

What Doth Science Mean?

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The Search for Knowledge. People seek to know the world by their unaided efforts. Indeed, **people can find certain truth!** The discovery of a cave or a mineral deposit yields “direct facts”...yet such accessible but fragmented knowledge is a letdown. It deflates our noble human ego! Surely people can do more than make lists of facts; we desire orderly connected knowledge about all reality: accessible and inaccessible. Inaccessible things implies such as history, things too small (atoms), and things too large (the cosmos of heavenly objects).

As science began in Greece, Greek pagans provided answers for at least history and astronomy. Actually, they gave many answers. Their oral and written records were a storytelling jumble.

Soon, other Greeks began to seek universal connected knowledge; they became philosophers, and they ignored unconnected facts. These pre-Socratic philosophers (before 400 BC) were the “earth, air, fire and water” folks. Their many answers showed some orderliness, but were not widely accepted.

The Atomic Search. Democritus (*ca.*460 – *ca.*370 BC) was an early philosopher with a difference. He theorized that **reality is composed of atoms**. These were inaccessible, indivisible, infinitely small, infinite in number, in an infinite cosmos and moving due to chance. Atoms randomly cohering “create” our emerging reality, according to his view of atheism and materialism. The need for disorder contradicted the search for order.

Democritus did not offer a methodology to advance knowledge. Later, Plato and Aristotle did that! Therefore, atomism received little support among thinkers, as the tools for searching belonged to his competitors, and his atheism repelled pagans and philosophers. In Greece, atomists led almost a quarantined existence. Epicurus (342? – 270 BC) and Lucretius (*ca.*96 – *ca.*55 BC), a Roman, continued the school. (St. Paul in his visit to Athens, around AD 55, recorded in Acts 17:1-34, encountered the Epicureans, who were atomists. But St. Paul’s listeners included the Stoics, who were anti-atomists! The followers of Plato and Aristotle are not mentioned. Athens’ thinkers were a quarrelsome crowd.) By AD 300, atomism had died out, although it lived on for years in Rome. Atomism survived in writing—in the criticism it received in the works of Plato, Aristotle and various Roman sources. So it had the potential to be reconstructed.

The Mathematical Search. Beginning a new phase, Plato (*ca.*427 – 347 BC), a disciple of Socrates (*ca.*468 – 399 BC), reached back to Pythagoras (*ca.*582 – 500 BC), a pre-Socratic philosopher, and both sought order and universal connectedness by a curious process! **They first studied a hidden “substance.”** This “substance” was

mathematics: arithmetic for Pythagoras and geometry for Plato. An ethereal heaven contained the master “pure” substance—and trained thinkers could access it! The reality of “pure,” but inaccessible, mathematics was said to be incarnated as reality. A “top-down” view of reality results, with mathematical “properties” causing physical properties. Mathematical LAW caused ALL things!

This was the theory—and they took over the word, *theory*. In common Greek usage, theory meant “sight-seeing.” Theory became an overarching vision—a “clear intuition”—in the “mind’s eye.” Theory was “sight-seeing” on the road to becoming “all-seeing.”

This theory was developed under the continuing shadow of polytheism. In contrast, **mathematics was mono-truth.** $1 + 1 = 2$ and the angles of a triangle always add up to 180 degrees—and gods could not change these! Facts were united by their common mathematical ancestry! Man’s “unaided” efforts were actually aided by mathematics—and their first “success” was in mathematics itself and then in astronomy. “Direct facts” were eclipsed by this search for connected inaccessible facts. Many call this **rationalism** but it seems best to call it **mathematicism**.

Indeed, as mono-truth, mathematics grew and many examples of incarnated mathematics were said to be found in reality. The danger was that incarnated mathematics might be “saving the appearances” instead of describing objective reality. Predictably, there were casualties. Pythagoras was defeated by irrational numbers. Plato’s view was ultimately defeated by multiple geometries and the belated recognition of inherent subjectivity in mathematics.

The Accessible Search. Plato’s most famous pupil, Aristotle, (384 – 322 BC), agreed with many “practical” items in Plato’s thought, but disagreed with this “top-down” approach. He found no rational proof that a mathematical heaven existed, nor its incarnation into reality! He saw that this theory required belief, not analysis, to arrive at truth. Instead, he said that **all knowledge “comes in” through our senses.** He reportedly said that mathematics comes through “playing with marbles or drawing in the sand.” Complex mathematics arises from thinking about this rudimentary data.

Aristotle was a master mathematician who studied accessible reality, but without a reverence for mathematics. He thus could “see” nature directly, and it was a challenge in its own right! Direct facts were to be discovered and then connected via the logical categories he developed, thus showing the common ancestry and structure of reality. His theory was a “bottom-up” search for knowledge. He was not adverse to direct facts or working with lists. It was **proto-empiricism**. But he faced a similar danger: he could be logically “saving the appearances” instead of describing objective reality.

His development of logic removed some muddles existing in the minds of thinkers. The steps of syllogisms were important, but each begins with “IF” and ends with a conclusion, but not necessarily a fact or truth. His logic developed some “First Principles” required for clear thought. Even the monumental *Elements* (of Geometry) by Euclid respected his logic.

Conflict and Compromise. Neither the “top-down,” “bottom-up” nor did atomist systems have long-term success, despite being “clear intuitions” in their minds’ eyes. Plato criticized Democritus without ever mentioning his name, and Aristotle criticized Plato many times. (Some philosophers point out that Democritus’ indivisible atoms, Pythagoras’s indivisible numbers and Plato’s indivisible triangles have a strange similarity!) And there were the systems of the Stoics and the Cynics. (At various times, these were more popular than the “big 3.”) After the deaths of these masters came an unsettled time. Contending “top-down” or “bottom-up” systems were “merged” or “transformed” into “neo-this” or “neo-that.”

Also, neither Pythagoras, Plato nor Aristotle was a “pure” atheist. However, a view of strict materialism arose after their passing which stressed logical rigor, the unaided power of reason, an infinite universe, geometry, and atheism. (And there was the separate path to atheism of atomism.)

