

Biblical Faith and the Mindset of the Physicist

Chris Thron

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"The heavens declare the glory of God" (Psalm 19:1). The universe bears the creative imprint of the One who made it. Therefore we should be able to learn much about God through what He has made, just as we learn most about an artist from his paintings. Through His handiwork God reveals His inner thought process, and His cherished ideals of beauty and order.

It's difficult to understand nature, and it's difficult to understand God. There are strong parallels between these difficulties. In some way nature gives us advantages, since it is more readily accessible to observation. The processes and tools we may use to understand nature are similar to the means by which we can come to know God more completely and intimately.

Few "Bible-believing" Christians understand modern physics. Many actively distrust it. They view most modern science as a manifestation of human pride, as sinful man's attempt to order the universe according to his own intellect in defiance of God and His Word. Many consider modern scientists to be arrogant, self-deceived by their inflated intellectual pride.

These Christians might be surprised to learn that one of the watchwords of modern physics is humility. Physicists have learned from hard experience (if not from the Bible) that "The Lord teaches the humble in His way" (Psalm 25:9). Physicists know this all too well because they have been flat wrong too many times. Recorded for the ages are the sentiments of various early Twentieth Century physicists who believed that Newton's and Maxwell's equations had revealed the basic structure of the universe, and all that remained was to clear up some details. In very short order, Relativity and Quantum Mechanics came along, and blasted them right out of the water. In light of current knowledge, their claims were ridiculous, and few physicists want to risk being known to posterity as utter fools (there are exceptions, of course).

On the basis of physicists' experience, we may advance several general statements which may be generalized and applied to Christian theology as well.

1. Reality can be understood at ever-deepening levels of insight; and deeper levels of insight enable more effective action within and control of the physical environment.

This statement has been verified repeatedly in the course of modern civilization. The Machine Age would have been impossible without the Newtonian framework for mechanics. Basic telecommunications required Maxwell's equations which comprehensively describe electromagnetic radiation. The Computer Revolution would not have taken place without quantum mechanics, upon which semiconductor technology is based.

Moving over now into the Christian arena, there is at least one crucially important instance where the above statement has proved resoundingly true. The saints of the Old Testament anticipated the Messiah, but they could only dimly grasp His nature and the full significance of His coming. Knowing who Christ is and why He came, we may now bear witness to Him with a power and effectiveness which was entirely unavailable to Jesus' predecessors.

Unfortunately, there seems to be a prevailing attitude among biblical Christians that once Christ has come no further breakthroughs in spiritual understanding can occur. They are notoriously skeptical (and rightly so) of new schools and fads in theology. But they have also been notoriously slow on the uptake when winds of change arrived which in hindsight are clearly seen to have had the backing of the Holy Spirit. This untoward hesitance was present even in apostolic times, when the chief apostles were reluctant to let go of the Law as an essential part of Christian practice: it took an outsider (Paul) to set them straight. More recently, we see the same pattern of reluctance repeated with disturbing frequency. In the 1800's the mainstream Church in the U.S. did very little against slavery. Frederick Douglas' autobiography contains scathing descriptions of slaveowners who attended revivals, led prayer meetings, and quoted Scripture at their slaves as they brutalized them [1]. William Lloyd Garrison vehemently attacked the do-nothing Church, and bore its fury as a result [2]. The Quakers were a remarkable exception to this general passivity – but were considered by many to be strange at best and extremists or heretics at worst [3]. Christians by and large resisted rather than assisted the execution of God's justice and the accomplishment of His will. Fifty years later, the very same pattern was repeated in the women's suffrage movement . A disproportionate number of early advocates of women's rights were Quakers, Unitarians, freethinkers, or other "deviants"[4].

Even more recent examples can be found, up to the current day. In the 1980's, environmentalism was often perceived among Christians as a movement fomented by earth-worshipping cultists. Christians remain slow to take up issues such as cultural diversity and family planning which have the taint of "secular humanism". To be sure, the "humanists" have taken up many rightful causes, which the Church has unrightfully neglected.

The Church has been reactionary not just in social issues, but also in culture. Modern trends and fads in culture and mass media have frequently been resisted as "worldly" and "un-Christian". Only recently has the Church woken up to the opportunities afforded by these changes. For instance, contemporary-style worship music is being used in many churches which only a short time ago would have denounced the same music as worldly or even demonic. Christians who early on saw the possibilities in modern culture were reviled as backsliders or syncretists.

