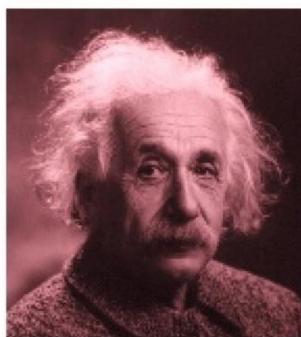


Revisiting Einstein's argument
that space is a physical substance

The Ether Dispute



“Space without ether
is unthinkable.”
Einstein

Richard J. Wilson J.D.

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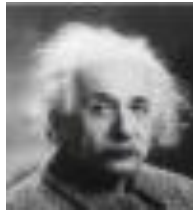
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“By far the greatest hindrance and aberration of the human understanding proceeds from the dullness, incompetency, and deceptions of the senses; in that things which strike the sense outweigh things which do not immediately strike it, though they are more important. Hence it is that speculation commonly ceases where sight ceases; insomuch that of things invisible there is little or no observation.”

Francis Bacon: *Novum Organum* 1620

Introduction



Einstein

“We may say that according to the general theory of relativity space is endowed with physical qualities; in this sense, therefore, there exists ether . . . space without ether is unthinkable; for in such empty space there would be no propagation of light . . .”

Einstein: *Leyden Address* 1920

The Dispute

There is a serious dispute by very intelligent people over the physical nature of space. The dispute arises because of what Francis Bacon calls in his *Novum Organum* the “dullness, incompetence, and deceptions of our human senses.” When we observe outer space, our human senses lead us to two different conclusions:

On the one hand, if we judge by appearance, space appears and feels to us like an empty void, leading some to conclude the earth and heavenly bodies are spinning in an empty vacuum. On the other hand, if we judge by behavior, space exhibits physical behaviors – for example, it carries light and heat from the sun and stars – leading some to conclude space is some sort of invisible substance called “the ether.”

Parties to the Dispute: Cosmology champions the conclusion that space is an empty vacuum. Although often confused with astrophysics, cosmology is not a modern science like astrophysics. It is a scholastic philosophy that uses Aristotle's ancient method of inquiry, and seeks the goal described in his ancient Greek *Organum*.

Following this ancient method, cosmologists divide the universe into categories according to appearance to arrive at the conclusion that it is composed of three base elements of *space, energy, and matter*, and it then applies human logic to speculate upon *where* the universe came from, *where* it will end up, and *how many* universes exist.

Early biblical cosmologists used this ancient method to develop the theory that in the beginning there was only God and totally empty space. Lonely God then created the heavenly bodies to float in the void, and created man to populate the earth and keep him company. They also speculated there are two other invisible universes called Heaven and Hell where man goes after life in this universe, and predicted, if man doesn't mend his ways, God will destroy our universe in a fiery apocalypse.

Modern cosmologists generally agree with the biblical cosmologists. Using the same method of inquiry, they theorize our universe began as an empty vacuum; and that there was a mysterious "big bang" that created the earth and heavenly bodies that are now speeding from the point of explosion out into space. They also speculate there are probably many alternative universes,

and that ours may someday collapse upon itself in a fiery apocalypse.

Modern cosmologists argue this “big bang” theory is the result of advances in modern science that just happens to agree with Genesis, but Francis Bacon observed in his *Novum Organum* that they were already promoting such a theory based on Genesis in 1620:

“Some moderns have with extreme levity indulged so far as to attempt to found a system of natural philosophy based on the first chapter of Genesis . . . and bring them into the view of the world so fashioned and masked, as if they were complete in all parts and finished.”

On the other hand, astrophysics champions the conclusion that space is some sort of invisible physical substance. Using the modern scientific method suggested in Francis Bacon’s *Novum Organum*, astrophysicists divide the universe into parts according to their observed behavior, and seek to determine *what* the universe is made of, *how* it produces its behaviors, and *the laws* that nature uses to govern the behavior.

Using this different method and seeking this different goal, astrophysicists theorize that, since space, energy, and matter all exhibit physical behaviors, they must all be physical substance forming a part of a *unified field* of interrelated and interchangeable substance. Einstein managed to discover the formula for converting

matter into energy, and was actively contemplating the possibility that space could be converted into energy and matter.

As we can see, this conclusion drastically differs from the biblical view regarding the physical nature of space. However, astrophysicists from Newton to Einstein, remembering the sad fate of Galileo, carefully played down this difference, and avoided entering into a debate with theology and cosmology over *where* the universe came from. They just went off on their own tangent seeking their own goal of determining what the universe is made of, and how it produces its behaviors.

And our establishment, also remembering the embarrassing Galileo incident, carefully published papers in its forums from both cosmologists and astrophysicist, tolerating both the biblical view of the universe and space, and that of astrophysics. Cosmologists discussed their Big Bang theory and called space an “empty vacuum;” while astrophysicists discussed their Unified Field” theory and often referred to space as “the ether.”

Dispute Led To Progress: We need to recognize at this point that the Big Bang theory of modern cosmology had been substantially complete since biblical days, but that it didn’t lead to any progress in understanding our universe. While it satisfied man’s longing to speculate upon the unknown – to talk about where we came from, where we’ll end up, and how many universes exist – it was sterile of

progress. We knew little more about the universe before Copernicus' time than did the biblical cosmologists.

Francis Bacon noted in his *Novum Organum* that the failure of scholastic philosophies like that of Genesis to lead to progress was that it wasn't looking for progress. Its goal was to discover *where* things came from, and not *whereby* or how they behave. And he argued, the lack of progress of scholastic theories, even if they grab our attention, should be taken for a sign that the theory is sterile and that a new approach is necessary:

“They make the quiescent principles wherefrom, and not the moving principles whereby things are produced, the object of the contemplation and inquiry. For the former tend to discourse, the latter to works. . .

“Fruits and works are sponsors and sureties for the truth of philosophies. For what is founded on nature grows and increases; while what is founded on opinion varies but increases not.”

Progress in understanding our universe only began when astrophysicists like Copernicus, Galileo, and Kepler decided to ignore Genesis, and study the actual behavior of the universe. Their new approach provided a more accurate picture, leading Isaac Newton in the 17th century to discover many of the physical laws that govern its behavior to set the stage for our modern Age of Space. And the subsequent development of the new Unified Field theory by astrophysicists like Faraday, Lorentz, and Poincare in the late 19th century, led Einstein to his revolutionary Theory of Relativity to set the stage for our modern Atomic Age.

So, while the Big Bang theory of cosmology and Genesis, and the conclusion that space is an empty vacuum, proved sterile for thousands of year; the new conclusion of astrophysics that space is an invisible substance and part of a Unified Field interrelated with energy and matter quickly led to progress. In just a few hundred years, the new theory led us to discover enough about the behavior of our universe to begin to accurately and safely leave the earth and explore it.

