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THE BIBLE AND PHYSICS

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Introduction

I want to start with several anecdotes and personal experiences.

One day I came home from high school and excitedly told Mam-ma (my grandmother Mundy) that President Kennedy intended to put a man on the moon within ten years. She solemnly responded, "Billy, God will never allow this! Sin is confined to this world," she declared. She did not live to see the failure of her word.

In 1980, after the Voyager I and II fly-bys of Jupiter and Saturn, our Physics Department at Pacific Union College got a laser disk with many of the close-up pictures made of the two planets, their moons, and rings. Several students, seeing this, were eager for me to do a presentation at Paulin Sabbath School, a Sabbath school by students for students. Several hundred attendees were wowed by the pictures of the red spot on Jupiter and the rings of Saturn. But they were stunned by pictures of active volcanoes on Io, one of Jupiter's moons. How could there be this destructive activity 800 million miles from the nearest known sin? One of the mature religion faculty members cornered me afterward and asked, "Are these pictures real? What do you make of it?" For a close friend and colleague of mine, this was an "epic moment" in his life, forever altering his world view and causing him to question his conservative beliefs about creation and the history of this earth.

I was a pre-teen when I first heard of supernovas, exploding stars. While these are only occasionally visible to the unaided eye from earth - the most recent was 1987 - with telescopes we know they are not an uncommon event. Knowing that these were thousands of light years - trillions and trillions of miles - from the earth, my young mind also wrestled with these explosions in the celestial heavens. Then I saw a Moody film in which there was time-lapsed footage of the blooming of a rose. All of a sudden it occurred to me that I was watching an "explosion!" Subsequently I imagined that supernova where simply "flowers" blooming in God's cosmic garden.

Another disturbing insight for me occurred when I first saw the Orion Nebula through a telescope and found that it was located in same arm of the Milky Way in which our solar system is located, an astronomical neighbor in our galaxy that has another 100 billion suns; and this Milky Way is just one of 100 billion galaxies that are now accessible to the Hubble telescope. I had been taught since childhood that heaven was going to come down through Orion and I had visions of a glorious corridor into which one could gaze and almost see the throne of God.[1] [2] Fortunately, my earlier experience with supernova helped me.

We are familiar with comments about the danger of wedding science and religion lest religion becomes a widow. It is said we must be careful about binding our theology too closely with particular science theories.[3] The context is that the science of today will be gone tomorrow. Science does change. But the above stories may suggest that some of our religious views may be skewed and change also.

But I have digressed from my assignment from the start, the Bible and physics. I would like also the freedom to treat the converse; the physics in the Bible. I use both of

the phrases loosely to discuss the consistency of science and Scripture, implications and constraints revelation suggests for our understanding of science, and the support and understanding science may bring to the Word. Thus, what can we learn from God's two books and how do they relate?

It is reported that when asked by the Archbishop of Canterbury what the implications of relativity theory for theology were, Einstein replied, "None. Relativity is a purely scientific matter and has nothing to do with religion."[4] On the other hand, Paul Davies in the preface to *God and the New Physics* says, ". . .science offers a surer path to God than Religion."[5] It appears that Hugh Ross shares this opinion also, suggesting that nature has been less effected by sin than the canonization, translation and preservation of scripture.

However, we understand that, "Deprived of heavenly light, [humans] can no longer discern the character of God in the works of His hand."[6]

"And through man's disobedience a change was wrought in nature itself. Marred by the curse of sin, nature can bear but an imperfect testimony regarding the Creator."[7] As scripture says, "we see through a glass darkly" (I Cor. 13:12) and "the whole creation groaneth and travaileth in pain. . ." (Rom 8:22)

With these caveats, let's consider some insights that physics may provide for scripture.

