Some Truths of Science

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ABSTRACT: I intended to title this paper "True Science!" Instead, "Some Truths of Science" will be more palatable until some definitions become clear. I was trained to manipulate mathematics to fit nature and at the same time trained to manipulate observations to fit mathematics. This gave me the ability to contribute to the subject of atmospheric physics in basic research. Knowing this manipulative aspect of science, I find it difficult accepting the term "laws of science" as is commonly used in our Wisconsin Synod circles. This paper will attempt a slightly different bent to the familiar semantics. I feel a change is necessary because of the world's worship of science. The new semantics must separate the laws of men from the ordinances of God

The laity of science might find the concept of science as an art form difficult to accept, but the understanding of nature in a modeling sense needed for prediction is not readily derived from observation. For example, Prof. Lettau, a world authority on atmospheric turbulence, claimed ten numerical laws of turbulence are discovered every year. The difference between all these and the most nearly true explanation is the theory based on first principles. Here is the artistry: Mathematical models are derived from fundamental definitions and concepts of matter and energy. These are conceived in the imaginative minds of men.

God has given this scientific and technological age so much that we all tend to count the many gadgets as proofs of understanding nature with certainty. Yet in the history of science, every age was certain of its understanding of nature. I have deliberately chosen astronomy because it is one area we are so convinced we are certain of. I do not intend to turn us into geocentric astronomers. I accept heliocentricity as most do. But we dare never say we know nature with certainty. Other ages have said that. Today we look at their proved laws as nonsense.

We run this same foolish risk with Creation Science. We put our trust in the words of scripture in jeopardy every time our science falters. In this scientific age of science worship, such a risk, in my opinion, is not worth it. You may pick and choose, but in science, "What is truth?" Today's Creationist I find to be rather weak scientifically. I have taken one of their strongest theses, the Second Law of Thermodynamics, and briefly examined it for us today. I judge its use by Creationists to be in error, its application exceedingly limited according to practicing physicists, and see its possible rejection in the near future.

God's Word asks that we walk a rather narrow path. Evolution and millions of years for creation is obviously wrong. Instantaneous creation is wrong too. Only six days is correct. Evolution goes particularly wrong when it puts man's wisdom above God's Word. Creation research goes wrong when it adds to God's Word and intermingles with errors of the Market Place. God's Word alone prevails.

Some Truths of Science

It is properly taught among us that a correct study and observation of the created universe and the laws established for its operation in the creative activity will never conflict with Scripture. It is quite an exciting life pursuing the true Laws of Science with which our Heavenly Father governs nature all around us. All mankind is richlyrewarded for adhering to the Laws of Science, scientific prediction, exploration, and discovery. Without a doubt these times of technological and scientific advancement are rich and blessed times.

There is a "but" coming. The "but" I wish to describe is a very old one and too quickly passed over in this scientific age. The "but" I wish to describe does not apply to Democritus, Charles Darwin, Alfred Russel Wallace, or Richard Leaky' alone, but to absolutely every root and branch of the subject today identified as science. A truth more fundamental than the socalled Laws of Science is that those algorithms, those classifications, those math functions determined to be laws are not determined to be such unalterable or correct laws in the same way the Ten Commandments are, nor in the same way the clear doctrines of Scripture are. The

Laws of Science are determined as such laws by the inventors of those laws. Newton's Three Laws of Motion were first established as laws, ranking above theory, by Isaac Newton himself when he first proposed them. We will see that Kepler's Laws of Planetary Motion all were referred to as law long before, centuries before, confirming evidence. Here now is the "but". It is a tragic fact that today the vast majority of scientists, upon whose shoulders rest the decision to regard a concept as law, embrace evolution, a philosophy that denies God's almighty hand in creation and His continued maintenance of that creation. These scientists with their blasphemous theories and laws exist in every branch of study in what today would be recognized as scientific. Physics and chemistry are no less immune from evolution than biology or works like *Origin of Species* by Charles Darwin or *The Ascent of Man* by Jacob Bronowski. Newton's Laws of Motion and Universal Gravity exist equally along side explanations governing chemical evolution. When it comes to the subject of science, absolutely none of us, believers and unbelievers, Christians and atheists, creationists and evolutionists, can escape the Idols of the MarketPlace. We use our reason built on and learned in part from other systems of thought. We all, in error, bow before these Idols of the MarketPlace. To the Christian servant in God's laboratory of nature these are the tares among the wheat which cannot be separated until the Final Harvest. I believe Galileo and Newton have done more for evolution than Darwin ever did.

I fear in today's worship of science, using phrases and definitions such as "science is an approach to material truth", "the Laws of Science are the methods by which God governs the universe", or "God established the Laws of Science the creation week" can be a detriment to Christian faith. To claim in a course description that an objective of a science class in a Lutheran school is to teach the student to distinguish between the Laws of Science and just theories or to limit the subject to true science is either an announcement of naivete or an acceptance of a wolf in sheep's clothing. These terms worked very well a generation ago, when in academic freedom, Darwin's theories could still be debated. Today, more than one hundred years after *The Descent of Man* (Charles Darwin, 1871) this is no longer possible. Terms like Laws of Science and material truth have come to mean very different things. I believe our Lord lets language change, mathematics change, and scientific interpretation of nature change in order to keep us studying and returning to His unalterable and inerrant Word. Each of us in our age must turn to Him for the solutions to our problems. I do not wish to ignore the past. In fact, the history of science is vital to understanding any explanations of nature. It is a crucial mistake to learn the Laws of Science before learning the setting from which they came. But today a student of science fed on the certain Laws of Science, equated with God's Laws of Nature, is a sitting duck for the poachers during open season on the game preserves of university and research centers of the world. I am not so sure we should claim Newton's Law of Universal Gravitation was created creation week. I do not doubt that the order by which things move on this planet and among the other planets and stars was created the creation week. But Newton's Law of Gravitation was developed in 1687. It was rejected by Ernst Mach in 1893. It was entirely revamped by Albert Einstein in 1917.[7] Newton's Law is still taught as true in every one of our schools.