Dispute a Victim of Cold War: Unfortunately, toleration by the establishment for the view of astrophysics ended during the “red scare” of the Cold War. Rumors began to circulate that the blasphemous Unified Field theory of astrophysics was a plant of “godless communism” designed to disrupt the Christian west; and, as the record shows, our establishment went bananas and reverted to the same intolerant behavior that went on in the infamous Galileo fiasco.

Wanting nothing to do with anything even rumored to be connected with “godless communism,” the establishment banned from its forums any further discussion of the Unified Field theory, or any reference to space as “the ether.” Since then papers accepted by establishment forums must agree with the Big Bang theory of Genesis, and refer to space as an empty vacuum, or be summarily rejected. And, today, 20 years after the Cold War, the ban remains.

Thus, all the work of genius like Newton, Faraday, Poincare, Lorentz and Einstein that led to so much progress before the ban has been swept off the table. Our establishment is now a Defender of The Faith, protecting the Big Bang story of Genesis, and behaving in the same medieval manner Bacon observed existed in 1620 when all establishment forums were dominated by medieval scholasticism in 1620:

“In the customs and instructions of schools, academies, colleges, and similar bodies destined for the abode of learned men and the cultivation of learning, everything is found adverse to the progress of science. For the lectures and exercises are so ordered that to think or speculate on anything out of the common way can hardly occur to any man.

“And if one or two have the boldness to use any liberty of judgment, they must undertake the task all by themselves; they can have no advantage from the company of others. And if they can endure this also, they will find their industry and largeness of mind no slight hindrance to their fortune.

“For the studies of men in these places are confined and as it were imprisoned in the writing of certain authors, from whom, if any man dissent, he is straightway arraigned as a turbulent person and an innovator.”

Of course, cosmologists provide us with a “scientific” reason for continuing the ban. They argue the Michelson and Morley experiment of 1884 proved “scientifically” that space is empty, and that no such thing as the ether exists. And, for good measure, they add that Einstein’s *Theory of Relativity* supports the M and M finding. This argument is accepted by our western establishment forums as scientific fact.

However, the argument is bogus, propagated to discredit the blasphemous theory of astrophysics. The fact is the Unified Field theory was developed by astrophysicists like Poincare, Lorentz and Einstein well *after* the M and M experiment of 1884, and Einstein made a special effort in his 1920 *Leyden Lecture* to mention the experiment, and to state categorically that his Theory of Relativity “does not deny the ether,” and he should know.

Grounds for the Indictment: It may seem ridiculous to accuse our modern scientific establishment of such medieval behavior. After all America is the leader of our modern Space Age. It landed man on the moon, and is still busy exploring our solar system with space travel and the space telescope. But careful notice will reveal we haven't been on the cutting edge of investigating the behavior of our universe since the Cold War. We're drifting along today on technology and information about the behavior of the universe that is at least a half-century old.

This drifting can be seen in two ways: *First*, using the Big Bang theory, we're not doing much breakthrough discoveries in our space programs. We've already determined *where* the universe came from, *where* it is going to end up, *how many* alternative universes probably exist, and that space is an empty vacuum. In fact, biblical cosmologists determined those questions thousands of years ago. We're not seeking to discover *what* space is made of, *how* it relates to energy and matter; or *how* space creates its behaviors like inertia,

gravity, or transmitting light and heat. We're merely looking for more evidence to support the Big Bang theory, and ignoring evidence that conflicts. So, gaining little from our space program, we are cutting the budget. We're in the same boat Bacon noted for all philosophy in 1620:

“The logic now in use serves rather to fix and give stability to the errors which have their foundation in commonly received notions that to help search after truth. So it does more harm than good. .

“It is idle to expect any great advancement in science from the super inducing and engrafting of new things upon old. We must begin anew from the very foundations, unless we would revolve forever in a circle with mean and contemptible progress.””

Secondly, we can see the drifting in the books and papers published under the auspices of our establishment in the last half-century. They are nothing more than a mere polishing of the sterile Big Bang story of Genesis. Each book or paper may include some recently discovered evidence -- provided it supports the biblical speculation of the beginning of time -- but carefully ignores any new evidence that conflicts.

Books and papers published in establishment forums no longer seek *what* space is made of, how it relates to energy and matter, or explore questions of *how* the universe produces relativity, inertia, gravity or transmits light and heat – questions that raged in the forums before astrophysics was banned. The books and papers now follow the same tired pattern Bacon noted in 1620:

“For let a man look carefully into all the variety of books, he will find endless repetitions of the same thing, varying in the method of treatment, but not new in substance, insomuch, what was a question once is a question still, and instead of being resolved by discussion, it is only fixed and fed . . .

“For if you look at the methods and the divisions, they seem to embrace and comprise everything which can belong to the subject, and, although these divisions are ill filled out and are but as empty cases, still to the common mind they present the form and plan of a perfect science.

“But as the matter now is, it is nothing strange if men do not seek to advance in things delivered to them as long since perfect and complete . . . It is idle to expect any great advancement in science from the super inducing and engrafting of new things upon old. We must begin anew from the very foundations, unless we would revolve forever in a circle with mean and contemptible progress . . .”

Of course, there are books published outside the establishment arguing for astrophysics. There is Eric Lerner’s *The Big Bang Never Happened* arguing space is populated by plasma: There is Walter Isaacson’s best-selling *Einstein: His life and universe* that devotes a full chapter to the work Einstein did on the Unified Field theory, and of his support of “the ether” concept: And there is Professor Jane Gregory’s *Fred Hoyle’s Universe* reporting how Hoyle was professionally destroyed by the establishment for daring to challenge the Big Bang story of Genesis.

But, like all books that conflict with Genesis, these books are either totally ignored by our scientific establishment, or, if noted at all, dammed with faint praise. Meanwhile, all the new information about the physical behaviors of space reported by advancing technology like the space telescope and space travel over the last 50

years lies ignored and unexamined. No one has bothered even to catalogue them, much less study the patterns they might provide.

We Are Playing with Fire: If Francis Bacon were alive today, he'd warn us we're playing with fire. We're committing exactly the same error Italy and Spain did in his 17th century. Free discussion had led Spain and Italy to become leaders of *The Age of Exploration*, and the new *Renaissance* of science; but, at the very height of their success, the two nations suddenly banned any further discussion of the universe that conflicted with biblical cosmology.

The tragic result was leadership of the age, and all the wealth and power it could have provided Spain and Italy, passed to northern countries where the ban was not in effect. Those nations took over leadership of exploration and of science, and the political power and wealth it brought, while poor Italy and Spain wasted into confusion and poverty.