Despite many Christian authors' attempts to explain everything, there is still much in the Bible which we do not understand (starting with the book of Revelation!) We should look forward with humble expectancy to God's surprising us with new insights into His nature and His will, that NONE of us properly anticipate. God has not finished turning the world upside down, including the Christian world.

One area where I believe we do not yet have the whole story from God is abortion. It has become unchangeable dogma among most conservative Christians that the human sperm's penetration of the egg is the "magic moment" before which it's OK to terminate the process and after which it becomes murder. While this choice is convenient and makes for a good rallying-point, it falls far short of being a Biblically-demonstrable absolute.

2. Any understanding of reality at any level must rely on appropriate basic principles. When any attempted explanation strays from these basic principles, confusion and obscurity result

Without Newton's laws, it is impossible to quantitatively understand the motion of objects in everyday life. Consider the motion of a cannonball which has been shot into the air. There are many surrounding circumstances which may be noted and many quantities which may be measured, like air temperature and pressure, weather, the color of the ball, the time of day the signs of the zodiac, and so on. It is Newton's laws which direct us to the critically important factors, namely the muzzle velocity and the angle of inclination of the cannon: for from this data, Newtonian equations may be formulated for the motion of the ball. Given the same data, any two physicists will make virtually the same predictions of the cannonball's motion.

When agreed-upon basic principles are absent, no consensus may be reached. Ask four economists (the saying goes) and you will get five opinions: this state of affairs exists because there is no set of common ground rules for analyzing the economic situation at any given time. Each economist bases his opinion on the circumstances which he/she thinks are most important.

Unfortunately, we find the same lack of agreement among Christian preachers and denominations, and for exactly the same reasons. Each expositor extracts those Biblical verses and passages which line up with his/her own priorities and preferences.

The basic principles of Christianity are all comprised within a single, central, historical event: namely, Jesus' death on the Cross and His Resurrection. Herein we find the extent of God's love, His compassion and mercy towards us, His promise of redemption, salvation, righteousness, and sanctification: all are fully expressed and fully realized through the Cross and the Resurrection. Even the question of who God is cannot really be answered without the Cross and the Resurrection: for the glory of God is revealed to us in the face of Jesus Christ (2 Cor. 4:6). Before the Cross and the Resurrection, we may say of God only that "He Is Who He Is". Afterwards, we may know Him face-to-face, as it were, through Him who was "declared with power to be the Son of God, by His resurrection from the dead" (Romans 1:4).

In truth, ALL the Bible's laws and ordinances, narratives and prophecies, psalms and proverbs, can ONLY be correctly understood in light of the Cross and the Resurrection. When interpretations stray from this focus, heresy and confusion result. Every exegesis which does not pass muster before both the Cross and the Resurrection should be dismissed from the Christian vocabulary.

The Cross and the Resurrection must hold priority in every Biblical application. It is too easy to pick out Scriptures which appear to have a common theme, hammer them together, and create a new "teaching". When a preacher or movement does this, they are in effect committing idolatry, as did the Israelites who worshipped the bronze snake in the time of Hezekiah.

We may see this loss of a sense of priority in many teachings in the Church today. For instance, some Christians believe their mode of Sabbath observance, or baptism, or Communion, is the only correct one, and that those who follow different practices are sinners or unbelievers. These people have created their own bronze snakes. They have mistaken form for substance. The point of all these observances is to portray and proclaim the death and resurrection of Jesus. They are not initiatory rites or magic rituals. They are not clauses in the basic Constitution of our faith. They are re-enactments and representations of the foundational truth of our redemption through His Resurrection, and should never be taken as amendments or addenda to this fundamental truth.

Teachings such as this are motivated by a sincere desire to obey God. Certainly obedience is important: but true obedience must be imbued with a sense of priority. Suppose I tell my daughter, "Don't go out in the street", but she runs out to rescue a baby from an oncoming car. Should I punish her for disobedience? Certainly not! I should praise her because she understood what was important. Now will the Lord praise those who scrupulously observe particular ordinances (as they understand them), but who rip asunder His body by refusing to work with or even associate with other believers? Are they not in the same league as those whom Jesus excoriated because they "tithed mint, dill, and cumin, but neglected the weightier matters of the law" (Mt. 23:23)?