Though we all could live quite well with using the term Law of Science as something true and attempt to differentiate between what is a law and what is just a theory, I believe all children at our feet would be better off hearing a delineation between God's ordinances and man's laws. A work on the history of science in which I attempted to explain these problems was rejected from publication for fear of stirring up debate with the Creationists and because it was primarily a game of semantics. But it is not a game. Generations employed in science have gone to the grave frustrated in their search for true science. Some have gone to hell for abandoning their faith for what they thought was true science. You see, believing that I could grasp true science, that I could learn to distinguish between fact and theory, between theory and law, that I could communicate true science as our own Wisconsin Synod Lutheran Science Institute does, only set me up for a mighty fall. All a university professor need do is display a superiority of his reason over mine, true or not. By God's grace I have been called to teach science instead of discover science. Thus, God has spared my soul. Formerly I was dedicated to atmospheric physics and glaciology with research offices of the United States and as guest of foreign expeditions. Now I accept the Lord's dedication to me as an erring individual. My own reason in my research convinced me of the logical strength of evolutionary science and of the frail pseudo-science claiming to be creation science. Such a faith propped with reason would not have survived in the pursuit of true science. Hence

God keeps me a teacher in the academic freedom of His Word. Stronger laymen continue in engineering and science, also in God's gracious providence.

In this lecture permit me to define true science to be simply the true way in which the practitioners pursue their trade, the true way in which men attempt to describe the environment God has placed them in. This does not mean their methods are true. It does not even mean their scientific conclusions are true. *A law of science at best is only a theory which is no longer debated*. Some may always wish to debate, but the influential, rightly or wrongly, begin to use theories to support other theories and thus call the first a law. All recognize the truth of their conclusions is limited to the truth of their founding assumptions and laws upon which they build. In my experience it has only been teachers who claim for the Laws of Science more than the scientist. Too often the rigid scientific approach of a classroom leaves a student with the idea that the Laws of Science are proved. He spends his high school and undergraduate college days memorizing these Laws of Science. He reworks the famous experiments demonstrating these laws and concludes that these laws must be proved. Yet the scientific community is struggling desperately to change them. No scientist dare claim such certainty for the things called laws. And no true scientist does! Nature is just far too complicated to yield to a simple formula. Here is where all must bow humbly. Einstein claimed we can only attempt to explain the simplest things in nature. Anything of a complex nature is beyond human intellect. Paul, by inspiration, writes that in nature is where all can witness God's eternal power. Such is the true magnitude of the created world.

I'd like to get a bit more technical than the science classroom in order to show why I am convinced from a purely technical argument that the Laws of Science cannot make a claim for certainty. Any abstraction a man formulates in a test tube is vastly separated from the real world. Think of the many inverse square laws: gravity, magnetic field strength, intensity of light, intensity of sound. Did God create all these things according to an inverse square law or is man's reason, especially of the eighteenth and nineteenth century, stuck on this one math function? Most certainly from a purely mathematical point of view, many more functions could equally well apply. Consider all the socalled universal constants. The speed of light drastically changes for different media; hence, one must use an index of refraction. Different physical substances radiate heat differently than the Stephen Boltsman Law; hence, a wide ranging emissivity constant must be applied to the Stephen Boltsman constant. Plank's constant requires quantum number multipliers. The gas constant is defined with respect to an ideal gas. Very complicated formulas and additional manipulative constants are needed. The simple elliptical orbits of Kepler's Laws for planetary motions that we teach in the real world of astronomy turn into mathematical expressions of more than one hundred printed pages in length. A mathematical model of our solar system still presents baffling difficulties. And when turning the computer backwards at the urging of a famous historian of science and mathematics, O. Neugebauer, using the most uptodate theories of planetary motion, disagreement with well documented events in ancient times still a requires several empirical adjustments. John Dalton established the Laws of Definite Composition and Definite Proportions which established the atomic theory beyond question today, but a whole generation of chemists had to follow who accepted the theory and beat the data into submission. Normal laboratory measurements did not produce the exacting numbers needed without adjustment and explanation.'

Science is an entirely human endeavor. Its laws are intellectual models of artistry. They bear little concern for material truths. This is an extraordinary thing to say: But just think of some material truths. There is a roof over our heads. The winter of '79 produced great quantities of snow. The stars are an unfathomable, magnificent sight to see. The scientist could care less. He is pursuing the truth of subatomic structure, black holes in space, gravitational fields, protein synthesis, the particle structure of light, and the wave structure of light. He does not care that an apple falls from a tree. He desires to statistically fit a mathematical curve to the changing fall rate of that apple reduced to a point mass as it falls to earth, also a fictitious point mass, all taking place in a frictionless nonatmosphere. This is what I call true science.