Bacon would remind us there are emerging nations today who pay no attention to Genesis, but that are surely reading Newton and Einstein. Without any ban upon astrophysics in their establishment forums, they may very well be studying the accumulating evidence that we are ignoring, and, like Italy and Spain, we may wake up one day to discover they have snatched our leadership and left us in the dust.

The Purpose of This Work: This work is an attempt to avoid a repeat of that tragic scenario. We'll begin in Part I by cataloging the new evidence of the physical behaviors of space provided by advancing technology, and see how it tends to support the Unified Field theory of astrophysics, and that space is a physical substance related to energy and matter. I think many will join me and find it interesting enough to study in detail and, perhaps, make some additions.

But, this is not a scientific treatise. It isn't going to settle the ether dispute. That's a job for trained cosmologists and astrophysicists. So, unless you're interested in the details, read only enough to be convinced that Newton, Faraday, Poincare, Lorentz and Einstein were not fools to conclude space is a physical substance and part of a Unified Field, and then skip to Part II.

There we'll discuss explore how our establishment came to ban discussion of astrophysics in its forums, and review a proven way to get the ban lifted without getting into a battle with theology and cosmology, leaving the Big Bang theory of cosmology intact. We'll then close by outlining three simple steps we lay men and women can follow to help revive the silenced voice of modern astrophysics and protect our leadership of the Space Age and the wealth and power it brings us all.

'No one has yet been found so firm of mind and purpose as resolutely to compel himself to sweep away all theories and common notions, and to apply the understanding, thus made fair and even, to a fresh examination of particulars . . .

Francis Bacon: *Novum Organum*

Part I



Newton

“That one body may act upon another at a distance through a vacuum without the mediation of anything else, by and through which their action and force may be conveyed from one to another, is to me so great an absurdity that, I believe, no man who has a competent faculty for thinking could ever fall into it.”

Isaac Newton: *Notebooks*

A Partial Catalogue of The Physical Behaviors of Space

From Newton to Einstein, astrophysicists worked practically blind. None saw galaxies or pictures of beautiful clouds in space in the definition provided by our modern space telescope of space travel. Telescopes in their time barely penetrated our atmosphere, and the exploration of space was still in the future. Yet, based upon the fact that space supported the transmission of light and heat from the sun, and provided the peculiar behavior of gravity and inertia, astrophysicists concluded that space could not

be an empty vacuum, but must be some sort of invisible physical *atmosphere* called the ether.

We'll start our review with that conclusion, and see how advancing technology tends to confirm it. Then we'll move on to other even more strange and exotic behaviors of space that, if the evidence had been available to Newton or Einstein, it may very well have led them to resolve the question of what space is made of, and how it produces its behaviors, and we'd be living today in a new and undreamed of age.

So, once you're convinced astrophysicists from Newton to Einstein had good reason to suspect space is an ethereal substance, skip down to Part II to discover how laypeople like you and I might shame America's scientific establishment into reopening its forums to astrophysics, and create a renaissance of scientific progress in understanding and using our universe for man's improvement. Let's begin with the observation that space:

Behaves Like A Physical Atmosphere: With very primitive technology, Newton was convinced that space can't be empty, but must be a physical atmosphere. Now photos by the space telescope should raise the same suspicion in anyone's mind. Compare space telescope's photos of spiral galaxies in space with satellite photos of Hurricanes in earth's atmosphere -- photos available to anyone on the internet. Without a caption, we'd be hard put to tell the view of hurricane Katrina from that of the spiral galaxy. Both have the same

“eye” in the center, the same giant windswept spiral arms, and both move slowly, sweeping up everything in their path.

Then compare space telescope photos of the beautiful cumulus clouds hovering in the distant Nebula of Orion, with the beautiful cumulus clouds that hover in the atmosphere over Arizona and New Mexico during monsoons. Again, they look like twins. Both are big, beautiful, billowing, orange colored clouds quietly floating along reflecting the light of the neighboring star. Again, one would be hard put to tell which is which because they appear so similar.

Then compare space pictures of tornados in Kansas sucking up everything in their path, the kind that transported Dorothy to the Land of Oz, with astronomer's drawings of Black Holes in space that appear to be sucking up everything around them, transporting the stuff to somewhere as mysterious as Oz. It's interesting to note that Einstein's theory of relativity predicted we'd find these tornadoes in the physical fabric of space, because according to the theory space is a physical substance.

It's interesting to note that four hundred years ago Newton was not alone in observing that space acts like it is a physical atmosphere. In the 17th century, before telescopes revealed spiral galaxies, floating clouds, and black-hole tornadoes in deep space, many people concluded space couldn't be an empty vacuum. An English country gentleman, for example, wrote Newton that, unless space has a physical atmosphere to resist the effect of gravity from

neighboring stars and planets, all would fall into the closest large star, and the whole universe end up in one giant ball.

Newton agreed and circulated the letter among the new scientific community he was building in England, entered similar thoughts in his notebook to formally begin the ether dispute. It's also interesting to wonder what Newton or Einstein would have accomplished if they seen the spiral galaxies, space clouds, and black-hole tornadoes confirming their suspicions. We could very well be living in a far different society.

A Physical Barrier: But there are far more similarities between the way earth's atmosphere and space behave. We must note that both also provide a physical barrier to the speed of the vibrations traveling through them. Earth's atmosphere provides a physical barrier to the speed of sound vibrations, limiting them to 760 feet per second, while outer space provides a physical barrier to the speed of light vibrations, limiting them to 186,200 miles per second.

And both space and earth's atmosphere produce the same Doppler Effect, that peculiar phenomena that the speed of the source of light or sound doesn't add to the speed of the light or sound, but merely changes their frequency of vibrations. And we can plainly see that both space and the atmosphere reduce the amplitude of the vibrations as they travel because both light and sound diminish in intensity over distance.

This affect of space upon the speed of vibrations and objects traveling through space is what causes the strange “relativity” of time. When I am at rest in space, the electrons in my body are speeding around their nucleus at 186,000 miles per second, but, as I begin moving through space, the speed I am traveling through space is subtracted from the speed of electrons circling my atoms, and with each atom the passing of time slows down for me relative to my speed.

Physically Distorts: And there is clear evidence that space distorts physically just like earth’s atmosphere. When our atmosphere is distorted, it develops air pressure so strong it can blow over huge buildings. Space acts the same way. When celestial objects move into an area, they distort the area of space, and the resulting distortion of pressure can hold huge stars in orbit. The distortion created by our earth in its surrounding space keeps us and everything else plastered to earth’s surface.

However, there is a difference. When earth’s atmosphere is distorted, we can feel the pressure on our skin, but when space is distorted, we can’t feel the pressure on our skin. All we feel is heavier and lighter as we pass through a gravitational field. This leads some to believe, since we feel nothing on our skin, nothing in space is pushing us down to earth, and that gravity is due to magical rays emanating from the earth.

