

Seven Patterns For Relating Science and Christian Faith

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프린스턴 대학에서 물리학 M. A.와 Ph. D. 학위를 취득하였으며 1964년 이래 현재까지 스탠포드 대학에서 재료 공학과의 교수로 재직하고 있다. 「Journal of the American Scientific Affiliation(J. A. S. A.)」의 편집인을 역임(1969~1983)하였으며 1992년부터는 「Christians in Science」지의 편집위원으로 봉사하고 있다. 본 원고는 통합연구 편집부의 청탁에 의해 집필, 기고된 것임을 밝히둔다.

Abstract

The number of different ways that people have devised to relate science and Christian faith is remarkable. Part of the problem arises with the definition of these terms, which must be made clear at the beginning of any discussion. In particular we must arrive at an appropriate definition of authentic science as our human description of the physical universe, and authentic Christian theology as our human expression of the Christian faith. Then if we examine the different ways that people follow in relating science and Christian faith, we find that there are at least six, some one of which is held by the majority of people: (1) science has destroyed the possibility of faith, (2) faith is to be upheld in spite of the findings of science, (3) science and faith are totally unrelated and neither one can say anything about the other, (4) science provides the rational basis that demands faith, (5) science provides the philosophical structure in which faith needs to be redefined, and (6) both science and faith need to be redefined so that an appropriate synthesis can be achieved. In this paper we describe and evaluate each of these six positions, and then propose a seventh: (7) faith and science provide complementary insights into reality, insights that need to be integrated, some well-defined form of which is essential if we are to maintain both authentic science and authentic Christian theology.

Introduction

Trying to reconcile the demands of modern scientific thinking with the inputs of religious faith is often a formidable task. One of the main reasons is that there is a wide variety of opinions about what 'science' and 'faith' really mean. I would like to suggest that the meaningful terms to define for our purpose in this paper are 'science' and 'Christian theology'. 'science' is a human endeavor to describe and understand the physical universe; 'theology' is a human endeavor to describe and understand the broader relationships involved in human life before God. We want to see, for example, how people who have made a personal commitment to Jesus Christ can live a consistent life in the midst of a secular, scientifically-oriented world. We start our discussion, therefore with suggested definitions of authentic science and authentic Christian theology, to which we can refer as we look deeper into each of the seven proposed patterns for relating them.

Authentic Science

By the term 'authentic science' we mean *a particular way of knowing based on the human interpretation in natural categories of publically observable and reproducible data obtained by sense interaction with the world.* This definition in no way rules out creative thinking or uninhibited speculation; it does demand that such efforts at interpretation be testable in the ways specified. To say that something is not included within this definition of science is

not to say that it is not true, important, or meaningful. It is only to claim that such a concept or event is outside the domain of authentic science, which by itself describes only a part of reality, and that it cannot therefore claim whatever validating support science might give. It is adherence to this definition of science that gives science integrity and value; once we begin to depart appreciably from such a definition, we have an enterprise that no longer shares in the reliability and trust appropriate to authentic science. Each of the terms in the definition is significant.

(1) To say that science is *a* way of knowing is to deny that science is *the* way of knowing. The belief that science is *the* way of knowing is often called 'scientism;' it affirms that science is the only source of truth and that the scientific method is the only guide to truth. We offer two other non—sophisticated definitions of important terms necessary for our discussion: (1) reality corresponds to 'what is,' and (2) truth is that which corresponds to reality. Clearly the distinction between science and scientism is an essential one. Science can tell us how things work in the universe, but it does not provide us with knowledge of why the universe is ultimately the way it is, nor can it inform us about the purpose or meaning of its existence.

(2) Our definition affirms that science is a way of *knowing*. By the pursuit of authentic science we do indeed come to understand better the physical universe in which we live. Authentic science is not simply an esoteric game but a way to understand the world better. We construct scientific models that tell us partially about what the world is like. They do not tell us what the world is —

but they are able to give us valid insights into some aspects of reality.

(3) Science is an activity carried out by *human* beings. It is not a perfect enterprise free from the foibles of humanity.

(4) Science is based on the human *interpretation* of the evidences and observations made in the scientific pursuit of understanding. This is the theoretical aspect of science in which scientists try to find out how their data and observations can be described in a single, simple - as - possible framework. A complete treatment of claim (4) must be based on an appreciation of the interaction between the theory guiding the experiments and the interpretation of the results. No "fact" ever provides us with its own interpretation: how it fits into the larger scheme of things, and which model is best for describing its occurrence and significance. In some way every experimental "fact" is "theory - laden," and the scientist must strive to take into account the complexities of the interpretational task. He usually does this by constructing, in as neutral a mode as possible, experimental tests of a greater and greater demanding nature to test the hypotheses and theories being used. No "fact" ever provides us with its own interpretation: how it fits into the larger scheme of things, and which model is best for describing its occurrence and significance.

(5) Science is concerned by definition with *natural* categories, categories that can be described within the mechanistic perspective of science. It is precisely this limitation that also marks the strength of scientific descriptions and understandings. Science does not limit itself to natural categories because of some prejudice

against supernatural descriptions, but simply to limit the scope and the content of authentic science to a well defined and testable range. We acquire a great freedom once we appreciate two closely related truths: (a) science does not and science cannot provide answers to ultimate meaning, purpose, and primary causes; (b) there are insights into reality that cannot be obtained by scientific investigation, i.e., they are not scientifically – meaningful questions, but this in no way represents a negative judgement against the validity or the value of such insights.