A similar loss of perspective is evident in the Pentecostal doctrine that speaking in tongues is necessary evidence for the Baptism in the Holy Spirit. The doctrine is based on New Testament accounts of the experiences of various groups and individuals. However, once again the phenomenon must be placed in the context of the Cross and the Resurrection. The Baptism in the Holy Spirit is nothing more nor less than an impartation of the same Spirit which raised Jesus from the dead, which is also the same Spirit of love which compelled Him to die on the Cross. The only genuine evidence of immersion into the Spirit of Christ is Christlikeness, where Christlikeness means becoming like Him in His resurrection and in His death (and that likeness is not a likeness in mere outward form, but in heart). To add another item of "necessary evidence" based on circumstantial descriptions rather than the essential nature of the Spirit of Christ skirts dangerously close to idolatry. This teaching exalts the created phenomenon to the same status as the Creator.

On the other hand, neither do those who oppose speaking in tongues and the other "charismatic gifts" base their opposition on considerations of the Cross and the Resurrection. Their arguments are based on biblical passages taken from here and there, and whatever reports of abuses of these gifts which they can find. By and large, there is no serious attempt to evaluate whether the Spirit of Christ is working through the Charismatic movement as a whole,

or whether the Cross and the Resurrection are being proclaimed and demonstrated through the exercise of spiritual gifts.

The concept of the "new birth", though fundamentally Biblical, is often distorted due to overemphasis of externals. Some teach that there must be a single identifiable moment when a believer "crosses over" and is "born again". But if I confess Jesus as Lord and believe in my heart that God raised Him from death (Romans 10:9), what does it matter how I came to that realization? Do you compel God to change my heart according to your timetable, just because He has often done so in the past? Is God not allowed to deviate from your checklist?

As a final example, the prosperity and divine health of the righteous is (not surprisingly) an extremely popular and attractive topic in the American Church today, and enjoys plenty of Biblical support. But if both Cross and the Resurrection are not included as an integral and essential part of this teaching, then imbalance and fanaticism will inevitably result. We must never forget that "Jesus Christ suffered for us leaving an example, that we might follow in His steps" (1 Peter 2:21). We must never relegate the Cross to past history, and ignore its current applicability to the life of the believer. We must not attempt to escape into Never-never Land, thinking that "Jesus suffered, so I don't have to", for quite the contrary is true.

3. When using principles, care must be taken to define their range of applicability. Principles which may hold in one physical regime may be totally inappropriate and inapplicable in another.

Most physical principles only have local validity. For instance, though Newton's laws are consummately accurate in describing and predicting motion of everyday objects, they break down when velocities become too large (because of relativity), or physical dimensions become too small (because of quantum mechanics).

All of the doctrinal imbalances mentioned in the preceding section arise from attempts to take principles and examples which have local validity, and make them universal.

In physics, it is rare to find basic principles which apply across several levels of physical description. Nonetheless, a few may be found. In particular, the conservation laws (e.g. conservation of energy, charge, linear and angular momentum) have withstood several fundamental breakthroughs in physical understanding, and appear to be valid on all scales from the sub-nuclear up to the intergalactic. Though conservation laws have been maintained, their meanings have changed, because the concepts they involve have been broadened. Following Einstein, "energy" has come to include mass; and quantum mechanics has introduced a whole new type of angular momentum ("spin"), as well as new rules for combination of angular momenta. It was first shown by Emmy Noether in the 20th century that conservation laws actually spring from basic symmetries and invariances: for instance, conservation of energy within a physical system is a consequence of the time-invariance of the equations which describe the system.. Symmetry continues to play a leading role in ground-breaking physics today in defining acceptable theories and motivating predictions.

As we have intimated above, the Christian faith also has universal basic principles. God has encapsulated and expressed these principles to us, not in a verbal statement, but in an event of history: the Cross and the Resurrection.

4. Breakthroughs in understanding occur when assumptions (either implicit or explicit) are challenged.

Einstein's great breakthrough with special relativity was based on the repudiation of a longstanding implicit assumption, namely that duration and length were absolute quantities, measured the same by all observers.

