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Existential Questions Seen Through the Eyes of Science and Christianity

by

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Anyone who sits down to put pen to paper does so, perhaps without consciously realizing it, by using the ideas written down by the authors of the books that person has read. The ideas that make up the quilt work of a book are usually not original. It is similar to what a painter does when he creates a painting. He uses different pigments or colors to create his own unique painting, but those colors or pigments aren't original. They are just mixed together in an unusual, unique and hopefully pleasing way by the painter. So I, like most authors, stand on the shoulders of giants that have preceded me with their work. It is to them I am indebted.

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Part I

Soren Kierkegaard wrote a small book in the 19th century; its main point was that purity of heart was to will one thing. In recent times the virtue of "purity" has lost some of its luster among the people of many western cultures. But if purity of heart is to will one thing, most of us are in trouble because we have a dozen different major agendas. And that is the beginning of the problem. Trying to balance the requirements of many different agendas necessarily leads to inner conflict. Conflict begets much frustration and suffering. If we could will only one thing, many of our problems would never make it on the radar screen. This difficult integration of many agendas into one integrating ideal requires not only a great deal of time, introspection, and will power, but also a working knowledge of two very different realms. These realms are the natural, studied most exhaustively by scientists, and the spiritual or supernatural, studied by many, including, but not limited to, clergy and theologians. Representatives of these two very different subcultures rarely converse in any protracted or serious manner. But for those who are serious about creating within themselves the necessary integration that would allow them to develop a pure and unburdened heart, an earnest discussion needs to begin between religion and science.

There is a serious problem for many people today when they think about walking into a church. Some feel that in order to be comfortable inside the church they must check their brain at the door before entering the sanctuary. Likewise, when a person is in a scientific milieu such as a hospital, and interacting with doctors, one shouldn't have to hide one's spirituality. This should never have to be, and it is unnecessary. Many feel that good science and good theology are completely compatible and should share a symbiotic relationship. If there is an incompatibility between the two, then either one has the science wrong, or the theology is faulty. The point of this document is to explore both the natural realm of science with an emphasis on physics and cosmology, and the world of spirituality and religion from a Christian point of view, in hopes that one can view their interdependence and the way each is supportive of the other. I have an advantage in being neither a cleric nor a scientist. I am not in anyone's camp, so to speak. I can't be fired, and my family's financial well-being will not be put in jeopardy if I speak my mind. I have been an active student of both science and theology for almost 40 years. I love them both and am here to create peace and understanding between the two.

The rift between science and religion is very old and continues to this day. Galileo (1564-1642), an Italian physicist and astronomer, discovered the laws of falling bodies and the motions of projectiles. What got him into trouble with the Roman Catholic Church was his support of the Copernican Theory that the Earth revolved around the sun. The Church supported the Aristotelian and Ptolemaic assumption that the planets and sun revolved around a fixed Earth. In 1616 books on the Copernican Theory were subjected to censorship. Jesuit Cardinal Bellarmine instructed Galileo that he must no longer defend the concept that the Earth moves. In 1632 Galileo was summoned to Rome by the Inquisition to be tried for "grave suspicion of heresy" and was sentenced

in 1633 to life imprisonment, which was then commuted to permanent house arrest. Galileo's book, *The Dialogue on the Tides*, which discussed the Ptolemaic and Copernican hypotheses, was ordered to be burned, and his sentence was read publicly in every university. In October 1992, more than 350 years later, a papal commission acknowledged the Vatican's error. Apparently they didn't want to rush to judgment on this issue. Galileo, in referring to the Bible, is quoted as saying, "It is the Holy Spirit's intention to teach us how to go to heaven, not how the heavens go."

Serious controversies between Church dogma and hypotheses coming forth from the scientific community have been erupting ever since. One of the greatest conflicts between certain denominations of Christianity and science in the 20th century was over Darwin's theory of evolution. Most scientists today, including biologists and physical anthropologists, don't see this as a controversy. To them it is an extremely solid theory, subject to possible minor revisions down the road. They almost unanimously support the biological version of evolutionary theory. Some denominations of the Christian church have great difficulty with the theory of evolution because it disagrees with a Creationist viewpoint. Other denominations have seamlessly integrated evolutionary theory into their theology. The church is split on this particular issue. Some clerics and lay people accept evolution. Others cling to a more literal interpretation of the Bible and vehemently oppose it.

The differences of opinion between science and Christianity must have been troubling to the great physicist, Albert Einstein. He once said, "Science without religion is lame, and religion without science is blind." Science was never designed nor is it capable of answering questions about the ultimate meaning of life. And religion that ignores the findings of scientific discovery risks losing credibility, relevancy, and acceptance by holding to beliefs about

the natural universe that are contrary to scientific evidence. In hindsight, it is easy for us to look back and see that the theories put forth by Copernicus and Galileo were not as great a threat to Christianity as the religious authorities first thought them to be. Two hundred years from now, hopefully sooner, I think the church will look back on today's controversy over the theory of evolution as an equally frivolous debate. Science helps us to understand the miracles of nature, and for believers this means a better understanding of God's creation. When a magician performs a great trick, we would count ourselves very fortunate if, after the show, the magician would tell us in private how he performed the illusion. Science in its own way does the same thing by telling us how God performed some of His greatest creative tricks if we are only curious enough to listen. And God's tricks aren't illusions; they are authentic.

Free Will and Determinism

Fortunately, today's church is less likely to disagree with the theories of physics than it is with the theories of biology. Some might ask what physicists could possibly have to tell theologians that theologians might actually want to know. Well, one very important example would be the old and hotly contested issue of "free will."

The debate about free will has been going on a long time. The controversy generally goes like this: Our common sense seems to tell us that that we make decisions every day, some good and some bad. Some of these decisions may even alter the path of our journey through life, e.g., where we decide to go to college, what occupation we might choose to make a living, who our spouse should be, etc. We assume we have a certain amount of free will in how we make these decisions, even if we have external limitations on what some of our options may be. But there is a school in philosophy called Determinism that says every cause has an effect and that every effect is preceded by a cause. If there were an all knowing God who was aware of all the causes and effects in the universe, he could predict—indeed, determine—what every person would do at each juncture in their lives. Our lives, in effect, would be predetermined by our genetics, the laws of the universe, and everything that preceded us. But

if every action we take is predictable, then are we really free? Could we have actually chosen differently than the way we chose?

Before we can answer that question, we need to define what we mean by free will. For the vast majority of people free will means something quite simple. When we come to a fork in the road, we have a couple of different options from which to choose, and we choose one of those options. We may not particularly care for the available choices, but choose we do (or not) and take that road. And if God can predict which road we will choose, in our mind that doesn't diminish or change the fact that we made our choice. But in the world of philosophy and theology there exists a definition of free will that is more restrictive than the layman's definition. This definition requires that we not only have various options to choose from, but when we do make our eventual choice, that it not be predetermined or completely predictable. The argument reasons that if we could not have chosen otherwise because of all the predetermining causal factors, then we were not really free. We were not free because we were preprogrammed to choose what we chose. Our choice was fully determined, but we were unaware of it. According to this argument we suffered from the illusion that we could, in fact, make a moral choice. But if we don't have free will, if we really couldn't choose otherwise than what we did; then we in turn are not morally responsible for what we chose to do. If we can't really choose, then we are like robots that have been preprogrammed to sometimes do good or bad things. The moral culpability then transfers to the creator of the robot, not the robot itself. This argument about free will is no small matter, for if the determinists are correct in asserting that we do not have free will, we cannot be held morally responsible for either the good or the bad things we may do. We could not choose nor do other than what we have done. Our notions of crime and punishment would become irrational. Serial

killers, it could be argued, aren't really responsible for their crimes because they couldn't have done otherwise. But people who disagree with the determinist's point of view do so because in their gut they feel they really are making real and free decisions, and that the actions resulting from these decisions really do matter. People who believe in free will believe in the reality of the struggle between good and evil, and that all of us are integral players exercising our very real free will in that daily drama we call life. Wouldn't it be nice to bring something more concrete to the argument about free will besides having a strong hunch or instinct? Physics, and more specifically, quantum mechanics, supplies us with that supportive evidence in the form of the Heisenberg Uncertainty Principle. This, as we shall see, is an example of science coming to the rescue of theology.

The Heisenberg Uncertainty Principle

A German physicist, Werner Heisenberg, discovered the Heisenberg Uncertainty Principle in 1927. It is an important part of "quantum mechanics," which is a conceptual framework for understanding microscopic properties of the universe. The basic concepts we use to understand our everyday world fail to have any meaning when we examine the microscopic realm. In classical physics we describe a particle by giving its location and velocity. At the microscopic level, according to the Heisenberg Uncertainty Principle, one cannot know both these features with precision simultaneously. The more one knows about the location of a particle, the less one knows about its velocity, and vice versa. The truth of the uncertainty principle has nothing to do with technology's limited ability to make such measurements at the microscopic level. This has to do with the fundamental nature of microscopic particles. The best we can do and know using quantum mechanics is to assign a probability curve to one or both of these characteristics. This means that it is not fundamentally possible

to make precise predictions about a microscopic particle. We can only describe it using probabilities. If it is fundamentally impossible to accurately predict the properties of any individual particle, then it is also impossible to predict the exact path of an immensely more complex system such as a human being. The bigger and more complex the system, the more unpredictable it becomes. The Heisenberg Uncertainty Principle is, therefore, a major objection or counter-argument to the determinist viewpoint and allows for the possibility of free will. For this the theologians will be forever indebted to science.

It may not be immediately obvious why the concept of free will is such an important issue, but all major religious theologies presuppose its existence. The concept of love assumes we can make a free choice to love our neighbor and/or to love our God. It is basic to most religions that we have the ability to freely choose to believe in a Divine Being or not to believe. The tenets of determinism undermine that basic presumption by eliminating the possibility of free choice.

The existence of free will may also help us explain why sometimes bad things happen to good people. Some "bad" people make choices to hurt other people. Terrorists aren't the only ones who do this. It is free will that allows the possibility of making good or bad decisions. Some people question why God would allow people to make these hurtful kinds of choices. Since the act of choosing to love gives love much of its significance, one must question what life would be like if we couldn't choose—if in fact, we did not possess free will. Love, and much of what we consider significant about living our lives, would be impossible without the possibility of choosing. Life would be reduced to millions of little robots moving around according to some pre-arranged program. Either free will exists totally or it doesn't exist at all. There are no hybrid possibilities. If one is free, then one must also be free to make

hurtful choices. It must work both ways or neither way. This is easier to grasp intellectually than it is emotionally. When something bad happens to someone we love at the hands of another person, it doesn't seem enough just to blame and possibly punish the guilty party. We want to find the fault in the larger system that would allow such a thing to occur. For many that means blaming God for allowing or creating such a system that allows bad things to happen. Emotionally this may feel right and justified, but if one accepts the concept of free will and its logical corollaries, then blaming God for the free acts of mankind must be seen as irrational.