(6) Evidence acceptable as scientific must be accessible to *public* testing. Private visions, insights and revelations do not provide the basis for a scientific description.

(7) Science proceeds by interpretation of *sense data* obtained from *interaction* with the world. This is the experimental aspect of science. The subject matter of authentic science must be suitable for test by the acquisition of sense data in interaction with the world. Science is therefore limited to those kinds of questions and those areas of human experience that can be tested through investigation by sense interactions. This comprises an important set of categories for human life and experience, but by no means does it comprise all that human beings would like to know or need to know.

If we adopt this definition for authentic science, we can recognize a few of the basic characteristics of such an endeavor. The doing of science is impossible without a faith commitment to a number of fundamental *presuppositions*, e.g., the word is understandable through rational processes of the human mind, natural

phenomena are reproducible, patterns of order can be sought and found, and there is a physical reality that does not depend ultimately on us. The scientist succeeds as a scientist to the extent that he maintains an *impersonal* relationship with the *objects* of his investigation; this limits the ability of science to deal fully with the interpersonal dimensions of human life. It causes necessary distinctions to be made, for example, between research psychology and clinical psychology; the former follows a scientific (scientist/object) pattern, the latter incorporates a large measure of interpersonal interactions (scientist-as-person / person). Even when scientists act from the best of motives and are successful in achieving their goals, the *ambivalence* of all human activity asserts itself; every time we increase our capability for good by increasing our knowledge, we simultaneously increase our capability for evil. Science is *ethically silent* : it has no way of defining the good. Its function is to tell us "what is", not "what ought to be". The great ethical fallacy is to identify "what is" with "what ought to be".

There are activities that look like science, use the terminology of science, claim the authority of science, but at a fundamental level violate the basic integrity of authentic scientific activity. They are counterfeit science; commonly called *pseudoscience*. Three main sources for pseudoscience can be identified: (a) simply bad science in which the basic guidelines for authentic science are neglected or ignored; (b) the claim to be able to achieve scientifically what science is incapable of achieving, e.g., the development of an ethics from science; (c) the attempt to arrive at scientific conclusions as the result of pressure by some kind of philosophical, metaphysical, religious, or political ideology, which define from the

beginning what the results must be.

Authentic Theology

We limit our discussion in this paper to authentic theology in the Christian tradition, and seek a definition of such theology to compare with our previous definition of authentic science. By the term authentic theology, we mean *a way of knowing based on the human interpretation of the Bible and human experience in relationship with God*. Once again we may consider the implications of these various terms.

(1) To say that Christian theology is *a way of knowing* is to affirm that it is not *the only way of knowing*.

(2) Christian theology is also a way of *knowing*. It is commonly said that to believe that theology is a way of knowing is nothing more than a matter of faith. This assertion is acceptable if we recognize that it is matter of faith to believe that any activity provides us with authentic knowledge (i.e., valid insight into the nature of reality), as true of science as it is of theology. Both rest upon presuppositions, both provide evidence, both require a faith commitment before genuine involvement is possible. The main difference between science and theology is the kind of knowledge that each gives. Science primarily answers questions about "how" something happens; theology primarily answers questions about "why" something happens, what the purpose and meaning of the events are, and what the ultimate causes for it are. Science establishes as wide a gap as possible between the observer and the

observed, whereas theology deals with the realm of human experience in which we enter into relationships with other persons, making ourselves vulnerable in the process.

(3) Christian theology is based on *human* interpretation. As long as human beings seek to understand a verbal revelation (oral or written), there is no other possibility. Christians believe that God made the world and inspired the Bible, but it is human beings who react with His revelation in the world to do science and with His revelation in the Bible and their experience to do theology.

(4) Christian theology is based on human *interpretation*. Just as “facts” in science never provide their own interpretation, so Bible passages and experiences do not provide their own unambiguous interpretation either. The claim to believe only what “the Bible says” is, in fact, an impossibility; we are unable to believe anything except an interpretation (our own, or someone else’s) of what the Bible says. This is not a downgrading of the inspiration, authority or trustworthiness of the Bible; it is a simple statement of the necessity of human communication. Nor does it imply that the meaning of the Bible and our experience is up-for-grabs, a relativistic area in which anyone can make an equally valid judgment. In both science and theology we take as a matter of faith that there is an appropriate set of interpretational principles (hermeneutics) that must be followed to obtain the valid insights contained in our study of the natural world in science (authentic science) or of the Bible and our experience in theology (authentic theology). If our scientific understanding and our theological

understanding appear to conflict, it is not "science vs the Bible," as if science required interpretation but the Bible does not, but rather science (as a human interpretation following appropriate rules) vs theology (another human interpretation following appropriate rules). There are, of course, spiritual resources available to help us in any interpretation, resources that are given to us as individuals and as a community.

