, Duhem discovered an accurate articulation of Newton’s first law of motion in two other Sorbonne professors, Jean Buridan (1300-1358) and Nicole Oresme (ca. 1323-1382).¹⁷ Buridan is generally given passing note in the history of philosophy (e.g., Buridan’s ass). In these two men, obscure in Duhem’s time (and, unfortunately, still significantly obscure in our time), he discovered scientific genius. But, even more unanticipated by Duhem, he discovered that this historical breakthrough was predicated by *a belief in and application of historic Christian creeds.*

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Aristotelian Motion

It was during the 13th and 14th centuries that the Greek scientific corpus, primarily the works of Aristotle (384-322 BC), found their way into the purview of medieval scholastics (via the agency of Arabic scholars). To Aristotle, the universe was uncreated and eternal (time being understood as cyclical in nature¹⁸). Buridan and his fellow Christian scholars, including Thomas Aquinas (1225-1274), rejected this thesis as unbiblical and not in accord with Christian tenets, i.e., that God the Father Almighty created the universe “in the beginning” (time being understood as linear in nature¹⁹). To a Christian, the universe is created and finite. Buridan, possessing keen scientific inquisitiveness, did not put a period at the end of “the universe is created and finite” sentence (as Aquinas did). He considered the answer to the following question, “How, physically, did the motion of the universe start?” He first took a deep look at Aristotle’s theory of motion.

Aristotle’s theory of motion was lashed to his *a priori* (and deterministic) pantheistic emanationism. According to Aristotle, the universe consisted, as you recall the Greek geocentric arrangement, of a series of concentric, crystalline spheres with the Earth at the center. The universe moved because its highest sphere, the sphere of the fixed stars, was in a sort of “contact” with a “divine motor” that Aristotle called the “Unmoved or Prime Mover.” As Aristotle stated, it was through eternal contact with this “undefined” Prime Mover that the universe continued in its eternal motion (or rotation). Aristotle also pronounced (again *a priori*) that the celestial spheres reflected perfect motion. To him (and to the rest of his Greek collaborators), the circle is perfection and the heavenly rotations reflect perfect circular motion. Motion on the terrestrial realm, i.e., the Earth, being at the farthest point from the perfect motive power (or emanation) of the Prime Mover was, by its distance from the source of that emanation, *imperfect* (or, in the state of *partial disorder*). No coherent or universal law, therefore, could unite motion celestial with motion terrestrial. Also, the Greeks had a name for their conception of the universe; they called it *monogenes* (the only-begotten).²⁰

Fruitful Reflections

Buridan and Oresme presupposed, based upon biblical revelation, an *absolute beginning* for physical motion. To them, the universe was *distinct* from its Creator. To assume the contact that Aristotle postulated was, to them, pantheism (i.e., the universe, in its contact with the Prime Mover, was intimately connected to and part of that Source of movement). Buridan then asked, “If the universe is distinct from its Creator, then how do we account for the movements of the celestial orbs?” At this point, Buridan’s genius came into play, a genius motivated consciously by his belief in the tenets of the Christian God. He stated that at the moment of creation, God imparted motion to the universe and in that motion He established general influences (ordinances) that governed its continued motion. He said: When God created the world, He moved each of the celestial orbs as He pleased, and in moving them He impressed in them impetuses which moved them without His having to move them any more except by the method of general influence whereby He concurs as a co-agent in all things which take place; ...

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these impetuses which He impressed in the celestial bodies were not decreased nor corrupted afterward, because there was no resistance which would be corruptive or repressive of that impetus.²¹

Note three momentous and crucial features nested in these few sentences. First, note the equivalence with Newton's first law of motion.²² Since Newton's first law forms the basis of his second and third laws of motion, then, in Buridan's statement, we have encapsulated before us the very foundation of modern physics.²³ All of us know that modern physics impacts the entirety of modern technological life. Few of us know, and thanks to Duhem and Jaki, we no longer have any excuse for not knowing, the medieval and Christian basis for such modernity.

