Science to Face the Questions of Value and Religion to Use Logic and Science

Mark Alexander
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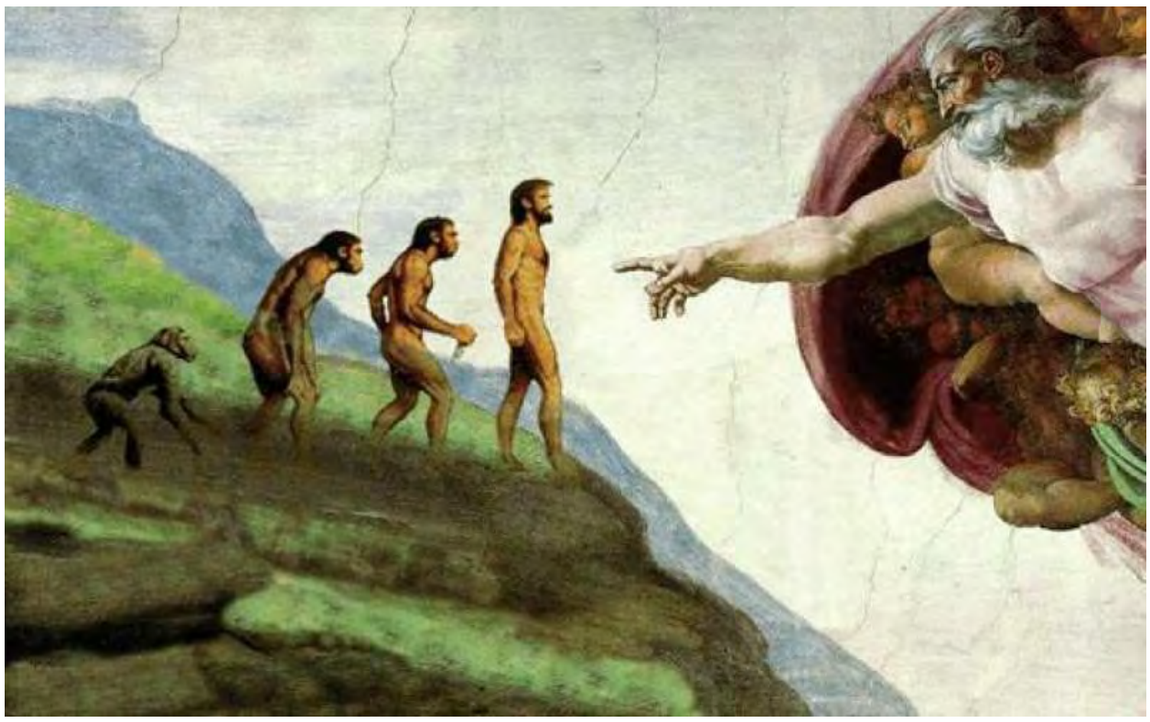

Today the need for science to face the questions of value is probably only exceeded by the need of religion to use logic and science. Both disciplines seek the truth from the different aspects of the internal and the external. Modern man requires logical proof in order to understand and follow his best comprehension of the truth. Religion has been moving along a long tortuous path toward the goal of scientific explanation, and science, rather than mainly looking at what is, has had to raise its horizons in search of what ought to be.

The interaction of the internal search for truth and the external search for truth have a potential for harmony despite a history of vital, yet often unharmonious relationship. In the twentieth century the relationship of science and religion can become one of complementarity and harmony reflecting a dynamic, intuitive relationship which may one day lead to a relationship of love. Science becomes more internal and religion more scientific. Physics, long called natural philosophy (from the Greek physikos), will be my primary mode of looking at the science-religion dynamic. Well suited for the task, Physics embodies the most rigorous aspects of science while touching many realms of theology such as cosmology, the nature of matter, the role of progress, the process of inspiration, and philosophy. My concentration will be on these growing interfaces of science and religion.

Physics is defined in the Encyclopedia Britannica as "a point of view about the natural world, and a method of attack upon its problems." Pervaded by "a kind of confidence that nature may be reduced to a few comprehensive principles" physics seeks for "those central ideas by which great areas of common experience may be brought into order and coherence." Physics, and all science, embody the interplay of experiment and theory using the tools of mathematics and logic. Einstein, for example, exemplified the most rigorous, incisive application of science while relying on intuition and imagination for some of his greatest breakthroughs. All the while he was driven by a faith that "nature may be reduced to a few comprehensive principles." He died before he could discover a single Unified Field Theory for electromagnetic and gravitational fields. Recently, in trying to attain this goal, scientists have tried to combine the two pillars of modern physics, relativity theory and quantum mechanics, in another step toward a Unified Field Theory.