One can see that the Heisenberg Uncertainty Principle of quantum mechanics has much to add to the discussion and debate about free will. And since free will is one of the cornerstones of Christian, Jewish, and Islamic morality, the concepts of physics should not be eliminated from important discussions regarding free will, and, in turn, Christian theology. One of the logical corollaries to the existence of free will is that God must choose to relinquish some of His/Her power, control, and authority to those he has invested with free will. God's creatures have more power in the form of free choice because God chose to love us and relinquish some of His control. We can learn much about love from His example.

The implication of the Heisenberg Uncertainty Principle on the free will debate is only a single example of what physics has to tell us about theology and religion. We will be considering some of the following ideas where knowledge of science and physics will be a great asset:

(1) The more we know about the nature of creation and the universe, the more we will know about the creator.

(2) As mentioned above, the more we know why things are the way they are, the less we will hold on to simple ideas of how we wish things might be, but aren't.

(3) Physics can reintroduce us to the total and seemingly miraculous wonder of the universe.

(4) Certain prayers of petition may contain logical contradictions. Physics might assist us in avoiding some of those contradictions.

(5) Physics might suggest a possible scientific framework to be able to understand certain para-normal phenomena such as mental telepathy.

(6) As our scientific knowledge expands, especially in the area of physics, what constitutes the realm of the natural and the supernatural may very well shift significantly. And this knowledge might well throw significant light on the miracles described in such detail in scripture.

Scientific epistemology asks the question of how science knows what it knows. A scientific theory is different from a mathematical theorem, which is supported by a mathematical proof. The mathematical proof of the Pythagorean Theorem, for example, never changes. It does not evolve with time. A scientific theory, on the contrary, is a work in progress. It is not static like a mathematical proof. As new technology and measuring instruments are developed, additional scientific data are generated. These data may further reinforce a scientific theory, may indicate shortcomings, or may invalidate an existing theory altogether. So it is never assumed that a scientific theory is in its final form. It is considered to be in a state of flux or evolution. This is true for all branches of science including, of course, physics. Sometimes a theory is

very accurate in its predictions under the vast majority of circumstances, but, when tested using the extreme values of a variable's range, such as velocities approaching the speed of light, it may come up short. It turns out to be inaccurate in its predictions or fails to make any at all. This is what can be referred to as a "paradox," where there is evidence of an inconsistency or an absurdity somewhere in the theory. Another interesting occurrence of paradox is when two separate theories are fundamentally incompatible, but at the same time they are highly respected for their accurate predictions within their normal parameters. Such a situation exists between the Theory of Relativity developed by Albert Einstein and that of quantum mechanics (more to be said about this later). The important point is that it is these areas of paradox that drive and motivate the greatest scientific efforts of discovery and exploration. This is where the work needs to be done to modify existing theories or to create new ones. In so doing, we reduce or eliminate the old paradox. We solve the enigma. We eradicate the earlier contradictions. But in creating a new paradigm or theory, we open up the possibility of discovering new areas of paradox, contradiction, and mystery. To a scientist this is the driving engine of science. It would be absurd to think that a scientific theory has ever arrived in its final form.

The Mind of God

It is helpful to visualize the universe as a marvelous, finely tuned pocket watch. If one invests a lot of time and effort into understanding how a particular Swiss watch is made, one cannot help but learn something of the maker. The branches of science that have the most to do with exploring how the ultimate pocket watch, the universe, works are physics and cosmology. Cosmology is specifically the science of the origin and nature of the universe. One can't study physics and cosmology without feeling some of the awe that the great scientists must have felt as they made their great discoveries. When a human being deeply feels that sense of awe, it is very hard for the mind to shut out the concept of God. And so it is not surprising that the word "God" is often found in the writings of the great scientists. Of course, Galileo's quote, mentioned above, first comes to mind, "It is the Holy Spirit's intention to teach us how to go to heaven, not how the heavens go." Einstein once came out and said, "I want to know how God created this world." And Isaac Newton said, "Whence arises all that order and beauty we see in the world?" Steven Weinberg said, "The task of the physicist is to see through the appearances down to the underlying, very simple, symmetric reality." In so doing they keep stumbling into "God" or at least a discussion as to His possible existence and even His

preferences. One of Einstein's most famous utterances was that "God does not play dice with the Universe." Einstein had difficulty with some aspects of quantum theory, especially the Heisenberg Uncertainty Principle. He preferred that a universe exist without chance or probability as a fundamental element. Very convincing experiments performed over time, though, have proved him wrong on this point. And the great Stephen Hawking, who has been very careful to keep theological musings out of any of his writings, ended his most popular book, *A Brief History of Time*, with the following paragraph:

> "However, if we do discover a complete theory, it should in time be understandable in broad principle by everyone, not just a few scientists. Then we shall all, philosophers, scientists, and just ordinary people, be able to take part in the discussion of the question of why it is that we and the universe exist. If we find the answer to that, it would be the ultimate triumph of human reason—for then we would know the mind of God."

In order to really understand what physics can say to theology, one needs the briefest understanding of what the science has to tell us. One needs to know the evolution of the many theories that now make up the science of physics. In its simplest components one starts with (A) classical physics, then (B) relativity theory, then (C) quantum mechanics (or quantum physics), and then (D) string theory (or m-theory in its latest form). Descriptions of each of these theories in the simplest possible terms will follow beginning with classical physics.

Classical Physics

Classical physics refers to the theories of physics regarding time, energy, forces, motion, etc. developed from the 16th to the 19th century by giants such as Galileo, and especially, Isaac Newton. This is the kind of physics taught in the freshman physics courses using Algebra and Calculus as mathematical tools. It includes topics in dynamics (or the movement of objects), kinetic and potential energy, laws of conservation of energy and matter, thermodynamics, gravity, and optics (the study of light), etc. One common thread that all these topics in classical physics have in common is that they deal in units of measurement, the size of which occurs in everyday life, as opposed to the super large or super small. For example, if we speak of the velocity of an object, it is usually expressed in meters per second or miles per hour, but not in magnitudes on the order of the speed of light. Also, in classical physics we are describing objects that can been seen with the naked eye or with the assistance of a normal microscope, as opposed to using electron microscopes or an atom smasher. All the formulas and mathematics developed for classical physics are highly accurate in making predictions as long as we limit our calculations to orders of magnitude experienced in everyday living. As physics moved into the 20th century and we developed measuring technologies that could perform far

beyond the capabilities of earlier measuring instruments, the laws of classical physics broke down under certain circumstances. These laws or theories were not able to predict what the new tools were able to measure when performing experiments, where some of the variables were pushed to the extremes. Necessity is the mother of invention; so new theories were created in the 20th century that could correctly predict phenomena and data in the realms of the ultra microscopic and of the very, very large.

Relativity

For questions regarding phenomena and velocities on a very large scale, we look to the two theories of relativity created by Albert Einstein, the "Special Theory of Relativity" and the "General Theory of Relativity." This is where the theories of physics begin to become interesting, and in some cases, more counter-intuitive. In Einstein's Special Theory of Relativity space and time can no longer be thought of as universal concepts set in stone. Rather, space and time would be experienced and measured differently by any two persons moving at different velocities. Of course, the differences in velocities would have to be very significant for anyone to notice this variance. But the universal clock we envision measuring identical seconds here on earth or somewhere else in the universe does not exist according to relativity theory. Observers, therefore, moving at different velocities will not agree on which events occur at the same time. For example, let's presume that two people are moving at the same velocity wearing identical watches set to the same time. Then we accelerate one of these people to a much greater speed. If both people, then, look at their watches at the same instant, the person traveling at the faster velocity will show an earlier time on their watch than the person traveling at the slower speed. The implications are fascinating as we will see. If we could

accelerate a space traveler to speeds approaching the speed of light, time for that person would be dramatically reduced. Upon returning to earth the space traveler might find his spouse has become a senior citizen while the space traveler is still young and trim. This could be the real fountain of youth.

The Special Theory of Relativity

The Special Theory of Relativity is based on two postulates: that physical laws are the same in all inertial reference systems (systems moving at constant velocity with no net force acting upon them), and that the speed of light (670 million miles per hour) in a vacuum is a universal constant. Many interesting phenomena or consequences follow logically from these two postulates. One of those consequences is that no object, or influence of any sort for that matter, can travel faster than the speed of light, according to the theory of relativity. Newton's theory of gravitation presumed incorrectly that the influences of gravity were transmitted over great distances of space instantaneously. Another fascinating result of relativity is that, contrary to classical physics, an object's mass is not a fixed quantity. In Newtonian mechanics an inanimate object's mass is fixed over time as long as no change is exerted on it (and there is no radioactive decay). But "mass" should not to be confused with "weight." An object's weight (w) is equal to its mass (m) times the force of gravity (g) as expressed in the equation w = mg. An object's weight might vary from planet to planet because the force of gravity is different depending on the size of the planet; but according to classical physics, the object's mass would remain the same regardless of the planet on which it resided. According to

special relativity, though, an object's mass varies with its velocity regardless of its location. As an object approaches the speed of light, its mass increases greatly, as does the amount of energy needed to accelerate it to such a great speed. This would make it impossible for us to travel at light speed because it would require an infinite amount of energy to accelerate us to that speed. This variability of mass as a function of velocity is completely contrary to classical physics.

General Theory of Relativity

Einstein's second theory published in 1915 is called the "General Theory of Relativity." It is about gravity as it relates to space and time. In Newton's model of gravity (classical physics) time was a separate dimension from space, and was thought to be infinite in both directions (the past in one direction and the future in the other direction). He described gravity as an attractive force between two objects of a given mass, but he offered no explanation into what gravity was or how gravity executed its mission. Einstein's Theory of General Relativity combines the three Euclidean space dimensions together with the time dimension to form what is called "spacetime." The four dimensions of spacetime are integrally tied together. Time does not exist separately from space or from the universe. If there is no space, there is no time. This fabric of spacetime is warped or curved by the presence of matter or energy. These distortions in the fabric of spacetime transmit the force of gravity from one place to another. There is a large body of physical evidence to support Einstein's theory of gravity as described in his General Theory of Relativity. The earliest evidence came in 1919 when it was observed that the path of light rays passing near our sun was bent as a result of the warping of spacetime by the mass of the sun. Under the Newtonian concept of gravity, the path of

light should be unaffected by any body because light has no mass on which to exert an attraction. So in this experiment the predictions of general relativity were shown to be correct and those of classical physics to be wrong.