The physicists who introduced quantum mechanics challenged a whole host of assumptions: that matter had a fundamentally particle-like nature; that the fundamental equations of motion for material particles should be entirely deterministic; that measurable characteristics like location and velocity could be measured to arbitrarily high precision; and so on.

The overturning of assumptions is certainly not foreign to the Christian faith. Jesus by His very coming overturned multitudes of assumptions. The Jews never expected the Messiah to be like Jesus, whose kingdom was a spiritual one where the least was greatest, the poor were blessed, the blind were seeing and the seeing were blind. They were not at all expecting the kind of "salvation" that Jesus offered them, nor were they ready to admit that He was the ultimate fulfillment of the Law. Their theology had no place for the kind of "Son of God" that Jesus proved to be.

Unfortunately, Christianity as a whole has become complacent. As mentioned above, many Christians seem to think that theological breakthroughs ended once the Bible was completed. I am not trying to suggest that we need to add more books to the Bible. Nonetheless, significant shifts in theological understanding have occurred and should continue to occur, if the Christian faith is to remain alive. In particular, Christian assumptions should be continually re-examined in the light of new discoveries in physical science. We should not fail to learn from the Church's wrong-headed opposition to Galileo and Copernicus. Notwithstanding political and personal factors involved, the Church's fundamental objection to the Copernican theory was that it contradicted the Bible as they understood it: for the Church by and large assumed that Biblical accounts of natural phenomena like the sunrise (or the sun "standing still" in the heavens in the time of Joshua) described actual reality, as it were from God's point of view. It took Galileo (and other scientists) to open our eyes to the fact that these accounts were only meant to describe the appearance and not the objective physical nature of these phenomena.

The Biblical part of the "Biblical Creationist" debate is fundamentally a controversy over interpretive assumptions. Creationists tend to assume, (as Galileo's opponents assumed with other Biblical passages) that the first chapter of Genesis uses the language of "objective reality" from "God's viewpoint". This is not the only possible interpretive platform, and cannot even be said to be the most "biblical". Other Christians see the account as analogical, using common language to represent cosmic events which are foreign to our common experience. Still others consider the account to be spiritually rather than physically representative. There are other possible platforms as well. We need not all agree, but we should refrain from anathematizing others whom we cannot convince because we ourselves lack sufficient evidence.

Every Christian should acknowledge his/her own subjectivity in Bible reading. Christians who say, "I believe what the Bible says" to end all arguments are in essence deifying their own assumptions. Humility should always preside in the arena of theological debate.

The Church's gradual acceptance of contemporary music eventually came about when assumptions were challenged as to what constituted "holy" music. Many Christians tacitly assumed (and many continue to assume) that their own "church culture" is an essential part of the Gospel. Little do they realize that by raising their own worship styles and practices to the same status as the message of the Cross, they are flirting with idolatry. Churches sorely need to adopt a "multicultural" approach, but unfortunately most churches are too homogeneous and too comfortable in their own habits to accommodate others with different cultural preferences.

Christian doctrines are riddled with unacknowledged assumptions which generate inordinate amounts of confusion and conflict. The debate between Calvinist predestination and Arminian free will can be traced to the implicit presupposition that God exists within linear time. Without this presupposition, the statement(s) "God has (or has not) already determined your future" have little if any meaning. As if events occurred sequentially to God just as they occur to us!

A faith which does not continually examine and test its own assumptions is a dead faith. Unfortunately, many young Christians are taught not to challenge assumptions of the faith. This attitude on the part of the Church has turned many inquiring, mentally active young people away from faith (many of whom later on became scientists): for not only were their questions not answered, they themselves were reprimanded for asking them. This is entirely the fault of the Church's insufferable pedantry, and cannot be blamed on the inquirers' "lack of faith".

5. Passing from one level of understanding to another involves recognizing principles and concepts which have a more fundamental validity.

The invariance of the speed of light under Galilean transformation was the key principle which led to Special Relativity: in fact the mathematician Henri Poincaré, used this mathematical premise to derive (before Einstein) many of the same results for which Einstein later became famous. The Principle of Equivalence, which states that free fall in a gravitational field is physically identical to weightlessness in outer space, was the foundation for General Relativity. Schrödinger based his quantum mechanics on the concept of a "wavefunction" which was not directly measurable, but from which observable quantities could be derived. The wavefunction concept was subsequently abstractified and identified with elements of Hilbert space, which is an infinite-dimensional space which possesses measures of "length" and "angle".