But it's possible we feel nothing on our skin because space doesn't act on the molecular structure of our skin, but acts *only* at the atomic level on every atom of our body with equal pressure. Since the pressure is evenly distributed on every atom of our body, we feel nothing except heavier and lighter as we move through a gravitational field. This observation is important because it will tell us something about the nature of space.

And this distortion is true for magnets. We can see compass needles line up north and south, and, if we sprinkle iron filings on a piece of paper and move a magnet nearby, the iron filings will neatly arrange into the distortions of space created by the magnet. And, while we think our bodies don't react to magnetic distortions, medical science disagrees. Doctors now prescribe magnets to speed healing of our bones after an operation.

Furthermore, we can observe that animals may actually sense magnetic distortions, because cows often line up north and south in a field, and birds and whales appear to use earth's magnetic distortions to migrate. Animals seem to travel with the same accuracy of direction by their natural senses that man does using his magnetic compass to detect the magnetic distortions of space.

But there are more distortions of space than gravity and magnetism. Whenever there is a sudden release of energy from an explosion, there is a distortion of space that dramatically affects other objects. Were we to explode an atom bomb in space, it is thought the release of energy from the explosion would create such

an enormous distortion of space, that it could change the course of dangerous asteroids to prevent them from hitting the earth.

Physically Vibrates: We've known for some time that sound is merely vibrations of earth's physical atmosphere, and that we can send out sounds, and use the echo bouncing off objects with our ears to navigate like bats in the dark. This fact convinced 17th century scientists that, since the atmosphere can carry physical sound vibrations, earth's atmosphere must be an invisible physical stuff. So they investigated and eventually discovered the atmosphere is indeed an invisible physical stuff.

Likewise, we've known for some time that space can carry vibrations of light and heat frequencies, and that we can use those vibrations bouncing off objects and use our eyes to navigate about in space. This fact convinced astrophysicists that space, even though it is invisible, if it vibrates like our atmosphere to carry light and heat, it must also be a physical substance that can eventually be understood as we now understand earth's atmosphere.

Has Physical Energy: Evidence is also clear that space is not just a passive medium transporting light and energy from the sun; but is an active substance that exhibits enormous inherent energy of its own. When objects in space behave from inertial forces, unlike gravity, there's nothing to blame for these forces except space itself. Einstein believed these inertial forces were generated by the

substance of space, and was deep in study of the question at his death.

However, Einstein found a puzzle. Space pays no attention to an object at rest or one moving at a steady rate. It only reacts to an object that is *changing* direction or speed. Thus, he found we can't use space to determine a fixed location in space in regard to other objects. We can only use space to determine if we are changing direction or speed. Let Einstein speak for himself:

“Recapitulating, we may say that according to the general theory of relativity space is endowed with physical qualities; in this sense, therefore, there exists the ether. According to the general theory of relativity space without ether is unthinkable; for in such space there not only would be no propagation of light, but also no possibility of existence for standards of space and time (measuring rods and clocks), nor therefore any space-time intervals in the physical sense. But this ether may not be thought of as endowed with the quality characteristic of ponderable matter, as consisting of parts which may be tracked through time. The idea of motion may not be applied to it.”

Physical Interconnection: Astrophysicists find that, when an atomic particle is split, with each half going off in opposite directions, the parts appear to remain connected by space. That is, if something happens later to one half of the particle flying off in one direction, the same thing happens to the other half at the same time flying off in the opposite direction. Einstein was fascinated by this phenomenon, because it indicates the two parts somehow remain physically connected by the intervening space.

And in a sense this is not a brand new discovery. Marconi used something like it to invent radio in the early 20th century. He discovered that, if one powers an oscillator to amplify electronic vibrations and broadcasts the vibrations into space in England, an oscillator in Newfoundland tuned to that frequency of vibration will oscillate exactly like the oscillator in England. So, in effect, a radio receiver on the moon is physically connected to the radio transmitter on earth by the intervening space.

Interchangeable With Matter: Thanks to Einstein, we've already learned that matter can be changed into energy. And thanks to modern chemistry we've learned to change one kind of matter into another by altering molecular and atomic structure. And, like ancient alchemists, astrophysicists have long theorized that everything in the universe is probably interchangeable, and that space could morph into energy and matter and *vice versa*.

Scattered reports now tend to support this long time theory. We often read that particle physicists, when they disturb space in the laboratory, report something they call "virtual matter" momentarily appears, and then disappears. And astronomers think that, when positive and negative objects collide in space, they disappear. So not only do we have some evidence that space can morph into matter, but equally some evidence that positive and negative matter when joined can morph into space.

And there is another interesting phenomenon connected with this interchangeability. Physicists puzzle over the discovery that light has the quality of both vibration and particle. I think this condition is created by light vibrations as they travel through space. The vibrations disturb space as it passes by to cause space to emit photons that then disappear as the vibrations pass. In other words, photon particles aren't emitted by the light source, but are emitted by space, and morph back into space as the light vibrations pass.

Physical Sensations: Astronauts report that when traveling in space they sense most of the same things they sense traveling in earth's atmosphere and oceans. Of course, they feel no molecules of air or water brushing against their bodies in space, because space has no particles of air; but the explorers report feeling most everything else in space that they feel in earth's atmosphere.

For example, if an astronaut were blindfolded, she wouldn't be able to distinguish any difference between gravity and inertial forces she senses here on earth and those she senses in outer space. In fact a clever pilot in earth's atmosphere can maneuver a jet plane to cause her to think for a short time she is in outer space. She also feels in space the same G forces she would feel in earth's atmosphere, and the same gravity and inertia as she passes through a gravitational field or changes speed and direction in space.

And, outside her craft in outer space, she sees light vibrations and feels heat vibration from the sun just as she would

on earth. And when she fires jets of ionized energy to push her space craft off against the surrounding space, she feels the same jolt of acceleration a squid feels when it expels jets of energy to push off against the surrounding water; or a jet pilot feels when he fires his engines to push off against earth's atmosphere.

Of course, she can't use the same wings and rudder of her spacecraft she uses in earth's atmosphere to gain lift and make turns in outer space. But, this may be that the wings and rudder are simply not big enough to deform the atmosphere of space to gain lift and change directions. If they were say the size of the moon, or she was traveling near the speed of light, there's every indication they would deform space and provide lift and guidance.

In fact, Einstein's Theory of Relativity indicates that the substance of space would begin to provide friction to any object as it approaches the speed of light, and the friction would be proportional to the size of the object and its speed. This resistance would increase until the object reached the speed of light, and then it would be so strong the object would hit the light barrier of space and could accelerate no further because there isn't enough energy in the universe to break through the light barrier. That, of course, remains to be proven.