Time Out

A word needs to be said here about the limits of language in describing some of these theoretical ideas or constructs in physics. In the concept of general relativity mentioned above, for example, the term "fabric of spacetime" was used in an effort to describe general relativity. Other authors in trying to describe spacetime have tried analogies using a model with a two dimensional rubber sheet representing the three dimensional fabric of space and a bowling ball representing a body such as our sun. The bowling ball creates an indentation in the rubber sheet so that other objects close enough to that indentation tend to fall toward the bowling ball. This is supposedly similar to how gravity works. Uses of such analogies are well intended to assist readers in visualizing difficult concepts, but often they are totally inadequate. Sometimes there are just no analogies or words in our language that are really appropriate. There may be mathematical equations that can describe a concept, but that doesn't mean there is a visual or intuitive concept in words that can closely approximate it. So the reader should not be frustrated and feel some inadequacy on his part, if he cannot easily formulate a visual image or model relative to some of these very abstract theories of physics.

Quantum Mechanics

While relativity theory is very accurate in predicting events involving large numbers, quantum mechanics is a theory in physics that is capable of making very accurate predictions in the microscopic realm. The gently curving geometrical form of spacetime (such as the rubber sheet) associated with relativity theory is incompatible with the frantic microscopic behavior of quantum mechanics. The incompatibility of these two theories forms a juncture of a major paradox. The resolution of this paradox has earned the reputation of being the central problem of modern theoretical physics. But successfully wrestling with and creating an illuminating description of quantum mechanics has eluded most writers who have attempted it. But we can't move onto a description of string theory without first crossing the quicksand of a description of quantum theory.

There is an interesting analogy that is possible between economic theory and quantum theory. In economic theory one can view the economy through the prism of micro-economic or macro-economic theories. In micro-economic theory one examines an economy on a small scale such as the operation of a company, or the consumer, or even an industry. One can look at how hitting a lottery will affect an individual consumer's spending habits or look at the

percentage of consumers declaring bankruptcy and the causes thereof. One can examine why certain companies are thriving and others are folding. Within the purview of micro-economic theory one can observe wildly disparate events—the creation of wealth or the loss of wealth. The opposite is true of macro-economic theory. Macro-theory concerns itself with large scale economic events such as the sum total of consumer, business, or government spending. It looks at the aggregates of consumer income, consumer spending, and unemployment. Measurement of these categories over time is usually provided in tenths of a percentage point change, a dramatic contrast with micro-economic theory.

So from the macro-economic viewpoint (large scale) the economy changes ever so slowly and incrementally. But from the micro-economic viewpoint (small scale) the economy is incredibly dynamic and ever changing, often with wild fluctuations. Ask recently unemployed people how fast one's economic well-being can drastically change in a short period of time from receiving one little pink slip.

The view provided by quantum physics is quite similar to that of micro-economics (small scale). If one could reduce oneself to the order of magnitude of an atom, the universe would be a very different and a very scary place. Particles would move at astonishing speeds within an ocean of empty space. Some particles would pop into existence and exit again from whence they came in the space of an instant or nano-second. On this level matter would appear to move like a frothing, boiling, explosive soup of atomic and subatomic particles. And what would seem very weird at this micro level is that the location and momentum of any individual particle could never be completely known due to quantum mechanic's Heisenberg Uncertainty Principle mentioned earlier. This is a view of the universe that we cannot comprehend because it is so contrary

from the "human view" of reality, or what can be thought of as the macro or large scale view. For example, as we sit down at a table and look around the room, everything is stationary and predictable. The table has a hard surface and so does the floor. All inanimate objects are immobile unless a human picks it up and throws it, or some other obvious external force is applied. This large scale view of reality is, for the most part, safe and predictable, which is the way we like it. So how can we start to understand the quantum (or micro) level of existence?

First, it is comforting to know that the mathematical formulas for quantum mechanics have been in place since 1928 and that they have been capable of producing the most precise and successful predictions in the history of science. So we know this exercise is not a waste of our time. That said, what does quantum theory have to tell us about the micro world versus the macro world? Quantum mechanics tells us that at the atomic particle level of existence, the behavior of these particles is very contrary to the world of large objects we know at the macro level. To better understand these differences, let us first examine the macro or large scale level of reality as we normally view it. At the macro level our visual world is made up of objects and things (in addition to other people) that have characteristics such as mass, weight, velocity, momentum, inertia, color, smell, etc. Another part of our macro world consists of electromagnetic energy, some of which we can see, which we call light. This energy does not have the characteristics we associate with objects or particles. It has no mass. We cannot touch it. Light is an energy that we now know is just part of the electro-magnetic spectrum of energy. This spectrum consists of other types of radiation energy as well that are not visible such as: microwaves, radio waves, x-rays, etc. Electromagnetic energy, such as light, is assigned very different descriptive characteristics than that of

matter like objects and particles. Terms like wavelength, wave amplitude, and frequency are used to describe different forms of electromagnetic radiation. Uniquely, energy waves can cause interference patterns that large objects or particles cannot. Also, electromagnetic energy waves do not have mass. Therefore, radiation does not have momentum or inertia, nor is it subject to the forces of friction. That's one reason light can travel at the speed it does. In summary, our macro world has these two very distinct categories of stuff in it: (1) objects or particles that have mass (but no wave-like characteristics) and (2) electromagnetic radiation energy, which does have wave characteristics (but no mass).

One might be quick to point out as a possible exception to this that some particles, such as water, exhibit wave-like properties, such as the beautiful waves and breakers we see when visiting the ocean. Those wave-like properties of water are generated by the interactions of trillions of water molecules acting together and driven by the powerful forces of the winds and the friction generated at their interface. One would not find an individual water molecule in isolation, though, to possess these wave-like properties or characteristics. It is only because large numbers of water molecules can exist in a liquid or fluid state, rather than in a solid state, that ocean waves can possess wave-like characteristics.

Contrary to this view of the macro world, quantum mechanics tells us that in the micro world individual particles and radiation energy possess a "duality" of both particle and wave-like characteristics. This principle of duality is the first of three significant principles of quantum mechanics, which will be discussed here. As an example of this duality, light energy has both the characteristics of a particle (otherwise known as a photon) and a wave. Likewise, a particle, such as an individual electron, exhibits both particle characteristics (which we

would expect) and wave-like characteristics (which we would not expect). Prior to quantum mechanics this possibility would have seemed preposterous. The question had always been—Is light a wave or a particle? Intuitively it would seem, it can't be both, but quantum mechanics says otherwise. This duality of both particle and wave-like characteristics is not observed at the macro or large scale level of reality. The simultaneous particle and wavelike characteristics do not seem to make sense or seem possible.

To further complicate this picture, one of the favored interpretations of quantum mechanics (known as the Copenhagen interpretation) says, for example, that every photon or electron exists in a superposed state of being either a particle or a wave, but the potential state is only determined by an act of observing it. In other words, only upon its being observed, is this superposed particle or wave forced to manifest itself as either one or the other. Only the act of measurement turns potentiality into actuality. This principle of duality contributes significantly to what is known as quantum weirdness. There are also other viable interpretations to explain this duality besides the Copenhagen one, but space does not allow for their explanation in any detail here.

A second significant aspect of this quantum weirdness has to do with the concept of "locality." Locality is the supposition that one system can change another system only if there is some mechanical interaction between the two, and according to relativity, that interaction cannot occur at faster than the speed of light. Quantum mechanics proposes that on the micro level, subatomic particles behave in a "non-local" way. Changing one particle really does alter a sister particle instantly, regardless of the separating distance. This is a clear violation of Einstein's relativity. Conclusive experiments, most notably performed by Alain Aspect, verify this astounding finding. Its far reaching

implications are still being debated, but non-locality is certainly contrary to classical physics as well as to relativity theory.

The third major principle of quantum mechanics is the Heisenberg Uncertainty Principle, which has already been discussed earlier relative to the topic of free will. It tells us that we can't know simultaneously both an object's location and its velocity or momentum at the atomic level. We would have no difficulty ascertaining those same properties of a much larger object at the macro level.

These three principles are just part of what is called quantum mechanics. Many large books have been written in an attempt to describe it. The human mind, along with the limitations of language, just doesn't seem to be able to adequately grasp the nuances of this theory. This is why one of the fathers of quantum mechanics, Neil Bohr, once said, "If someone says that he can think about quantum physics without becoming dizzy, that shows only that he has not understood anything whatever about it."

String Theory

The response of science to the unexplained parts of current theories that seem paradoxical is to attempt to create a new theory that: (1) in its new form eliminates the paradox and (2) can be verified through reproducible experimental results. The new string theory is very strong on its ability to eliminate paradox, but very weak on being experimentally verifiable. Because of its unique ability to solve so many puzzles and to unify the physical laws of the very large as well as the very small, it should be taken very seriously.

String theory's description of matter at its most fundamental level resolves the differences between general relativity and quantum mechanics. String theory requires that we drastically change our understanding of space, time, and matter. But some things remain comfortingly familiar such as atoms being composed of a nucleus containing protons and neutrons and with an outer shell of revolving electrons around the nucleus. Also unchanged is that protons and neutrons are made up of different kinds of quarks. The major principle of string theory is that all matter at its most microscopic level consists of vibrating strands, and from this premise, an explanatory framework can be built that encompasses all forces and matter. Unfortunately, the typical strand or string loop is about 10^{20} times smaller than the atomic nucleus. That means

its direct measurement is impossible. The replacement of the former model of point-particle type matter (similar to a billiard ball) on the sub-atomic level with matter consisting of vibrating strings seems to resolve the incompatibility between general relativity and quantum mechanics. For the first time in history string theory has the potential to explain every fundamental feature of matter and energy that makes up our visible universe. Some of those fundamental features or laws that seemed very arbitrary in the past can now be explained as arising from essential aspects of the geometry of the most elementary particles or strings. In the earlier "standard model" of quantum mechanics, each type of sub-atomic particle was uniquely different. In string theory the stuff of all matter and all forces is the same—they are comprised of identical strings. The different sub-atomic particles and various force charges manifest different characteristics and properties because their respective strings undergo different resonant vibrational patterns. This is analogous to different strings on a violin generating different musical notes. To be mathematically consistent, string theory has more surprises in store. It requires that the spatial fabric of the universe possess more than the three spatial dimensions commonly thought to exist. In initial calculations, string theory proposed nine spatial dimensions and one time dimension for a total of 10 dimensions (versus four space/time dimensions implicit in relativity theory). In addition to the three large spatial dimensions of classical physics and relativity, it was suggested there exist six tiny dimensions that are curled up into complicated shapes, the dimensions of which would be on the order of the Planck length (which means very, very, very small), putting them beyond experimental measurement. The theory explaining the nature of these six tiny extra space dimensions is known as Kaluza-Klein theory. The geometrical form of these tiny extra dimensions plays a critical determining role in the resonant patterns of the vibrations

of the strings. Because these different patterns of vibration determine the various masses and charges of the elementary particles, it is presumed that the fundamental properties of the universe are greatly determined by the size and shape of the extra dimensions. The mathematical equations of string theory severely restrict the geometrical forms that these tiny six-dimensions can take. The particular class of six-dimensional shapes that meets these criteria is known as Calabi-Yau shapes. Different shapes offer up potentially different resonant vibrations and, therefore, different particle and force properties.