In the long history of the interplay of science and religion, Divine Principle' goes all the way back to the fall of man for an understanding of the separation of the internal and external search for truth. Just as God and man became separated, man's mind and body became disharmonized. By placing material values over spiritual values man reversed the order of the universe causing ignorance, conflict and unhappiness. Cain and Abel, representing the relatively spiritual and physical views of life, struggled instead of harmoniously interacting. Because they couldn't work together for a purpose higher than themselves, they caused the first war. Cain murdered Abel. The pattern of relationship has expanded throughout history leading to the Hellenistic and Hebraic views of life, the right and left Hegelian views, and the Christian and Communist views of life throughout history science and religion have also reflected a Cain-Abel

relationship. Cain and Abel were meant to love one another and work together in a vital, creative harmony. Religion would have been the rudder and science the vessel. This awesomely powerful ship of science must have a strong, sensitive, smoothly working rudder in the twentieth century.

Originally physics began to emerge around the time of Aristotle. He connected physics and theology to philosophy, attempting to show the philosophical foundations of physics in his eight-volume work, Physics, while defining "theology" as the first philosophy. Aristotle taught that natural science should be based on scientific observation, followed by reflection and leading to generalization. This approach was neglected by medieval man and was revived only when translations were made from Aristotle's original writings in the thirteenth century. While moving away from his philosophy, seventeenth century scientists retained his common sense scientific approach while adding the very powerful tools of advanced mathematics and experimentation.

At the culmination of the Middle Ages, St. Thomas Aquinas formulated a unique synthesis of reason and faith by combining the essence of medieval thought with the newly translated Aristotle. With theology as the big brother to philosophy, supernatural truth and natural truth were to complement one another without contradiction. His famous quote: "Grace does not destroy nature but perfects it," was more systematically and logically elaborated in three propositions typical of Aquinas' approach.

St. Thomas proceeds: "1) If I believe a proposition on faith, I assent to it on the authority of God, who has revealed it to mankind. 2) If I know P by reason, I assent to it either because it is self-evidently true or because it is logically deducible from self-evident premises. 3) Any proposition which can be logically demonstrated can also be the subject of revelation."

Aquinas took the Aristotelian approach and gave it life by making Christianity and systematic philosophy complementary. The Thomistic synthesis has dominated much of Catholic thought and Protestant education in Northern Europe until today. Through scholasticism Christian thought became highly systematized, although somewhat dry and removed while logic and reason were subtly influenced by the results of revelation. Aquinas' "comprehensive principles," although emphasizing "being" more than change, embodied Aristotle. And for Aristotle, to know anything in a scientific way was to know its causes, of which there were four kinds: material, formal, efficient, and final. St. Thomas emphasized God as the first uncaused Cause and as the Final Cause. Everything in the universe progressed towards its individual, final conclusion laid down by God.

From the thirteenth century, man's understanding of the nature of the "comprehensive principles" in the universe underwent a Gestaltian shift. Physical rather than teleological causes were emphasized. Aristotelian and Thomist concepts of the purpose and quality of matter gave way to the quantitative understanding of objects and properties such as heat and motion. Rene Descartes, a contemporary of Galileo, planted the idea of extreme spirit/ matter dualism in the minds of seventeenth century man. The material world became a large, intricate machine which God was said to have started and left. Theories of science were thought to be literal interpretations of reality, a viewpoint challenged by many philosophers in the light of twentieth century physics.

The revolutionary discoveries of Newton grew out of this seventeenth century milieu. His deterministic, mechanistic worldview was very useful at the time, leading to important achievements in classical physics and the industrial revolution. Unfortunately, the spirit/matter split and the successes of science allow for only an impersonal God. Theology, still stubbornly adhering to Aristotelian philosophy, or overemphasizing faith, lost its ability to guide the way to dominion over creation. The consequent uninhibited excesses of the industrial revolution made fertile soil for the growth of atheistic Communism.

Despite many scientific advances in the eighteenth century, the ripples of Newton's scientific discoveries still dominated. In physics further developments were made in mechanics by Legrange, d' Alembert, Laplace and others. Rationality spread to other areas of thought. A deterministic reductionistic view of nature led some to a mechanistic view of God and others to atheistic-materialistic philosophies. Optimism prevailed with the ideas that human reason led to individual perfection and that science led to inevitable social progress. The high hopes of the early industrial revolution in England had not yet soured.