A Physical Trampoline: Space is often described as acting like a physical trampoline. A star with huge mass will depress the trampoline, and cause nearby objects to role toward the distortion

created by the star to act like gravity. But, since establishment forums reject the idea that space is a substance, nobody today is bothering today to discuss what the trampoline might be made of, and how it provides its springy behavior.

Bacon notes the reason we aren't interested in determining what the trampoline is made of, or how gravity and inertia occur, is because things which always occur simply don't attract our attention and are ignored:

"In my judgment philosophy has been hindered by nothing more than this – that things of familiar and frequent occurrence do not arrest and detain the thoughts of men, but are received in passing without any inquiry."

However, if inertia, gravity, and centrifugal force couldn't be depended upon to happen, and things occasionally flew off the earth, we can be sure the establishment would be trying to determine how they happen and how to prevent them from not happening. We'd be fast at work trying to determine what the trampoline of space is made of, and not so quick to dismiss space as an empty vacuum.

A Physical Typography: If we examine navigation charts NASA makes for a trip in the solar system, we'll find they resemble the navigation charts made for voyages on our oceans and in earth's atmosphere. All have physical impediments that need to be avoided, with similar conditions of timing necessary to navigate. Let's look at

a few of the more obvious such physical impediments and the need for timing:

Tides and Currents: Every voyage in space is timed to begin according to the position of the moon and sun to take advantage of the tides in space created by them, just as ships captains wait for the right position of moon and sun for tides to assist sailing vessels to launch their voyages in earth's oceans. And, after launch, the spacecraft will drop down to some current in space to assist the craft to sail more easily across open space, just as an ocean ship or an airplane will drop into an ocean current or jet stream to sail more easily across the ocean or atmosphere.

Then, as the spacecraft goes out into the solar system, it uses currents created by other planets and their moons to maneuver to a destination. This is not any different than the maneuvers sea captains use to navigate the open oceans, or airplane pilots use to navigate the open atmosphere. Physical tides and currents are a part of space topography just as they are of oceans and our atmosphere.

Physical Winds: There are also solar winds in outer space. We can observe that whenever a comet comes close to the sun, the comets million-mile smoke-like tail won't point toward the sun as the law of gravity would dictate. The tail points in exactly the opposite direction away from the sun defying the law of gravity. This suggests space is heated by the sun, and carries the particles of the

comet's tail away from the hot sun by convection, just like the heated atmosphere around a fire carries particles of smoke away from a fire.

Physical Waves: Astronomers also report that, whenever a supernova explodes in outer space, the violence creates very destructive shockwaves that flow across space for billions and billions of miles. And radio operators report that when the sun has explosions, besides producing flares of solar material that falls back into the sun, it sends out tsunami like shockwaves into space that interfere with radio vibrations. It is also assumed that an atom bomb exploded in space will send out shockwaves that could change the course of dangerous asteroids. If space were an empty vacuum, there'd be no such shockwaves because in a vacuum there'd be nothing to wave.

Physical Whirlpools: Astronomers using the NASA space telescope also report that space contains whirlpools called "black holes" that suck-up anything in their path – just like whirlpools in oceans and tornadoes in the atmosphere suck-up everything in their path. And they believe there are "keyholes" in space that can interfere with the course of a spacecraft or an asteroid. In order to have physical whirlpools and keyholes, space would need a physical fabric.

Physical Noise: Supersensitive modern infrared receivers recently detected a ubiquitous heat or noise coming from all directions and every aspect of space. Apparently space not only produces energy in the form of inertia, but also produces detectable vibrations or infrared noise in the process of its behaviors. Certainly an empty vacuum wouldn't buzz or carry such static. It would be absolutely silent. The noise or heat must be created by the varying physical behaviors of space itself.

Helter-Skelter: When biblical scholars described the universe thousands of years ago, they didn't have the technology to see into space. They wrongly assumed the universe was an perfect product of a perfect God. However, photos of deep space today show that space is a helter-skelter conglomerate of sizes, shapes, and age. Galaxies move away and toward us, are organized in every shape from spirals to saucers, lie in every possible physical attitude, travel at every different speed in different directions, appear of different ages, and even collide.

This suggests that matter may be constantly being created and destroyed; and at all different times and places. It's the kind of evidence that Bacon noted is ignored by our minds when we use the scholastic method of cosmology:

“The human understanding when it has once adopted an opinion (either as being the received opinion or as being agreeable to itself) draws all things else to support and agree with it. And though there be a greater number

and weight of instances to be found on the other side, yet these it neglects and despises, or else by some distinction sets aside and rejects; in order that by this great and pernicious predetermination the authority of its former conclusions may remain inviolate.

“Therefore it was a good answer that was made by one who, when they showed him hanging in a temple a picture of those who had paid their vows as having escaped shipwreck, and would have him say whether he did not now acknowledge power of the gods, -- “Aye,” asked him again, “but where are they painted that were drowned after the vows? . . . It is the peculiar and perpetual error of the human intellect to be more moved and excited by affirmatives than by negatives, whereas it ought properly to hold itself indifferently disposed toward both alike. Indeed in the establishment of any true axiom, the negative instant is the more forcible of the two.”

Author’s Note: This is only a partial catalogue of the physical behaviors of space garnered by a retired trial lawyer from scientific reports. I’m certain that the astrophysicists working with space at NASA everyday could easily come up with many more of the physical behaviors of space, and, perhaps, correct some of the observations made in this catalogue.

Einstein Would Be Appalled: If Einstein were alive today, he wouldn’t be a bit surprised to find advancing technology has produced further evidence of physical behaviors of space. It would spur him on in his quest to determine what space is made of, and how it produces its behaviors. In fact, it’s my judgment, if our establishment hadn’t banned the ether theory a half century ago, we might know today such seemingly impossible things as how gravity and inertia are created, and how to change space into energy.

While this is mere speculation by a lawyer, one thing is certain: Einstein, like all the astrophysicists before him, would be appalled to discover our establishment has closed the door on his work, and is ignoring such evidence. Einstein understood, just as Bacon before him, that progress requires that our establishment provide a protected forum for free discussion of scientific ideas even if they disagree with establishment ideas or the Bible, something that is not being done today:

“The free, unhampered exchange of ideas, and scientific conclusions is as necessary for the sound development of science, as it is in all spheres of cultural life . . . we must not conceal from ourselves that no improvement in the present depressing situation is possible without a severe struggle; for the handful of those who are really determined to do something is minute in comparison with the mass of lukewarm and the misguided.”

The question then arises, after all the well-publicized progress brought about by the work of astrophysicists like Newton, Faraday, Poincare, Lorentz and Einstein for four centuries, what happened to suddenly sweep all their efforts and ideas about space and the universe off the table? The answer will be hard for anyone who didn't live through the “red scare” of the Cold War to accept, but the description of the medieval madness that follows is well-documented.