(5) Christian theology is based on human interpretation of *the Bible*. Christians accept the Bible as a trustworthy source of God's revelation to us. Thus the Bible is more like the loveletter of a friend, than it is like a manual on how to make a machine. From our interpretation of the Bible, we want to come to know what God wishes to say to us. Traditional advice on biblical interpretation involves three questions: (a) What does the passage say? (b) What did the passage mean when it was written? (c) What does the passage mean to us today? To answer these questions a set of interpretational principles has been developed through the years, commonly called hermeneutics: the principle of progressive revelation over time; the importance of the situation and conditions under which the words were first written; recognition of the wide variety of human literary styles involved in the Bible; the general practice of understanding questionable passages in terms of clear passages and of the biblical revelation as a whole; the appreciation of God's total revelation both in the created universe and in the Bible, so that authentic scientific interpretations of His work, as defined here, cannot ultimately contradict authentic theological interpretations of His verbal and historical revelation, as defined

here, and a consideration of both deductive and inductive approaches to the Bible so that neither approach alone dominates our interpretation.

(6) Christian theology is based on human interpretation of the Bible and of *human experience*. Theology is not a scholarly investigation of esoteric problems in an ideal world, but a practical application of biblical understanding to our world. Although experience may be highly subjective, we must think carefully about a proposed biblical interpretation that regularly violates human experience. Theology tries to provide guidelines for experiences and events in the world today on which the Bible is silent by basing these guidelines of the biblical revelation and extrapolating consistently beyond them. This is an area where the guidance of the Holy Spirit is vital. Theology must also deal with the significance of the findings of science. The meaning of events within science can be dealt with by scientific interpretation itself, but the meaning of events beyond science can be dealt with only by theology. The modern scientific paradigms such as relativity, quantum mechanics and cosmology all provide occasions for speculation in the hazardous business of seeking to derive theological insights from scientific theories. It is the task of theology to relate these non-scientific, supposedly theological insights to the biblical revelation.

Consistent with the above characteristics of authentic Christian theology, we can summarize a few of the adjectives that describe it. Such theology is *personal*, because it is concerned primarily with relationships between human beings and God, and between persons. Christianity at its core is not a theology but a rela-

tionship, not a philosophy of life but a love between a person and God, not a set of rules but a personal commitment that turns rules into joy and service into privilege. The fundamental act of a Christian is to commit him/herself to God in an existential act of trusting faith. This in itself is not theology, but theology then clarifies the significance of this commitment to living for God. Theology can be studied as if it were science, but it cannot be lived unless it is put into practice like marriage. Like science, theology is also *ambivalent* and capable of being used for evil as well as for good, of being distorted or adapted for self-centered human needs as of being lived out for the glory of God and the welfare of human beings. Theology finds *the basis for ethics*, not in some relativistic human choice, or in some misguided attempt to derive values from science, but in the character and will of God. Finally authentic Christian theology provides us with the foundation for *a worldview and a life*. Seeing God as the Creator, Revealer and Redeemer provides an understanding of the relationship between God and the world, the proper perspective on sin and evil in the world, and the guidelines for a new life in which Christians seek to glorify God by what they say and do and to demonstrate what it means to be citizens of God's kingdom while still being citizens of earth.

There is also a parallel between pseudoscience and *pseudoteology*. Pseudoteology (a) may simply be bad theology, based on interpretations of the Bible and experience that violate guidelines of hermeneutics; (b) may attempt to do things that authentic theology cannot do, such as deriving scientific mechanisms from

theology; or (c) may attempt to use theology in the effort to establish or justify a particular philosophical or religious ideology previously chosen.

We may summarize the common features of both science and theology as follows:

- Both science and theology are based on faith commitments: a faith commitment to the intelligibility of the world, the “possibility” of doing science, and a faith commitment to God as most clearly revealed in the Person of Jesus Christ.

- Both science and theology provide us with partial descriptions of part of reality.

The defense of authentic science is closely coupled to the defense of authentic theology. If one of these comes under serious attack or attempted reformulation, the other suffers with it.

- Insofar as the descriptions of science are compatible with the actual physical world, and insofar as the descriptions of theology are compatible with the actual relationships that describe our life in and with God, both provide true and valid insights that need to be integrated.

- In general these insights provide different kinds of information derived from the two different kinds of disciplines, yet dealing with the same reality. Once again integration of the two insights in the individual person or community is the crucial response.

Pattern 1: Science has Destroyed the Possibility of Faith

Science and theology tell us the same kind of things about the

same things. When scientific and theological descriptions conflict, one must be right and the other wrong. In this encounter science always proves to be the winner.

This is perhaps the most commonly held view of the interaction between science and Christian faith. It is a view that is part of the subconscious structure of our whole culture, the unspoken assumption of secular society around the world. This pattern argues that Christian Faith as expounded historically through Christian theology has become impossible in the present scientific day, a relic of a less knowledgeable past, Whether it is Freud claiming that God is only an anthropothentric projection, of Marx claiming that Christianity is an opiate of the people, the thrust is and has been for centuries the same: no informed, modern person can possibly continue to accept the mythological claims of biblical Christianity.