Second, Buridan's statement engenders the consideration of how the "general influence of God whereby He concurs as a co-agent in all things which take place" works out in practice. In other words, Buridan is stating that the universe is coherent and that its law-like interactions can be studied and discovered. God's created order acts in a consistent fashion, so consistent the man can put "mathematical equations" to it. It is this consistency that serves as a basic presupposition (and, I might add, this presupposition is Christian in nature) for all research scientists.

Consistency in the interactions of God's created order due to His faithful rule leads us to the third point. We can quantify these motions (that is just what Oresme, Buridan's successor, attempted to do).²⁴ In Oresme, we find the notion of a mathematical function (e.g., heat vs. time, distance an object falls vs. time).²⁵ It is important to also note that another medieval invention, the mechanical clock, providentially came onto the scene simultaneously with Buridan and Oresme.²⁶ The mechanical clock combined with Oresme's seminal functional concepts enabled scientists to "time" motion activities that no one had ever thought of timing before. The medieval mechanical clock also provided the quantitative precision needed for the birth and growth of modern science. The theory of impetus combined with mathematical functions provided the foundation for the one of the most important mathematical formulations ever and Newton played a key role in its initial articulation.²⁷ I am speaking of the differential and integral calculus, i.e., the "mathematics of motion" that serves as the rigging of the ship of science.²⁸

The "Sacred" Cliché

This medieval presentiment of Newton's first law of motion, founded upon Christian creeds and unearthed initially by Duhem a century ago, rings "hollow" in the modern world of academe and science.²⁹ This vacuousness should not come as a surprise. The French Enlightenment, led by the French philosopher François Marie Arouet de Voltaire (1694-1778), launched salvo after salvo of propaganda, each burst exploding into the myth that science and revealed religion (i.e., the Christian Faith) were in an irreconcilable conflict.³⁰ Needless to say, Duhem, a French Roman Catholic, upset the cart and the horse of this hallowed cliché. Duhem's exposé is why, at the behest of certain elements of the French government, the last five volumes of his *Système du monde* were shelved.³¹ It was not until the early 1950s, some 38+ years after Duhem's death, that these manuscripts saw the light of day owing to the incredibly heroic persistence of Duhem's daughter, Hélène.³²

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False Starts

Duhem showed that physical science could not be contrary to the Christian Faith *because it owed its very birth to that Faith*. As Jaki has so elegantly revealed, science was stillborn in every ancient culture.³³ In spite of some promising starts, science failed to emerge. For example, consider the decimal system (base 10) of numeration, a Hindu invention, and Euclidean Geometry, the glory of Greek deductive genius. Yet, neither was science; neither gave a handle to dealing with things in motion, the very crux of modern science. All these stillbirths – whether Indian, Babylonian, Mayan, Egyptian, Chinese, or Greek – can be traced to a faulty view of the universe. Each of these cultures embraced an organismic view of the cosmos, a view that fathomed all things in pantheistic terms as an eternal begetting (Greek: *monogenes*) of a divine absolute or *logos* (Greek for “reason”), starting from the celestial realm and emanating into the “partial disorder” of the terrestrial.³⁴

There was one culture that got a handle on dealing with things in motion and that culture embraced and believed in a babe born in Bethlehem. This babe, according to Christian creeds, was the only-begotten (Greek: *monogenes*) Son of God (John 1:18). This babe was also the *Logos* of God (John 1:1), a *Logos* that was God manifested in the flesh (John 1:14). Any Greek philosopher, reading these words of the Apostle John, would not have missed this affront to pantheistic emanationism.

This challenge was based upon the person of the Lord Jesus Christ, the *Logos*, revealed in Scripture and in Christian creeds as fully God (very God of very God) and fully man (incarnate of the Holy Spirit and born of the Virgin Mary). The theological ramifications of the revelation of God in Christ were hammered out initially by the early councils of the Church.³⁵ The preciseness of these statements, in time, had far-reaching consequences.

Impact of the Incarnation

Rome eventually fell and the Christian West began its pioneering struggles. The followers of Christ eventually reconstructed a barbarian world making it a Christian civilization (although with faults). It was when this Christian civilization gained full access to the Greek philosophical and scientific corpus that the impact of Christ on science began to unfold.