Thinkers now had many answers, but where was truth? None of these relied solely on public knowledge. But did one, at the least, point in the correct direction?

Interestingly, three other prominent individuals may not have been members of philosophical schools. They were Archimedes of Syracuse (*ca.*287 - 212 BC), Ptolemy of Egypt (*fl.* AD 127 - 151) and Euclid (*fl.* 300 BC). Archimedes is remembered as an engineer and developer of military weapons. But he also discovered the principle of buoyancy and wrote some mathematical treatises.

Ptolemy is remembered for his *Almagest*—which showed how to calculate planetary positions, assuming geocentricity. (Its accuracy was unsurpassed until well after Copernicus.) He also wrote the *Tetrabiblos*, the standard handbook on astrology! Back then, astrology was a serious endeavor, indeed, a branch of philosophy.

Euclid wrote his celebrated *Elements* of Geometry and Number, and it remained the standard textbook for about 2,000 years. Euclid did not originate all of the material therein, but he collected and organized the existing scattered material.

Euclid required less than two pages to list 23 definitions, 5 axioms (postulates) and 5 common notions. Then follows 400 pages of elaboration (in 13 books), each of which begins with additional definitions and various interspersed lemmas. (Lemmas are subsidiary definitions added as the geometry is developed.)

Only the gifted few can tackle the *Elements* without help. The two most noted commentators are Proclus (AD 410 – 485) and Sir Thomas Heath (AD 1861 – 1940). Proclus and Heath each required more than 100 pages to explain Euclid’s beginning list. To understand the *Elements*, Proclus and Heath both quote some of Euclid’s sources and, ironically, a major reference is to Aristotle! Aristotle discusses mathematical particulars and history, plus his logic set the standard of rigor that Euclid followed. As the two commentators said, the “Divine Plato” and the “Inspired Aristotle” were both required.

The Scientific Method (of the Greeks). The *Elements* became “celebrated” because with less than two pages of beginning notions, the entire edifice of geometry and number was constructed. At the least, it was (and is) an intellectual exercise.

The *Elements* inspired the Greek scientific method. The foundational definitions, axioms and common notions are undefined terms. They are accepted but no attempt is made to prove them. They are obviously true—clear intuitions. As Aristotle had said, each science must be based on undefined terms in order to avoid an infinite regress. The *Elements* also accepted Aristotle’s observation that reality was not infinite, as such a notion went beyond sense experience.

Geometry and number are abstract subjects, but Euclid does not say if he considers them to be merely abstract or do they exist in Plato’s ethereal heaven. Proclus has no doubts that Euclid was a committed Platonist—but Proclus was a prominent neo-Platonist (and an anti-Christian). Heath agrees that he was a Platonist (in education). As abstractions, how do the beginning notions apply to the real world? (The question is not even asked in the *Elements*.) Both commentators agreed that “space” is not where these abstractions reside. Nonetheless, the abstract *Elements* were easier to understand than the complex real world.

Greek science, thus, became based on founding principles—which were undefined but obviously true. It was called the **axiomatic method**.

Then, clearly enunciated steps were followed to build up to...knowledge. This build-up was not a ‘cause and effect’ process, but a logical “definitional” process. Each step must “save the appearances” of the subject under study. These steps obeyed Aristotle’s logic, concepts were not to be “smuggled in,” but there were some lapses. This also meant that “wrong notions” were not to be used, even if they developed the correct result. The success of the *Elements* inspired a “passionate search for truth and beauty”!

There were several “Achilles’ heels”: Where does “pure” geometry reside? What does it mean to apply an abstract “definitional” construction to the “causal” real world? To a Pythagorean or a Platonist, these presented no difficulty as the real world was incarnated mathematics. To an Aristotelean, these statements required caution, as matter may have surprises not captured by mathematics. The non-philosophically-minded Greeks supposedly weren’t interested in the question.

So, Greek science obscured a tension. Geometry was abstract truth, but not objective truth. Other real world Achilles’ heels followed.

The Christian Search. The Christian era soon began and conflict arose over worldviews: the orderly over-arching knowledge of the accessible, and the inaccessible. All worldviews require belief, with evidence!

None-the-less, Greek thinkers insisted that there was “guilt by association” with anything connected to the name of “god”. (In lands immersed in polytheism, atheism may have

seemed like progress!) The Biblical record, though, was orderly and connected, but full of “events.” **Events (history, discontinuity)** contradicted the mathematical and logical order Greek thinkers favored—exemplified by a mathematical straight line. **Mathematical order (mathematical determinism) has no “events,” it is ahistorical, it is axiomatic!**

But it is also logical that sense observation invalidates the application of abstraction to reality. Mystery and the unknown remain—as a principle! Another Achilles’ heel. And if abstraction and sense experience argue for superiority, does our noble human ego act as referee?

Plato and Aristotle were ambiguous regarding the existence of God or the otherwise inaccessible. Further, Plato mentions the “myth” of the lost city of Atlantis. He mentions universal floods at intervals—which no longer occur because the constituent “triangles” of matter are now hardened. He even mentions a time when “the sun rose in the West and set in the East.” And there was the memory of the violent earthquake and tsunami that destroyed the Minoan civilization on the island of Crete. Aristotle mentions some astronomical “events” but dismisses them. So, did the mathematical straight line prove “eventless” truths about the universe? This ambiguity was another “Achilles’ heel.”

Historical evidence includes what earlier observers have reported. One does not investigate the Peloponnesian Wars without reading the Greek reports on these wars. Myth can be a word used to discredit earlier observers. We honor macro-historical statements about “events” in the Bible by investigation: *ex nihilo* creation, Noah’s Flood and Joshua’s Long Day. Worldwide records also report them. Are these history or intercontinental synchronized mythology? Indeed, “events” mean that “sight-seeing” or “knowledge” regarding the inaccessible may be “unclear” intuitions.

Ex Nihilo Creation stands as a witness to God’s power and creativity—which history is not foreseeable by unaided humans. “Knowledge as to the origin of the universe passed to us by Revelation has the credibility that is associated with the testimony of an eyewitness.” [1]. When the Bible talked about “science, falsely so-called” or the “winds of human wisdom,” a major target was Greek mathematicism, which made history ahistorical.