V.Y.Frenkel [5] for example argues that there is a simple and inevitable sequence of development. (1) All religions start with fear of the unknown, which when it becomes somewhat more mature and less needed, turns into a religion of morality to prescribe the ethical do's and don'ts of a society. (2) When it is realized that the attempt to direct the moral sensitivities of a relativistic society is really neither effective nor ultimately possible, a cosmological religion develops in which the personal attributes of God are replaced by impersonal concepts such as the "spirit of the universe." (4) Finally when this last attempt to sustain religion runs its course, only atheism is left.

There are many arguments advanced to defend the thesis that belief in the historic Christian faith is no longer intellectually re-

spectable nor psychologically acceptable. Perhaps the most common of these is the argument that modern scientific understanding has made God unnecessary. In the past, when human beings were ignorant of scientific explanations for the phenomena observed in the world, they were quick to assign God as the necessary and sufficient cause. Now that we know what really happens, we don't need God any more. This argument does strike directly at a common, but fundamentally false concept of God held by many Christians through the years up to today: God's presence and activity in the world are made known primarily by His direct action in those areas where we are ignorant of any scientifically describable mechanism. This is the "God-of-the-Gaps" position that seeks apologetic strength by establishing the existence of areas in which we are and must remain by definition unable to provide any scientific descriptions. But this is a fundamentally mistaken view of the biblical revelation of the nature of God and His activity in the world, which sees God as active in all phenomena, the natural that can be described scientifically as well as the supernatural that cannot. In the biblical view the whole universe depends moment-by-moment for its very existence on the continuing free activity of God, who is the Ground and Foundation of existence itself. To argue that the God of the Bible — as contrasted with the "God" of some institutionalized religions — has become unnecessary is to fundamentally misunderstand the biblical revelation.

A second argument advanced to support the thesis that science has destroyed the possibility of acceptance of the historic Christian

faith is the claim that scientific understanding of natural phenomena has made belief in the "supernatural" impossible. But this argument is based on the mistaken assumption that "natural" and "supernatural" are mutually exclusive descriptions, that "supernatural" means an act of God, whereas "natural" means an event that is not related to God's activity. The problem is closely related to the "God-of-the-Gaps" issue described above. It is resolved by recognizing that events in the world can be considered simultaneously both from a natural perspective (what is the scientific description of the mechanisms involved?) and from a supernatural perspective (what is the meaning and purpose of this event, how does it relate to God and ultimate reality?) To be complete, a description of events in the world must include both a natural context and a supernatural context.

A third reason often advanced for the supposed discrediting of Christianity by modern science is that science has shown that Christian faith is *only* and this can be followed by any number of possible descriptions, e.g., a psychological experience, another human religion, a sociological phenomenon etc. The fallacy here is that science cannot by its very nature proclaim that something is *only* Science can give us descriptions of what is, but the claim that this scientific description is the ultimate description that invalidates all other descriptions is the result of philosophical extrapolation, not of the legitimate consequences of authentic science. Science itself knows no *only's*.

Related to the above misunderstandings of the relationship between God and the world, is the objection that the Bible talks

about miracles happening but today we know scientifically that miracles are impossible. Such an objection is based first of all on the unjustified conclusion that science is the only possible way to obtain knowledge and an insight into truth. Since miracles are events that by definition may well not be describable scientifically, then this perspective demands that they not be possible. But such a view is not based on science but on a particular philosophical extrapolation beyond science. Science shows us that miracles would not be expected, not that it is impossible for them to occur. A second kind of objection to miracles is related to the fact that they seem to call for God to intervene in an otherwise orderly and well-behaved world in order to pull off some kind of magic act that violates natural laws. But this objection also is based on a faulty view of the relationship between God and the world. The biblical view delivers us from this dilemma: the continuing existence of the world depends upon God's free activity, natural laws do not prescribe what will happen but are human descriptions of God's normal activity, and God's free activity in a miracle is not qualitatively different from God's free activity in sustaining natural phenomena. Miracles are not arbitrary violations of natural laws but appropriate evidences of God's free activity in revealing Himself.

Pattern 2: Faith is to be Upheld in Spite of the Findings of Science

Science and theology tell us the same kind of things about the

same things. When scientific and theological descriptions conflict, one must be right and the other wrong. In this encounter the theological descriptions always have the priority.

In this pattern, possible threats of science against faith are warded off by holding up theology and its interpretations as the only relevant ones for a Christian. This pattern may not be often advanced in the scholarly literature, but its significance for Christians and Christian culture cannot be underestimated. Those who feel that theology needs to be upheld over science in this modern scientific day most often seek to find a scientific framework in which to make their case against the science that proves troublesome to them; such advocates would be found in another of the patterns to be described here. But we should not forget the large Christian constituency which has no interest in science whatsoever, either apologetically or as an area worthy of extended interaction. This subdivision of Christians adopts a fundamentally anti-intellectual stance with respect to faith and effectively seeks to separate itself and its society from the influences of a world dominated by science.

In this framework the important questions and issues of life have only supernatural answers, and meaningful scientific descriptions will never be found. If science appears to disagree with these theological interpretations, so much the worse for science, which is clearly either incompetent or more likely, deliberately ante-religious.

The primary orientation of this pattern is to ignore science and to discourage participation in science. Young people brought up in

this environment are led to believe that a career in science is not something that any Christian should contemplate. The important things in life are spiritual and they have nothing in common with science and its earthly concerns.