The universe to the Christian West was a Christ-ruled universe. It was in no way an “emanation from a divine motor.” It was free from vague organismic or animistic influences (the source of a multitude of disorderly processes). This universe was ordered in accord with God’s faithful decrees (Job 38:33; Psalm 148:1-6; Jeremiah 31:35-36). Only in this universe could motion be understood properly; i.e., the conservation of momentum and where free fall was truly “free” and not governed by Aristotle’s “desire-driven” machinations.³⁶ As we have seen, the law of inertial motion was first formulated in reference to the biblical God, the Creator of that motion, who, in the beginning, made all things in and through Christ (John 1:3; Colossians 1:16).

The createdness of all things in and through a person, the *Logos* of God, proved to be a certain assurance that all things cohere in their Creator (Colossians 1:17). All His works reflect a coherent wisdom because the *Logos* of God is also the Wisdom of God (Proverbs 8:12-36; I Corinthians 1:24;

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Colossians 2:3). Athanasius (ca. 293-373), who stood *contra mundum* (against the world) of Arian heresy (that purported Christ as not being fully God), recognized the significance of a fully rational and wise God creating a fully rational and good (interconnected and interacting) creation.³⁷ After citing John 1:1, Athanasius described the universe as a divine hymn:

... so also the Wisdom of God, handling the universe as a lyre; ... in combining parts into wholes ... produces well and fittingly, as the result, the unity of the universe and of its order ... and He produces as the result a marvelous and truly divine harmony.³⁸

The divine harmony of Athanasius differs antithetically (at the root level) with the Pythagorean “harmony of the spheres.” To Pythagoras (ca. 582-ca. 500 BC) and the rest of the pantheon of Greek philosophers, this harmony was not the reflection of a personal, rational Creator revealed in the flesh as the only-begotten Son of God. Although Athanasius was *contra mundum* (against the world of error), he was *pro universo* (for the universe). He was *pro universo* because Christ holds the universe together in His wisdom and by His power. It is this revelation of Christ, the Incarnate Christ, that is the only valid ground for a totally rational and harmonious universe, an orchestral hymn linking the realm of the celestial with the realm of the terrestrial. Contra Aristotle, who denied that any coherent law could unite these two realms, the Christian West, founded upon the reality of the Incarnation of Christ, could embrace such a union. And it eventually did in the person of Isaac Newton for he breathed deeply of such a Christian consensus, in spite of his own latent Arianism, in an English scientific atmosphere commanded by Puritan theology. This “air of truth” provided the foundation for Newton’s confidence that he could connect the falling of an apple with the motion of the moon. He made this connection mathematically in his inverse-square law³⁹, better known as the law of *universal* gravitation (one law connecting two diverse realms, motion celestial with motion terrestrial).

This science of motion could not be born until the babe born in Bethlehem made His impact, until His light of truth dispelled the darkness of error. This Christ, in the fullest sense of the term, is truly the *Savior* of science.

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Endnotes:

¹ The commencement of the so-called “Nicene Creed” (ca. 374). These declarations probably came from the writings of Cyril, Bishop of Jerusalem from 350 to 386, with the addition of clauses from the Creed of Nicaea. The Council of Chalcedon approved this creed in 451 as representing the creed of the Councils of Nicaea (325) and Constantinople (381).

² Isaac Newton’s (1642-1727) rendering of his “first law of motion.” From Isaac Newton, *The Principia*, trans. Andrew Motte (Amherst: Prometheus Books, [1687, 1848] 1995), 19.

³ By Catholic, I mean universal in the sense of (1) the universality of Christ’s reign over every square inch of the creation, whether visible or invisible and (2) the universality of His Church, consisting of His blood-bought people from every tribe, tongue, nation, and age saved by His sovereign grace

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(irrespective of outward structure or form).

⁴ I will try to summarize Jaki's arguments in the chapter entitled "The Birth That Saved Science" in *The Savior of Science* (Grand Rapids: Eerdmans, 2000), 49-87.