A new fundamental principle may be recognized by the hallmarks of simplicity, clarity, and accuracy. In light of the principle, observations which heretofore were baffling and inconsistent suddenly come into focus as clear and logical consequences. The principle enables numerical predictions whose agreement with the experiment is far too close to be coincidence.

It is impossible to overemphasize the importance of the Cross and the Resurrection as the quintessential expression of the Bible's fundamental spiritual principles. When the Cross and the Resurrection were unveiled, all of the incoherence and seeming arbitrariness of the Old Testament were swept away. But could there be spiritual principles more fundamental than those exemplified by the Cross and the Resurrection? If we truly hold to the mindset of the physicist, we must concede the possibility. However, this does not mean giving up the Cross, any more than modern physics forces us to shelve Newton's equations. Quantum mechanics and relativity notwithstanding, when dealing with the motion of everyday objects in our everyday world, Newton's equations are consummately accurate and entirely sufficient. The Cross and the Resurrection have proved their efficacy in this world in the lives of billions of Christians, and this shall never be invalidated.

6. Concepts and principles which are appropriate at one level of understanding are entirely inappropriate at another.

We have mentioned above that the concept of wavefunction was basic to the inception of the Quantum Theory. But even the concept of wavefunction has fundamental inadequacies. A wavefunction presupposes an object which, apart from moving around, has a permanent and has an unchangeable basic nature. However, elementary particles such as electrons meet none of these conditions, for they may be created and annihilated with abandon when high enough energies are involved. Also, quantum mechanics does not give a very satisfying account of the relationship between matter and electromagnetism. Electromagnetic fields may be introduced into quantum mechanics, but in a very ad hoc manner. There is no compelling reason within quantum mechanics why such fields should exist, and the fields appear to be governed by entirely different principles.

Both of these objections are resolved by quantum field theory, which merges the theories of matter and electromagnetism into one. On the one hand, matter is seen to be a field phenomenon, not a system of indestructible particles. On the other hand, the electromagnetic field equations are quantized, so that both matter and electromagnetism are described as quantum fields. What's more, from basic symmetry principles it may be demonstrated that the two types of fields actually require each others' existence -- they are like two puzzle pieces which must be fit together to obtain a whole.

The upshot of this example is that the wavefunction, which is much more accurate, effective, and satisfying than the classical picture of matter, nonetheless was superseded by yet another conceptual breakthrough.

No Christian can deny that the same thing has happened in the arena of faith. When Jesus Christ revealed His true nature to us, it became clear that neither the Greek nor the Hebrew concept of "God" was sufficient to describe His nature. The Jews anticipated a Savior, and expected that God would be with Him -- but they did not envision what kind of salvation He would offer, nor did they dream that He Himself would be the very Word of God, by whom the worlds were made. In hindsight, we may see numerous references in the Old Testament which hint of these things -- but no man unaided by divine revelation could have inferred on the basis of the Old Testament alone what manner of Savior Jesus would be.

The Church, called a "mystery" by Paul, was even more unexpected. What predecessor of Jesus would have predicted that the disciples of the Messiah would become a single interconnected Body, empowered and indwelt by the Spirit of God? Who understood that the temple in Jerusalem was merely a prototype for a temple built of living stones, where living sacrifices would be offered without the shedding of blood?

7. Analogies and models are essential tools in understanding phenomena at deeper levels of reality.

In physics, systems which are complex, inaccessible, and hard-to-understand are often compared to simpler systems which are better understood. The structure and behavior of the more complex system is explained in terms of the analogous aspects of the simpler system. For example, relativity is founded upon the concept of "space-time", a four-dimensional continuum in which space and time are wrapped together. Space-time may be most easily understood by comparison with the much more familiar notion of three-dimensional space. The position of an object in space is specified in terms of coordinates, while the spatial separation between two objects is characterized by a "length" or "distance". The motion of objects through three dimensional space can be described in terms of rotations and translations, which are length-preserving linear transformations. Rotations and translations also describe the relationship between the measurements of different observers. Analogous statements hold in space-time, with a significant twist: rather than describing the locations of objects in space, space-time describes "events" having a definite location in both space and time. Time serves as a fourth coordinate, added to the three coordinates of ordinary space. The separation between two events in space-time is characterized by a '4-length' (which can be imaginary!). Four-rotations and four-translations, which are 4-length preserving linear transformations in space-time, describe the motion of objects through space-time, and also relate the measurements of different observers.