Part II

The Medieval Reason Establishment Forums Closed

From the dawn of the Age of Science in the 17th century, until the “red scare” of McCarthyism in the mid-twentieth century, our establishment provided an open forum for both cosmology and astrophysics to discuss their theories. Cosmologists speculated upon where the universe came from, and astrophysics speculated upon what the universe was made of, and how it created its behaviors. And all during that time, both parties and the establishment quietly ignored the fact that they differed over the physical nature of space.

And, remembering Galileo, astrophysicists during the time from Newton to Einstein, always publicly deferred to theology and cosmology, stating astrophysics was a handmaiden of religion trying to determine how God runs the universe, and how all the miracles related in the Bible happened. None of the long line of astrophysicists from Newton to Einstein, even though many were atheists, ever directly challenged Genesis, or its Big Bang theory and, furthermore, found no reason to do so. As far as they were concerned the question of where the universe came from, where it would end up, and how many universes exist was the turf of religion and cosmology, and irrelevant to astrophysics.

But on the death of Einstein, things drastically changed for the worst. English astronomer Fred Hoyle became the *ad hoc* spokesman for astrophysics. An ebullient Yorkshire Englishman,

host of a popular BBC radio program, and busy traveling about promoting seminars in astrophysics, Hoyle sadly stepped into the turf of religion and cosmology, and began openly arguing with theologians and cosmologists that the “big bang” theory didn’t agree with his direct observations of the behavior of the universe.

Specifically, Hoyle argued that there is no evidence the universe had any beginning, or will have an end. He insisted that his observations indicated stars and planets are being created and destroyed all the time in the universe. He formally called his theory the “Steady State” universe, but, very unfortunately, he often referred to the universe as an *evolutionary* process.

Of course, that very word *evolution* waved a red flag in the face of both theology and cosmology. It directly challenged the “creationist” theory of Genesis and the Big Bang theory of modern cosmology, and ignited an open war. Theology was still battling Darwin’s evolutionary theory of where man came from, and now, suddenly, it found itself confronted with a new evolutionary theory of where the universe came from.

Neither theology nor cosmology intended to take Hoyle and his evolutionary universe lying down. Both began looking for a weapon to support a counterattack, and they found it in a theory promoted by astronomer Edwin Hubble. Hubble had noted that very distant galaxies exhibited a red shift, and, ignoring any evidence to the contrary, used this evidence to conclude that a

single explosion had created every galaxy in the universe to mark the beginning of time.

When Hubble related his theory to Einstein, Einstein characteristically responded that it was an interesting idea, but quickly added: “But it isn’t physics.” To Einstein, any theory of *where* the universe came from was not science. It was cosmology and irrelevant to the goal of astrophysics seeking to determine what the universe is made of, and how it produces its behaviors.

But Hubble’s theory was good enough for theologians. As physicist Thomas Gold later noted: “The biblically religious people wanted a moment of Creation, and obviously Hubble’s “big bang” was their stuff.” Georges Lemaitre, both an ordained priest and cosmologist, managed to get Pope Pius XII to publicly give his papal blessing to Hubble’s theory as “consonant with the Bible,” and a formal clash was on.

In a well-orchestrated release, theologians and cosmologists notified English newspapers that “science” had just discovered evidence to confirm the biblical story of the creation. The statement wasn’t quite true. Science was in no way connected with Hubble’s Big Bang theory, and, as Bacon had noted in the *Novum Organum*, cosmology had been promoting a such a theory based on Genesis in 1620 before the Age of Science had even begun.

However, editors of English newspapers didn’t care about such facts, and went bananas over the news. A brand new controversy, like the Darwin evolutionary theory, had been dropped

into their laps, only in this one they had a popular radio personality arguing for an evolutionary universe, and Hubble and Lemaitre and the Pope arguing for a universe created as a miraculous event.

Fanning the flames, the British Evening News blazed the headline: **“Science has proved the Bible was right.”** The Evening Standard followed with the headline: **“How it all began’ fits in with the Bible.”** Local papers all over England quickly copied the lead. In America, it was even worse. Already organized to battle Darwin’s “evolutionary” theory of *where* man came from, American theology and cosmology pounced on Hoyle and his evolutionary theory of the universe with organized gusto.

But the establishment, to its credit, managed to keep relatively calm. As it had with Darwin’s theory, it dutifully and properly provided a forum for both sides. One establishment journal actually ran an article quizzing its readers as to which theory of the universe they believed was correct, and the response split down the middle. However, significantly, another question in the same poll asked readers if they thought the first question was scientifically relevant, and got a 90% negative response.

The controversy would have eventually cooled down, as it had with Darwin, and the parties would have probably returned to tending their own turf. But fiery Hoyle wouldn’t back down. Like the newspaper editors, he was in showbiz, and he found the controversy improved his radio ratings. So Hoyle pressed the fight, with his group often derisively calling cosmology “cosmo-

mythology,” and it was Hoyle who gave cosmology’s theory the name the “big bang” to make fun of it.

Still the establishment played it cool. Not wanting a repeat of the Galileo incident, it continued publishing papers supporting arguments for both the Big Bang theory based on the creationism of Genesis, and Hoyle’s Steady State theory suggesting the universe is evolutionary and eternal. Then, unfortunately, something happened overnight, and poor Hoyle met a fate similar to Galileo. He was to watch as he was publicly humiliated and his professional career reduced to ruins, taking the Unified Field theory and astrophysics with him.

Hoyle Punished Like Galileo: On that morning Hoyle awoke to the news that Klaus Fuchs, a physicist among his associates, had been arrested for passing atomic secrets to the Russians. Shortly thereafter the Rosenbergs were arrested in America on a similar charge. The western political establishment reacted with panic. Fuchs was imprisoned in England, and the Rosenbergs were executed in America.

The Establishment then planted spies everywhere, and anyone even rumored to have communist or socialist sympathies, or who associated with such persons, were summons before tribunals, and publicly humiliated and their professional career ruined. Terrible and ridiculous things happened. For example, eminent scientist J. Robert Oppenheimer, the chief developer of the atom

bomb, lost his clearance to atomic secrets, and was professionally exiled.

Then a rumor began that Hoyle's "evolutionary" theory, which conflicted with Genesis, was a plant of "godless communism" designed to undermine the west. We are left to guess who was behind the rumor, but, suddenly, everyone and anything connected with Hoyle, including the Unified Field theory of Faraday, Poincare, Lorentz and Einstein, fell under a cloud, and establishment forums began to reject any papers that did not conform to the Big Bang theory and Genesis

Unfortunately the ban affected The Ether Dispute. After the ban, any paper that referred to space as the ether was summarily rejected, and as cosmologists took over as gatekeepers of establishment forums, they not only pushed the Genesis based Big Bang" theory, they pushed the Genesis view that space is an empty vacuum. Astrophysicists, no longer welcome at any discussion of the nature of space, were demoted to work as mechanics designing space trips.