Anthropic Coincidences

Evidence from the world of physics that affirms the Christian world view can be found in discussions of anthropic coincidences. As Barr states, "...when it is the laws of

nature themselves that become the object of curiosity, laws that are seen to form an edifice of great harmony and beauty, the question of a cosmic designer seems no longer irrelevant but inescapable."[8] Further, "...certain features of the laws of physics seem - just coincidently - to be exactly what is needed for the existence of life to be possible in our universe."[9] Various authors will list a dozen or more of physical coincidences that exist that appear to be necessary for the existence of life. For example:

- Strong force - if it were a little less intense, nuclei would not stick together and the only atom would be hydrogen. This does not provide sufficient complexity for life. Further, the fusion process responsible for the light and energy from the sun and other stars would not exist. If this force were a little stronger, then hydrogen, which is essential for water and organic matter, would be rare. In addition, the stability of the proton, essential to the existence of hydrogen, is also affected by any change in this force.[10] [11]
- Electromagnetic force - if this force were a little weaker, electrons would not bind to nuclei to form atoms. If a little stronger, then atoms would not "share" their electrons with neighboring atoms and form molecules. Either way, without the chemistry of molecules, life as we know it could not exist. Similar comments can be made about the electron to proton mass ratio.[12] [13]

More mundane balances, such as the earth-sun distance, the sun color and mass, the earth's gravity and rotation period all seem to be just right for life.

Unfortunately for us as short-term creationists, most of the anthropic arguments have to do with the cosmological evolution from a big bang of a universe which is suitable for life and the presumed biological evolution that begat life. Even so, "The 'coincidental' values of the constants of physics and the parameters of the universe point . . . to a designer who transcends the dimensions and limits of the physical universe." (See the Appendix.)

Among other things these anthropic coincidences naturally suggest the concept of an Intelligent Designer. For example, Paul Davies comments that "the impression of design is overwhelming."[14]

Intelligent Design

Over recent years the Intelligent Design movement, currently based at Discovery Institute in Washington, has developed. Noting that Darwin sought to explain design without a designer by replacing the designer with natural selection, they provide examples of life systems that show irreproducible complexity. They argue that the system cannot be explained by the slow development guided by natural selection, for no part of the system demonstrates advantage to an organism until it is all assembled. They use a mouse trap as an analogy. No one of the parts (spring, base, latch, etc.) of the trap separately has any advantage or potential to catch a mouse. Only when fully assembled, will the device work. The flagellum and the red blood cell are biological examples. They further claim that the process of cooption is not adequate for explaining the

development of the system.* Also, natural selection does not seem to be able to explain how life originated. There first must be life for natural selection to work - "that is, self-reproducing organisms able to pass on their traits genetically."[15]

As these comments indicate, the Discovery Institute and its Intelligent Design movement focuses on biological design. It will be appropriate to shift our attention to cosmological design and symmetric structure.

But I would like to continue my digression for another moment and consider the criterion for intelligent design that William Dembsky has developed. According to him, intelligent design is an improbable event with specification or recognizable pattern. There are many improbable shapes of rocks in the world, but in South Dakota there are rocks not only with improbable design, but also with recognizable patterns, the faces of four U.S. presidents. Together this is taken as evidence of an intelligent design and a designer. In all cases we can conceive, information rich systems (improbable event with specification) arise from intelligent design. This is assumed and recognized in the search for extraterrestrial intelligence (SETI) for example. If an improbable signal with a recognizable pattern occurs, this will be taken as evidence of intelligence.[16]

But let's now refocus our attention to physical science.

Symmetry

As physicists pursue their goal of a "theory of everything", the deeper and further they go, the more profound and beautiful are the symmetries they discover. It seems that the laws of nature are based on sophisticated symmetries. As a simple trite example,

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* Mouse trap analogy has been explained. See <http://udel.edu/~mcdonald/mousetrap.html>, for example.

Stephen Barr uses the illustration of a box held at an angle with a single layer of identical sized marbles.[17] A pattern will emerge in which the marbles are arranged in a hexagonal shape. Naively, one could argue that here is a pattern or design that just naturally occurred. A little reflection reveals that this pattern is due to the symmetry or shape of the marbles, a shape that was implemented by a designer. Though a simple analogy, it does properly represent what takes place in crystal formation, molecular structure, and even the nature of electrons. The pattern or design that "just naturally happens" is due to a deeper symmetry which in turn may be shown to be the results of a more fundamental symmetry yet. As Barr says, "*Order has to be built in for order to come out.*"[18] "The deeper one goes, the more orderly nature looks, the more subtle and intricate its designs."[19] The very laws of conservation, such as those of energy and momentum, are based on symmetries found in nature. The influence of symmetry has led scientists to postulate the existence of positrons and neutrinos, for example, before there was any experimental evidence for them. The laws of nature form an edifice of harmony and design that suggests a designer.