Around AD 50, there was some “shoulder rubbing” between Greek knowledge and Christian Revelation. Intense contact was to soon come. What would a conversation over “common notions” and First Principles reveal?

This contact did not dampen the fervor of the emerging Gnosticism, which became the great synthesizer of science(s) and religion(s). It was a heady brew, but was subdued by around AD 350. A major subject in the writings of the early Church Fathers was refuting various forms of Gnosticism. Irenaeus (AD? – 202) pointed out that system (and mathematics) comes from the Creator (not vice-versa) [2], thus partially coinciding with the “bottom-up” attitude.

Christian thinkers did find useful bits in the contending philosophical systems. St. Augustine (AD 354 – 430) used much of the moral and political tones of Plato. St. Thomas Aquinas (AD 1225? – 1274) used the logical rigor of Aristotle. With the destruction of the Roman Empire, about AD 500, Greek writings became lost to Europe, but preserved in Constantinople. Christianity, both in Rome and Constantinople, survived and flourished. Their witness and Revelation subdued paganism and rational “sight-seeing.”

In summary, atomism died out, and Plato’s moral tone was valued, but his top-down mathematics from an inaccessible ethereal heaven was eclipsed by Aristotle’s bottom-up analysis of the accessible. Aristotle’s logical rigor made some crucial mistakes which centuries later allowed Plato’s re-emergence. Also, Aristotle’s logical study of the accessible was hard to apply to astronomy, so a rigorized Euclidean mathematics, which was easily applied to astronomy, later offered “promise” of also conquering the accessible. Euclid’s *Elements*, a distilled wisdom, offered assistance to rational thinking, but its ancestry was unknown and, further, its relationship to reality was an avoided topic.

A New Dawn. After a thousand years, Europe began to recover from the destruction of the Roman Empire, the devastation of barbarian invasions, deadly plagues, warring kingdoms and mass migrations. Prosperity brought trade and travel, which, in turn, brought then unknown Greek manuscripts. They were hypnotic!

Thus began the Renaissance (of Greek science)! Indeed, much knowledge was recovered—but also mathematical or philosophical mysticism or “clear intuitions.” Pre-1800 writers such as Voltaire, Spinoza, Descartes, Leibnitz, Diderot, Hobbes, Hume, Thomas Paine, Laplace and Edward Herbert were not concerned with evolution or atoms. (They were atheists or philosophical theists, but definitely not Biblical theists.) **They were “expansive” Platonists—and rebelling against the “confining” Aristotle.** Their human ego favored a rigid mathematical determinism, materialism, unaided reason, an infinite universe, and Euclidean geometry. These ideas vividly influenced science in the 1800s, yet present-day creationists mostly ignore them.

First Principles in Science. At this transition from the Middle Ages to the Renaissance era, fact-finding continued, but there was concern over how to guide the quest for knowledge. The axiomatic method was, itself, entangled with “saving the appearances.” To say that one’s theory is comprehensive, causal and true is easy. To prove it is not so easy! Indeed, the excesses of partisans for Plato and Aristotle caused wariness. There were good points—and partisanship—in both camps. They also quarreled over which “camp” should take credit for empirical, craft and technological advances. In reaction, such as Leonardo da Vinci, [1452 – 1519], the painter and engineer, said:

“Mental things which have not gone in through the senses are vain and bring forth no truth except detrimental.” **What is detrimental are the universal statements which close our mind to reality....** This [Leonardo’s] use of mathematics is essentially different from that of **the Greeks, which had led them to organize a world of abstract entities fit only for contemplation,** and to geometricize the heavens into a system of eternal and uniform circles [3].

So thinkers in the Christian world needed to clarify the First Principles (axioms) used by science:

- A. The universe is real. It is a created fact.
- B. The universe is rational (orderly), witnessing to the “mind of the maker.”
- C. The human mind can understand much about the accessible universe, due to the testimony that the mind was a major feature of being “created in the image of God.”
- D. After the *ex nihilo* creation event, material actions proceed due to ‘cause and effect’ relationships—with few exceptions. Events do occur, but nothing happens because of definitions.
- E. There is unity in the cosmos. One God and His laws govern the universe.
- F. Experimental manipulation uncovers direct facts. Observation, by itself, is less objective. Experimental rigor helps to distinguish between storytelling, “saving the appearances” and ‘cause and effect’ relationships. Experimental results are expressed mathematically to limit ambiguity.
- G. Mathematics reflects the rational design of reality; mathematics is a science.

These First Principles reflected Christian belief as well as various Greek principles of logic and mathematics. Creation *ex nihilo* implies that a rational mind can explore an event-filled, yet orderly, unified, rational, finite universe. ‘cause and effect’ rejected the belief in astrological “spirits” or “essences” directing physical processes. But First Principles do not come from science; they frame science. Principles reflect belief, with evidence.

Mathematics, in G, came with a caution. The experimental domain is limited, so extrapolation of mathematical results requires assumptions about interactions between the components of reality. Grandiose extrapolation is even more dependent upon assumptions. Sense experience and wisdom—informed by Revelation and science history—must be added to the process! Is reality infinite, material, eventless, uncreated and resulting from a top-down mathematics “incarnation?” Does bottom-up mathematics “shadow” the interaction of specially created/existing units of matter? Are mathematics and logic subjective? As long as the “meaning was optional,” different folks could agree to G!

A few thinkers began to espouse atomism. Their influence is hard to judge. Atomism received harsh criticism for its link to atheism. Also, its “chance” motions were anathema to mathematical determinism. Pierre Gassendi, a French priest, attempted to “reconcile” atomism to Christianity around 1630. Mercene and Descartes later attempted the same.

Resulting Scientific Progress. The centuries that followed saw great advances in knowledge (and theorizing) regarding reality. Witness the Scientific Revolution of the 1600’s to 1900.