⁵ One jab that Jaki threw at me personally was this, "Protestants do not think." I responded, "Yes, in the majority of cases, that is true." Jaki continued, "If Protestants would think, then they would become Catholics." But, thinking Protestants are already Catholics (in the sense that I defined the word in footnote 3). Of course, that statement would infuriate Jaki based upon his definition of Catholic.

⁶ To Jaki, Christian theology is Roman Catholic theology. To him, the Reformers erred greatly when they replaced the "Pope with the Bible." In denying the self-authenticating nature of Scripture, Jaki readily submits the interpretation of Scripture to the fallible and fixed canons of the Holy See. I'm sure that Jaki would vehemently disagree with me on this assessment; i.e., that the Holy See is fallible *just like the rest of us*. Only Christ and His Word are infallible in the true sense of the meaning of infallibility.

⁷ Although, he has not read Van Til based upon his "silent response" to my request that he make the attempt.

⁸ In this respect, the "priestly" call befits Jaki. One cannot be married with children and accomplish what he has accomplished in his life of seven decades plus seven and counting.

⁹ Having read his *A Mind's Matter: An Intellectual Autobiography* (Grand Rapids: Eerdmans, 2002), I am convinced that Jaki embraces the dogma that personal salvation can only be found through the channels of grace that reside in Roman Catholicism. In the eternal joys of the consummate New Jerusalem, one of God's angels will likely command us to stop the joyous ruckus as we approach the "Roman Catholic" sector (of course, there will be no such "sectors" in the eternal state) saying, "Sh, be quiet, they think they are the only ones here." After reading Jaki's autobiography, though, to say that he does not know the "joy of God's gracious salvation" would be a lie.

¹⁰ In short, Jaki has nothing good to say about Creation Science. To refute his reasons for such bias is beyond the scope of this essay.

¹¹ See the chapter entitled "The Historical Importance of a Theory of Impetus" in Herbert Butterfield, *The Origins of Modern Science* (New York: The Macmillan Company, 1961), 1-16.

¹² His magnum opus is the ten-volume (5,000-page) work *Le Système du monde: Histoire Des Doctrines Cosmologiques* (Paris: Librairie Scientifique A. Hermann et fils, 1913-1959). The abridgement of this work in English is *Medieval Cosmology: Theories of Infinity, Place, Time, Void, and the Plurality of Worlds*, ed. and trans. Roger Ariew (Chicago: University of Chicago Press, 1985). See also *The Aim and Structure of Physical Theory*, trans. Philip P. Weiner (Princeton: Princeton University Press, [1954, 1982] 1991). For his biography, see Stanley L. Jaki, *Uneasy Genius: The Life and Work of Pierre Duhem* (Dordrecht: Martinus Nijhoff, 1984) or Stanley L. Jaki, *Scientist and Catholic: Pierre Duhem* (Front Royal, VA: Christendom Press, 1991).

¹³ Duhem's main history teacher in his university days was Louis Cons, an advocate of Auguste Comte's (1798-1857) positivism. The only positive prescript of positivism is its emphasis on the study of history; i.e., the necessary precondition of a true comprehension of any subject is the thorough study of its history. We should be grateful that Duhem learned this lesson well.

¹⁴ We are not sure as to the real identity of this person. We know that someone by the name of

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Jordanus Saxo (d. 1237), a second master-general of the Order of Preachers (i.e., Dominicans), founded the school of Jordanus Nemorarius. So, Jordanus may represent a “school” of thought.

¹⁵ See Alistair C. Crombie, *The History of Science: From Augustine to Galileo* (New York: Dover Publications, [1959, 1970, 1979] 1995), 1:126-127.

¹⁶ In about six years, as a result of his unprecedented and almost superhuman research, Duhem filled approximately 120 notebooks at 200 pages each (i.e., 24,000 pages) with excerpts from almost a hundred manuscripts. Remember that he did this without the assistance of central library catalogues, Xerox machines, microfilms, typewriter, or ballpoint pen. Worldwide access to computer relational databases was not on anyone’s radar yet (neither was radar). All he had was an ink well, a quill (or maybe fountain) pen, paper, and dogged persistence.

¹⁷ In 1985, I asked Rousas J. Rushdoony this question, “Where do I go to find out what was happening in science and mathematics in the medieval era?” Without pausing to think, Rushdoony replied, “Read Oresme, Nicole Oresme.”