Sometimes Christians basically involved in this pattern do become involved with the interaction between science and Christian faith to the extent that efforts are made to make theology the ultimate guide for acceptable science. The attempt is made to determine by theology which theories in science are consistent with Christian faith and which are not, or even to reformulate science so that its format can now be dictated by theology.[6] When this happens there is always the pitfall of sacrificing scientific integrity for the sake of apparent theological credibility, thus producing a pseudoscience.

In a world in which the successes of science are established, it appears that this pattern will be unable to survive very long. Its demise may be accompanied by considerable loss of faith among its proponents. Those committed to it will find themselves squeezed into a smaller and amaller “God – of – the – Gaps” position, particularly if they seek to witness to the world around them.

Pattern 3: Science and Faith are Totally Unrelated; Neither One Can Say Anything about the Other

Science and theology tell us different kinds of things about different things. There is no common ground between them. Science

has absolutely nothing to say about theology, and theology has absolutely nothing to say about science. Conflict is impossible.

Although this pattern probably needs the least space to describe, this does not mean that it has few advocates. It could even be argued that this is one of the most common of all the patterns in everyday life. It is an attempt to eliminate the conflict that plays such a dominant role in Patterns 1 and 2. Science and theology are put into separate airtight compartments, so that no interaction between them is possible; such an approach is judged to be the "safest" way to handle the problem.

In the course of everyday life for many people, it has become convenient to think in a secular, cultural and scientifically-related way during six days of the week, and then discontinuously on the seventh day to think in a religious and theologically-related way for the purpose of a worship service or gathering of those professing faith. If the attitudes followed during the six days contradict the attitudes held on the seventh day, it does not matter. During the week we can act as if the world were 5 billion years old, but on the seventh day we can also act as if the world were only 10,000 years old. Neither position has an actual claim on basic reality; each is an example only of unrelated statements.

In recent years the position that science and theology cannot by definition interact at all has been a major theme of what has been named "neo-orthodox" theology, spearheaded by such notable theologians as Karl Barth. In this case, one might argue that the desire to defend and preserve the perceived truths of Christian theology in the midst of a scientific climate that seemed to be

threatening them, led to this Pattern that seemed to promise immunity for theology in a hostile scientific environment.

It is, however, difficult to maintain a vital position in which the significance of science and theology for each other is simply ignored. In practice, it is likely that indifference and apathy to the issues may well be the most common result.

Pattern 4: Science Provides the Rational Basis that Demands Faith

Science and theology tell us the same kinds of things about the same things. An understanding of the scientific descriptions of the world provide us with such overwhelming evidence of the truth of the Bible and Christian theology that we have no choice but to believe them.

This pattern accepts the modern conviction that science is the prime defender and revealer of the truth, and therefore seeks to build an apologetics for the faith based on science. It expresses a reaction against Pattern 2, with its non-rational and anti-intellectual emphases, and attempts instead to marshal all of the social prestige enjoyed by science in defense of the faith. It is the pattern of an appreciable subgroup of Christians who desire to bring to bear the most powerful elements of their modern armamentarium against the popular attacks on Christianity in the name of science. The emphasis is on a logical and systematic, intellectual defense of a conservative Christian interpretation of the Bible, so compelling that non-Christians would be convinced on the basis of

this evidence alone to become Christians.[7,8]

If science has called the authenticity and the authority of the Bible into question, then the issue is dealt with by the attempt to show that the Bible can be scientifically defended, that the Bible revealed scientific truth long before it was scientifically discovered, and that the integrity of the Bible can be objectively demonstrated by showing how every apparent interaction with the descriptions of modern science can be harmonized with the biblical record. Although probably no one would openly claim that he could prove the validity of the Christian faith by logical or scientific approaches, this pattern comes closest to such a claim.

The marshalling of evidences that support the reasonableness of the Christian faith and the trustworthiness of the biblical revelation is indeed a worthy attempt. It can be an effective witness to help those, who think that all of modern science contradicts Christianity, to see that this is simply not the case. The destruction of caricatures is always a valuable achievement.

But the methodology of this pattern is troublesome for two fundamental reasons. First of all, it makes science the ultimate judge and arbiter of truth and reliability in an area where such a position for science is not justified. There is a strong desire to set forth "objective evidence" in such a convincing way that a faith commitment itself almost becomes unnecessary. There appears to be no place for a personal response to Christ's love, only an intellectual response to scientifically testable evidence. So strong is the commitment to "science" that proponents of this position frequently argue that miraculous events should be properly considered as

part of a scientific description, thus arguing for a change in the definition of authentic science and its inbuilt limitations with similarities to advocates for Pattern 6.

And second, it gives far too little significance to the nature of the biblical revelation that is actually given to us in the Bible, choosing to assume instead that it is the same type of communication that we might expect to obtain by reading a daily newspaper or textbook today. Among the most questionable are those arguments based on the existence of "prescience" in the Bible. Almost everything we know about the nature of the biblical revelation as developed from its own character and purposes, everything we understand from the relevance of progressive revelation, everything we would ascribe to the actual purpose and meaning of the Bible, argue against hidden prescientific insights as the result of special revelation thousands of years ago. This is more like an argument from mysticism or magic than it is a faithful understanding of the nature of communication between God and human beings.