Determinism

At the end of the nineteenth century physics had placed the universe in a straight-jacket. Conceived to be stable, infinite in space, without beginning or end, it was described by a naturalistic and materialistic model which made unnecessary the supernatural. This seems ironic since so many of the scientists who were a part of the Scientific Revolution, including Copernicus, Kepler, Galileo and Newton, were devout religious men. But the science they developed led to a deistic clockmaker God and

eventually to a world view that had no need for a God. It is reported that after having the wonders of Newtonian mechanics explained to him, Napoleon asked, "Where is God?", to which Laplace replied, "I have no need for that hypothesis."[20] This mechanical world view also led to a very deterministic universe which fundamentally left no room for freedom of choice. In principle, given the locations and motions of all the atoms in the universe at a given instant along with the relevant forces (gravity and electromagnetic for example), their future positions and motions and all that was composed of them (including you and me) would forever be determined. Classical physics was fundamentally incompatible with existence of free will.[21] In addition, Hume's arguments against miracles were based on this Newtonian determinism.[22]

There are several anecdotes that indicate that at the end of the nineteenth century there was a feeling that all the discoveries had been made in physics, that there were only a few loose ends to tie up and greater accuracy to be achieved in measurements. But early in the twentieth century several revolutionary developments occurred in physics that broke the fetters of classical science. These included quantum theory and the general theory of relativity.

Quantum theory, a theory that relates to the very small microscopic entities, is fundamentally probabilistic in character. Determinism is overthrown by this quantum physics. So this theory, which has been extremely successful in helping us to understand and explain atomic and sub-atomic phenomena, has restored room for the free choice. While it does not produce free choice, in whatever manner free will happens, it is not disjoint with physical laws.[23] Conversely, modern physics is not inconsistent with the Biblical concept of free choice and personal responsibility. Also "this flexibility within

the understanding of physical law has ... created a more congenial atmosphere for the concept of miracles."[24]

John Polkinghorn has argued that chaos theory that has been developed in recent decades also relaxes the deterministic grip of natural processes.[25] But really it is demonstrating the implausibility, not the impossibility, of knowing the exact initial conditions of a classical system so that it is not realistic for us to make predictions of the outcome of a deterministic process. The indeterminacy in chaos is in the precision of our knowledge, not in the process. The openness and freedom needed for free will is not latent in this theory.[26]

Complementarity

Another aspect of quantum theory that may illuminate some religious teachings is Bohr's complementarity principle. This theory relates to the fact that microscopic objects exhibit particle and wave characteristics. Elementary particles have the mass and location of a particle and yet exhibit superposition and non-local characteristics of waves. It is these wave characteristics that, in fact, are the source of quantum indeterminacy discussed above.

Now, though particle-like and wave-like characteristics as developed in physics are mutually exclusive, both concepts are necessary in describing the behavior and properties of microscopic objects. No simple metaphor has been found that can adequately describe atomic and sub-atomic behavior. So particle and wave characteristics are said to be complementary. Under certain circumstances one of the properties is more obvious than the other. So the movement of electrons that form the

images on a TV screen can be best explained in terms of the particle characteristics of electrons. However, the behavior of electrons in an electron microscope can best be understood in terms of the wave behavior of electrons. The two concepts complement each other.

Similarly, in scripture we may find words, concepts and teachings that may complement each other, such as the mercy and justice of God, the divine and human nature of Jesus, divine foreknowledge and human free will, faith and reason, and the transcendent and immanent character of God. Somehow the two words in each pair seem to be mutually exclusive, and yet both are necessary and complement the understanding of the other.