In reaction to the mind/body dualistic mechanistic view, the poets, theologians and novelists of the late eighteenth century Romantic movement defended man's freedom, imagination, and intuition. Nature was not an impersonal machine but, says one scholar, a companion to many permeated by beauty, vitality and an underlying spiritual reality." In contrast to the Enlightenment, Pietistic and Methodist movements brought personal and mystical relationships with God. Philosophy remained somewhat ambivalent with Hume's scientific empiricism and systematic agnosticism. Kant bestowed mixed blessings by developing new and unusual ways to reconcile science and religion, which certainly hurt cosmological proofs of God but may have furthered moral arguments. In the twentieth century Einstein's conceptions of curved space-time may mitigate against some of the Euclidian-based ideas of Kant.

In the nineteenth century scientific discoveries skyrocketed, putting a strain on many cherished

conceptions near the end of the century. This was certainly true in physics as the century opened with the discovery of the wave character of light by Young in 1802. Knowledge of both ends of ' the visible electromagnetic spectrum grew with the 1800 to 1801 discoveries of Herschel and Ritter. Observation preceded theory in this case as Faraday and later Maxwell developed the electromagnetic theory of light (1861-1873). In 1887 Hertzl discovered radio waves. Throughout the mid-1800's the principle of the conservation of energy, entropy, statistical distribution law, and statistical mechanics developed. The discoveries of the cathode ray, X-rays, radioactivity and the electron signaled further geometric progression of physics and science in the late 1800's. According to R. V. Jones, despite the successful century long sweep of physics, three problem experiments puzzled scientists at the end of the century:

> 1) The failure of the Michelson-Morely experiment to detect any motion of the earth through the supposed universal aether.
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> 2) The failure of the classical statistical concepts to account for the way the radiation from a body varied with its temperature.
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> 3) The failure of the wave velocity of light, despite its other triumphs, to account for the photoelectric effect."

In 1905, at the age of twenty-six, Albert Einstein solved all three experimental puzzles by founding the theory of relativity of contemporary physics and making a major contribution to quantum theory. Of his four famous theories of that year, relativity was most famous and mass-energy equivalence followed from it. Helped by relativity theory and aided by Planck, who foundered on the old Newtonian physics, Einstein developed the photon theory which laid the foundation for quantum mechanics. Einstein's fourth famous theory of that year was Brownian motion. In solving the experimental puzzles of the nineteenth century physicists, he opened up whole new realms of experiment and theory. Someday these new theories may give way to even more radical theories just as Newtonianism did. Einstein was partially led to relativity by an example in thermodynamics as shown in his autobiography: *"The example I saw before me was thermodynamics. The general principle was there given in the theorem: the laws of nature are such that it is impossible to construct a perpetuum mobile."*

In admitting that there are things that one cannot do many new doors open into new worlds. The two pillars of modern physics bear out this theory surprisingly well. Heisenberg's Uncertainty Principle postulates that one cannot measure the specific place or momentum of a particle of quantum. Some twenty years earlier, just after the turn of the century, Planck made a similar, foundational "postulate of impotence". In essence Einstein's· theory of special relativity states that it is "impossible to detect any change in the velocity of light, whatever the speeds of the source and observer.'" Almost harkening back to the old "earth as the center of the universe" days Einstein further proposed, as a consequence of relativity, that there is no way to tell experimentally whether one is at the center of the universe or not. E.A. Milne based a whole cosmology on this and in 1948 Bondi and Gold theorized that it is impossible to know the age of the universe, causing theories of continuing creation to mount. Clearly, in physics or in Christianity one must humble himself and let go of the old in order to be born into new life or new theories.

Albert Einstein exemplified many Christian attitudes in his humility, hard work, and in his free, almost childlike imagination and wonder.

Of God He writes: *"I will call it a cosmic religious sense. This is hard to make clear to those who do not experience it, since it does not involve an anthropomorphic view of God. The individual feels the vanity of human desire and aims, and the nobility and marvelous order which are revealed in nature and in the world of thought. He feels the individual destiny as an imprisonment and seeks to experience the totality of existence as a unity full of significance. Indications of the cosmic religious sense can be found even on earlier levels of development -- for example, in the Psalms of David and in the Prophets. The cosmic element is much stronger in Buddhism as, in particular, Schopenhauer's magnificent essays have shown us."*

Einstein also has embodied a search that has inspired physicists and scientists from the beginning. The cumulative effect of science as it geometrically increases in knowledge has been to find more simplified and elegant principles to bring order to experience. Newton discovered the simple relationship between force, mass, and acceleration, while Einstein found the equivalence of mass and energy, and in 1916 in his General Theory of Relativity showed that gravity and inertia are one and the same thing, an idea that would have astounded Newton. Einstein died before he could fulfill his lifetime dream of a Unified Field Theory encompassing all known fields both electromagnetic and gravitational. Strongly and justifiably convinced of the unity, harmony, and beauty in the universe Einstein asserted: *"that the cosmic religious experience is the strongest and noblest driving force behind scientific research... What a longing to understand even a small glimpse of the reason in the universe must have been in Kepler and Newton to enable them to unravel the mechanism of the heavens in long years of lonely work."*

Einstein's belief in the universe as being a harmonious unity never dissuaded him from strict scientific discipline and verifications, however. His theories, though influenced by a great imagination, were nevertheless inspired by experimental evidence and tested by rigorous method. Nonetheless, the unknown factor in science remains: from what source of inspiration emerge new ways of looking and understanding? Where did scientists get the notion that the universe is somehow harmonious and unified?