First Principles underwent stress during this time. For example, Newton's Universal Law of Gravitation left gravity as a result without a cause and understood without experiments. Newton (1642 – 1727) was pragmatic! His equations at least “saved the appearances,” but he offered no theory as to how or why gravity worked. (On other subjects, Newton readily theorized!) He recognized that “causal” gravity eluded his grasp.

As an expert, pragmatic mathematician, he recognized the two-fold character of mathematics: a servant to empiricists; a Janus master [4] to seekers of the inaccessible. His celebrated fluxions (calculus) upset mathematical purists. The calculus replaced astronomical objects with mathematical points. Newton was accused of occultism! While a convenient calculating device, everyone could “see” that astronomical objects **were not** mathematical points.

His failure to explain the cause of gravity did not inhibit his contemporaries or later generations. (**Paradoxically**, Sir Isaac Newton is one of the few thinkers who did not believe in Newtonian gravity!) To understand gravity, these thinkers tended to theorize that mathematics is a top-down “incarnating” causal phenomenon, thereby easily “explaining” why $F = MA$! This, in turn, fostered thoughts re-espousing determinism and atheism.

Blaise Pascal (1623 – 1662) had warned that “the heart has more reasons than reason is aware of.” It is also true that “mathematics and logic have more answers than reality is capable of.”

But, all-in-all, great advances were made: common folk continued to discover direct facts; mechanical, chemical and craft tinkerers made instruments, processes and machinery; experimenters made discoveries. These various individuals were the primary developers of empirical science, engineering and technology. The printed word now spread knowledge rapidly, which stimulated additional minds.

Observers, such as in astronomy, also made discoveries; while thinkers, mathematicians and philosophers made predictions transcending experimental data.

Intermediate First Principles in Science. Approaching AD 1900, rational thinkers unfairly took credit for all achievements of the previous centuries, and Intermediate First Principles revised the original First Principles. As a result of their growing mathematical confidence, item H was added. Finding Direct Facts happened less and less because so much had already been found:

- A. The universe is real.
- B. The universe is rational (orderly), not chaotic.
- C. The human mind can understand the universe.
- D. Activity proceeds due to ‘cause and effect’ relationships.
- E. There is unity in the cosmos. One set of laws governs the universe.

- F. Scientific experiments and observations uncover facts. Scientific rigor helps to distinguish between storytelling, “saving the appearances” and ‘cause and effect’ relationships. Scientific results are expressed mathematically to limit ambiguity.
- G. Mathematics ahistorically reflects the rational order in nature; mathematics is a science.
- H. Rational thought can safely extrapolate into the inaccessible.

These austere Intermediate First Principles now had minimal Christian theoretical guidance. The question of “origins” was either ignored or thought to be answered within geology and biology. Common Notions of that day rejected “supernatural” or historical limits to ahistorical physical processes—thus hinting at infinity. Subsequently, many Christians began to talk less about God’s action in historical “events” and more about “principles.” As before, principles reflected belief, with evidence.

Mathematics had hardened into an incarnated top-down “commander!” Thus reality was infinite, material, eventless and uncreated. Dissention caused exclusion from the ranks of science, as scientists must “believe” in the infinite universe. Leading scientists were rational atheists, assisted by “clear intuitions” in their mind’s eye.

The impact of “clear intuitions” was most notable in the “theory of evolution” as **astronomers and mathematicians now “explained” the over-arching nature of reality.** They published “theories” that the universe was much larger and older than *ex nihilo* creation could allow. **This obligated geology and biology to “fall-in-line” and develop a “connected account”** that began with an utterly large and old universe.

Yet **mathematics changed from 1600 to 1900.** It entered as **mono-mathematics**, relatively simple concepts that could be physically modeled and easily accommodated to Euclid’s *Elements*. It exited as **poly-mathematics**—with all the democratic pitfalls that implied! Was this progress on the road to objective truth?

In the decades prior to 1900, observation or experiment had uncovered phenomena that were hard to categorize. Heat, chemical reactions, electricity, electric and magnetic fields, *etc.* were “hard to wrap your hands around.” Accordingly, mathematics rose in importance as an aid in “understanding.”

Atomism was now reviving, and it or its critics drew little distinction between atomism (a philosophy of chance and materialism) and atoms (the structure of elements). Chemistry and the budding study of elements gave atomism some prestige, suggesting another rationale for a resurgent atheism.

God and *ex nihilo* creation were replaced by a postulated mathematical certainty. Sight-seeing “explanations” exhibiting universal connectedness were expressed mathematically, so rationalists (mathematicists) knew these were “incarnated” geometrical truth, not mere foundationless “saving the appearances.” Further, experimental proofs about the accessible implied that whatever was mathematically said about inaccessible reality was also true. **Theory led to mathematics, which led to**

truth!

Two items hinted at impending problems. First, mathematics and logic were encountering hard times. Subjectivity was rife in their “advanced” dominions. They looked like creatures of imagination, not a mono-truth “commander”.

Second, all previous research had been on a “macro” scale. No one could enter into the atom. Such research would certainly support the then existing “science.”

Shifting to Paradigms from Intermediate First Principles. Well, the optimism was unwise. First, although abstract mathematics had great capabilities, there was now uncertainty about its **truth-guaranteeing power**. Attempts to rigorize geometry instead discovered non-Euclidean geometries. Attempts to rigorize arithmetic finally succumbed to the 1931 paper of Kurt Gödel on his “*Incompleteness Theorem for Formally Undecidable Propositions*.” The cloud of discredit remains, applicable to all four foundational schools of arithmetic: logicist, formalist, intuitionist and set-theoretic. [5] The sister discipline, logic, likewise splintered into many schools of logic. Rationalists reluctantly recognized that God and *ex nihilo* creation were not replaced by axioms, causality or mathematics, as originally thought, but by consistent connected “saving the appearances” of inaccessible realities.