Beginning

The other revolutionary theory near the beginning of the twentieth century was Einstein's general theory of relativity. It was quickly recognized that this theory of gravity allowed for the expansion of the universe rather than the assumed static universe. Einstein was so repulsed by this possibility that he introduced an ad hoc "cosmologically constant" into his equations to prevent an expansion. Sir Arthur Eddington considered the notion of a dynamic universe with the attendant possibility of a beginning repugnant. He wrote, "...the expanding Universe is preposterous...incredible...it leaves me cold."[27] The belief that the universe was static and eternal without beginning or end was the scientific dogma. However, about a decade after Einstein published his theory, the astronomer Edwin Hubble made observations, using the new 100 inch Mt. Wilson telescope in southern California, that indicated that galaxies were moving away from

each other in a manner consistent with an expanding universe. On seeing this data, Einstein was convinced and reckoned that the introduction of the cosmological constant into his theory was one of the greatest blunders of his life.[28**]

Now if the universe is expanding, one can project the motion backward until all of the universe converges to a point - a beginning. Thus, Hubble's measurements which suggested that the universe was dynamically expanding indicated a beginning, something that both Hebrews and Christians clearly saw taught in scripture though it was foreign to science as it had been to the Greeks. Big Bang cosmologies lead "to the inescapable conclusion of a beginning."[29] Gradually, the weight of evidence has convinced most scientists of the validity of the cosmological expansion and its beginning is now known as the Big Bang. While we may not feel comfortable with all aspects of the Big Bang, and an inflationary expanding universe, the discovery of a beginning is a vindication for Jewish and Christian thought. Worthing suggests that "No other theory of modern science has corresponded more closely to (nor met so well the requirements of) a doctrine of creation than the theory of the Big Bang." For science, it makes less problematic Gen. 1:1. It provides at least an interesting correspondence between science and scripture.[30]

Other Dimensions

As a final example of how a modern scientific theory may shed understanding on scriptural phenomena, I would like to consider string theory or now, in its more developed form, M-theory.

**Recent evidence of an inflationary universe requires the reintroduction of the cosmological constant.

First of all, some of the scriptural phenomena of which I am thinking: Christ's startling appearance among the disciples in a locked room after His resurrection; the sudden disappearance of Phillip after baptizing the Ethiopia eunuch; the quick response to Daniel's prayer; and the ascension of Christ. (I have occasionally wondered what the disciples would have seen if they had been able to follow Christ's ascension with a telescope, perhaps a radio telescope that can see through clouds.) These events and others have caused me and others to wonder if God has access to additional dimensions besides the three spatial and the time dimensions with which we are familiar.

Some of us are acquainted with *Flatland*, the story of a fictitious universe with only two spatial dimensions that, unknowingly to its inhabitants, is embedded in a three-dimensional space.[31] The Flatland creatures are puzzled by events that disappear at one point in their two-dimensional world and mysteriously reappear at another, not realizing the object has simply been picked up, moved along the third dimension, and set back down on Flatland. Perhaps more familiar to some of us is a shadow play, where the shadows of objects seem to pass through each other. A glance behind the screen reveals that the objects are at different distances from the screen and one is passing behind another. So events that appear mysterious and perhaps supernatural in two dimensions are natural and uneventful in three dimensions. Likewise, if God has available additional dimensions beyond what we perceive, then the miraculous would not involve a rupture of mystery in His universe.

As mentioned above, the two great theories in the twentieth century are General Relativity and Quantum Theory, both of which we have referred to earlier, and which have been very successful in explaining, synthesizing and predicting in the realm of the

very large and the very small respectively. Ironically, the two theories are not compatible with each other. Science has and is investing a lot of attention into finding a way to harmonize and unify these two theories. A possible candidate that is currently under consideration is string theory or its refinement and generalization, M-theory. In this theory particles are considered to be very short strings (a millionth of a billionth of a billionth of a billionth of a centimeter long - I am not stuttering). Different particles are associated with different vibrations of these strings just as different tones can be produced by different vibrations of a violin string.[32]

The most promising of these theories, M-theory, requires ten spatial dimensions in addition to the time dimension - eleven dimensions! Yes, even though it is impossible for us to visualize ten dimensions of space, it is easy to generalize the math of three dimensions to any number of dimensions. In this string theory, the unquantized gravity seems to emerge as a natural partner of the other quantized forces of electromagnetism and nuclear physics. One suggestion is that these additional dimensions are curled up tightly so as not to be visible to us. Efforts are being made to think of experiments that might support the theory and reveal any of these additional dimensions. Right now all that the theory has to recommend it is the natural way it incorporates gravity and the theory of General Relativity with Quantum theory and the other forces. In addition, as Steve Weinberg, a Nobel Prize physicist, says, "There never has been a time that a theory that has the math appeal that string theory has, turned out to be completely wrong. I find it hard to believe that that much elegance and beauty would simply be wasted."[33] This is just another example where scientists are hoping and expecting that the beauty, elegance and simplicity of a theory will lead them to understand natural phenomena. And perhaps

in the process maybe there will be evidence of additional dimensions in God's universe that avails Him movement and freedom that seems mysterious to us.