Advocates of this pattern frequently miss the importance of the "human interpretation" element in both science and theology. Instead of recognizing that there are no "self-interpreting facts," they would argue the contrary. But any student of the philosophy of science knows that facts do not provide their own meaning, and that every experiment is itself "theory laden." To deny this is to reject the very qualities that characterize authentic science as human interpretation of observations. But such arguments also commonly misunderstand the essential role of human interpretation played in biblical interpretation.

Pattern 5: Science Provides the Philosophical Structure in which Faith needs to be Redefined

Science and theology tell us the same kinds of things about the same things. Traditional, biblical theology must be thoroughly redefined and rewritten in order to be consistent with the developments of modern science.

Whereas Pattern 4 was aimed at justifying a traditional type of conservative Christian theological interpretation by showing that it was really scientifically defensible, this pattern is aimed at arguing for a new definition of theology to become consistent with the results of modern science.[9-12] It is the general position of a considerable number of Christians, well versed in science, who feel the need to alter traditional theological positions to bring them more into harmony with the philosophical implications suggested to them by modern science. One might argue that in Pattern 4 scientific reasoning was put into the service of theological convictions, whereas in Pattern 5 new theological formulations are proposed in order that they might be consistent with an interpretation of the results of modern science. This approach is based either on (a) the effort to reconstruct Christian theology in categories that are acceptable to a modern scientific worldview, or (b) to argue for a major new insight and revelation of God coming to us through the models and descriptions of modern science. There is often only a thin line that separates Pattern 5 from Pattern 6, which calls for a radical revision of both science and theology in the future to form one common view.

One of the issues that relates to several of these patterns is “natural theology,” the attempt to derive theological concepts from the scientific investigation of the natural world. Since for some, as in Pattern 3, natural theology was seen to constitute a threat by science to theology, the thrust of theological apologetics was to deny any validity to natural theology. As is so often the case, this effort was carried to an extreme so that Romans 1:20 was seen as having virtually no content concerning the natural evidence for the existence and power of God. The opposite extreme in which scientific descriptions are seen as providing the basis for a theological revolution as in Pattern 5, or in which both scientific and theological descriptions are rewritten to provide a new synthesis as in Pattern 6, base their principal arguments on what might be called “natural theology.” The attempt is made in Pattern 7 to avoid the extremes of these two poles of the response to “natural theology.”

One of the difficulties of assessing advocates of this pattern is the determination of whether they intend their rhetoric to be taken literally, or whether it is only a form of poetic overstatement; in more extreme cases of the former type there could even be considerable overlap with Pattern 6. There can be no debate that certain theological models have changed with increasing scientific understanding, primarily because faulty models were adopted in the first place as apparently reasonable interpretations of the Bible, which were later shown to be inappropriate interpretations. The problem is aggravated by those who, following Pattern 4, insist that certain biblical models for the physical world be taken

as actual scientific descriptions. When these models break down under the development of scientific understanding, the appearance is that the biblical revelation itself needs to be drastically altered, whereas in fact what has happened is that we have realized the fallacy of a caricature of a biblical picture.

Our new insights into the vast size of the universe together with its black holes and perplexing properties, and our new perspectives on the physical structure and interactions of the universe brought to us through such modern theories as quantum mechanics and relativity, impress on us what we should have realized all along — our God is far greater than we could ever imagine. Our simplistic ways of thinking of Him in terms of classical determinism are inadequate in the actual universe that we begin to see more clearly through applications of quantum physics. Scientific research shows us with ever more wonders the fantastic ways in which God acts in the universe. But as we learn more and more about the way in which God acts, we do not learn anything that challenges the basic revelation of God as the loving Father of our Lord Jesus Christ, who died for our sins on the cross.

Nor does this increased scientific knowledge make any significant differences in the meaning or our expression of the fundamental characteristics of the Christian life; love, joy, peace, patience, kindness, goodness, faith, gentleness, self-control, mercy, compassion, forgiveness, redemption and regeneration. This brings us back to the basic problem of understanding the statements of advocates of Pattern 5: are they only reacting to the increase in our scientific understanding with excessive language that proclaims

the greatness of God, or are they really proposing that Christian theology needs to be totally revolutionized and changed because of these increases in scientific understanding, as their language often indicates?

So-called “scientific theology” usually supposes that biblical categories of thought are hopelessly unacceptable to the modern scientific mind, that religious beliefs are wholly products of human activity, and that in the final analysis it is knowledge and understanding that save. The task therefore is to reconstruct biblical categories and translate them into acceptable scientific categories. What is envisioned as happening is frequently described in terms of such dramatic words as “new Reformation”, “reformulation” of religious concepts to bring them into line with contemporary scientific descriptions, or a “new paradigm”. All of these expectations call for a reinterpretation of biblical theology so as to make it consistent with contemporary science.

This task may result, for example, in seeing Nature as God, the natural system as the Kingdom of God, science as truth, evil as non-viable, and salvation as the human quest for survival. Usually sin is no longer a meaningful category to be mentioned, and since there is no sin, there is no need for a Savior from sin. Theology constructed in this way, being shaped by current scientific descriptions and not by authentic biblical or experiential interpretation, can be nothing else than pseudoteology.