Mathematics is the language of science. At its simplest level of research and development, the student of science must be fluent in the integral calculus and partial differential equations. It is here among the integration constants and the Eigenvalues where the artistry takes place. Here is where the laws are impressed on nature. Here is also where the laws collapse as the math constraints remove the laws too far from the real.

A sad truth exists that in standard chemistry and physics courses, without the years of mathematics, a student never gets to see this artistry. The Laws of Science taught with only algebra and trigonometry have a way of impressing people that they are absolute, certain, and unchanging. In this frame of reference I can understand why many teachers of science who have not seen the manipulative side of discovery tend to believe the laws as proved rather than heuristic programs upon which to base continued and expanding research. I would hope the science training of future pastors would stress surveying the many fields of science rather than taking courses meant for engineers and mathematicians. A sampling of the frontiers is needed where the scientist must say again and again, "Our laws remain limited to an equilibrium process, limited to steady state, limited to an idea, governed by these constraints, revised by those additional constraints, or we simply do not know." Biology and the many earth sciences such as geophysics and oceanography are the current frontiers of science. Did you know it is not yet possible to establish a theory governing the growth of a rain drop? Yet God still sends the rain. Did you know sea level is far from level nor can it stabilize according to current wisdom? Did you know the planet earth is a warm planet not capable of having glaciers such as Greenland or Antarctica? Did you know the first lifedetecting satellites launched from earth failed to detect life on earth. Orbits of electrons have been abandoned at least since the 1940's. The mass of an atom may be nonexistent at rest; it appears to derive its weight or maybe even existence from the motion of the protons.' The concepts of magnetism all of us have learned are in total disarray. This sounds like the questions God asked of Job.

Back to "true science". I have tried to show that those things commonly called by the teachers of science and the scientists "laws" are artistic inventions of thought, made to fit experience. I now would like to turn to a little history of science to see these changing laws. Let us examine briefly the history of astronomy. I don't think anyone here doubts Kepler's Laws of Planetary Motion, that the earth as well as all the planets orbit the sun in an elliptical path with the sun being at a focal point. Yet for most of written history men did not believe these laws and followed other laws quite successfully.

The scientific record of men up to Thales is primarily lost. The brilliance of these men is not doubted. Innumerable sketches, numerical progressions for planetary motions, star charts, and building alignments related to the sun, moon, and stars exist, but remain quite unintelligible at our disadvantage point. We simply lack the wisdom of interpretation of these ancient scientific thoughts. Just how Thales could forecast a coming eclipse remains mysterious. The record itself is even uncertain if he did or not. This is a major problem confronting the historian of science. We can see the remains of civilization, but their thoughts slip through our fingers to the unknown. Nevertheless, every age was certain of its philosophies and its understanding of nature just as we are certain today. It always takes one more age to learn the difficulty with the certainty of the present age

The most intriguing phenomena of the heavens were the wanderers. Most of the early civilizations identified seven sun, moon, Mercury, Venus, Mars, Jupiter, and Saturn. These bright objects in the sky moved while all the stars kept their relative positions with respect to each other. Five of the wanderers displayed retrograde loops relative to the background of stars. It was these wild motions which man desired to explain. (Fig. 1)

I will begin with the Pythagoreans. Their approach to science was similar to out own, almost a fanatical obsession to interpret nature entirely in abstract mathematical patterns. The interrelation of completeness and the number ten led this school to believe in ten planets. In an effort to get ten planets, they became the first presently known group to consider the earth among the planets. The four perfect solids (cube, tetrahedron, octahedron, and icosahedron) signified the four elements (earth, fire, air, and water). The discovery of the fifth solid (dodecahedron) led to the discovery of the fifth element ether. This element filled all space and in it moved the planets. Perhaps this line of reasoning appears fanciful, but I believe no more fanciful than the abstract mathematical derivations within science today as we try to generate meaning out of unsolvable second order partial differential equations.

These Pythagorean thoughts gave Plato the hint for his greatest assignment handed down to the many disciples pursuing the science of astronomy. Plato suggested the solution to the motion of the planets was in terms of circles and spheres. For the next 2000 years no other method of abstraction was tried. However, an

insight to scientific thought is gained when you realize these retrograde loops contain no hint of circles or spheres. They do not hint of ellipses either.

The first meaningful diagram we have of our planetary system is that of Eudoxus made popular and widely known by Aristotle. Such a system of interlocking concentric spheres adequately describes the motion of all the wanderers for several centuries. This system fit all demands science expects of itself. (Fig. 2) The interpretation of observations in light of the theory fit. With acceptance, theory becomes law.

An earthcentered universe had its early challengers, Philolaus (400 B.C.) and Aristarchus (250 B.C.). But these and all other challengers were defeated by both reason and observation. It was heliocentric parallax, an oscillating motion among the stars that would have to be witnessed opposite any contrived motion of the earth. Century after century passed with no such observation. Even the telescope would fail to see such motion.

The pinnacle of ancient science in astronomy was achieved by Claudius Ptolemaeus (100 A.D.178 A.D.), in his work he amassed for a quarter of a century first known as *The Mathematical Composition*. The Arabs renamed it *The Almagest*, (The Greatest). This unified set of laws of planetary motion fit the observations better than any before and predicted with an accuracy better than was capable of observing with the first generation of telescopes. (Fig. 3) This ability to fit the observations so accurately still has historians questioning why Copernican theory did not have a more difficult time before acceptance. The laws of Ptolemy defeated all challengers for 1500 years. No modern set of laws in science has survived so long. Many laws of today are already on the brink of collapse after only a few centuries of existence.