Science in Scripture

Now I would like to turn my attention to contributions scripture has made to science. We have to first acknowledge that the Hebrews have not provided us with a legacy of science like the Greeks, although many important modern scientists are Jewish - think of Einstein, for example. Occasionally, it is pointed out that II Chron. 4:2 provides an estimate that the circumference of a circle is three times its diameter. But this ratio (known as *pi*) was already known to a much greater accuracy by the Egyptians and Babylonians.[34] Others provide a score of Bible texts that relate to quantities or events having scientific associations. A compilation of verses from an unknown source that I came across in my files is as follows:

- Gen. 1:6-8 Firmament (or expanse) with water above and beneath.
- Ps. 148:4 Waters above the heavens.
- Gen. 1:14-17 Lights and stars in the firmament.
- Gen. 6-7 Flood description.
- Gen. 9:14 Rainbow a sign.
- Gen. 30:37 Jacob's idea of pre-natal influence.
- 2 Chron. 4:2 Circumference equals three times diameter.
- Ps. 8, 19, 104 Nature psalms.
- Job 38:1-7, 19-33 Only God can understand and control nature.

- Heb 13:8 Stability of God's laws.
- Job 26:7 Earth hung on nothing.
- Job 38:4, Ps. 104:5 Earth's foundation.
- Rev. 7:1, Isa. 11:12 Four corners of the earth.
- Isa. 40:26 No stars fail.
- Isa. 40:21-26 Vault of heaven.
- Gen. 2:10 River system.
- Jos. 10:13 Sun stands still.
- 2 Kings 20:11 Motion of sun reversed.
- Eccl. 1:5 Sun moves.

The nature Psalms and some chapters in Job provide edification and may be shown to be consistent with science as we know it. But modern scientists don't consider scripture to be a science text. Usually those scriptural references dealing with nature, the structure of the universe, and the shape of the earth were written to praise the Creator or to express the opinion that only a "great and gracious God can possibly understand the mysteries of the creation."

One can find books like *Scientists of Faith* providing short biographies of scientists who were Christians.[35] Generally, the scientists listed precede the twentieth century. The closest one can currently come to a resource on physics in the Bible is *Astronomy and the Bible: Questions and Answers*.[36] Here 100 questions are posed, such as, "Is earth at the center of the universe?", "What makes up our solar system?", "Do stars evolve?", and "What is gravity?" Answers are given in a Christian context, or spiritual illustrations are provided. The author is a physics and astronomy professor, and

his science is pretty good, although he strains at times to make the information fit his presuppositions. For example, in discussing the question of evidence for an expanding universe, he suggests that when "God placed the stars in the sky, there was instant expansion!" Apparently the book is primarily used by Christian parents who are home-schooling their children.

Christian Influence on Science

However, there is evidence that scripture and Christianity may have had a more subtle and sophisticated influence on science. Historians of science have wondered if it was more than a coincidence that science developed to its modern form in the Christian west.[37] They have noticed that the Protestant Reformation preceded the Scientific Revolution by about fifty years.

In fact, there is a history of encounters between religion and science. In Egypt and Babylon, to which the roots of science are normally traced, the priests were the ones that studied the stars in order to establish calendars for religious events, and developed pre-chemistry and physiology in the process of embalming. It was the Greeks, considered to be the founders of science, which separated religious questions from the laws of nature.

Early Christianity generally ignored secular studies and concentrated on the science of salvation. In spite of this, most historians of science concede that Christianity provided a positive legacy for science.[38]

For example, the doctrine of creation suggested that nature was good since God created it, and hence it was worthy of study. Further, Christ demonstrated dominion over

nature thereby removing a fear of nature. In fact, nature seemed to sympathetically respond to the death of Christ. Thus nature was something safe to explore. Though the Bible suggests a positive attitude toward nature and the incarnation can be understood to sanctify the physical universe, they didn't deify nature. So nature was not an object of worship and could be studied.