Physicists came up with five different versions of string theory sharing many of the same basic features. They were later combined into an all-encompassing framework now known as m-theory. Due to more exact mathematical calculations, m-theory now requires eleven dimensions (ten space dimensions and one time dimension), which is one more space dimension than that required by earlier versions of string theory. Another major refinement of m-theory is that, in addition to one-dimensional vibrating strings, there are two-dimensional membranes and undulating three-dimensional blobs or "three-branes." Needless to say, describing these new constructs would be easier using mathematics than the visual imagery created from simple words.

The greatest challenge to string or m-theory will come in the area of experimental verification due to the infinitely small scale involved. Such experimental results will, of necessity, be of an indirect or circumstantial nature as a result of the inherent difficulty of taking measurements at the Planck length scale.

Having taken a cursory glance at parts of quantum theory and the more recently evolved string and m-theories, what inspiration would students of theology take away with them from this knowledge? Any students who study physics now realize there are more unanswered questions and more mysteries

implicit in this field than students did 200 years ago. The more scientists know, the more they realize what they don't know. A truly earnest and serious student of physics must stand in awe at the mysteries of the universe. Einstein once said, "The most beautiful emotion we can experience is the mystical. It is the source of all true art and science. He to whom this emotion is a stranger, who can no longer wonder and stand rapt in awe, is as good as dead." The student of theology is studying the handiwork of the Creator when he explores the mysteries of physics and cosmology. In the examination of this handiwork, as in watching a master craftsman making a fine violin, one can get a feeling for the master. A theology student might also ask himself about these additional seven space dimensions required by m-theory, which are over and above the three space dimensions to which we are all familiar.

Who would ever have guessed that ten spatial dimensions and one "time dimension" might exist, as proposed by m-theory? Three of the space dimensions we are well acquainted with. Six more space dimensions probably manifest themselves as the Calabi-Yau geometric shapes that are at this point in time too small to directly or indirectly measure. But one spatial dimension seems to remain unaccounted for. But is it really a spatial dimension? Or could this unexplained dimension be a spiritual dimension? Might this possible spiritual dimension be the conduit for all types of information and communication between animate beings, better known as mental telepathy?

Let me indulge in a few personal experiences as examples. One vivid experience I had as a young person involved the day my father received a phone call in New York from his sister in Massachusetts. She was crying hysterically on the phone asking my father if their mother was O.K. My grandmother was in the hospital at the time. My aunt was crying that there was something dreadfully wrong, and my father answered that he had just come from the

hospital after visiting his mother, and that he had just left her resting peacefully. My father tried to quiet and reassure his sister by promising to call the hospital right away to check on her. When he called the hospital, he discovered that his mother had just passed away. My poor father then had to call my aunt back and confirm her mysterious intuition.

A similar experience recently occurred involving my son who was a U.S. Marine deployed to the war in Iraq. I received a very animated phone call from a dear and well-meaning relative of mine telling me he had seen a photo of my son a few minutes earlier on the television and was listed as one of the Marines from the New York area who had recently been killed in action in Iraq. He asked me what I knew about this. He was very insistent that he had recognized my son's photo on the TV screen. After reassuring him that it was probably a mistake, I hung up the phone more shaken than I had let on. Questions ran through my mind like "What if the military had mistakenly failed to notify us, the family, prior to releasing information to the media?" My own three years in the military fed these kinds of fears. I experienced a few hours of horrible emotions and doubts. It was as if a dark sinister cloud was passing through my body, permeating my bones, and infusing me with a sadness that was paralyzing and numbing. I quietly and patiently talked myself back into the land of the living and endeavored to adopt a saner viewpoint. A few hours later I finally obtained confirmation that it was a case of mistaken identification on my relative's part. The very next day I recounted an abbreviated version of this story to a dear friend of mine. She told me that she had felt on the previous day (at approximately the same time) that I had gone through some strong emotional anguish and uncertainty that lasted for an hour or two. She felt it so strongly at the time that it brought tears to her eyes. This is a person whose veracity is unimpeachable from my experience. How could she have known

what I was feeling and experiencing that day without my communicating with her in any normal way? Most people have their own anecdotal experiences of similar types of unexplained phenomena. Could this missing spatial/spiritual dimension hold a natural explanation to what is perceived now as an unexplained or paranormal telepathic communication?

Let us play with this thought a little. Let us assume we are citizens of the 22nd century. Science has verified, for argument's sake, the existence of this 10th dimension. They now call it the telepathic dimension. Research and development has come up with technology that can boost the telepathic signal generated by a normal person so that not only extreme emotions are transmitted in this fashion, but also normal everyday thoughts as well. In addition to cell phones, the 22nd century citizen has access to 10th dimension phones which are nick-named "telepathy phones." Let us also assume that 22nd century science has learned to understand and harness the principle of non-locality (from quantum mechanics), so that telepathy phones can be used anywhere in the universe for instantaneous communication. Of course, these devices are used very judiciously because they can only transmit actual thoughts and feelings.

Let's imagine some of its practical uses. When any two parties might decide to enter into a contract, they would decide ahead of time on an agreed upon list of questions to be asked of each other regarding the contract agreement and then use the telepathy phone to question the other party. The contract would not be signed until this procedure was completed satisfactorily. Of course, this could be applied to business purposes or personal decisions. Two people contemplating marriage could use the telepathy phone to clear up any points of concern. This kind of technology would transform every level of human interaction. Maybe the telepathy phone would come to be used in the confessionals in many churches. Privacy laws would have to be

rewritten regarding the use of this device. Whole new areas of law practice would open up. So hypothetically speaking we see that what was considered 21st century paranormal phenomena might become part of the 22nd century natural science. It is possible that one need not presuppose a 10th dimension to explain telepathy. It might be revealed in the future that telepathy might be understood quite adequately using the currently known four time-space dimensions. Science at this time doesn't possess the technology to detect, to measure, and to understand telepathy within the current constructs of natural science. But someday science might possess this knowledge and be able to experimentally verify telepathy's existence and the mechanics of its operation.

Cosmology

Getting back to the 21st century, what does modern physics have to teach us about cosmology and the origins of the universe? In 1929 Edwin Hubble and Milton Humason made the fantastic discovery that the universe was expanding rather than being static in size as had been presumed for centuries. By measuring the rate of expansion, one could estimate that the galaxies were very close together between 10 to 14 billion years ago. Roger Penrose and Stephen Hawking showed, using Einstein's General Theory of Relativity that the universe and time itself must have had a beginning in a tremendous explosion, commonly called the big bang singularity. A singularity is a point of infinite curvature of space, where the equations of general relativity break down. At the moment of the big bang, the universe started with an infinitely high temperature and density. Although Hawking and Penrose's theorems proved there was a beginning to the universe, they provided little information about the conditions at that beginning. The theory of relativity breaks down when approaching the first instant of the big bang because it does not incorporate the uncertainty principle of quantum theory, essential at this micro-level. So the initial conditions (or boundary conditions as they are called) at the time of the big bang are a mystery, and may forever remain so. The big bang theory is

consistent with the Genesis version of creation, much to the comfort of most theologians.

The first version of the big bang theory (called the standard cosmological model) had to be revised because of the "horizon problem." The horizon problem refers to the unexplained uniformity of temperature of the microwave background radiation that exists at the farthest reaches of the universe. Apparently there was not enough time in the early universe for heat to flow from one region to another to account for this uniformity of temperature. So how does one account for this uniformity of the microwave background radiation? Mr. Guth proposed a solution to the horizon problem involving the concept of an inflationary universe. This solution has revamped the standard model into what is called the "inflationary cosmological model." In his inflation theory Guth found a different solution to Einstein's equations. In this solution the early universe would go through an exponential expansion in an incredibly short period of time. In a tiny fraction of a second after the big bang, the size of the universe increased by a greater percentage than it has in the 14 billion years since. This would allow for the uniformity of temperature of the microwave background radiation that has actually been observed.

In addition to the inflationary universe modification, string theory makes a few changes of its own. The standard model of cosmology says the size of the universe starts out at zero. String theory implies that the universe starts out at a smallest possible size, but that size is still greater than zero. String theory also has more than four space-time dimensions. The evolution of all of these dimensions must be addressed in a cosmological model. This potentially new cosmological theory, like the standard cosmological model, is not capable of speculating about the boundary conditions. These conditions may lie beyond the purview of any scientific theory. This seems to lead to the conclusion that

science and cosmology have very real limits in their ability to explain not only the boundary conditions at or around the big bang event, but what preceded those conditions, if anything. Is that even a meaningful question if time does not exist apart from space?

Parameters of the Universe

The more one learns about physics, the more one marvels at how unique the boundary conditions and all the laws of physics that followed the big bang had to be in order to allow the development of intelligent life forms as we know them. If any of hundreds of different parameters had been just slightly different from what they were, complex atoms and molecules could not exist; galaxies and solar systems could not exist; and of course, we would not exist to even ask the questions we are asking.

For example, if the force of gravity were just a little bit stronger, the cosmic expansion would have halted, and the universe would have collapsed long before life could have evolved anywhere. The stars would have burned out too rapidly to allow for the evolution of life. Planets would also light up and become stars, or they would collapse to become white dwarfs, neutron stars, or black holes. A black hole is an object with a gravitational field so intense that its escape velocity exceeds that of light. This means light cannot escape from a black hole. A black hole is also considered a singularity because of the infinite curvature of space due to its massive gravitational field, which causes the mathematical equations of Einstein's theory of relativity to break down.

If, on the other hand, the parameter of the force of gravity were weaker, the matter from the big bang would have dissipated before it could clump together as planets, stars, and galaxies. Again, the possibility of biological life would not exist.

Another example for the need of these highly specific parameters of the physical laws involves the slight difference in mass between a proton and a neutron (the two types of particles contained in the nucleus of an atom). If protons were just one percent heavier, they would spontaneously decay into neutrons. Without protons, there would be no hydrogen atoms, and, therefore, no stars. Without stars there would be no life forms. And without just the right number of spatial dimensions, life forms could not exist either.

How is one to understand how this exact mix of very specific parameters took place? Does one assume, as does orthodox theology, that God (being all powerful) got it right on the first try? Or does one assume that God's signature style is less arbitrary than that, and in fact, more consistent with the style of creativity observed here on earth—that style being one of an evolutionary formation.