This brings us to another time to change the laws of science regarding astronomy. Nicolaus Copernicus first published an outline of his theory in 1530 (Commentariolus). Thirteen years later *On the Revolutions of the Heavenly Spheres* appeared as he died. Copernicus returned to the thinking of the earlier Philolaus and Aristarchus which questioned a stationary earth. A rotating revolving earth moving uniformly as the other planets around the sun replaced a stationary earth. (Fig. 4) Were the times less turbulent and in less of a spirit for change, the Copernican theory may have died as all earthmoving theories did before, failing to conform to experience.

Many astronomy textbooks claim the Copernican theory was simpler and more accurate, especially after the confirming observations of Tycho Brahe. But in that day, both these ideas were wrong. Copernicus was forced to use epicycles as Ptolemy to fit the observations. That made the Copernican system especially with the wild idea of earth motion, much more complicated. He failed to witness heliocentric parallax. Retrograde loops had to be interpreted as only apparent motion and not real, while the supposed real motion of the earth could not be detected.

A generation later when Tycho Brahe established his special observatory on the island of Hveen of Denmark for twenty years, he amassed the most accurate data of planetary motion up to that time. He returned to a Ptolemaic system for planetary motion with the earth stationary. It must also be remembered that the great exploring era from Columbus in 1492 to Magellan's circumnavigation of the globe from 15171522 had preceded Copernicus and proved Ptolemaic astronomical navigation as more than adequate.

As a partner to Tycho Brahe, Johannes Kepler (15711630) developed the three laws of planetary motion as they are accepted today. But before he did, he tried to restore planetary motion to the Pythagorean ideas of using the five perfect solids and an arrangement of Pythagorean musical harmonies. (Fig. 5) Once Kepler stumbled and bungled his way to the three laws of planetary motion as we accept them today, the Ptolemaic laws collapsed overnight. Kepler's laws as developed from 1595 to 1619 are:

I. All planets move about the sun in orbits in the shape of ellipses with the sun at a focal point.

II. During equal periods of time the planets sweep out equal areas.'

III. $(\text{Period of a planet})^2 \propto (\text{major axis})^3$ (Fig. 6)

Let us examine in some detail the assumption, observations, and arguments used to develop this group

of laws which so greatly overturned the laws of Ptolemy, so longstanding. In order to grasp the difficulty Kepler had, remember one can never see where a planet really is. He can only see in what direction it lies from the earth, which itself is moving in an unknown manner. The earth's own motion resists discovery. One can only examine the changes of a straight sunearth line without knowing anything of its length.

Kepler began with assuring the earth moves around the sun. Why? No one shall ever know what leads a mind to imaginative assumptions.

By tracing a sunearth line for some length of time, Kepler discovered the earthsun relative motions, whatever they might be, lie in the same plane at all times. The geometric principle used is that two intersecting lines in space determine a plane. The discovery came from the observation that all other earthsun lines formed the same plane.

A third step, the observation that the angular velocity of the earthsun line (earth's revolution around the sun) underwent changes day by day, but exactly repeated themselves annually was seen. The angular velocity changed in exactly the same manner with respect to exactly the same background of stars. This led him to believe the earth's orbit was closed. The bold generalization followed that all the other planets had similar closed orbits.

With many years of detailed observations, the period of revolution of Mars around the sun was calculated to be 687 days. Proceeding with his research, a time when the sun, the earth, and Mars were all one the same line had to be waited for. From that time on, Kepler could count many successive groups of 687 days. At the end of every Martian year, it would be in its same position as our first established base line when all three were on the same lire. The earth would be in a different place each new Martian year. All the angles of the EarthsunMars triangle would be known. Distances did not matter. By simply establishing a base line on paper and plotting all the measured and calculated angles, all the triangles formed would have to be similar to the real planetary system. (Fig. 7) A plotted picture of the earth orbit would emerge after many Martian years. Mathematical techniques permitted the discovery of the shape of this orbit to be an ellipse with the sun at the focal point. Kepler's other laws would follow quickly. (Kepler's development as explained by Einstein, 1934)

One should not forget at this point, even though Aristotle's and Ptolemy's longstanding concepts of the motion of the planets were quickly abandoned, Aristotle's own question had not been answered. "What about the lack of oscillating motions among the stars?" What should be done with this question? The best observations produced no such heliocentric parallax as the missing phenomenon came to be called. You had to observe it if the earth moved. If a scientist is good at anything, he is particularly good at explaining why the mast damaging evidence to his theory is not damaging at all, but instead helps to prove it. The concept of the universe suddenly shifted from finite, limited at its outer bounds by the sphere of stars, to infinite in space, putting the stars so far away that heliocentric parallax could not be observed. This provided future scientists with the idea of the fixed stars being motionless and an infinite distance away giving them endless numbers of points for future triangulation work among the planets. Unanswered in Kepler's research was the reason for the motion of the planets. Galileo and Newton would provide it the next century.