Also, the creation account suggests that God was a free agent and that the nature of nature is contingent, not to be rationally derived from first principles. The natural order is not divine but created. Purpose resides in God, not nature. Hence, to be understood, it must be investigated. Intuition and reason alone are not sufficient to discern its patterns. This provided impetus for experiments.

The concept of a monotheistic God, who is the same yesterday, today and forever, not a plurality of capricious gods, suggested the universality, consistency and coherence of His creation. Among the contingently created beings were humans created in God's own image. This led to "the idea that we lesser rational beings might, by virtue of that Godlike rationality, be able to decipher the laws of nature."[39] There is a confidence that we are equipped with abilities to understand God's creation. The very concept of "law of nature" is rooted in Biblical theism. Belief in natural law is based upon belief in the ordained power of God. Not only things created, but even the laws of nature are contingent. Logic alone could not discover them. They express a physical regularity built by God into the fabric of the universe. If our world was not orderly and predictable, science would not be possible. Furthermore, the transcendence of God suggests that there is something beyond what we superficially see, something that can bear exploration and investigation.

Characteristics of Protestantism, and especially Calvinism, seem to provide fertile soil for the development of modern science. For instance, it was understood that the chief aim of science was to know God and glorify Him and that God put nature at our disposal to contribute to these pursuits.[40] (Luther's theology saw nature implicated in the fall so that it was in such a degenerate state that it could no longer bear good witness to God.)

The concept of the priesthood of believers suggested that believers are individually responsible to God. This provided the privilege and responsibility to study not only the Bible but also nature for ones self in order to individually be able to prove all things and hold fast to that which is good.

The understanding that we are saved by grace, not by works, implied that secular work was just as valid as religious occupations, that spiritual activities gained no extra merit. Also, science, conducted in a rational orderly way furthers general welfare and is approved by God. In addition, science contributes to the stewardship mandate to subdue the earth and have dominion over it.

Finally, the reformation created a vacuum by doing away with the hierarchy of angels that pushed the planets and stars around in their crystal spheres. It put all of nature under the control of God, who was orderly and predictable.[41] [42] Calvin exaggerated this understanding in developing the teaching of predestination which in turn contributed to the scientific principle of determinism which was fundamental to Newtonian physics which we discussed above.

Miscellaneous

As I start to conclude I have a few miscellaneous observations.

• With the help of Kuhn it is now generally recognized that scientific data is theory laden. Some of the initial anecdotes would suggest that this may be true of some religious beliefs also.

• When using Barbour's book, *Issues in Science and Religion* in a class also by that name, I came across a statement that I have found helpful. In a section on Religious Commitment and Reflective Inquiry, he states "that faith does not exclude doubt."[43] I see in this comment an implication that where there is no doubt, no faith is necessary. Conversely, faith finds its necessity in the context of doubt. For me this has been reassuring wisdom. It has kept me from becoming overly stressed when I come across information that makes me wonder or when I am confronted with troubling questions.

• Another quote that I want to share is one I have personally heard Polkinghorne give with obvious emotion: "however valuable natural theology (science) may be in pointing to the divine and affording insight into his creation, it will only at best be able by itself to bring us to the Cosmic Architect or Great Mathematician. The God and Father of our Lord Jesus Christ is to be sought by other means."[44] For anyone who wants to find God, science is not the first way. Who God is and what He does must be answered elsewhere. Jeeves and Berry go so far as to state: "An understanding and acceptance of modern science does not - cannot - prove anything about the existence and activity of God."[45]

• We have to invoke God and the miraculous to explain earth history in traditional Seventh-day Adventist terms. It seems somewhat arbitrary to me when and how we

place these interventions. To seek intellectual explanations down to the last detail is the propensity of fundamentalists that may not always be valid. Even Polkinghorne in his book, *The God of Hope and the End of the World,* while limiting the history of this world and the miraculous events to that which is possible with in the parameters of known physical laws, acknowledges that when it comes to eschatological events, there must be a discontinuity in science as we know it.[46] I suspect that we need to allow for this possibility at other times in earth history. Hebrews 11:3 tells us that it is "by faith we understand that the universe was formed at God's command, so that what is seen was not made out of what is visible." "By the word of the Lord were the heavens made, their starry host by the breadth of his mouth." (Ps. 33:6) I am inclined to accept what the Bible says here. I suggest we will never find the silver bullet that unequivocally affirms creation, for it is by faith, not science, that we understand. By faith, Christians believe that God created. Of course it is true that with experiments and reason we may learn something of the timings and methods He uses.[47]