And, today, 20 years after the end of the Cold War, when most other departments of the establishment have returned to their senses, the ban on astrophysics and its Unified Field theory continues. This medieval charade could go on until some emerging society – especially one not fascinated with Genesis but reading Newton and Einstein – creates a breakthrough in discovering what space is made of, and its interrelationship with energy and matter,

and America could be left behind like Italy and Spain in the 17th century.

The Sad Silence of Astrophysicists: Working every day to chart the physical topography and behavior of the great ocean of space, we have to ask why astrophysicists are so quiet. Why don't they publicly mention that space doesn't act like an empty vacuum, and attack the ban on their astrophysics? We can only imagine what physical behaviors they come across, dealing as they do with the behaviors of space every day, and what far reaching ideas they may harbor.

Why are they behaving exactly like the chart-makers and explorers in The Middle Ages who certainly observed that the biblical cosmologists were wrong? They certainly knew the earth wasn't flat, and from their navigational calculations knew the earth wasn't at the center of universe. Francis Bacon, an English aristocrat, attributed this silence to a working class mentality.

“The mechanic, not troubling himself with the investigation of truth, confines his attention to those things which bear upon his particular work, and will not either raise his mind or stretch out his hand for anything else.”

But I think Bacon let his own class prejudice get in his way. Early Spanish and Italian mathematicians, physicists, and explorers certainly knew the earth was not flat, and not the center of the universe, but they kept quiet because their establishments were

Defenders of the Faith. They knew if the contradicted biblical cosmology, they'd literally be toast. I'm sure today's astrophysicist charting and exploring space keep silent for the same reason.

Astrophysicists want to keep their jobs and food on their tables at home. If they were to present a paper contradicting Genesis, suggesting space is a physical substance, they be summoned to the front office and required to recant or leave. Astrophysicists may run our space program using their knowledge of the behavior of space, cosmologists certainly couldn't, but cosmologists have control of the purse strings and carefully protect Genesis and their Big Bang theory and their argument that space is an empty vacuum.

So, if we can't depend upon astrophysicists to speak up, what can we do to correct the situation? If Isaac Newton were alive today, he could tell us the answer. He'd urge us apply the solution suggested by Francis Bacon in his *Novum Organum*, the solution Newton used to smuggle science into 17th century England at a time when it was totally dominated by scholastic philosophy. Let's look at Bacon's clever solution, for history proves it works, and it may be the only one that will work.

Part III



Bacon

“Let there be two streams and dispensations of knowledge, and in like manner two tribes or kindred of students in philosophy – let there in short be one method for the cultivation of existing knowledge, and another for the invention of knowledge.”

Francis Bacon: *Novum Organum*

The Baconian Solution

Francis Bacon, Attorney General of England, Chief Judge of the English Supreme Court, an English Baron, a philosopher, and, we need to add, a Machiavellian politician, recognized that inventions like gunpowder and the compass had changed the course of human history, for better or worse, and set out to discover what method of inquiry had led to the inventions and progress. He found the method was very much like the method produces by the new rules of evidence then being developed in the English courtroom to arrive at truth.

He then wrote the *Novum Organum* providing information that, in the hands of experimental genius like Isaac Newton, quickly led to the development of the scientific method, and a totally new age of progress for any nation that put it to use. The basic difference between the courtroom method and the scientific method was that, in a courtroom the judge or jury makes a final decision of the truth, and in science experimental proof provides the final decision.

This striking similarity between the method of inquiry used in the modern court system to arrive at truth, and the method of inquiry used in science, may be the reason people trained in the law like Bacon, Copernicus, Descartes, and Neils Bohr have been so valuable to progress in the physical sciences, and people like Jefferson and Madison have been so valuable in progress in political science. And, of course, the reason a lawyer is writing this book.

But from the beginning Bacon was worldly enough to recognize most people will not readily understand the new method because it is so contrary to our natural method of inquiry, and will hold the new scientific method as suspect as he found they held the new rules of evidence used in his English courtroom. Furthermore, Bacon recognized that the average person is conservative, more interested in preserving the status quo than change, while he'll use any invention once made available, he won't be able to imagine an invention beforehand, he wrote in 1620:

“For when a man looks at the variety and beauty of the provisions which the mechanical arts have brought together for men’s use, we will certainly be more inclined to admire the wealth of man than to feel his wants.”

“Such is the infelicity and unhappy disposition of the human mind in this course of invention, that it first distrusts and then despises itself: first cannot imagine that such thing can be found out; and, when it is found out, cannot understand how the world should have missed it so long.”

So Bacon suggested that the new science not try to replace religion, but be offered to society as a handmaiden of religion, and, whenever there arises a conflict between science and religion, science is to demur to religion, treat its view with respect, and give religious leaders the facts and time to absorb them:

“If the matter be truly considered, natural philosophy is after the word of God at once the surest medicine against superstition, and the most approved nourishment for faith, and there she is rightly given to religion as her most faithful handmaid, since the one displays the will of God, the other his power.”

And Bacon was worldly enough to know who to target to implement this dual system. Recognizing from politics that everything boils down to economics and power, he didn’t try to change the views of scholastic philosophers or establishment professors. Instead, he appealed to the movers and shakers of society – the King, the English aristocracy, financiers, shipping magnets, military leaders, and the church fathers – working to convince them that the new system and inventions would bring these people increased power and wealth.



Sir Robert Boyle

The British Adopt Bacon's Dual Solution

In 1660, shortly after Bacon's death, a group of English aristocrats like Sir Robert Boyle, joined by merchants, industrialists, financiers, military men, and some theologians seeking more dominion for the Church of England, became convinced that Bacon's new scientific method could make England, the English Church, and themselves wealthy and powerful; petitioned the new King Charles II to grant them a charter to organize a formal scientific society to put Bacon's new ideas to work.

The King, anxious to replace Spain's hegemony over the seas and the world and make his realm richer and more powerful, chartered *The Royal Society of London*; the first formal organization dedicated to the scientific method, and declared himself a charter member. The members then formally dedicated the new society to the memory of Francis Bacon, and the new age of science was very formally launched.

In 1672 Isaac Newton became a Fellow, and in 1703 its Director, and remained its virtual dictator for another thirty productive years. Educated in a seminary and familiar with theology and cosmology, Newton set up what was to be a long-term tacit agreement between science and religion. The agreement was that his Society would stay out of the turf of the Church of England, and the Church would tolerate science more or less as its handmaiden.

It was a highly successful tacit arrangement. Unlike Italy where Galileo had used the work of Copernicus to initiate the Age of Science, but had insulted the Church of Rome with a book portraying the protagonist of biblical cosmology as a simpleton, the Royal Society under the leadership of Newton treated the Church of England with deliberate circumspect, always giving it time to absorb new discoveries, and this kid gloved treatment continued until Newton's death.