Working through Kepler's writings gives confusing headaches trying to work with sterile translations, trying to understand unusual terminology, and recalculating old math methods. Never expected are the innumerable condemning errors. Quoting first from Kepler and then from a biographer:

> "Since I was aware that there exists an infinite number of points on the orbit and accordingly an infinite number of distances from the sun the idea occurred to me that the sum of these distances is contained in the area of the orbit. For I remembered that in the same manner Archimedes too divided the area of a circle into an infinite number of triangles."
> This is Kepler's immortal Second Law a law of amazing simplicity at the end of a dreadfully confusing labyrinth. Yet the last step which had got him out of the labyrinth had once again been a faulty step. For it is not permissible to equate an area with the sum of an infinite number of neighboring lines, as Kepler did. Moreover, he knew this well, and explained at length why it was not permissible. He added that he had also committed a second error, by assuming the orbit

to be circular. And he concluded:

> "But these two errors it is like a miracle cancel out in the most precise manner, as I shall prove further down."

The correct result is every more miraculous than Kepler realized, for his explanation of the reason why his errors cancel out was once again mistaken, and he got, in fact, so hopelessly confused that the argument is practically impossible to follow as he himself admitted. And yet by three incorrect steps and their even more incorrect defense, Kepler stumbled on the correct laws.

As a contemporary scientist, Galileo Galilei invented the telescope and joined the now strong surge of acceptance of Kepler's laws. He witnessed for the first time that awesome gaze that still strikes us all when we look upon the handiwork of our Lord in the firmament. Galileo takes credit for expanding the universe a hundred thousand times, sees mountains and craters on our moon, rings on Saturn, four moons of Jupiter, sun spots, records the rotation rate of the sun (He goes blind in his later years.) and adds a convincing argument in favor of Copernican law. Shadows or the phases of Mercury and Venus, like our moon, can be explained best by allowing those planets to orbit the sun. By now however, Ptolemaic law is not given a chance to provide an alternative. And still not seen is heliocentric parallax. The second generation of telescopes those of Newton fail to find such observations as well.

Isaac Newton (16421727) provided the theoretical base that unified all motions of the planets and gave a strong reason for all planets, being small, to orbit the sun of far greater mass. Newton's three laws of motion and the Universal Law of Gravity jointly could mathematically derive Kepler's three laws. Newtonian physics further required empty space and particle structure of light.

Before proceeding, it should be pointed out that although Newton could derive Kepler's laws from his own laws, Newton developed the inverse square law for gravity from Kepler's third law. He also determined the universal gravity constant by guessing the mass of the earth. The gravity constant was confirmed by Cavendish using instruments invented with the assistance of the theory of gravity. All this strongly hints of a circle of reason tying up some of the most fundamental laws of science. But a circle of reason is not unheard of in science. Thomas Kuhn writes that circles of reason are necessary in science especially at such revolutionary times.

> The historical study of paradigm change reveals very similar characteristics in the evolution of the sciences. Like the choice between competing political institutions, that between competing paradigms proves to be a choice between incompatible modes of community life. Because it has that character, the choice is not and cannot be determined by the evaluative procedures characteristic of normal science, for these depend in part upon a particular paradigm, and that paradigm is at issue. When paradigms enter, as they must, into debate about paradigm choice, their role is necessarily circular. Each group uses its own paradigm to argue in that paradigm's defense.

At the time of Newton's death, James Bradley detected a displacement of the star alpha Draconis. It was the long missing, but vital heliocentric parallax. One problem the annual oscillation was in the wrong direction.

These two centuries, the 18^{th} and 19^{th}, that follow Newton are dominated by Newton. His laws are pushed into every possible field of science. Newtonian physics is still the primary foundation of any high school and college physics course. Yet as the 20^{th} century approaches, the foundations are severely shaken. Young, Hertz, and Maxwell established light to be of wave structure. Space must return to its substance of ether. Gravity, an unexplainable force at a distance then gets confused with planetary friction which cannot exist. Ernst Mach severely criticizes Newton's definitions of mass and weight and revamps Newton's third law to conform to his newer definitions. He claims mathematically it does not matter if we consider the earth stationary and the stars to move around the earth or if the stars are fixed and the earth does the spinning. He

preferred the earth motion which best explains a bulging earth in the tropics and a weaker gravity force at the equator.

By mid 19th century heliocentric parallax was finally explained in the correct direction though the observations had to undergo extensive interpretation. These now were the decades of certainty. Kepler's laws, Galileo's telescopes, Newton's laws, and heliocentric parallax all march to the same paradigm now proven beyond a question of a doubt.

The study of light and the ether of space are still perplexing. Michelson in 1881 and again with Morley in 1887 followed by over twenty precision laboratories around the world measured the speed of light from many directions to determine the change in the speed of light. To the amazement of all, these observations became the greatest negative experiment of modern science. The speed of light did not change whether the earth moved away from the direction of the light source or toward the direction of the light source. The speed of light remained the same. By normal reason one can usually catch up to another person quicker if he is running toward you than if he is running away. However, according to these experiments, such common sense addition of velocities does not work with light. Strange isn't it? Science rejects the common sense, but if it didn't reject the common, we would be faced with thinking along Ptolemaic motion again. Within a few decades of determining heliocentric parallax, the laws governing earth motion dare not be questioned.

Nobel prize winner Albert Einstein with special and general relativity changes all our fundamental definitions and beliefs of length, mass, time, and gravity. All are relative, and all change slightly as velocities change so that the speed of light in space cannot be detected as changing. Kepler's laws are preserved.