**Pattern 6: Both Science and Faith Need to be Redefined
so that an Appropriate Synthesis can be Achieved**

Science and theology should tell us the same kind of things about the same things, but the present status of science and theology makes this impossible. What is needed, therefore, is a radical transformation of both science and theology into new approaches compatible with one another and a new understanding of reality.

Becoming dissatisfied with the continuing apparent conflicts between science and theology, this Pattern looks with visionary hope toward the time when both science and theology will have grown into one coherent discipline. A wide range of advocates can be found from moderate to extreme, extending from variations on sound Christian positions to extremes of New Age.[10–15] At its best, this pattern envisions a growing awareness of the similarities between scientific and theological descriptions while continuing to recognize their legitimate differences; at its worst it calls for a radical change in both science and theology, thus denying the characteristics of authentic science and authentic theology with their corresponding effectiveness and trustworthiness.

A mystical convergence of science and theology in the future does not necessarily speak of the fulfilment of authentic science and authentic theology. If such a convergence does occur, it may well be because we have lost both authentic science and authentic Christian theology. Nowhere is this more evident and more challenging than in those cases where pseudoscience and pseudoteology have been joined together in the effort to synthesize a new relationship between science and theology, a great new transformation in the not-too-distant future spoken of in glowing terms: a transformation in which science and theology will join

together, their conflicts will end, and the two will become one marvelous and mystic celebration of the human spirit. Such a movement claims the authority of science, but actually rests upon a particular philosophical or religious interpretation of science not actually derived from authentic science itself.

The case for this new revolution in thinking, this new paradigm that calls for a thorough rethinking of all of our theology in the light of modern science, together with our redefinition of science in order to accommodate dimensions of life not previously included in our definition of authentic science, abounds in poetic language and dramatic claims. Upon inspection, however, it turns out that the major fault with these claims is that they are simply not true.

- It is not true that modern science is demonstrating to us the nature of the eternal order that underlies the universe.

- It is not true that modern science is showing us spiritual dimensions of reality previously unknowable.

- It is not true that the developments of modern science have contributed or can contribute in any major way to our spiritual understanding.

- It is not true that modern science has become the basis for human assurance that God has made us and cares about us.

- It is not true that the earth is a living organism with an earth spirit.

It is not true that all matter has a non-material center characterized by intelligence.

Much of this language is indistinguishable from New Age think-

ing, basically an uncritical embracing of Eastern Monism. It is important, therefore, to appreciate the great temptation that such New Age thinking poses for modern religious people immersed in a scientific world. The subtlety of language, the ease of shifting from one perspective to another, the charm of incorporating new visions constructed from pseudoscience and pseudotheology, are all very much a part of the challenge that faces Christians in the future.

When we read in the Christian literature such phrases as the development of the sphere of the spirit expanded by modern science, a new order in which science will enrich our spiritual understanding, or a new understanding of spiritual truths based upon discoveries of modern science, we ought to reflect on the similarity between these words and those of New Age advocates. Christians will wish to be very careful that statements of theirs that may sound like these will not be misunderstood to be the same kind of statements being made to support New Age thinking. They will wish to be very careful in maintaining clearly the definition of authentic science and authentic spiritual thinking.

Many of the above claims are supposed to be based on insights gained from the "new science," by which usually relativity and quantum mechanics are meant, as its scientific basis, but in reality they are little more than an *ad hoc* semi-poetic construction. They speak in mystic terms about the findings of modern science showing the reality of an intrinsic "spirit" in all reality. But as a matter of fact scientific descriptions have not shown any such thing; by their very nature they are intrinsically incapable of giving informa-

tion about the existence or non-existence of "spirit". In fact, consideration of the effects on human society that have been brought into prominence by scientific and technological developments strongly suggests that the trend is toward depersonalization of human beings, not toward recognition of a non-material spiritual quality.

Contrary to frequently-heard claims, physicists are not telling us that there is an innate "intelligence" present in each atom of matter. There may well be people saying such things, but they are philosophers or theologians who are mistakingly seeking some kind of apparent foundation in science for their own preconceived faith commitments. They are attempting a grand synthesis of pseudoscience and pseudotheology. Its strongest advocates have adopted the viewpoint of Eastern Monism and have then sought to find support in particular interpretations of modern science.

Pattern 7: Faith and Science Provide Complementary Insights Into Reality that Need to be Integrated

Science and theology tell us different kinds of things about the same thing. Each, when true to its own authentic capabilities, provides us with valid insights into the nature of reality from different perspectives. It is the task of individuals and communities of individuals to integrate these two types of insight to obtain an adequate and coherent view of reality.

At the end of this sequence of possible patterns for relating science and faith, we come to the one, with its appropriate limitations

and openness, that seems to have the most consistent relationship to the characteristics of authentic science and authentic Christian theology.[16–24] It is the perspective of complementarity — the holding of both scientific and theological descriptions together, while recognizing their differences and yet appreciating their similarities, with the effort to integrate them into one whole picture that does justice to them both as different insights into the nature of reality. Effective complementarity demands insights from authentic science and authentic theology, rejects inputs from pseudoscience and pseudotheology, and proceeds to the task of integrating these insights recognizing that science and theology give us different kinds of descriptions, yet of the same reality.