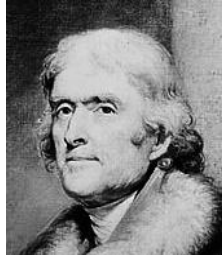
But after Newton, the Society allowed member Charles Darwin to rock the boat. On a voyage financed by the Society, Darwin discovered that animals developed new physical qualities through "survival of the fittest." The observation and his *Origin of the Species* led to the modern science of genetics, but Darwin didn't stop there and carelessly invaded into the turf of theology.

With very little scientific evidence, in *The Descent of Man*, Darwin argued man wasn't made in the image of God, as the Bible said, but was descended from monkeys. Naturally the book infuriated churches everywhere, and the battle between theology

and science very nearly wrecked the tacit agreement that Newton had so carefully built between science and theology. But the English establishment remained cool, and continued to provide an open forum for both theologians and scientists.

However, in the area of politics, the establishment stumbled. In the 17th century Englishman John Locke developed modern political science. The old system using the scholastic method of inquiry had granted power to people based upon *where* they came from, and like all systems using this scholastic method of inquiry, it wasn't leading England to political progress. Locke's new system proposed a system where the public would elect politicians based on their behavior, and not where they came from. It was scientifically as revolutionary as modern physics.

But, instead of supporting the new political science, the English establishment unfortunately banned it from discussion in its forums, and as a result England ultimately lost much of its power and wealth to its North American Colonies who embraced the new political science.



Jefferson

“Three of the most important people who ever lived are Bacon, Newton, and Locke.”

Thomas Jefferson

Americans Adopt Bacon’s Dual Solution

Shortly after Locke’s death, the economic and political leaders of America – its planters, financiers, businessmen, shipping magnets, military people, and theologians – became convinced Locke’s new scientific political system could help improve the wealth and power of the colonies, the American Church, and themselves; and set out to experiment with it in America. They adopted The American Constitution that included a dual system commonly known as “separation of church and state” that guaranteed an open forum to allow both biblical theologians and political scientist to express their divergent views on politics and religion.

But the duality in America occasionally has proven unstable. In times of war and fear, the American establishment will often ignore its Constitution, and close its forums to any view that conflicts with biblical views. However, in most cases, as soon as

immediate danger passes, it will restore the duality progress will resume.

But this hasn't happened regarding astrophysics, and the study of the behavior of the physical universe. The "red scare" ended 20 years ago, but our establishment forums, one might say in violation of the American Constitutions, still categorically reject articles supporting the Unified Field Theory and the possibility that space is an ethereal substance for no other reason than it conflicts with the biblical cosmology of Genesis.

So, while sciences like medicine, particle physics and political science, enjoying duality, have progressed so much in the last half-century, they don't seem the same sciences; there has been no such progress in astrophysics. We know little more about what the universe is made of, or how it produces its most common physical behaviors like gravity, inertia and relativity than we did a half-century ago because we aren't looking. And if we find it hard to believe that four centuries into the age of science our establishment could be guilty of such medieval behavior, we need only remind ourselves that Bacon warned of such regression:

"The idols which are now in possession of the human understanding, and have taken deep root therein, not only so beset men's minds that truth can hardly find entrance, but even after entrance obtained, they will again in the very instauration of the sciences meet and trouble us, unless men being forewarned of the danger fortify themselves as far as may be against their assaults . . .

"All must be put away with a fixed and solemn determination . . . for the entrance into the kingdom of man, founded on the sciences, being not much

other than the entrance into the kingdom of heaven, where into none may enter except as a little child.”

If we don't heed his warning, we are placing our position in this age of science at risk of being lost to new emerging societies not fixated on our Idols, nations that may be busy today inquiring into the views of Newton, Faraday, Poincare, Lorentz and Einstein regarding the behavior of the universe, and we may awake one day to find our place taken, leaving us to kick ourselves as we desperately play catch up.

Part IV

Three Proven Steps to Reopen Establishment Forums

If Bacon or Newton were here today, they'd suggest we citizens help restore duality by helping to reopen establishment forums to astrophysicists. They would name three simple steps that their experience proved will create a *renaissance* of progress in the understanding of *what* our universe is made of, *how* it creates its behaviors, and *the laws* that govern those behaviors:

1. Formally separate cosmology and astrophysics: Our establishment must be urged to recognize that cosmology is not a science, but is a scholastic philosophy; and formally place it in the department of philosophy along with theology and other scholastic disciplines. Cosmology would be charged with using our natural method of inquiry outlined in Aristotle's *Organum* to speculate upon the unknown – to provide satisfying theories of *where* our universe came from, *where* it is likely to end up, and *how many* universes exist.

At the same time the establishment would recognize astrophysics is a behavioral science, and place it in the department of science along with medicine, particle physics and political science. This science would be charged with using the scientific method to satisfy our need to know *what* the universe is made of,

how it works, and the *laws* that govern its behavior so we can resume progress in understanding the behavior of our universe.

2. Restore the tacit agreement between cosmology and astrophysics: Astrophysicists must learn the question of *where* the universe came from is the exclusive turf of theology and cosmology, and is irrelevant to science's goal of learning *what* the universe is made of. Astrophysicists need to avoid Hoyle's mistake of arguing with theology and cosmology that our universe is a product of an evolutionary process, and stick to the job of determining what the universe is made of, how it works, and the laws that govern it.

On the other hand, cosmology and theology must remember biblical cosmologists were dead wrong in many cases about the physical aspects of our universe. The earth is not flat or the center of the universe as it appeared to them, and, likewise, space may not be the empty vacuum it appears. So cosmologists need to play down their view that space is empty vacuum. In fact, their Big Bang theory would be an easier sell if they could say the galaxies were created out of the ethereal substance of space.

And our establishment needs to keep in mind Einstein's observation: "*Science without religion is lame. Religion without science is blind.*" Under the terms of duality that is built into our Constitution, our public establishments can't judge between religion and science. They are required constitutionally to provide an open forum for

both, and allow the public and scientific progress to be the judge and jury of which is correct.

3. Target the movers and the shakers of society: Finally, we need to keep in mind Bacon's observation that everything boils down to economics and defense. We don't need to convince cosmologists or astrophysicists of the need to reinstate duality, it is the movers and shakers -- our economic and military leaders -- that we need to convince. Once these people understand the value of the dual approach, it would only take a casual word in their operations to restore it.

Using this approach, there'd be no heated arguments between cosmology and astrophysics. We'd simply discover independent chairs of cosmology and astrophysics quietly popping up in our universities, and find establishment forums once again quietly accepting papers from both qualified cosmologists and astrophysicists. With constitutional duality restored, progress would resume, and our place in the Space Age, and the wealth and power it brings, would once again be assured.

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