I personally prefer to relate to nature and to the study of science with a sense of awe and wonder which, I fantasize, Kepler and Newton had, with a desire to behold the handiwork of God rather than in an effort to prove or to challenge Him. I don't presume to understand God but I am grateful for the privilege to behold Him even though through a glass dimly. Here you can see I am being influenced by Calvin who apparently felt that "the study of nature has two functions: it is a means of knowing God and it's a means of glorifying God."[48]

I should not be misunderstood: The wondrous beholding of what God has done may (and should) give us understanding, which I find exciting, too. And it should be

understood that for me beholding does include analysis and synthesis, critique and research, models and exegesis, but for the purpose of better to behold and with constant realization that we are but playing with grains of sand by the sea while an uncomprehended ocean of knowledge and concepts lies beyond.

Research and investigation can still be vigorously pursued in the framework that I am suggesting but with a different attitude than I usually perceive, and with a relaxed sense of urgency. God's existence, the success of His mission, and my survival do not depend on the answers gotten. But the richness of my life, the meaningfulness and reality of the relationship with the Divine, and the pleasure of God may be enhanced by the beholding that takes place as in awe and wonder I study the universe He has created.

In conclusion I would like to quote one of the psalms of Kepler:

> *The wisdom of the Lord is infinite; so also are His glory and power. Ye heavens, sing His praises! Sun, moon, and planets glorify Him in your ineffable language! Celestial harmonies, all ye who comprehend His marvelous works, praise Him. And thou, my soul, praise thy Creator! It is by Him and in Him that all exists. That which we know best is comprised in Him as well as in our vain science. To Him be praise, honor, and glory throughout eternity.*[49]

Appendix

Strong proponents of the anthropic principle are Barrow and Tipler in their book, *The Anthropic Cosmological Principle.* Subsequently, Tipler wrote another book, *The Physics of Immortality.*[b] In the preface of this book Tipler states, "When I began my career as a cosmologist some twenty years ago, I was a convinced atheist. I never in my wildest dreams imagined that one day I would be writing a book purporting to show that the central claims of Judeo-Christian theology are in fact true, that these claims are straight-forward deductions of the laws of physics as we now understand them. I have been forced into these conclusions by the inexorable logic of my own special branch of physics." He goes on to argue that "The time has come to absorb theology into physics, to make heaven as real as an electron." Several years ago, an article appeared in the Adventist Review[c] which is primarily a review and interpretation of Tipler's book.

Tipler, like Stephen Hawking and Roger Penrose, is a global general relativitist of some repute. However, this book and its proposed Omega Point Theory has not been well received. It has been characterized as "fantastic speculation" involving circular logic with many assumptions and lots of holes. He takes a lot for granted and has not provided promised proofs, including the Eternal Life Postulate.

Even Tipler states that "...the only evidence in its favor at the moment is theoretical beauty, for there is as yet no confirming experimental evidence for it." Thus, his "appeals to the solid results of modern physical science" seems out of place. There appear to be a number of gaping holes in his arguments or assumptions of facts contrary to the best available evidence.

For example, his conclusion that the universe ends in an Omega Point requires a closed universe (with its Big Crunch). Currently all evidence points to an open or flat universe.

Tipler admits that if the Hubble constant is greater than 45, his foundation is destroyed. Currently, the best measurements suggest that this constant is 75 or larger. Also, the mass of the universe appears to be 3-10 times less than his theory requires.

Tipler assumes the many-world interpretation of quantum mechanics rather than the accepted Copenhagen interpretation. Black holes create a problem for Tipler's theory and have to be removed before the singularity of the Omega Point emerges.

These are some of the reasons why there is skepticism about Tipler's theory and its implications. He presumably does show in his cosmological model that while God is omniscient, humans do have freedom of choice.