¹⁸ Time is in an “infinite loop” where the code of history continuously repeats itself. No long-term commitment to progress can be established with this treadmill (we are running but going nowhere) view of history.

¹⁹ Time is “sequential” where the code of history is ordained in terms of God’s eternal decrees. The sequential nature of time is inherent in the Christian creeds. They start from creation, progress to the Incarnation, declare the Christ as the Lord and Judge of history (and His holy congregation operative in that history), and end with the Second Advent, the general resurrection, and the eternal state. Long-term commitment to growth and development can be established with this structured (we are walking toward a goal) view of history.

²⁰ See some examples in Gerhard Kittel, ed. *Theological Dictionary of the New Testament*, 10 vol. (Grand Rapids: Eerdmans, 1964-76) under “monogenes.”

²¹ Cited in Marshall Clagett, *The Science of Mechanics in the Middle Ages* (Madison: University of Wisconsin Press, 1959), 536.

²² Newton, like most other scientists of the 17th century, the “Century of Genius” according to the analysis of Alfred North Whitehead (1861-1947), ignored the scientific “giants” of the medieval era, contra to his mantra that he “stood on the shoulders of giants.” The ignorance of these giants is partly due to the anti-medieval thrust of the Renaissance, a thrust that popularized a misguided notion that medieval times were nothing but the “dark ages” of obscurantism. Newton actually “copied” this law (without noting any credit) from the writings of the French philosopher and mathematician René Descartes (1596-1650). Descartes learned of Buridan’s ideas, if not of Buridan by name, by way of the traditions taught to him during his student years at the Jesuit College in La Flèche. At this school, Descartes’ teachers taught from a tradition cultivated especially at Salamanca. Salamanca, in turn, was indebted to the 14th century Sorbonne.

²³ By modern physics, I include (1) the celestial mechanics of Albert Einstein (1879-1955) and (2) the atomic (i.e., quantum) mechanics of Max Planck (1858-1947). I do not embrace Einstein’s theology (he borders on pantheism) or the logical equivocation (known as the Copenhagen interpretation of quantum mechanics) of Werner Heisenberg (1901-1976). Please note, though, without Newton’s laws of motion (what is now considered to be the foundation of classical physics), *both these evolvments could not*

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have been initiated. And, without Buridan's Christian conceptual foundation, *Newton's work could not get the "jump start" it needed.*

²⁴ Quantification was certainly in the medieval "air" and Oresme breathed deeply from this ambient atmosphere. The Latin phrase "God has arranged everything according to measure, number, and weight" (from Wisdom of Solomon 11:20-21) was the most often quoted and alluded to phrase in Medieval Latin texts. See Ernst R. Curtius, *European Literature and the Latin Middle Ages*, trans. W. R. Trask (London: Routledge and Kegan Paul, 1953), 504. See also Ivor Grattan-Guinness, *The Rainbow of Mathematics: A History of the Mathematical Sciences* (New York: W. W. Norton, [1997] 2000), 127 and Alfred W. Crosby, *The Measure of Reality: Quantification and Western Society, 1250-1600* (Cambridge: Cambridge University Press, 1997).

²⁵ Oresme also contemplated, with remarkable composure, an innovative concept for those times; i.e., the prospect of the Earth's rotation.

²⁶ The motivation for this invention may have come from the medieval monasteries where a monk had to awaken in the middle of the night to call his brothers for nightly prayers (Ps. 119:62, 147-148). The sundial (only works during the day) and water clock (does not work in freezing temperatures) could not be relied upon for the necessary precision. The solution was the invention of a "verge and foliat" mechanical clock that uses a mutual feedback mechanism, a system copied in countless modern instruments. See Donald Cardwell, *Wheels, Clocks, and Rockets: A History of Technology* (New York: W. W. Norton, [1995] 2001), 20-48.

²⁷ See the chapter entitled "Medieval Contributions" in Carl B. Boyer, *The History of the Calculus and Its Conceptual Development* (New York: Dover Publications, [1949] 1959), 61-95.