Cosmologists have presumed for some time the possibility of a "multi-verse." A multi-verse would contain an almost infinite number of universes, some of which like our own, have parameters of the laws of physics that allow for the evolution of life forms with the intelligence to question their own existence. What would a model of such a multi-verse look like? An imaginative proposal has been put forth by Lee Smolin of Penn. State University. It is based on the similarity of the conditions that existed at both the big bang and at the centers of black holes. Both scenarios presume a huge density of matter in an incredibly small space. They represent what are known as singularities because the rules of relativity and quantum mechanics break down under these

circumstances. Smolin's proposal suggests that every black hole is the possible seed for a new universe that erupts into existence in a big bang-like explosion. Smolin further suggests that small parameter variations in the physical laws of these baby universes would lead some of these new universes to produce more black holes than others. Those new universes that produced the most black holes would come to predominate in the vast multi-verse because they would in turn produce more universes. The physical laws of these universes would become more prevalent by a form of natural selection, that selection being for optimum black hole production. Maybe that selection process would also favor the type of universe having the physical laws that would allow the possibility of a universe as we know it and that would support the possibility of life. But mankind's existence requires only that one of these millions of possible universes have the physical laws that our particular universe possesses. Also, Smolin's hypothesis is compatible with string theory's requirement that the big bang didn't start from nothing or zero, but rather, from a "something" extremely small and dense—something perhaps pinched off from the central depths of a black hole as discussed above. The principles of evolution might permeate cosmology as well as physics and biology—which might lead one to see it as part of God's creative signature, i.e., evolutionary formations rather than single arbitrary ones. In either scenario it would be God at work. This is another example of what was mentioned earlier— that the more one knows about the nature of creation and the universe, the more one might know about the creator. For example, one might surmise that the creator is much more interested in the process or the journey rather than reaching a particular end in a one shot instantaneous manner. Perhaps God just enjoys the continuous act of creation and is neither concerned with nor desirous of reaching a particular goal.

Symmetry

How does an area of science such as physics impact something as spiritual as prayer? Understanding the symmetries of nature might be helpful in optimizing our prayer life. What is symmetry? Symmetries of nature refer to the existence of certain physical laws and their being invariant relative to time or place. Symmetry remains unbroken when a fundamental law is in operation in every moment of time and in every location in space. A central theme of physics is the identification and understanding of these symmetries. Exploring some of these symmetries led Einstein to discover his Special Theory of Relativity. We should be very thankful for the existence of these symmetries and the resultant physical laws because intelligent life forms would not exist without them. If there were no symmetries, there would be no people to pray. This is significant. It is significant because if our prayers require the suspension of some of these symmetries, we have a logical inconsistency. If we assume God created our universe in a way (meaning with certain physical laws operative in every time and place) that allowed intelligent life forms, it wouldn't be prudent or consistent to ask Him/Her to suspend those very laws He created that allow for our existence, just so we might advance our particular individual agendas. For example, if a prayer was offered up that God should indefinitely

eliminate all earth quakes, this would probably require the suspension of one or more of God's physical laws or break some symmetry. It would certainly be a well-intentioned prayer, but it would be one that contained a logical inconsistency. That inconsistency is to request the suspension of a necessary symmetry upon which all life depends. Sometimes some of the things people pray for require such a break in these very important symmetries. If symmetry can be suspended, then it is not symmetry anymore. We are physical beings. Is it logical or realistic to expect God to suspend those very physical laws and symmetries that allow us to exist and pray in the first place?

Unfortunately, even our current understanding of existing symmetries doesn't offer us as much clarity as we might like. Our understanding of the physical laws of the universe is incomplete and imperfect. As said earlier, the more we know about physics, the more we know what we don't know. We might ask what really falls within the realm of the possible and the realm of the impossible? This is a very difficult question. When our scientific understanding was limited to the laws of classical physics, it was much easier to make that determination than it is now, given the tools of relativity, quantum mechanics, and even string theory. In the micro-world of quantum mechanics, every possible event can be assigned a probability curve (even those events that under classical physics would be considered impossible). With quantum mechanics the demarcation between the possible and the impossible is blurred out. That is not to say that the symmetry of a particular physical law is tentative, but rather that labeling an event as impossible or possible becomes a more challenging task. What was in the past considered impossible is now assigned a certain probability, even if that probability is infinitely small.

Questions regarding symmetries and physical laws and the boundaries of natural and supernatural phenomena impact our understanding of God's

omnipotence. What do we mean when we say God is omnipotent? Many Christians mean, when they say God is omnipotent and all powerful, that if God wants to perform a miracle, He can just suspend any of the physical laws of His created universe to do that. We need to give more thought to what real omnipotence would entail. Maybe the question about omnipotence might be framed this way. Which God would be more omnipotent: (1) a God that doesn't foresee every eventuality, and as a result, when He sees the need for a special intervention, He must temporarily suspend the laws He has created in order to effect His will; or (2) a God who has foreseen every eventuality and has created a set of natural laws that allows the perfect manifestation of His will in all circumstances without requiring their suspension? Maybe what mankind interprets as divine miracles, a healing for example, are really natural phenomena that the existent knowledge of mankind is totally inadequate to comprehend or explain. In other words what we now perceive as supernatural is really within the natural realm, but our ignorance prevents us from perceiving that. The more we know about science, the greater our humility should be regarding our understanding of natural phenomena. Our humility should also extend to our understanding, or lack thereof, of the omnipotence of God.

Wilkinson Microwave Anisotropy Probe (WMAP)

Speaking of unexplained phenomena, 2003 has turned out to be a great year for physics, astronomy, and cosmology as a result of new findings and data from a NASA satellite known as the Wilkinson Microwave Anisotropy Probe or WMAP for short. It has provided answers to questions man has been asking for centuries. This WMAP mapped an image of the cosmic microwave background radiation over a period of 12 months with increased accuracy. It shows the pattern of heat and density of the universe when it was only 380,000 years old. The light we see today in the form of microwave background radiation has traveled over 13 billion years to reach us. The Goddard Space Flight Center together with Princeton University built and operated this satellite. It was able to compute the parameters that describe the universe with unprecedented precision. These astounding findings not only illustrate how far we have come in this area of science, but how far we have to go, which is equally important.

A summary of some of the more interesting findings from NASA's WMAP program are the following:

1. The first stars appeared only 200 million years after the big bang of our particular universe—much earlier than expected.

2. The age of the universe is 13.7 billions years old, which is accurate to plus or minus 1%.

3. The new data from WMAP continue to endorse the big bang theory as well as inflation theory.

4. Data from the WMAP mission and from observations of distant supernovas have suggested that the expansion of the universe is accelerating. This was unexpected. This acceleration implies the existence of a form of matter with a strong negative pressure. This strange matter is also known as the "dark energy." If this mysterious energy continues to influence the evolution of the universe, it is likely that the universe will continue to expand indefinitely. It was thought at one time that gravity would eventually slow down the expansion and reverse it until there would be at the end of time a "big crunch." All the matter in the universe would come together again in a reversal of the big bang. As a result of this dark energy, it seems, this big crunch isn't going to happen.

5. The contents of the universe include:

a. Ordinary matter consisting of atoms (also known as baryonic matter) = 4%. Up until a hundred years ago, scientists believed all the matter in the universe was of this type.

b. Unknown type of dark matter = 23%

c. Mysterious dark energy (which acts as a source of anti-gravity) = 73%

After assimilating all of the above material, the reader may have a better grasp of the information that thousands of scientists over many centuries have worked extremely hard to acquire. That information fills thousands of

books, papers, cd-roms, and internet web sites. It was gained at the expense of tremendous human sacrifice and with the investment of billions of dollars and man hours of labor. Each scientist's discoveries were built on the work of those that preceded him. As daunting and sometimes impenetrable as this information might seem at times, it is a gift to all who might seek answers on their personal journey, whether that journey be into the areas of science or spirituality. The more we know about science, the closer science takes us to the experience of the mystical. Scientists now know more about what they don't know than ever before. Isn't that a paradox? The boundary between what is now considered natural and what is supernatural is blurred. A boundary that used to be considered clear and fixed is not static any more. What used to be considered weird and impossible has now become part of orthodoxy. Those who would seek comfort in black and white categories are now learning the true meaning of frustration.

Not all the best or most interesting questions can be answered by researching science. Theology and religion offer their own unique perspective for the mind that is seeking answers to the most basic questions regarding mankind's existence. To revisit what Einstein once said: "Science without religion is lame, and religion without science is blind."

Part 2

What does science have to say to the person who wants to know the purpose of his/her life? The questions of who am I? What am I doing? And why am I doing it? Why do bad things happen to me sometimes? How can something be so incredibly beautiful, or wonderful, or so complex? How do I prioritize what is important to me? What do I do first and why should I do that? Questions about the meaning and significance of life, existential questions, are really outside the purview of science.

One needs to look toward theology and religion for answers to the deep existential questions. That task can be distasteful or painful to the many people who see today's institutional religions as being terribly flawed and just not user-friendly. But we shouldn't throw the baby out with the bath water. There is a way to look past all the short-comings, inconsistencies, and in some cases, even uncharitableness of today's religious denominations to find the truth buried beneath the flaws of the institutional church.

Is there such a thing as a spiritual truth? If it exists, where does one find it? Some time ago I read two short essays by Leo Tolstoy, the great Russian novelist better known for his great novel, *War and Peace*. These two essays shed much light on these questions. They are: (1) "A Confession," and (2) "What

is Religion, and of What Does Its Essence Consist?" The first is Tolstoy's spiritual autobiography. Given the spiritual insights contained in *War and Peace*, few would guess the depth of spiritual crisis through which Tolstoy lived. He was brought up in the Russian Orthodox Christian faith, but when he left the university during his second year, he rejected all the religious beliefs that he had been taught. In their place he put the belief in self-perfection, and worked hard to improve himself intellectually. He also tried to perfect his will and to perfect himself physically as well. Then for ten years he turned his back on the perfection goal and lived a life of debauchery and sin as he described it. Then he became a writer and a poet. He adopted writing and the writer's life style as his religion. After a while he became repugnant to himself and saw his religion of writing as a fraud. Describing his view of the writer's culture, he said, "Failing to notice that we knew nothing, that we did not know the answer to the most basic question of life—what is good and what is evil—we all spoke at the same time, never listening to one another." After a while he realized that he and his fellow writers were all chasing money and fame, while professing a faith in "progress." He saw himself as a teacher that did not know what he was teaching. To find relief from his confusion and despair he got married and distracted himself with the circumstances of family living. He spent the next 15 years trying to achieve the best for his family and himself, while continuing to write. At the end of that time he began to experience frequent moments of bewilderment. He felt lost and fell into despair—a despair that Soren Kierkegard has described as the "sickness unto death."