In summary, there are a number of reasons to be skeptical of Tipler's theory. Even people who wish he were right are not satisfied with his arguments.

[a] Barrow and Tipler, *The Anthropic Cosmological Principle*, (Oxford University Press, 1986).

[b] Frank Tipler, *The Physics of Immortality*, (Anchor Books, Doubleday, 1994).

[c] Dan Lazich, "In Defense of God," Adventist Review, (Feb 24, 2000). p. 22.

References

1. E.G. White, *Early Writings*, (Review and Herald Pub. Assoc., 1945), p. 41.
2. Merton Sprengel and Dowell Martz, "Orion Revisited," Review and Herald, (Mar 25, 1976), p. 4.
3. Mark Worthington, *God, Creation, and Contemporary Physics*, (Fortress Press, 1996), p. 134.
4. Ref. 3, p. 25.
5. Paul Davies, *God and the New Physics*, (Penguin, 1983), p. ix.
6. E.G. White, *Testimonies for the Church, vol. 8*, (Pacific Press, 1948), p. 256.
7. Ref. 6, p. 256.
8. Stephen Barr, *Modern Physics and Ancient Faith,* (University of Notre Dame, 2003), p. 24.
9. Ref. 8, p. 25.
10. Ref. 8, p. 119.
11. Hugh Ross, *The Finger Print of God*, (Promise Publishing, 1989), p. 121.
12. Ref. 8, p. 123.
13. Ref.11, p. 123.
14. Paul Davies, *The Cosmic Blue Print*, (Simon & Schuster, 1988), p. 203.
15. *Unlocking the Mystery of Life*, (Illustra, MMII), video.
16. Ref. 15.
17. Ref. 8, pp. 77,78.
18. Ref. 8, p. 79.
19. Ref. 8, p. 81.
20. Ref. 8, p. 76.
21. Ref. 8, p. 175.

22. Ref. 3, p. 142.

23. Ref. 8, pp. 176 - 179.

24. Ref. 3, p. 143.

25. John Polkinghorne, *Science and Providence*, (Shambhala, 1989), pp. 29, 29.

26. Ref. 8, p. 171..

27. Ref. 8, p. 43.

28. Ref. 8, pp. 39 - 43.

29. Ref. 3, p. 90.

30. Ref. 3, p.85.

31. Edwin Abbott, *Flatland*, (Dover Publications, 1952).

32. Brian Greene, *The Elegant Universe*, (W.W. Norton, 2003), chp. 8.

33. Brian Greene, *The Elegant Universe*, (Nova, PBS, Nov 4, 2003).

34. Petr Beckmann, *A History of* π, (St. Martin's Press, 1971), pp. 12 -15.

35. Dan Graves, *Scientists of Faith*, (Kregel, 1996).

36. Donald DeYoung, *Astronomy and the Bible: Questions and Answeres*, (Baker Book House, 1989).

37. Ref. 8, pp. 65 -67.

38. Enrico Cantore, "The Christic Origination of Science," JASA **37**, #4, (1985), p. 211.

39. Alan Padgett, "The Roots of the Western Concept of the 'Laws of Nature': From the Greeks to Newton," PSCF, **55**, #4, (2003), p. 212.

40. Sara Joan Miles, "The Roots of the Scientific Revolution: Reformed Theology," JASA, **37**, #3, (1985), p. 158.

41. Stephen Mason, *A History of Science*, (Collier Books, 1962), pp. 179 - 182.

42. David Lindberg, *The Beginnings of Western Science*, (University of Chicago Press, 1992), pp. 250,251.

43. Ian Barbour, *Issues in Science and Religion*, (Harper Torch Books, 1971), p. 227.

44. John Polkinghorne, *Science and Creation; The Search for Understanding*, (Shambhala, 1989), p. 86.

45. Malcolm Jeeves and R.J. Berry, *Science, Life, and Christian Belief*, (Baker Books, 1998), p. 248.

46. John Polkinghorne, *The God of Hope and the End of the World*, (Yale University Press, 2002).

47. Ref. 45, p. 249.

48. Ref. 40, p. 162.

49. <http://www.omkarananda-ashram.net/metaphysical.html>.