Second, the Intermediate First Principles had been strained by Maxwell’s recent mathematical treatment of electrodynamics. The Intermediate First Principles were then violated by the relativised non-Euclidean extension of this electrodynamics and by “explanations” of the inner workings of the newly found atom. The atom is almost impossible to see; its component parts or fields are impossible to see. Researchers experimented on the atom, but what they “saw” was understandable only after being massaged by top-down poly-mathematics. They could not “see” causes. Models of the atom were offered, but they had known defects. Finally, in 1913, Niels Bohr swept the whole lot aside with his theory of the “solar-modeled” atom as a point-particle quantum phenomenon—using poly-mathematics to supposedly “open” the atomic black-box. All noticed that causality was sacrificed to definitions, but few noticed that the definitions were expressed with un-understandable poly-mathematics.

Perplexing experimental results led to increasing use of poly-mathematics. That was the price paid for unfortunate allegiance to the “clear intuition” that the unseen electron “point” exists within a solar model of the atom. Since then, mathematics twists and turns to “save the appearances” of the atomic and electromagnetic black-boxes. (It is like appealing to Plato’s mathematical heaven because the equations demand it! Or appealing to Democritus’ random atoms!) In revenge, “atomic science” became a complicated, congested labyrinth!

The mathematical triumph of relativity and quantum mechanics; the transition from mono-mathematics to poly-mathematics; the continued rational defense of *ex nihilo* creation; the rise of “sociologies” of knowledge and science; the rise of post-modernism; and then on to an enigmatic deconstruction caused rational thought to falter. (**Had truth**

been traded off for ahistorical continuity?) Intermediate First Principles needed so much revision that thinkers knew that agreement on a revised universal mathematical or logical basis for science was unlikely. **Thus science “splintered” into various specialized paradigms**—consensus agreements of specialized learned participants. (Outsiders, of course, were not learned.)

Indeed, such disciplines were so immersed in poly-mathematics that outsiders were not capable of understanding them. But they were not alone—many insiders could not comprehend them either, but could use them by following the rules. [6] Causality was replaced by rules. Was this the “new reality” or evidence of “saving the appearances?”

(The rise of paradigms allowed additional “disciplines” to acquire the mantle of science—such as economics, psychologies, social sciences and political sciences, for they were also guided by consensus agreement of their learned participants.) Yet the complexity of reality revealed weakness in “consensus.” Learned participants rely on many theories—much mathematics—much consensus—but little certain truth! So paradigm shifts occur and have scholarly subjectivity. Some learned participants “opt out” to post-modernism or deconstruction or New Age beliefs. All-in-all, Modern Science is another heady brew! In this milieu, direct facts remained curiosity pieces, with minimal influence against the startling new picture of reality.

Paradigms for Inaccessible Science. “General” consensus of learned participants is a catastrophic overhaul of science:

- A. The universe is an illusion. The inaccessible micro-world and macro-world are “known” with top-down poly-mathematics. The bottom-up mathematics of the Intermediate real-world is a lower-level science—or mere engineering or technology.
- B. Micro-reality is not causal. Experimental results are put into data arrays—to be retrieved as needed. Micro-reality is imprecise and chaotic—within experimental limits. After all, a whizzing, orbiting point-particle electron generously twists and turns to “save the appearances” of the reality of spinning charged ring electrons (first postulated in 1915 by A. N. Parsons as *magnetons*.)! Supposedly, when returning to the real-world level, Intermediate First Principles reappear!
- C. Actions proceed due to whatever is in the data arrays, as ‘cause and effect’ predictability is replaced by definitions and indeterminacy. This is the “death of (classical) science.” Science is a game—with strict rules, paying homage to the non-causal nature of quantum mechanics.
- D. In spite of chaos, there is unity in the cosmos, but there is no TOE (Theory of Everything).
- E. Experiment and observation are needed to uncover some facts.
- F. Mathematics proves that nature is infinite or unbounded. **Mathematics is the Foundational Science!** We know nothing about the micro- or macro-worlds, only their equations. (This reflects the dark-side of the Janus mastery of

mathematics.)

- G. Rational thought, based on the above, can safely extrapolate into the past or whatever had been considered inaccessible. Prodded by relativistic ideas, they did switch from an infinite universe to a finite, unbounded, but expanding universe. Consensus teaches that science no longer “sees through a glass, darkly.” The “unaided” noble human ego was proud of its **consistent connected mathematical models that display the unaided proof of the unity of the materialistic universe.**

Eight centuries ago, science had been helped, then hobbled, by **Aristotelian logical Scholasticism**. Today, science is helped, then hobbled, by a **neo-Platonic mathematical Scholasticism**. While experimental science, engineering and technology thrive, Paradigms for Inaccessible Science struggle to present themselves as responsible for this success.

Few see what is hidden in plain view: that which thrives and Paradigms which struggle both use mathematics—but not with the same attitude! Empirical science is comfortable with a bottom-up attitude toward reality, for explanatory failure is a frequent companion of accessible science. On the other hand, inaccessible science is euphoric about its top-down explanatory successes! But the success/failure comparison is too jarring. It hints that “success” is “saving the appearances.”

Trails leading to False Science. Mankind is now as modern as can be, yet inaccessibility and many black-boxes remain! Scientific truth has a history of “half-lives.” Failure analysis indicates that a major problem has been “clear intuitions” or theories about opening black-boxes, based not only on current “research,” but with a life-line back to unprovable articles of Greek rational belief but hidden by top-down mathematics “creating” a “reality” that may be “other” or larger than reality actually is. This gives witness to “saving the appearances” within a complex, congested labyrinth, but not of reality:

First, to use a paradigm consensus to uphold the infinite (or unbounded) universe and to exclude the supernatural begins with an “IF” and ends in...a consensus. To investigate what “is”, without grandiose theories, would be “like” empirical science (and its “bottom-up” mathematics), not Paradigms for Inaccessible Science (and its “top-down” mathematics). Fossils do not come with age tags attached; so also, sub-atomic parts do not come with equations attached.

Second, mathematics still suffers from hard times. This goads some thinkers into mathematical tinkering not sanctioned by the consensus Paradigm. Manipulation of equations that “revise” relativity, quantum mechanics, or the “big bang” upset defenders of the consensus Paradigm. But such tinkering retains the twisting, turning, poly-mathematical dance! Even more incomprehensible to them is to question the nature of gravity, the nature of electromagnetism, or the structure of the atom. Defenders of inaccessible orthodoxy see all such questioning as a threat, not as a life-line!