Werner Heisenberg, originator of the Uncertainty Principle, gives an embryonic answer to the process of inspiration: *"The great scientific contribution in theoretical physics that has come from Japan since the last war may be an indication of a certain relationship between philosophical ideas in the tradition of the Far East and the philosophical substance of quantum theory."*

Modern physics with its "postulates of impotence," its commonsense shattering conceptions, is indeed mystical, but it differs from ancient mysticism by virtue of a firm, scientific, incisive logical foundation. Many outstanding modern physicists would concur with this synthesis as Julius Robert Oppenheimer reiterates Niels Bohr: *"The general notions about human understanding... which are illustrated by discoveries in atomic physic., are not on the nature of things wholly unfamiliar, wholly unheard of, or new. Even in our own culture they have a history, and central place. What we shall find is an exemplification, an encouragement, and a refinement of old wisdom."*

Just as in the Heisenberg Uncertainty Principle, where the change in the position times the change in the momentum equals a certain number, the truth of the situation lies in the relationship of position and momentum and not in the impossible-to-know-exact understanding of the two separate factors. So, similarly, the truth of science and religion is in their relationship. As in Einstein •s relativity, the truth pervades in the relationship between space, matter, and time. All are interrelated. Thus, the only frame of reference in the physical universe is the varied relationship of space, mass and time.

In a similar sense, the essence of happy human life requires relationship. Happiness comes from the harmonious marriage, family, and friendship. The force of love binds these relationships together like a force field. Perhaps a Unified Love Theory could exist. If particles have "charm", love may have momentum and direction. Science has been searching for ways to make people happy, and for guiding values besides just simplicity, elegance, and curiosity. Religion also seeks to make people happy through understanding relationships between man and God, Tao, himself, other people, and creation. Man is the focal point where religion and science, the internal and the external, spirit and body, cause and effect, and God and man come together. The truth of these essences dwells in their relationship, which involves complementarity and order. In the conclusion of his book, The Tao of Physics, Fritjof Capra describes complementarity: *"Neither is comprehended in the other, nor can either of them be reduced to the other, but both of them are necessary, supplementing one another for a fuller understanding."*

Not only do the complementary essentialities interrelate, but, as a rule, one takes the more aggressive role and the other a more receptive role. The cause precedes the effect, the spirit should guide the body, God is the Father to man, the mystic strives for a higher nature, and science is the "is" and religion, "the ought." In order for complementarity to be achieved, the two or more essences need to fulfill a purpose higher than themselves, whether it be the relationship itself, or a hierarchical purpose. Man serves society, or the atom helps build the molecule.

Throughout history the search for truth in the external and the search for truth from inner experience have seemed to conflict, yet the overwhelming movement of science has been toward unifying, comprehensive principles, as even this very abbreviated journey through history has shown.

According to Einstein and experimental evidence, time slows down as velocity approaches the speed of light. If a person travelled at the speed of light, time would stop and he would never grow old, although it would seem to him as if the rhythms of his life were proceeding normally. In such a magnificent, wonderful, ever-expanding universe, could there not be an eternal Being, who inspires the prophets, creates the universe, and guides history towards a once frustrated ideal? Albert Einstein and Leopold Infield said that one of the most important inventions since Newton was the field: *"It needed great scientific imagination to realize that it is not the charges nor the particles but the field in the space between the charges and particles which is essential for the description of the physical phenomena."*

Symbols such as advanced mathematics are only vehicles for describing the fields and not the fields themselves. Our understanding and the symbols change as we move toward a Unified Field Theory. Scientifically, our eternal Being could exist as a Field, permeated with personality, and charm, and emotion, intellect, and will. Our symbolic vehicles for trying to describe our charming Field would be the Word of God as in the Bible, the Tao, the I Ching, the Upanishads, etc. As science moves towards one Unified Field Theory, religions, brought together in a shrinking world, seek unified, simple, comprehensive principles to fully understand the inner realms. Both science and religion seek the truth through the complementary paths of the internal and the external.