Physical models are usually highly mathematical in nature. Physical systems which have similar behavior often have similar underlying mathematics. For instance, many systems which involve oscillations distributed over space (including light waves, radio waves, and water waves) are described by the wave equation, which is a second-order hyperbolic differential equation. The basic mathematics of the wave equation can be used to derive phenomena such as diffraction and interference which are common to all of these systems. By observing the diffraction and interference of water waves (which is often done in high school or college physics labs), we may gain a much better sense of what's happening with invisible light and radio waves.

Even when complete physical analogies are unavailable, partial analogies often provide the key for physical breakthroughs. The existence of discrete atomic energy levels reminded deBroglie (and others) of resonances observed in bounded oscillating systems (like a drum or piano string). This led Schrödinger to search for a wave equation to describe matter, (even though he had no idea what was "waving"!).

The underlying similarity between diverse physical phenomena in vastly different regimes is one of the beautiful evidences of God's design. Why should the deeper levels of reality be comprehensible to us? This very comprehensibility bears witness that the Creator intends for us to know Him and His creation, and He does not want to separate Himself from us with a wall of inaccessibility. Suppose we lived in a world where sub-microscopic dynamics were so inaccessible to measurement and so vastly different from our usual experience that it would be impossible for us to develop a theory to explain it. That we can understand quantum mechanics has not (until now) materially affected our ability to survive as a species. It appears that God is interested in something more than our mere survival.

In the Biblical explanations of the spiritual world, we may find the very same prevalence of model and analogy. Virtually everything which Jesus said about God and His kingdom was an analogy to everyday experiences and relationships. For instance, when Jesus addresses God as "Father", he is making an implicit analogy with earthly family relationships – an analogy which He expands upon in many of His teachings (e.g. Luke 11:13, 12:29-30, 15:1ff).

Jesus' teaching makes use of the similarity between earthly and heavenly things. In physics, the similarity between diverse phenomena may be explained in terms of similarity in the underlying mathematics. But how do we explain similarities in the spiritual world? Is there a mathematics of the spirit? As we have already indicated, the basic principles of the spiritual world are not formulated in mathematical terms, nor are they fully expressible in words.

Rather, they are exemplified by the Cross and the Resurrection. Two situations (whether earthly or spiritual) which resemble the same aspect of the Cross and the Resurrection will also resemble each other.

We should do as Jesus did, and try to compare the spiritual with the physical. But how can we ensure that our comparisons are valid? In physics, models may be tested by experiment – but even before that, the model should be examined for mathematical consistency. Similarly, in the spiritual arena, analogies may also be tested by experience -- but even before that, comparisons should be examined for consistency in light of the Cross and the Resurrection. The Cross and the Resurrection in effect function as "philosopher's stone", (or the Urim and Thummim of the Old Testament), used to test and discern true spiritual wisdom.

Unfortunately, it appears that many Christian theologians and Biblical expositors seem to have lost sight of the critical significance of model and analogy. They treat the Bible more as a legal document, rule book, or taxonomy, rather than a sourcebook for spiritual analogies. There have been many attempts to distill the essentials of the Christian faith into a creed, catechism, or doctrinal statement. But Jesus never formulated a doctrinal statement, and for good reason. "Doctrine" in the New Testament sense consists of spiritual analogies and comparisons (1 Cor. 2:13). Spiritual teaching MUST rely on analogy, and analogies MUST be tested and refined by prayerful discussion between believers who acknowledge the fundamental truth of the Cross and the Resurrection.

Much current Christian doctrine comes definitions derived from syntactical examination of terms used in the Bible – terms like "God", "grace", "salvation", and so on. Jesus explained all of these things by analogy and models, not by definitions. Without models, terminology easily becomes meaningless.. The Athanasian ("trinitarian") creed, which is a prime example of theology based solely on syntax, should certainly rank as one of the most confusing and incomprehensible statements of all time – in stark contrast to the simplicity, directness, and practicality of Jesus' teaching (or Peter's, Paul's, or John's, for that matter). Since Athanasius, many writers and preachers have attempted to clarify the Trinity: and those who have achieved any semblance of clarity or insight have always relied on model and analogy (like Saint Patrick's use of the three-leaf clover). Though no single model can capture the full intricacy of the situation, if we are deprived of all models we cannot achieve even a particle of understanding.