Third, to investigate the inaccessible past requires “belief” in uniformitarian processes. Present earthly processes include historical catastrophic events, such as earthquakes, volcanoes, hurricanes and tsunamis. (Recent such events are small compared to what has happened over the last several thousand years—and even smaller when compared to Noah’s Flood.) Therefore, **uniformitarianism is indeterminate**, an ahistorical “clear intuition,” but not a reasonable thought!

Fourth, it is fashionable to say that science includes such as astronomy, which substitutes repeated observations, manipulated by consensus equations, for controlled experiments. However, an orbiting satellite observes, it does not perform experiments. (The distinction is real, but brilliant engineering and technology still pay generous dividends!)

Fifth, research into “micro” nature now includes molecular life. Is there really biological “Irreducible Complexity?” The direct facts do not support consensus Paradigms!

Sixth, consensus paradigms claim experimental support to which they may not be entitled. Many cite, but do not read, foundational research papers. In relativity, this paper is Sir A. S. Eddington’s on his 1919 eclipse expedition, published in *Nature*. In 1922, the astronomer, Charles Lane Poor critiqued this report with his *Gravitation versus Relativity*. More recently, *Sky and Telescope* reported that the 1919 eclipse expedition’s “results were of only 20% accuracy and plagued with systematic errors. Later eclipse expeditions show only minor improvements in accuracy!” [7]. Ironically, Relativity Theory is so firmly believed that the *Nature* article receives benign neglect.

Seventh, consider the Natural Philosophy Alliance. Their consensus of learned participants is that General Relativity, Special Relativity, (Copenhagen) Quantum Mechanics and the Big Bang are all wrong! The Alliance has at least 1800 degreed members who “agree on little more than that something is drastically wrong in contemporary physics and cosmology.” They illustrate the important point that a “proof of a theory” may be claimed as proof for another theory, (presented, of course, by an equally degreed expositor). Why don’t equal academic degrees lead to equal “scientific” thoughts about the inaccessible? Thus the supposed 100 “experimental” proofs of the Relativity Paradigm must be scrutinized for compatibility with other Paradigms. How many of the 100 “exclusive” proofs of Relativity survive this filter?

The above list blasphemes Paradigms for Inaccessible Science! The supporting consensus of learned participants is too dependent upon “clear intuitions,” easily swayed by dominant personalities and replete with “confirmation bias” bolstering inaccessible truths.

While Christianity says that “*love covereth a multitude of sins,*” mathematicians say that “*The noble human ego covereth a multitude of gaps.*” Science needs a life-line back to reality!

The Minority Report; Part I, The Human Response. The Rest of the Story.

Over the centuries, not everyone rejoiced in the “passionate search for truth and beauty” that Euclid’s *Elements* had inspired...or at least they did not like where it was going. These disillusioned ones did not like what an “un-event-filled” mathematical straight line said about themselves. **It consigned all mankind to meaninglessness**, so they thought it was a virtue to be alienated from science!

Romanticism sprang up in the mid-1700’s. It opposed rationalism and emphasized arts, music and literature. They wanted to find personal meaning by bravely facing untamed nature, usually as creative loners.

Existentialism began about a hundred years later and was first stated by the Danish philosopher, Søren Kierkegaard. In the twentieth century, such as Jean Paul Sartre were the leaders. They emphasized emotions, decision making and a “leap of faith in the dark,” in spite of the absurdity of an “un-event-filled” life on a mathematical straight line.

Phenomenology began with Edmund Husserl. It was a study of conscious experience, consciousness and the meaning of phenomena.

Modernism is against tradition, even enlightenment thinking, as well as against a creator. It has seen the verbosity of philosophers and realized that reality has unexplainable complexity. Philosophical schools stop arguing over the supremacy of your unconvincing creeds.

Post-Modernism is getting more uncomfortable. Even science has wisps of subjectivity. Thought has enough freedom to be bent by social “needs”. Reality is relative.

Sociology of Scientific Knowledge. This is really probing in taboo regions. Are “free thinkers” willing to defend their knowledge—without biases?

Deconstruction began with Jacques Derrida. Words form traditions. De-Sedimentation is the process of separating the layers of meaning. Truth no longer has meaning!

In a parallel manner, other thinkers praised the science resulting from Euclid’s *Elements*.

The earlier mentioned pre-1800 atheists and philosophical theists expressed contradictory road-maps as to how to find truth.

British Empiricism and later, John Locke, emphasized sense experience coupled with skepticism.

Pragmatism meant much the same thing, but sprung up in America.

Positivism began with August Comte and emphasized the “scientific method.” It was against anything metaphysical.

Immanuel Kant, and many others, struggled to “objectify” what all moderns knew to be true. Indeed, “.... The technical jargon of one school shortly becomes the gibberish of the next.” [8]

For those who considered themselves “scientific,” these positions were un-understandable, irrational and embarrassing! Yet none of these knew how to rationally circumvent the principles of science or its “proven” accomplishments in the previously inaccessible.

The lack of personal meaning troubled some. We, today, must not forget the historical disarray of thinkers! The disarray continues.

The Minority Report; Part II, Classical Science. The Rest of the Science Story.

Consider the mathematical triumph of Relativity and Quantum Mechanics: what did they triumph over? It was the Intermediate First Principles of Science—otherwise known as Classical Science or Empirical Science.

All factions praise the axiomatic method of Euclid’s *Elements*, but some wonder how to apply that abstraction to reality.