²⁸ Differential calculus is the mathematics of "motion at an instant of time." The integral calculus determines the area under a curve. Both procedures are inverses of each other as the Fundamental Theorem of the Calculus reveals.

²⁹ Even though Duhem's work is well known to the scholarly public (little of his work is known beyond this "public"), most scholars find unpalatable Duhem's linking of the theory of impetus to Christian and medieval origins. In spite of his opposition to Duhem's thesis, French science historian Alexandre Koyré (1892-1964) still recognized Duhem's work as a rich and indispensable source of information. In general, school science textbooks fail miserably to "account" for the medieval origin of the law of inertia. These texts present this law as a waiter presents your dinner at a restaurant. True education is not just learning the facts or definitions (the what), but also the why, the who, the how, and the where. Where did the food come from? How was this food prepared? Who is the chef? Why did he make it this way? That the "mainstream" physics textbooks just present the "facts" is to be expected. That so-called "Christian" physics textbooks do the same is inexcusable.

³⁰ By the late 19th century, before Duhem's discoveries, this myth had become undisputed fact. See John William Draper (1811-1882), *History of the Conflict Between Religion and Science* (New York: D. Appleton, 1875) and Andrew Dickson White (1832-1918), *A History of the Warfare of Science with Theology* (New York: Dover Publications, [1896] 1960). White founded Cornell University.

³¹ Volumes 6-10 contain Duhem's presentation and interpretation of Buridan's writings.

³² For this fascinating story, see Stanley L. Jaki, *Reluctant Heroine: The Life and Work of Hélène Duhem* (Edinburgh: Scottish Academic Press, 1992).

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³³ See Jaki's magnum opus, *Science and Creation: From Eternal Cycles to an Oscillating Universe* (Edinburgh: Scottish Academic Press, 1986).

³⁴ See the chapter entitled "The World as an Organism" in Stanley L. Jaki, *The Relevance of Physics* (Edinburgh: Scottish Academic Press, [1966, 1970] 1992), 3-51.

³⁵ See Rousas J. Rushdoony, *The Foundations of Social Order: Studies in the Creeds and Councils of the Early Church* (Fairfax: Thoburn Press, [1968] 1978).

³⁶ Aristotle's doctrine of inertia was a doctrine of rest (statics, not dynamics, was foundational). To Aristotle, terrestrial motion was not natural, but violent. Why? It contradicted the ordinary tendency (or desire) of a body to move to what was regarded as its natural place (i.e., its vital part or place of rest). To account for motion, Aristotle asserted that a body in motion would keep moving only as long as a mover (emanations from the "divine motor") was actually in contact with it, imparting motion to it continuously. For example, the continual movement of a projectile is explained by the commotion in the air caused by its initial movement – the air being pushed and compressed in front had to rush round behind (to prevent a vacuum that, according to Aristotle, cannot take place). Also, according to Aristotle, the heavier an object weighed, the more "desire" it had for its "natural place." That is why, when a ten-pound ball and a one-pound ball are released from a given height at the same time, the ten-pound ball, moving more jubilantly to its natural place, hits the ground before the one-pound ball. One *a posteriori* experiment could have lain to rest this languorous physics. To Aristotle, because the terrestrial realm was rather crude (being so far from the "divine motor"), one had to rely upon a priori abstract theory alone to explain motion. Aristotle's misunderstanding of the nature of the universe (= *monogenes*) imprisoned him in a blind alley that barred him from getting a viable handle on dealing with things in motion.

³⁷ Athanasius recognized that if the errors of Arianism were not nipped in the bud, Christianity would devolve into Greek pantheistic emanationism.

³⁸ Athanasius, *Against the Heathen* (Albany, OR: Sage Digital Library, 1996), 42. See 39-41 for citational context.

³⁹ Written mathematically as $F=Gm_1m_2/D^2$ where m_1 and m_2 represent the mass of two objects, D is the distance between these objects, G is a gravitational constant, and F is the force of gravitational "pull" between the two objects. If m_1 = your mass and m_2 = the mass of the Earth, then F = your weight (i.e., the measure of the gravitational "pull" between you and the Earth).