Tolstoy couldn't answer the most simple, but at the same time, the most confounding question of "Why?" Was life really meaningless? He had many suicidal thoughts, but he wouldn't move on that either because of confusion and indecision. He was in his late forties, had a loving wife and children, and a large

estate where he lacked for nothing, and enjoyed great respect from family and friends. He searched earnestly in all branches of knowledge including science and philosophy and found nothing. He thought that the only indisputable piece of knowledge available to man was that life was meaningless. The questions he could not find answers for could be expressed simply, "Why do I wish for anything, or do anything? Why do I live? Is there any meaning in my life that will not be annihilated by the inevitability of death, which awaits me?" His research on the question "Why does he or anything else exist?" arrived at the answer—because it does. For him this answer was no answer. In the more poetic words of Solomon, "Everything in the world, both folly and wisdom, richness and poverty, happiness and grief, all is vanity and emptiness. A man dies and nothing remains. This is absurd."

Tolstoy decided to change his search for answers by eschewing knowledge and looking instead at the real people around him and at their lives. He slowly began to suspect or have doubts about the intellectual conclusions to which he had subscribed. In continuing his journey, he did not turn his back on reason, but in addition to it, he employed another faculty he called a "consciousness of life." He looked for answers not among the intellectual elite who were his normal circle, but rather among the common man, the simple, uneducated people without wealth. And he discovered that the masses recognized that the meaning of life lay in irrational or non-scientific knowledge, otherwise known as faith. So he was in a quandary. Rational knowledge as he had known it pointed to the negation of life, while faith which answered the pertinent questions, required for him the negation of reason. This contradiction, or paradox, forced him to examine his assumptions. He realized that his question of "Why do I live?" was really asking "What meaning has life beyond time, beyond space and beyond cause?" And he was limiting the scope of his answers

to that of the finite. In other words he was searching for answers in the rational, scientific, and philosophical realm, all of which were in the realm of the finite. Questions relating to the infinite cannot be answered by propositions limited to the finite or rational (meaning experimentally verifiable). The answers that faith (or irrational knowledge) provide (whether they are correct or not) have the advantage of being able to relate the finite to the infinite.

For example, Tolstoy offers for the question "How am I to live?" the possible answer "according to God's law." To the question "What meaning is there that is not destroyed by death?" the answer is "unity with the infinite, God, heaven." These sorts of answers provided the possibility of life without despair or the sickness unto death. Answers such as these offered Tolstoy an infinite meaning to what was the finite dimension of man's existence, an existence that included suffering and death. Tolstoy concluded that "faith is the force of life." The juncture of paradox for Tolstoy was visible in the contradiction between the finite and the infinite, an infinite that he had previously rejected as being irrational. Until he could separate existence into those two categories, the equation he was trying to solve was reduced to an identity of finite quantities. An identity, e.g. 2=2 or 5=5, is unsolvable. The solution required a finite component on one side of the equal sign and an infinite component on the other.

So Tolstoy studied many religions including Buddhism, Islam, and Christianity. Intellectual explanations of these different faiths were not capable of convincing him of their individual truths. Only the actions of faith-filled individuals revealing their understanding of life and showing that they were not afraid of poverty, sickness, deprivation, and death had the power to persuade him. This was a critical point. No words, arguments, laundry list of beliefs, or points of doctrine could, of itself, be convincing. But the actions and the life

of a true believer were riveting and convincing. He came to know more and more of these kinds of people—people of simple means but possessing a genuine life giving faith. More importantly, he came to love these people. He was repelled by those who espoused religious beliefs, especially ecclesiastics, but whose lives and behavior were in contradiction to those very same beliefs. He also realized that his former conclusion, that life was evil and meaningless, was true when measuring his own life, but that it wasn't true for human life in general. The reason he couldn't see the truth earlier was because he was blinded by his very strong need to feel that he was good. So he came to love good people, but loathed himself, and that was a beginning.

Tolstoy also had the following revelation:

> "The life of the world runs according to someone's will; our lives and the lives of everything in existence are in someone else's hands. In order to have any chance of comprehending this will we must first fulfill it by doing what is asked of us. If I do not do what is asked of me I will never understand what it is that is asked of me, and still less what is asked of us all, of the whole world… Likewise, the simple uneducated working people, whom we refer to as the herd, fulfill the will of their master without ever reproaching him. But we, the wise, eat the master's food without doing what he asks of us; instead of doing it we sit around in circles debating whether we should do something as stupid as moving a handle up and down. And then we think it over and decide that either the master is stupid, or that he does not exist and that we are the only intelligent ones. The only thing is, we feel that we are no good for anything and that we must somehow escape from ourselves."

During this phase of his life Tolstoy had vacillated between hope and despair and suicidal thoughts innumerous times. Then he experienced a metanoia or life changing revelation. Tolstoy described it in his own words:

> "I have only to believe in God in order to live. I have only to disbelieve in Him, or to forget Him, in order to die. What are these deaths and rebirths? It is clear that I do not live when I lose belief in God's existence, and I should have killed myself long ago, were it not for a dim hope of finding Him. I live truly only when I am conscious of Him and seek Him. What then is it you are seeking? a voice exclaimed inside me. There He is! He, without whom it is impossible to live. To know God and to live are one and the same thing. God is life."

From that moment on, he states, the light never deserted him. He returned to the idea of improving himself, but this time, that improvement was to be defined by the will of God. He stopped chasing after the comforts of life, and instead, concentrated on work and assimilating the virtues of humility, sacrifice, and mercy into his everyday life. He made another breakthrough when he realized that the answer that faith provides to the eternal question of life—why do I live? while being essentially the same for everyone, must of necessity, be endlessly varied in its manifestation. That is because each person's circumstances, education, etc. are unique and different. The expression of that answer will be unique and different for each individual.

Tolstoy saw religion as a life-giving force because it answered the questions—why do I live and how should I live? Religion could relate the infinite to the finite in ways that science and philosophy could not. It had answers that could give life real meaning and direction. As he matured in his faith and enjoyed exploring theological questions, he became very troubled by the potential misuse of theology. The problem lay in how the church used theology to advance its own

agenda and to reinforce and preserve its institutional existence. The Orthodox Church regarded other churches such as the Catholics and Protestants as not being in possession of the truth, and therefore, these churches were considered heretical. The Catholics and Protestants, in all fairness, believed similarly that they alone possessed the truth and that other denominations were in error. Tolstoy's hope of unity through faith and through love, which was the promise of religion, was tragically destroyed on the rocks of denominational dogma and doctrine, i.e., theology. Theology, instead of being a source of light and love, was used to separate peoples, to label them as heretics, and to justify unspeakable acts of violence on those so labeled. Tolstoy felt "the assertion that you live in falsehood and I in truth is the most cruel thing that one man can say to another …" As Tolstoy saw it, while he was seeking faith, which was the force of life, the ecclesiastics of the various religious denominations were seeking the best way of fulfilling certain human obligations in a very human fashion. These obligations entailed preserving and safeguarding the purity of the denominational doctrine as it had been passed down from generation to generation. Each denomination identified its doctrine as possessing the only truth. Opposing doctrines were considered lies and heresy and, therefore, were very dangerous—so dangerous that violence was justified in exterminating the potential threat. Each church became an institution designed to preserve and protect its version of the truth, defenders of the true faith as it were; and to do that, it had to preserve and protect itself as an institution first.

Tolstoy found salvation in his search for, and his relationship with, God. His faith was nurtured by his church. He found fellowship with fellow seekers within the church. But disillusionment with church doctrine was not far behind.

Who would not feel an overwhelming sense of sadness to learn of the tremendous amount of religious persecution existent in today's world and over the last 2000 years? Where and why has the church gone wrong? Where did it begin? Why does violence in the name of religion continue? Are there recurring issues underlying religious conflicts? Where does one begin to search for answers to these very difficult questions?

I was under the illusion, like many others, that the further back in Christian history one looked, the more unity one would find within the church. I thought the main schism in the Christian church occurred with Martin Luther and the Reformation in the 16th century. That apparently is not the case. The first schism can be dated back to the 2nd century A.D. between the orthodox (by virtue of their being in the majority) and the Gnostic Christians. This wasn't known until fairly recently. None of the Gnostic texts were published before the 19th century. An Egyptian peasant discovered in 1945 at Nag Hammadi, Egypt, what proved to be a large collection of Gnostic Gospels although a few Gnostic texts had been discovered prior to this. Thirteen of the codices containing these Gnostic Gospels from the Nag Hammadi find came into the public domain by 1977. Elaine Pagels in her 1979 book, *The Gnostic Gospels*, takes a comprehensive look at these gospels and places them into an historical context. The canonical gospels of the New Testament are dated c. 60-110 A.D., while many believe the original texts of the Gnostic gospels to be dated c. 120-150 A.D. The Gnostic Christians did not acknowledge the divinity of Christ in the same way as the orthodox Christians. The Gnostics did not see Jesus as coming to save his people from sin, but rather, as a teacher or guide who opened access to spiritual understanding. According to Elaine Pagels the diversity and free expression of Christian beliefs existent in the 2nd century A.D. came to an end by 200 A.D. By that time orthodox Christianity had

become institutionalized with a distinct hierarchy of bishops, priests, and deacons. In addition to this institutional structure, their canon was established and contained in the New Testament as we know it, and they possessed a creed of central beliefs. Those who differed with those beliefs were considered heretics. The Orthodox Church gained military support after the conversion of Emperor Constantine of Rome to Christianity in the 4th century. The penalty for heresy escalated with that power, and it became a criminal offense to possess heretical books such as the Gnostic gospels. It was during the reign of Emperor Constantine that the Nicene Creed, which is the creed most commonly used today by Christians, was established. Just as a footnote here, the earliest recorded creed was written by St. Paul 20 years after the death of Christ in his Epistle to the Corinthians:

> "For what I received I passed on to you as of first importance: that Christ died for our sins according to the Scriptures, that he was buried, that he was raised on the third day according to the Scriptures, and that he appeared to Peter, and then to the Twelve. After that, he appeared to more than five hundred of the brothers at the same time, most of whom are still living, though some have fallen asleep. Then he appeared to James, then to all the apostles, and last of all he appeared to me also, as to one abnormally born." 1 Cor 15:3-8
>
> Some of the major doctrinal differences that separated Gnostic Christians from their orthodox or mainstream brothers were
>
> 1. The organization of authority—the mainstream Christians believed in a hierarchy of bishops, priests and deacons, while the Gnostics did not.
> 2. The participation of women—the mainstream Christians did not recognize women as spiritual equals with men. The Gnostic Christians saw men and women as spiritual equals.