[T]he elementary particles of modern physics are even more abstract than the atoms of the Greeks.... [I]t is not a material particle in space and time, but only, in some sense, a symbol whose introduction gave the laws of nature a particularly simple form. [9]

Was this a “science” of storytelling or of puzzle solving? It is possible that these investigators over-relied on a flexible mathematics. Amusingly, Albert Einstein said the following about the beginning of quantum theory:

Einstein appeared to have a similar opinion (of Heisenberg’s 1925 paper).... “The most interesting development produced lately is the Heisenberg-Born-Jordan theory of quantum states. The calculation is pure witchcraft, with infinite determinants (read matrices) in place of Cartesian coordinates. **It is most ingenious and, owing to its great complexity, safely protected against any attempt to prove it wrong.**” [10]

Beware of the labyrinthian nature of poly-mathematics! Also, few thinkers want to admit they do not understand esoteric mathematics. So they bow to the consensus of learned participants.

Quantum electrodynamics gives the most precise predictions of any physical theory. Yet physicists have known from its birth that it is self-contradictory. They make *ad hoc* rules for handling the inconsistencies. Divergent series of divergent terms are manipulated and massaged. [11]

Classical Science did not “roll over and die” just because consensus paradigmers told them to! I suppose the members of the Natural Philosophy Alliance are primarily adherents of Classical Science, as likewise the workers in the intermediate real-world, and technology and engineering. (As mentioned earlier, Classical Science is also “stand-

offish” in regard to Christianity, and also cherishes the ahistorical attitude to reality.) Classical Science adheres to the ‘cause and effect’ criteria. Ernst Mach (1838 – 1916) enumerated a number of criteria, centered around a rejection of unseen entities and undue trust that mathematical constructions exhaustively reproduce the real [12]. Classicists accused the paradigmgers of accepting “saving the appearances” instead of requiring the more rigorous ‘cause and effect’ criteria. No one has disproved what may be called the “irrefutability theorem,” that an incorrect theory, given access to much poly-mathematics, cannot be proven wrong! The resulting rap sheet includes the following:

- Non-Euclidean geometries have never been proven; all we know is that if Euclidean geometry is consistent, so are they. To use a non-Euclidean geometry as part of the “proof” of relativity is convenient “saving the appearances.” There is no ‘cause and effect’ process involved. Something is missing or wrong.
- Black-body radiation is not explained with Planck’s constant, yet it matches experimental results, but there is no ‘cause and effect’ process involved. Something is wrong or missing.
- To construct the inaccessible atom out of gluons, quarks, fermions, hadrons, force-carrying particles, *etc., etc., etc.* is poly-mathematical “saving the appearances,” there is no ‘cause and effect’ process involved. Something is wrong or missing.

Paradigmgers respond with “get over it.” This is the nature of reality! The micro- and macro-worlds don’t use ‘cause and effect’ criteria. You need to learn modern poly-mathematics, its data arrays and rules! (**Oh! They slyly ask:** “Explain the atom without us, if you can!”)

Classicists reply with “get over your mathematical infatuation!” Platonism is dead. Retreat from its ethereal mathematical heaven and replant your feet in the intermediate real-world.

And on ... and on ... the non-communicative conversation goes!

Those who hesitate before entering the paradigm labyrinth have a desire for a believable, robust model of the atom.

The Minority Report; Part III, The Atom. The Rest of the Science Story.

Fulfilling this desire is the major interest of a Christian group, Common Sense Science. They reject the solar model of the atom, thereby rejecting the sly temptation thrown out by the paradigmgers. Their Spinning Charged Ring model of the electron holds great promise of exercising Occam’s Razor. (And the model may impact additional subjects. The atom: a small item—enormous impact!). I look forward to the further work of Common Sense Science.

Over the entrance gate of Plato’s Academy was a sign, “*Let no one destitute of geometry enter my doors.*” Likewise, over the gate to paradigmatic science is a sign, “*Let no one destitute of the solar model of the atom enter my doors.*” Indeed, there is an abstract

ethereal similarity between the two!

The Common Sense Science researchers were all trained in Paradigm Science, but doubts arose as they tried to reconcile such “science” to Christianity. An immediate predecessor, Dr. Thomas Barnes, had investigated the characteristics of a finite size electron in the solar model of the atom and interesting results were obtained. However, he also reconfirmed the impossibility of such an electron existing in the solar model. Somewhere in this research, someone found references to electrons as stationary rings, leading back to A. N. Parson’s 1915 paper on magnetons (electrons with magnetic fields). Common Sense Science then brought this research up-to-date [13]. It was also realized that it was necessary to revisit the principles of science that are modeled upon Euclid’s *Elements*:

Definitions:

- Mathematics, including Euclid’s *Elements*, is pure abstraction.
- The universe is the physical reality.
- Science studies the universe to the extent possible, which excludes the infinite.
- Mathematics aids science in this project.
- The universe consists of matter, energy and electric and magnetic fields.
- Matter is comprised of electrostatic charge and associated electric and magnetic fields which have a precise form that keeps particles stable as electrons, protons, positrons, and antiprotons. These have finite dimensions and thus have internal structure.
- Their characteristics are therefore derived from electrical laws.
- The Law of ‘cause and effect’ is all that has been observed.
- Force is derived from interactions of electrostatic charge with electric and magnetic fields. The force-phenomena includes self-forces of each particle as well as force exerted by one particle on another particle.
- The Law of Conservation of Energy is all that has been observed.
- The universe has observed irregularities (events). About these events, science cannot be authoritative.
- Defined characteristics are saving the appearances.

Axioms: The following are valid:

- Gauss’s Electrostatic Flux Law.
- Gauss’s Law for Magnetism.
- Ampere’s Force Law between Current Loops.
- Faraday’s Law of Induction.
- Lenz’s Law for Non-Conservative Forces in Electromagnetic Induction.

- Lemmas are invoked as appropriate.

Common Notions:

- The same as in Euclid's *Elements*.

With this starting point, Common Sense Science (CSS) research has two major thrusts. The foundational thrust is to elaborate the structure of electrons, protons, positrons, and antiprotons. The other thrust is outward to the sciences of the cosmos. The results are detailed and published in their journal and newsletter named **Foundations of Science (FOSN)**. (See www.CommonSenseScience.org)

I would particularly point readers to the following topics in **FOSN**. The early model of the electron is discussed in many early Journal issues.