Today under never relativistic gravity, in addition to a planet in an elliptical path, now the elliptical paths rotate as well. Epicycles anyone?

We could examine all the wild interpretations of what we see in the universe according to the new physics of relativity. But I think if we are still not convinced the laws of science are imaginative inventions and purely of human origin, and I'm including the many we take for granted as true and certain like our earth notion and gravity, then we all have wasted our tine. The real choice of which theory becomes law primarily depends on the scientists inventing the theory and his influence over those scientists who will be expected to accept a theory as law. Theories pleasing to the mind become laws. A criteria for preserving a law of science is its ability to answer the questions of its followers. When answers are hard to come by, the scientists look for another system of laws to follow.

These changing laws, these circles of reason, these uncertainties are not limited to astronomy. Darwin's laws for the origin of species certainly require witnessing one kind of species to mutate into another. Lack of such observation has never been a deterrent for theory to achieve law status. If the astronomers could make a universe so large as to eliminate the need for observations of heliocentric parallax, then the biological evolutionist can develop natural history to such lengthy ages where impossible statistics become possible.

Our criticism dare not stop with some evolutionary sciences. I'm afraid a pick and choose approach to science, this one is good and that one is bad, is naive and lacks an understanding of science. Scientific knowledge is only the result of man attempting to explain the environment he lives in. His assignment is done when other scientists are satisfied and trust the explanation. Another explanation is not searched for until some theoretical crisis destroys the confidence. Innumerable contradictions, flaws of logic, and false interpretations of data are acceptable as long as men have confidence in their ideas.

On another front, a person's theology is inseparable from his ideas and explanations of the world around him. The trouble with science is that so many beliefs are intertwined. The majority of those beliefs do not believe in God's Word. Thus the whole spectrum of science is saturated with false belief. Louis Pasteur we would like to praise for his vivid demonstration disproving spontaneous generation. Yet today he is praised as the father of chemical evolution. His studies on bacterial mutation responses to chemical environment, which gave us pasteurization, today is the proof of spontaneous generation via chemistry. At the foundation of the atomic theory dating back to Leucippius (475 B.C.) and Democritus (470400 B.C.) is the idea of atomic interaction without spiritual intervention or control. Against overwhelming observational evidence, John Dalton and a generation of new chemists forced the modern concept of the same ancient atomic laws. It is in optics

where we understand the least about light, yet with certainty comprehend the evolution of the cosmos and interpret the makeup of stars, galaxies, and black holes. Nuclear particle physics, with its many creations and annihilations of matter and antimatter combine contradictory quantum laws with relativistic laws. Acceptance of contradiction, incompatible observation and unexplained paradox even to the point of requiring transcendental meditations has placed timehonored physics within the scope of Eastern mysticism.

The younger sciences of the earth such as geology, oceanography, and meteorology, where the socalled pure observations should stillstand alone as the true tests for theory, are where we find the greatest contradictions and paradoxes. These sciences still lack unifying paradigms to interpret what is observed. What then of progress or success? I claim socalled progress or success is not a measure of the correctness or truth of science. Modern laws of chemical evolution as well as older Darwinian laws have led scientists and doctors to the study of viral mutations and the resulting lifesaving vaccinations as well as hybrid agriculture providing food for the millions. The evolutionary laws of geology have led to the discovery of many of the new oil reserves we soon will be heating our homes with.

There is no doubt that at the foundation of many of these laws is a disclaimer of our Almighty God. God blesses and maintains His Creation in spite of man's denial of Him.

There is no difference between law, theory, or observation. Theory and law defines the observation, theory and law identifies desirable observation, and theory and law interprets observation. In turn, observation confirms the same theory and law. It is we as teachers and future teachers who memorize the laws of science and make them so unchangeable and proved. We foster the wrong idea of science being an approach to truth when few scientists would dare be so bold. A scientist becomes a Nobel laureate by developing new and different laws, never by confirming old established laws. Science must be taught as the imaginative artistry it is. Like the poet who chooses words for a poem, the scientist chooses formulas and natural impressions to develop his laws.

Without a doubt, the world's accepted laws of evolution imbibed in every branch of science are wrong. The Scriptures speak quite plainly where man's wisdom errs. A universe evolving of itself denies God. This is a sin against the First Commandment. Evolution denies beginning with a perfect creation. This robs God of His power and wisdom. Evolution denies all mankind as descendants from one set of parents. Evolution denies sin and man's accountability to his Maker. Evolution denies God of His justice. It denies God of His mercy and grace. Evolution robs man of the need for a Savior. These "Laws of Satan" turn us from Christ.

Why then creation science? Why is there an intense concern for scientific models on a creation base? Are these efforts supposed to authenticate the Bible? Or is the Bible expected to authenticate a Law of Science? Most laws of physics involve a great deal of higher mathematics. We do not find proof derivations for differential equations in the Bible; nor can we expect man's reason to prove God's Word. The proof of the Scriptures is in themselves, in the fulfillment of prophecy, in the claim of inspiration, in the faith instilled by the Holy Spirit in the believer's heart through the Word. God's Word is totally sufficient.