Christians should realize that God has provided us with a rich source of theological and spiritual models, namely the Old Testament. Some of the theological debates on the nature of God which have raged for centuries would have been more properly addressed, not with grammatical or hermeneutical analyses of the New Testament, but with examples or illustrations drawn from the Old.

For instance, a portrayal of the relationship between the Son and the Father may be found in the relation between Joseph and Pharaoh in the book of Genesis. Pharaoh, who held the power over Egypt, appointed Joseph to administer his kingdom. This picture is absolutely consistent with all of the New Testament scriptures which deal with the relationship between Jesus and His Father. As Jesus could say, "My Father is greater than I", so Pharaoh said to Joseph, "Only with respect to the throne am I greater than you". As Paul could say of Jesus, "God has put all things under His feet" (Eph. 1:22), so Pharaoh said of Joseph, that "without your permission no man shall lift hand or foot throughout Egypt" (Gen. 41:44). As the epistle to the Hebrews indicates that Jesus "upholds all things by His all-powerful Word" (Heb. 1:3), so Pharaoh said to Joseph, "According to your word shall all my people be ruled" (Gen. 41:40).

With this picture in mind, we are equipped to address the question, "Is Jesus God?" This question causes problems because in most cases the sense of "God" is extremely nebulous in the minds of those who are asking. According to 1 Corinthians 8:16, there is one God, namely the Father. Nonetheless, the gospel of John states that "the Word was God", and "the Word became flesh and lived among us" in the person of Jesus of Nazareth. These apparently contradictory statements are both perfectly consistent with the Joseph/Pharaoh picture introduced above, if we take the word "God" in the sense of "Ruler over all creation". Pharaoh indeed was the absolute ruler over Egypt: nonetheless, in an executive sense, Joseph was also the ruler of Egypt (Gen. 41:43). Functionally and practically, he was equal to Pharaoh, and his word also had final authority. Nonetheless, Joseph was still subject to Pharaoh, and was bound to obey him. Now, all of these statements concerning Pharaoh and Joseph are true *mutatis mutandis* if we replace "Pharaoh" with "The Father", Joseph with "Jesus", and "Egypt" with "All creation".

Jesus is not a vassal king, as the Greek gods were. He is not a co-ruler, as the members of the Roman triumvirate. Jesus is the executive ruler, while His Father is the titular ruler. There are no separate dominions, there are no conflicts of interest: but both rule over a single united Kingdom, expressing a single Will.

Are Jesus and His Father both manifestations of one transcendent para-personal entity whose name is "God"? As far as I can see, the Bible says nothing at all about such an entity! The entire concept comes from Christians trying to construct a theology around syntax, without having models to incorporate the terms they are using. As a result, they fall into grammatical confusion -- for "God" is not a name at all, but rather a title.

Apart from the Old Testament, the physical world and human society should also be recognized as gold-mines for spiritual models. Jesus made extensive use of both. For instance, Jesus calling God "Father" indicates that he wants us to compare the divine-human relationship to the earthly father-child relationship. The Bible uses the images of light, rain, and wind as illustrative analogies for God, His word, and His Spirit respectively. Since God created the cosmos in all its complexity, we should not restrict these analogies to phenomena which are immediately apparent. Rather, we should expect that discoveries modern physics may be useful as examples to gain insight into God, man, and their mutual relationship. For instance, quantum field theory, which explains the intrinsic interconnection between the electromagnetic field and matter, may bear some resemblance to the way God interacts with people through the Holy Spirit. Quantum mechanics, which shows that matter has both a particle and a wave nature, may tell us something about the human and divine nature of Jesus Christ. Special relativity, which indicates that though distance and duration are relative, the speed of light is absolute and invariable regardless of observer's reference frame, may reflect the contrast between the relative nature of religious practices and doctrines versus the absolute nature of Jesus Christ and His truth.