3. Martyrdom—the mainstream Christians believed that martyrdom was a wonderful gift of love, just as Christ's passion on the cross was the ultimate gift to mankind. The Gnostics did not believe in the utility of ordinary Christians becoming martyrs. They saw it as foolish.
4. The necessity of the Church as the only avenue to God or as a necessary "ark of salvation"—the Gnostics believed that spiritual ignorance, not sin, was the root of personal suffering. Therefore, they pursued personal self-knowledge which was acknowledged as a difficult process and involved overcoming a great deal of internal resistance. This path towards self-knowledge might entail choosing the truth of one's own conscience over the religious certainty offered by the institutional church.

The questions raised by the Gnostic Christians were temporarily squelched by 200 A.D., but they have been resurfacing ever since, most notably during the Reformation, but also in modern times. From the Reformation came a dozen different denominations, all with varying doctrines and traditions. It would seem that the need to differentiate oneself by one's theological and doctrinal beliefs has taken precedence over the importance of unity of faith envisioned by the earliest Christians—that unity of faith that hopes that "they will know we are Christians by our love" and by our brother/sisterhood.

The importance of doctrinal matters of faith can be taken to extremes. Heresy by definition is the promulgation of false religious doctrine, and a heretic is the supposed perpetrator. It can be helpful to look at the extreme situation that this mind-set can lead to, so we can learn from the mistakes of others. The 13th century was such a time, when divergence from accepted religious doctrine was met with the most severe consequences. The date was 1231, and Pope Gregory IX with the constitution "Excommuniamus" placed

the prosecution of heretics under papal direction. Thus began the Inquisition. It started in Germany and Aragon and then spread through other parts of Europe. The inquisitors could bring suit against any suspected heretic, even princes. The testimony of two witnesses was generally enough to convict. In 1252 under Pope Innocent IV, torture was sanctioned to obtain confessions. In serious cases penalties were usually confiscation of property or imprisonment. If a perpetrator was handed over to civil authorities, it was with the expectation of that person's execution. The Inquisition slackened off in the late 14th and 15th centuries, but was resurrected by the spread of Protestantism in 1542, as a result of the Reformation. In that year Pope Paul III established in Rome the Congregation of the Inquisition, also known as the Roman Inquisition, or the Holy Office. Unlike the earlier medieval inquisition, the Holy Office was more concerned with the writings of theologians. They pursued even bishops and cardinals. In 1559 the Holy Office established the first index of Forbidden Books. The Roman Inquisition became the instrument for regulating church order and doctrinal orthodoxy. As mentioned earlier, it was the Roman Inquisition that tried and condemned Galileo in 1633.

At the request of the King and Queen of Spain, the Spanish Inquisition was established with papal approval in 1478. Within a few years the supervision of the Spanish Inquisition was turned over to the sovereigns or monarchs of Spain. With the oversight of the monarchs, it had greater impact on religion, politics, and culture than did comparable inquisitions elsewhere. The most notorious Grand Inquisitor, Tomas de Torquemada, executed thousands of so-called heretics. The Spanish Inquisition was finally suppressed in 1834. Torture and persecution by the various inquisitions lasted for 600 years from 1231 to 1834.

These are extreme examples of a church straying from its proper course by placing the preservation and promulgation of specific religious doctrine as one of its highest priorities. Is this what Jesus had in mind for His church? Where do murder and torture fit in with a church whose mission is founded on the proposition of love? What should the true function of the church be? What is the true essence of religion? These questions were explored by Leo Tolstoy in his essay entitled, "What is Religion and of What Does Its Essence Consist?"

Tolstoy states that "True religion is that relationship, in accordance with reason and knowledge, which man establishes with the infinite world around him, and which binds his life to that infinity and guides his actions." So to paraphrase this quote, religion is the establishment of a relationship between finite man and an infinite God. That sacred relationship provides guidance as to one's actions, attitudes, and behaviors. Also, for a religion to be genuine and not just a semblance of one, the affirmations of that religion cannot be contrary to reason and one's level of knowledge. That is why good science and good religion should be symbiotic partners and not adversaries. The doctrine or theology of a sound religion should not be quick to ask a believer to renounce the best and most sound scientific evidence and concepts that the most credible scientific minds have produced.

Tolstoy makes the strong statement that "Religion remains the chief motivator and heart of human societies. Without it, as without a heart, there cannot be rational life." He also states that all varieties of religion go through different stages such as birth, development, aging, death, and then rebirth into more perfect and meaningful manifestations. In all faiths, the finite being of man is considered insignificant in comparison to the infinite God. And from God's perspective all persons are equal. It is this latter principle of the equality of all persons with which we, as finite persons, have the most difficulty.

From our perspective no two people are equal in worldly characteristics, talents, abilities, or possessions. This is where religious principles are most vulnerable to distortion, according to Tolstoy, in order to protect those who possess the most power, influence, and material wealth. To conceal the law of human equality and to further the institutionalization of inequalities, churches promulgate a number of tenets or principles to justify these differences. Chief of these tenets are the following:

1. There are special groups of people (usually the clergy) who alone can act as intermediaries between God and man.
2. There are certain words written in books, e.g., scripture, which express the certain will of God that makes them sacred and infallible.

Acceptance of these two tenets historically has allowed for the creation of a caste of people (cleric over lay people) with the power, if they so choose to use it, to determine the identity of potential heretics or trouble makers and to determine their unpleasant disposition or fate. But the essence of Christianity, on the contrary, proclaims the equality of all men (and women), not only because they share a universal brother and sisterhood, but because all beings are considered sons and daughters of God.

Jesus came, in part, to establish a new covenant between God and His people, not based on law, i.e., doctrine and scriptures, but rather on the two principle commandments to love. Jesus said, "Love the Lord your God with all your heart and with all your soul and with all your mind. This is the first and greatest commandment. And the second is like it: 'Love your neighbor as yourself.' All the Law and the Prophets hang on these two commandments." (Mt 22:37-40) Jesus also told his apostles not to set themselves up as rabbis or teachers. He said, "But you are not to be called 'Rabbi,' for you have only one Master and you are all brothers. And do not call anyone on earth 'father,' for

you have one Father, and he is in heaven. Nor are you to be called 'teacher,' for you have one Teacher, the Christ. The greatest among you will be your servant. For whoever exalts himself will be humbled, and whoever humbles himself will be exalted." (Mt 23:8-12) Jesus also condemned the Pharisees for living by the letter of the law rather than by the spirit of love and mercy. "Woe to you, teachers of the law and Pharisees, you hypocrites! You give a tenth of your spices—mint, dill and cumin. But you have neglected the more important matters of the law—justice, mercy and faithfulness. You should have practiced the latter, without neglecting the former. You blind guides! You strain out a gnat but swallow a camel." (Mt 23:23-24)

So Jesus was not in favor of legalism or institutionally sanctioned layers of hierarchy mediating between God and His people. Some varieties of the institutional church, though, saw the need for more and more law (doctrine) and more and more intermediaries. These churches required not only the distinction between clergy and lay people but also the division of clergy into bishops, priests, and deacons. The concerns regarding the church articulated by Tolstoy in the late 19th century are some of the same concerns that divided the Gnostic Christians from the orthodox Christians in the second century, as well as the Protestants and Roman Catholics during the 16th century Reformation. To an outside objective observer one might conclude that the institutional church had a distinctive agenda. Instead of the two great commandments articulated by Jesus, an outsider observing the actions and activities of the Christian church could conclude that the church's mission statement or agenda should probably read as follows:

1. 1st Commandment—to preserve, maintain, and protect the particular doctrines of faith and traditions of the people of God, and to establish a group of paid clergy that will insure the preservation of said doctrines by the formation of an institutional body known as the church
2. 2nd Commandment—to love God the Father and Jesus Christ with equal fervor of heart, mind and soul
3. 3rd Commandment—to love thy neighbor as thyself showing particular partiality to those individuals that are of like mind to yourselves

With the priorities exhibited in the above mission statements, I do not believe Jesus would have been well pleased.

To make an important qualification to this, I would add that the church in all probability has accomplished many things good and pleasing to God over the centuries that only the church could have achieved. The church has done great things. The church has had a strong positive impact on our country, both with its political structures as well as with its business and commercial institutions. Many would rightly argue, as Alexis de Tocqueville did, that America is who it is today because of the church and its believers. Today's faithful followers have the privilege of standing on the shoulders of giants in the faith, without which they would be mere adolescents in their discipleship.

The truth of this fact should not mitigate our efforts to see the church from an objective perspective, and to try to be part of its reinvigoration and renewal. The Christian Church is at risk if it resists change and endeavors to maintain the status quo. The church needs to realign its priorities and agenda to reflect more closely the two great commandments laid down by Jesus. The whole issue of religious law and doctrine needs to be viewed in a different light. The placing of too much importance on doctrine becomes a form of idolatry. The church has allowed doctrine to drive a wedge between people, rather than

using it as intended to bring people together. If being "right" (relative to some doctrine) causes one to turn away from one's neighbor, then being "right" is wrong relative to the commandment to love thy neighbor as thyself. If we turn away from our neighbors because of what or how they believe, we are judging and condemning them. By definition we would be in a state of prejudice, if the neighbor has done nothing to earn that distrust. Those sitting in judgment would be the creators of the breach. One may feel justified in judging their neighbor on the grounds of self-preservation, but operating out of this sort of fear is the true opposite of love. If one professes to be a Christian, one must attempt to control his fears and to step out in courage by extending himself without prejudice.

The Gospel of John tells the story of the woman caught in adultery and Jesus' response to that woman. This story illustrates not only his lack of prejudice, but his emphasis on compassion over condemnation and on love over law. In this story the scribes and Pharisees bring a woman to Jesus who has been caught in the act of adultery. They point out to Jesus that the Law of Moses commands that such people should be stoned. The Pharisees ask Jesus what disposition he would make with this woman. He answered them by saying,

> "If any one of you is without sin, let him be the first to throw a stone at her." Again he stooped down and wrote on the ground. At this, those who heard began to go away one at a time, the older ones first, until only Jesus was left, with the woman still standing there. Jesus straightened up and asked her, "Woman, where are they? Has no one condemned you?"
>
> "No one, sir," she said.
>
> "Then neither do I condemn you," Jesus declared. "Go now and leave your life of sin." Jn 8:7-11

This story is a dramatic example of the new covenant between God and man that Jesus came to proclaim. Jesus did not come to denounce the law and religious doctrines, but to place them in a new context. They were to be seen as important guidelines, but their only validity and credibility derived from their usefulness in helping God's people obey the two great commandments to love God and one's neighbor. If any part of that law came into conflict with those two great commandments, then those commandments to love took precedence over the religious law. The law was only a means to an end, and not an end in itself.