Far too much has been made of the creation science movement, creation science materials, and the development of creation science curriculum. I find great trouble in the mixture of the clear doctrines of Scripture with the science laws of men. Human artistry prevails; the signature of the scientist coexists in the Laws of Science. The Idols of the MarketPlace, which cannot be identified or separated from the Laws of Science, must not be mixed with Scripture. This is what Thomas Aquinas did with Aristotle's works and Roman Church doctrine in the thirteenth century. The churchsuffered greatly for this the next several centuries. Rome burned Giordano Bruno and threatened Galileo Galilei with torture. Johannes Kepler moved north to Wittenberg. We don't quote Luther so much on creation science. He fought evolution in his day too. Evolution is really any science which refuses the knowledge of nature God does give us in his Holy Word. Luther rejected fire as being the highest element above the earth since creation on the second day left waters above the firmament as well as below the, firmament. The science of earth, fire, air, and water is obviously dated, but Luther's faith in the Word is still the only answer. Today in creation science the Second Law of Thermodynamics is the major principle in this tragic intertwining of man's reason with God's Word. Let me quote the champion I find great fault with.

> Creation actually has been accomplished by means of creative processes which are not replaced by the deteriorative processes implicit in the Second Law (of Thermodynamics). The latter are probably a part of the "curse" placed upon the earth as a result of the entrance of sin... (Morris)
> We can see now that these two basic laws of science, the First and Second Law of Thermodynamics are merely man's scientific statements of the two revealed facts of: (1) a creation originally completed and now sustained by God's power, and (2) the curse of decay and death superimposed on the creation by its Creator because of man's sin. (Morris)

How dare these historically true and certain events revealing the heart of God's love and mercy be reduced to a logarithmic function of statistical probabilities! I find this an abomination and an offense to faith.

Most simpler physics texts state that in all thermodynamic processes where one form of energy is converted to another form of energy, some energy is lost to a form of nonuseful energy. This nonuseful energy has been called entropy. (A slightly more rigorous definition and discussion of entropy is added at the end of the paper green pages.) The creation science movement makes a strong appeal to the universal character of this law and its application to biology. It is supposed to refute the general scheme of evolution of increasing order. However, it is in the mathematics that we see the limitations, boundaries, constraints, and assumptions. Generally the limits are to chemical or physical processes, quasistatic processes, certain defined temperature conditions and to an overall state of equilibrium.

In the phenomenological sense the Laws of Thermodynamics have been used to study equilibrium structure such as crystals. They have been used to establish pressure versus temperature functions at the freezing points of crystals. They have given the explanation for the peculiar expansion of water at freezing. It is this peculiar property of water that sustains and protects life from a physical point of view. I am convinced that if indeed man's view of the Second Law of Thermodynamics is correct, then it was operative under God's description, "Behold it was very good." I am not so sure order and disorder in biological processes fill the limiting characteristics demanded by the math of thermodynamics. The sexual act, life propagation, exchange of genes, and establishing the conceived first cell are hardly acts in equilibrium. Growth and even death are not states of equilibrium either. I know some biological species mutated to degenerate states. I know organisms die. I know the Bible speaks of the earth wearing out like a garment. I know the whole earth travaileth in pain. But these are because of sin. You cannot link this to entropy: That is bad doctrine. Until even one major link is established linking biology to the Second Law of Thermodynamics in a rigorous mathematical sense, I am convinced for now that the Second Law of Thermodynamics is not applicable in biology. To insist on it without this kind of study is bad science. But study all the mathematics involved. The Second Law of Thermodynamics strictly deals with molecular arrangement. An increase of entropy is a decrease of a mathematical function defining the molecular order. I know in the battle against evolution we argue against the concept of one kind climbing the ladder of nature from a simple species to a complex species. We have described climbing that ladder as increasing "order". At times we refer to the "order" of creation. Sometimes we use the Word "order" to describe the way God maintains nature. You cannot link entropy to these usages of the word "order". That is bad English.

Up to this point, I have assumed the Second Law of Thermodynamics was unquestionably correct and tried to point to its false use in defense of good creationist principles. The historical development of the Second Law of Thermodynamics draws an even darker hue over the hope of combating evolution in the light of physics. It is true that most developers of this law, Carnot, Clausius, Lord Kelvin used the Second Law of Thermodynamics in a universal setting. In all energy exchanges, some energy was lost to a nonuseful form (entropy). This preserved the Law of Conservation of Energy as it came under attack mid-nineteenth century during the great technological advances of heat engines. The thermodynamics as used by creationists is in this phenomenological sense, that in all irreversible cases, in all natural energy exchanges, entropy can only increase.

> That was a nice idea a hundred years ago, because then heat could still be thought of as a fluid. But heat is not material anymore than fire is, or any more than life is. Heat is a random motion of the atoms. And it was Ludwig Boltzmann in Austria who brilliantly seized on that idea to give a new interpretation to what happens in a machine, or a steam engine, or the universe. (Bronowski)

Phenomenological thermodynamics started to go awry with the increased successes in the kinetic theory of matter. Yet powerful men of science, Plank, Ostwald, Duhem, and Mach all denied the existence of atoms on the evidence of the caloric based laws of thermodynamics. Without a doubt Boltzman's statistical formulation of the Second Law of Thermodynamics opened the floodgates to the atomists and to the evolutionists also. In fact, Boltzmann himself had been an early supporter of Charles Darwin. With the gap between thermodynamics and atomic structure closed, chemical evolution dominated the MarketPlace. Boltzmann had passionately staked his life on atomic structure. Life for him became one of statistical chance. He committed suicide at the age of sixtytwo. Confirmation of Boltzmann's explanation of the Second Law of Thermodynamics came with Einstein's work on the motion of suspended particles. He had predicted the existence and magnitude of Brownian motion from the kinetic theory of thermal equilibrium. Thermodynamics had been reduced to a statistical law under equilibrium constraints.