Certainly these analogies are fallible and speculative. They are meant to inspire and stimulate thought, and not to lay down incontrovertible dogma. In using analogies or models to illustrate spiritual realities, we may be guided by successful applications of models and analogies in the history of physics. The list of successful physical analogies is long, including: water waves and light waves [5]; Hamiltonian classical mechanics and quantum mechanics; electromagnetic fields and quantum fields; spontaneous symmetry breaking and renormalization group methods in solid state and quantum field theory [6], [7]; solitons (nonlinear oscillations) in materials science, solid state and quantum field theory [8]. In all of these cases, those who used the analogies were well aware of their limited applicability. For models to be applied intelligently, the appropriate domain of applicability must always be scoped out. This is just as true in theology as it is in physics.

Physicists don't promulgate creeds. They do formulate models and equations -- but always with the understanding that these formulations are only accurate if applied in the proper physical regime. I wonder if greater understanding and less controversy might result if theologians took a similar approach.

8. Complications and paradoxes are to be expected in any healthy theory. They are signs of a healthy, growing understanding, and not indications of fundamental error.

Currently the most fundamental physical theory which may be experimentally tested is Quantum Field Theory (String Theory is even more fundamental, but involves energies so large and distances so small that currently no experiments can be devised to test it). Quantum Field Theory in its current form might be aptly compared to a potful of Mrs. Murphy's chowder. To be sure, it contains beautiful elements, breathtaking symmetries, and astounding predictions. But together with these are thrown in all kinds of ad hoc assumptions, which are there for no other reason than they make things hold together. In comparison with Newton's or Maxwell's equations, Quantum Field Theory falls far, far short in terms of elegance, directness, simplicity, and comprehensiveness. The theory is next to impossible to apply to practical situations, except in highly specialized cases. Some individual predictions have been verified to incredible accuracy, such as the gyromagnetic ration of the electron (to within one part in 100 billion!) [9]. But in most cases, accuracy to within 50 percent is considered a great triumph -- simply because the computational difficulties impose severe limits on the accuracy of results.

In addition, Quantum Field Theory is just simply weird. To make any kind of physical prediction, the theoretical equations must be distorted almost beyond belief. Physical quantities like masses of particles are computed by

extending the field equations into "imaginary" space, because the computations in physical space are too difficult. In the imaginary space equations, masses appear as damping factors (such as produced by frictional forces), rather than energies of objects at rest (which is the Einsteinian picture of mass). Computations require intricate manipulations, involving the cancellation of multiple infinities, and theoretical proposals are accepted or rejected on the basis of whether or not the infinities which arise can be canceled.

This sort of complication is to be expected in any young theory. Maxwell's equations for an electromagnetic field originally took almost a full page to write, consisting of twelve separate equations with up to four terms apiece. Oliver Heaviside later re-expressed them as four vector equations with at most three terms [10]. Now, thanks to relativity and tensor analysis, we may express the same physical content in terms of a single tensor equation. As far as "weirdness" is concerned, Newton's calculus with its ratios of infinitesimal quantities seemed just as flaky to his contemporaries, such as Bishop Berkeley [11]. It took over a hundred years to construct sound logical foundations for the calculus, during which time the calculus was used effectively in myriads of applications in science and engineering. The application of the calculus did not suffer for want of a rigorous foundation.

The most compelling argument for quantum field theory is simply there are no serious alternatives. Just as Peter told Jesus, "To whom else may we go?" (John 6:68), so the physicist may address Quantum Field Theory.

The example of Quantum Field Theory shows how physicists are used to working with "messy" theories. It's not surprising then that they are not impressed with "Biblical Creationists" who take potshots at the Big Bang theory by pointing out local paradoxes and unresolved inconsistencies. If there were no paradoxes, then the theory would be suspect. The way some creationists try to tie everything together so nicely and neatly is extremely suspect to physicists, who know that the physical world is just not like that.

Conclusions

If the thesis of this paper is correct, and physical science is an important source for spiritual insight, then there is evidently a grave deficiency in Christian training and education. For physical science is a minuscule or nonexistent part of the curriculum in most schools of theology or Bible schools. Very few Christian colleges in the U.S. offer higher degrees in physics or other physical sciences. As a result, the theology which is preached in churches and is widespread among believers is shallow and deficient. May the Lord guide His children to remedy this situation, and enter into a fuller appreciation and more accurate understanding of His Word -- the Word which is declared both from the heavens and from the pages of the Bible.

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