Jesus teaches not only to refrain from condemning others but to stop the judging that precedes every act of condemnation. He specifically states,

> "Do not judge, or you too will be judged. For in the same way you judge others, you will be judged, and with the measure you use, it will be measured to you. Why do you look at the speck of sawdust in your brother's eye and pay no attention to the plank in your own eye? How can you say to your brother, 'Let me take the speck out of your eye,' when all the time there is a plank in your own eye? You hypocrite, first take the plank out of your own eye, and then you will see clearly to remove the speck from your brother's eye." (Mt 7:1-5)

Just because many varieties of religious institutions have made their first priority the preservation of religious doctrines, traditions, and the institution itself, that doesn't mean that the essence of true religion does not exist. Tolstoy felt there were some basic principles that could be found in every major form of religion. Those principles were the following:

> "…that there is a God who is the origin of everything; that there is an element of this divine origin in every person, which he can diminish or increase through his way of living; that in order for someone to increase

this source he must suppress his passions and increase the love within himself; that the practical means of achieving this consist in doing to others as you would wish them to do to you."

If one assumes, then, as Tolstoy did that to make the assertion "…that you live in falsehood and I in truth is the most cruel thing that one man can say to another," then a whole new element of humility needs to be injected into religious proselytizing. I may possess an undoubting conviction that the religious beliefs I hold dear to my heart are completely true and accurate, but my neighbor across the street who belongs to a different faith may hold his religious convictions as firmly as I do. We will both be better neighbors to each other if we don't try to fix each other's religious beliefs. I respect him for who he is, and he returns the same respect to me. If he asks me a question about my faith, then I will be happy to try to answer it for him. The truth is that no one possesses absolute certainty regarding a religious belief. By definition religious beliefs are taken on faith because they cannot be proven. As discussed in Part I, even defining the laws of natural phenomena using scientific principles can prove very elusive due to the Heisenberg Uncertainty Principle and the incredible complexity of some physical systems. Even if it comforts us to believe we possess some religious truth, we must have the humility to admit that only God possesses that truth. It is the believer's purpose or function to choose the most valid religious beliefs that he can find and to make a leap of faith in holding onto those beliefs for his personal well-being. One must then integrate those religious beliefs into one's core self so that his behavior reflects those beliefs. For me to act on the assumption that I am right and you are wrong in your religious beliefs is not only arrogant on my part, but it is very disrespectful to the other person and, therefore, contrary to the law of love.

Theology is like a photograph. They are both two dimensional representations/interpretations of a larger reality. A two dimensional photograph is a graphic representation of a four dimensional spacetime reality (or 11 dimensions if string theory is correct). Likewise, theology is a two dimensional interpretation (because it is usually expressed in words on paper) of a four dimensional spiritual reality called life. Spiritual truth is experienced in real living. Theology is only an interpretation of that truth. By its very nature it is one step (or two dimensions) removed from the truth. One should not confuse the "interpretation" for the reality, with either a photo or with theology.

So what should the mission and the purpose of the church (in the generic sense) be? We can use as a starting point the two great commandments to love God and to love one's neighbor. Also keep in mind Tolstoy's basic principles of all legitimate religions. To review these, Tolstoy said that (1) God was the creator of everything; and that there is an element of the divine in every person that will increase or decrease as the result of how one lives; and (2) that in order to increase the divine source within, one must suppress certain passions and increase the love within oneself in order that one can love others as laid out in the Golden Rule. The purpose of the ideal church would be to join together the body of believers and then to support its members in assimilating and living by the two great commandments. Churches would no longer have gate-keepers that granted admission only to those who had successfully passed some religious rite of passage or who agreed to believe in some complex list of religious doctrine and institutional by-laws. Churches would endeavor to be inclusive rather than exclusive because it would be recognized that everyone is on a spiritual journey that draws one closer to God, and that no one has successfully completed that journey or has a lock on the truth. In the old

fashioned vernacular, we are all sinners in need of God's grace. Grace is the undeserved love that flows from God to us in myriad forms, one of which includes forgiveness for the many times we have hurt others. This forgiveness is freely given in grace, but that does not mean that grace is a license to continue hurting others. Jesus did not condemn the woman caught in adultery, but he did advise her to sin no more. A church should be a place where grace abounds and God's people are drawn closer to Him. It should be an accepting place where people can feel safe and freely trust each other. Bearing false witness against one's neighbor or telling lies to advance one's personal agenda would be universally recognized as totally destructive to establishing this necessary trust and community. The people of God would build each other up in the faith. Forgiveness and love would abound.

The church could then be a celebration of life, love, and worship to the creator God. Joy and peace would replace judgment and condemnation. The covenant of love would supersede the law, the doctrines, and all the institutional self-serving of the old church structures. The church would exist for the benefit of God's people and not for those charged with its preservation. The church would be less an obstacle to God's grace and more a conduit for that grace. The example of one member accepting and supporting other members would be seen as fulfilling God's purpose for us and for the church, rather than the memorizing and agreeing to a particular laundry list of religious beliefs and doctrines. Being right would not be measured by what side of an argument one came down on, but rather by what level of love lay within one's heart and how that love was manifested accordingly in one's relationships. This is a theme that continually weaves its way through the Gospels. This is a recurring message of Jesus. I don't think Jesus envisioned three dozen different churches or denominations. Today it seems, every time there is a controversial moral

issue, whether it is transubstantiation or women clergy or homosexuality, some denomination is splitting off into two more groups depending on one's opinion on the issue in question. I think Jesus would have valued unity over "being right on the issue" because divisive issues create rancor and hard feelings. Neighbors are split apart, and hate is inflamed. Eventually wars are fought over these issues, and people are murdered and killed. This is what Jesus was trying to avoid. So living by the two great commandments would not only purify the body of believers known as the church but also purify and integrate the heart and mind of each individual that sought after God and the truth that God represents. This is the author's vision of an ideal church. What is yours? Are you content with the way things are? Whatever changes in the church are necessary; those changes must be made by the people of God. In prayer let us discern what those changes should be, and let us pray we have the courage and strength to make them. Then let us get on with the task of doing it. The peace of the world depends on it.

And So . . .

We are driving down a highway at 60 mph, obeying the speed limit, and unconsciously staying within our lane with the help of the white road markings on either side of our lane. As I am doing this, it occurs to me that the markings on the sides of my lane are like the teachings and doctrines of the church. They act as guidelines as long as I am moving down the highway. If I pull the car over, get out and look at them, they are lifeless white markings on asphalt. But moving at 60 mph they provide safety and guidance. As my car glides down the highway it is a symbol to me of science. Without it I would be walking at about 3 mph. Both science and my car are marvelous tools that enhance my life's journey. My car allows me to be and to work smarter in the sense that I can accomplish more in a shorter period of time. My car also allows me to pick up people along the way, which I couldn't do if I were walking. Science, like my car, enhances my journey and allows for a greater appreciation of living. It helps me understand so many of the intricacies of natural phenomena. Subjects like friction, forces, inertia are very helpful in knowing how to take a curve and keep my car on the road. Science is the master magician that explains to me how the greatest physical tricks are done. It introduces me to many of the mysteries of life and the universe and enables me to experience, in

a certain way, the mystical. Unfortunately, science cannot answer the questions of my heart that deal with the ultimate meaning of life. Neither the car nor the road markings represent the essence of life. It is the living, breathing person inside the car moving down the highway making the decisions where to go and how to get there that is the focus of the real action. How we interact with other car drivers and what people we pick up along the way has the most to say about who we are and what the quality of our life will be. I can travel down the road in a perpetual state of despair, or I can drive down the road with faith in my heart and love in my finger tips. That faith does not live in my heart because I was exposed to a laundry list of religious beliefs, but rather because I met a person along the way who already possessed a living faith. I recognized the light of life within him and wanted to align my path with his and learn and do things the way he did them. In doing that I learned that it wasn't the actions in themselves that were as important as the attitude in my heart as I was doing them. I recognized an absence of fear in my mentor's life. In its place was a single mindedness whose focus was on being connected to others—in supporting and accepting them as they were. Seeing beyond their brokenness, he delighted in their sensitivity, curiosity, and in their need to be known and recognized for the unique life force that they represented. He showed me that our final destination on the road was to be intimately connected with God and to allow His will for our lives to be our active compass.

The car, the road markings, and the signs, all work together to accomplish something new and good and help the driver approach the appointed destination. So too science and religion are meant to work together; to enhance each other's function. Adversarial relationships, whether between science and religion or between the institutional church and the People of God, only serve to detract from the mission and to slow down the good work that needs to be

done. A paradigm shift is needed within the institutional church to re-adopt the two great commandments and give them the priority that was originally intended. The Church needs to shift its focus away from the preservation of dogma and tradition, for they are only the lifeless white markings on the side of the road. Yes, this would require the equivalent of a second Reformation, and that Reformation has already started. Mankind needs to do more than just wish for world peace. We need to start creating it one person at a time. To attempt this, our identity as individuals needs to be grounded not on whether our beliefs are correct or deemed right, but on the quality of love in our hearts, the good works that naturally flow from genuine acceptance of other people, and the willingness to accept responsibility for who we are and what we do. Then we will be a few steps closer to the purity of heart that wills one thing.

Additional Reading

Davies, Paul. *God & The New Physics.* New York: Simon & Schuster, Inc., 1983.

Davies, Paul. *The Mind of God.* New York: Simon & Schuster, Inc., 1992.

Ferris, Timothy. *The Whole Shebang.* New York: Simon & Schuster, Inc., 1997.

Greene, Brian. *The Elegant Universe.* New York: W.W. Norton & Company, 1999.

Gribbon, John. *Schrödinger's Kittens and the Search for Reality.* New York: Little, Brown and Company, 1995.

Gribbon, John. *The Search for Superstrings, Symmetry, and the Theory of Everything.* New York: Little, Brown and Company, 1998.

Hawking, Stephen W. *A Brief History of Time.* New York: Bantam Book, 1988.

Hawking, Stephen W. *The Universe in a Nutshell.* Great Britain: Butler and Tanner Ltd, Frome,Somerset, 2001.

Kierkegaard, Søren. *Fear and Trembling and The Sickness Unto Death.* Garden City, N.Y.: Doubleday & Company, Inc., 1954.

Kierkegaard, Søren. *Purity of Heart Is To Will One Thing.* New York: Harper & Row, Publishers, 1956.

Kierkegaard, Søren. *Works of Love.* New York: Harper & Row, Publishers, 1964.

Pagels, Elaine. *Beyond Belief.* New York: Random House, Inc., 2003.

Pagels, Elaine. *The Gnostic Gospels.* New York: Vintage Books, 1989.

Tolstoy, Leo. *A Confession and Other Religious Writing*. New York: Penguin Books, 1987.

Wilson, Ian. *Jesus: The Evidence*. New York: Harper Collins Publishers, 1988.

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