Today I judge the Second Law of Thermodynamics to be in process of being entirely rewritten. My objection to the creationist approach is that faith finds itself continually floundering if it must respond to the everchanging Laws of Science. In a lecture given as recipient of the 1977 Nobel Prize in chemistry, Ilya Prigogine summarizes the latest developments in the MarketPlace.

> I should emphasize that 150 years after its formulation the Second Law of Thermodynamics still appears to be more a program than a welldefined theory in the usual sense, as nothing precise (except the sign) is said about the S production. Even the range of validity of this inequality is left unspecified. This is one of the main reasons why the applications of thermodynamics were essentially limited to equilibrium processes. (S = entropy)

In his abstract he writes, "It is shown that nonequilibrium may become a source of order and that irreversible process may lead to a new type of dynamic state of matter called 'dissipative structures'." An analysis of Benard convection gives a strong anomaly to the accepted statistical Second Law of Thermodynamics. In studies conducted away from equilibrium conditions, Boltzmann probabilities break down. In frequent studies opposite results occur. Super molecular order appears. Order develops through fluctuations.

A faith leaning on science will collapse when the crutches are removed. Teachers must teach evolution is wrong because it goes against God's Word, it denies sin, it takes away from the Triune God, it ignores our Savior. Science, especially as men have constructed it, is weak clay. Science can never be a foundation. It can never even be a coequal building block. The hope that science can be used to refute science and find truth is a futile dream. Too often pastors and teachers leave their divine calling to play scientist. This is where we all get killed. The struggle of reasoning, artistic manipulation of data and formulas, and empirical substitution in place of sound theoretical and mathematical developments of a research scientist is quite different from the ideal, oversimplified, special case that is taught in grade school, high school, and even early undergraduate science classes. Of necessity the teacher teaches the old science which in many cases the research scientist has abandoned. It is foolishness to destroy the theories of Darwin when today's evolution promotes chemical evolution. No person can know all the answers and counter arguments of every whim of evolution. We are better off teaching first to live by faith in Christ and trust all of God's Word. If some of our people only knew how stupid their science seems when they enter the research arena they had not been trained for. I would rather be ridiculed for my faith in Christ than for some pet scientific theory. From what I have seen, I fear the entire emphasis, as practiced among our own creationist teachers, is on their own discovery, their own scientific interpretation, their own fossil findings, and the clear Word of God is lost. The research of science should be left to the scientist. We should trust our Christian lay people as they trust us.

I have been negative here with respect to science; I believe the powerful positive approach of the science curriculum throughout our synod grade schools displays a correct naturalist view. The naturalist accepts nature as it is, and is perhaps the closest to the material truth of nature. He is a friend to nature and a friend of nature. Here is truly where the child can see God's wondrous creation: the intricacies, the complexities, the beauty, the special care of God for all things. Usually stressed in the early grades are the migration of birds, identification of animals, habits of special animals, some details of insects and their life changes, studies of water, rivers, air, clouds, identification of plants, and the understanding of our bodies and how all the organs work to keep us healthy.

This, of course, is far from a complete list, but the naturalist's approach is clear with this list. The student is shown the many wonders of nature which God has given us and has put within our dominion. Nature is accepted as it is. God is trusted. God's power and wisdom can be clearly shown to the student. God's special care for all His creatures is obvious. "While the earth remaineth, seedtime and harvest, and cold and heat and summer and winter and day and night shall not cease!" (Gen. 8:22). When nature is viewed as it is, nature truly testifies of God. It is in science where man's view dominates. Unless we see the negative side man places on nature, any positive view will be dimmed. Creationists become Calvinists. But this distinction will again raise another long discussion measured only in calendar lengths. Galileo Galilei is recognized to have established today's artistic science. When speaking of Galileo, I believe Robert Preus rightly keeps his distance from the Calvinist impact on creation and science.

> For Galileo was advancing a methodology which, although not so often followed, was old and which was based in part upon the Augustinian notion that God has spoken to us in two books, the book of Scripture and the book of nature. Galileo believed that the book of nature ought to be read in the language of mathematical science and empirical investigation. Scripture, on the other hand, does not contain scientific theories, but reveals to us our eternal destiny. When speaking of natural phenomena, the Scriptures use poetic imagery or the common language of the day. Like Kepler, Galileo was convinced that nothing uncovered by science would contradict Scripture but would rather confirm hundreds of passages which urge us to glorify and marvel at the supreme majesty of God. With far less enthusiasm the Lutheran theologians believed the same.

We have Moses and the prophets. We have faith, the substance of things hoped for, the evidence of things not seen. It is especially when our reason fails us, when all odds are against us, when evolutionary claims seem overwhelming that we must come to our Lord the way He wants us to come, as a child, only believing.

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General References

Sir William Cecil Dampier, *A History of Science,* University Press, Cambridge, England, 1929.

George Saxton, *A History of Science*, 2 volumes, Harvard University Press, 1952.

Rene Taton, *History of Science*, 4 volumes, translated by A. J. Pomerans, Basic Books, inc., New York, 1964.

F. Sherwood Taylor, *A Short History of Science and Scientific Thought*, W. W. Norton and Company, Inc., 1949.