- Reasons why the ring model of the electron is superior to the point model: **FOSN**, Vol. 4 #4, page 10.
- Universal Force Law (Electromagnetic): **FOSN**, Vol. 9 # 2, to Vol. 10 #1.
- Electromagnetic Origin of the Force of Inertia: **FOSN**, Vol. 10 #4 to Vol. 11 #2.
- Electromagnetic Origin of the Force of Gravity: **FOSN**, Vol. 11 # 4, to Vol. 12 #2. Ramifications are elaborated in several subsequent issues. (Because gravity is electromagnetic, not a “passive” force of gravity, the ring electron’s fingerprint shows through all “sizes” of nature, in such as chiral structures and the slow decay of the force of gravity.
- **FOSN**, Vol. 13 #1, has announced a refinement to the model of the electron (Spinning Charged Ring model), but the details have not yet been published.

The best approach to science is supposed to be the axiomatic method in which science is reduced to the minimum number of axioms and all the theories of science are derived logically from these axioms. The notion is that the simplest axiomatic approach that can explain all the data is probably closest to the truth [14].

A Christian Comment. Many people think they avoid unclearness by differentiating what they call Operational Science from Historical Science. Rather, they should differentiate between Empirical Science, Paradigm sight-seeing and historical studies.

Christians frequently warn against the “Primary Axiom: Evolution and Natural Selection.” Yet we are beginning to re-recognize the more Primary Axiom: “Astronomy shows that the universe has ‘vast distances and long ages.’ The subsequent job of geology and biology is to fill in the details.”

Not surprisingly, some Paradigm Protectors sense that their orthodoxy is facing a scholarly challenge. Unfortunately, they lash out at scholarly dissent. They may charge that learned Christians illustrate “belief without evidence.” But the paradigmgers’ ahistorical contemplation of the inaccessible makes them uncomfortable in searching

history and its events. Their ahistorical explanatory hypotheses' are "belief with insufficient evidence—a group-think." Equating paradigms with science is not wise. Reality provides no guarantee that *consensus* explanations of an inaccessible, complex, congested reality are not a mirage. Top-down mathematics and logic may "lock-up" within an event-filled reality. To claim that scientific investigation is not limited by the supernatural presupposes "uniformitarian" extrapolation to the uttermost. Such theorizing frames the answer ahistorically before the investigation starts; such a far-reaching "clear intuition" is self-serving.

This analysis is not a common message. Learned discussions rarely express doubts about the "big 5": General Relativity, Special Relativity, Quantum Mechanics, the Big Bang, and Evolution. Studying or criticizing them quickly encounters a wordy, mathematical haze. It seems best to leave the paradigm labyrinth and go back to the beginning, the search for knowledge.

Doubt is becoming rampant among the younger generation. They have read the **philosophers of philosophy** and other leading lights, but sense an ingrained haze. Some have advanced to the foreboding **philosophers of science** and are delving into inaccessible science. There they also surprisingly encounter the ingrained haze. (What a pity the de-sedimenting Deconstructionists do not ponder modern science [15].)

Present rational confusion calls for a reconsideration of historical "events" versus the reigning paradigmatic consensus that serves as gatekeeper to the inaccessible. The "irrefutability theorem" renders fruitless the attempt to "clean house" in labyrinths by merely tweaking consensus paradigms. While separating direct facts, engineering and technology from consensus overburden is helpful, the need is to step outside. Christianity, which takes Bible history seriously, offers cleansing from tarnished "clear intuitions" which forbid "events" due to the "reality" of the mathematical straight line.

So, **what doth science mean?** Science is a finite, experimental and measuring endeavor to find truth, by distilling out regularities and the associated mathematics. Unfortunately, it is surrounded by a wordy, mathematical haze that struggles with how completely reality is understood, how far the data is valid, and how to concurrently defend our "knowledge" of the inaccessible. Philosophers of science diplomatically agree. They seem to say, "I have written a large book on science, but, in a few words, I cannot say what science is."

References and Notes.

FOSN — Foundations of Science News, published by Common Sense Science, PO Box 767306, Roswell GA, 30076-7306.

[1] David L. Bergman, "Science of Origins, Part 1," **FOSN**, Volume 10, Number 2.

[2] **The Ante-Nicean Fathers**, Volume 1, page 396. Editors: Roberts and Donaldson, 1989 reprint of original.

- [3] **The Age of Adventure**, edited by Giorgio de Santillana, pages 69 – 70. Emphasis added. The first sentence is by da Vinci. The rest is by the editor.
- [4] From the title to Arthur Koestler's **Janus: A Summing Up**. Janus, a Roman god, had two faces.
- [5] See **Mathematics: The Loss of Certainty**, by Morris Kline.
- [6] "I can safely say that nobody understands quantum mechanics," by Richard Feynman, as quoted in the **Passion of the Western Mind**, by Richard Tarnas, page 489, note 2. Or Murray Gell-Mann, "One supposes that (quantum mechanics) is exactly correct. Nobody understands it, but we all know how to use it.... And so we have learned to live with the fact that nobody can understand it." As quoted in **How is Quantum Field Theory Possible?** by Sunny Y. Auyang, page 229.
- [7] **Sky and Telescope**, October, 1983, page 198.
- [8] **The Age of Ideology**, edited by Henry D. Aiken, page VII.
- [9] **The Atom in the History of Human Thought**, by Bernard Pullman, page 309. A quote from Werner Heisenberg.
- [10] *ibid*, page 290. Emphasis added.
- [11] **What is Mathematics, Really?** by Reuben Hersh, page 31.
- [12] Charles Lucas, Jr., "A New Foundation for Modern Physics." **FOSN**, Volume 4, Number 4, page 2.
- [13] This historical search is summarized by Charles Lucas, Jr. in "Structuralism—Key to Reality and Meaning in Science." **FOSN**, Volume 12, Number 4, pages 5 and 6.
- [14] Charles Lucas, Jr., response to reader question. **FOSN**, Volume 12, Number 1, page 3.
- [15] Paul Feyerabend may not have considered himself a deconstructionist or a sociologist of knowledge, but his **Against Method** is caustic.