It is important to recognize that complementarity is not simply a matter of preference, as through there might well be a better choice than complementarity. It is a matter of necessity in many areas of communication. Complementarity is not a cop-out, but an effort to respect the integrity of different, authentic insights into the nature of reality.

There are two basic reasons derived from the nature of communication that makes complementary descriptions necessary: (a) the limitations imposed on us when we try to describe something that is unknown in terms of what is known, the only choice available to us; and (b) the use of descriptions drawn from different areas of experience to describe the same event or phenomenon.

Whenever we attempt to characterize something unknown that is not part of our regular experience, we have no choice available

to us except to describe the unknown in terms of what is known to us. Since such a single description can never be complete, our knowledge and understanding of the unknown can never be completely accurate. We are, however, aided if we have available to us two or more attempts to describe the unknown from different perspectives of human endeavor. In both science and theology, for example, we are involved with the expression of what things *are like*, employing similes, metaphors, analogies, models, and pictures.

Scientific descriptions commonly consist of *models* of the world being observed and described. These models do not describe the world completely or fully accurately, but we believe (as a matter of personal scientific faith) that the better the model is, i.e., the more it corresponds to our perceptions of the world and allows us to predict new perceptions that can be tested, the more completely it images for us what reality is *like* (not what reality *is*). Such models change as we gain new information and as we formulate new pictures and ways of looking at things more in agreement with our new information. This is the reason that it makes no sense to speak about God revealing to us a "true scientific model" in the Bible; the very nature of communication and revelation makes such communication impossible.

This condition is not unique to scientific descriptions. Theological descriptions also make use of models (or metaphors) to reveal to us what God is like and what His relationship to the world is like. God Himself is pictured for us in the Bible under the models of Father, King, Husband, Bridegroom or even Hen. This

means, for example, that there are attributes of fatherhood that give us valid insights into some of the qualities of the character of God; it certainly in no sense implies that God is wholly like a human father or that our human concept of fatherhood is adequate to describe the actual characteristics of God. Similarly the central biblical doctrine of the atonement is presented to us under various different models: healing, wholeness, redemption, reconciliation, sacrifice, legal substitution, and victory. No one of these models does full justice to the ultimate mystery of the atonement; yet we have a more complete description of God's activity in this event if we include the insights of all of these models than if we include the insights of only one or two.

Thus we often find it both expedient and necessary to use more than one metaphor to give a number of possible different perspectives on the unknown, providing a more complete representation than any single metaphor alone. Particular models or metaphors give particular insights, but they each of necessity convey only partial and incomplete insights into the nature of reality. When we therefore use more than one model for more complete description, it is common to use scientific metaphors to describe scientific issues, and to use theological metaphors to describe theological issues. For example in science we find the complementary descriptions of an electron as a particle or as a wave are used depending on the type of experiment we perform to measure it. In theology we find the complementary descriptions of God/human relationships as Divine Sovereignty and human responsibility, again dependent on the type of perspective we are adopt-

ing, and the type of questions we are asking. In all such cases it is critical that a meaningful question be asked in order to get a meaningful answer.

Sometimes complementary descriptions are drawn from different realms of discourse and experience and are applied to the same event. This can happen within different levels of scientific investigation, as for example, with descriptions drawn from both chemistry and psychology to describe psychological aspects of whole human beings, or it can happen with both a scientific description and a theological description being given for the same event or phenomenon. Healing from disease can be appropriately described both in terms of antibiotic defense against infection and as the healing activity of God. To eliminate one description or the other decreases our understanding of the whole process; both are needed. Although we do not yet have all the information necessary, it is likely that the origin of life can be appropriately described in terms of physical, chemical, and biological processes, and at the same time also in terms of the creative activity of God bringing something new into being. To be able to give a description in the scientific categories by no means makes unnecessary, invalid, or meaningless a complementary description of the same event in theological categories. The opposite is also true: having a theological description does not rule out the significance of a scientific description.

Other examples of situations where complementary descriptions by both science and theology must be integrated are not difficult to find. Some of the most illustrative of these have to do with

different kinds of descriptions of a human being and human relationships. To speak of a human being as the product of "genes" is to use scientific language; to speak of the same human being as a living "soul" is to use theological language. Both descriptions are valid; neither can be ignored. If the description of "soul" is abandoned in favor of a description only of "genes," the human being is reduced to an organic machine. If the description of "genes" is abandoned in favor of a description of "soul," the human being becomes a kind of dualistic "ghost in the machine." A complementary approach recognizes that "genes" is a description of a human being on the biological level, whereas "soul" is a description of a human being on the theological level. One way of integrating them that does not do violence either to authentic science or to authentic theology is to see the soulful properties of a human being as emergent properties of the whole, resulting from the particular patterned interactions of the biological parts according to the creative activity of God.

Specific examples can also be drawn in the area of ethical issues concerned with the beginning and ending of life. Each of these must be informed by insights drawn from the biological and psychological scientific areas, and from insights provided by biblical perspectives on the value of human personhood.[25]

It is also as important to recognize what "complementarity" does not claim as to recognize what it does claim.

Complementarity is not equivalent to the compartmentalization of Pattern 3. It is true that a complementary set of descriptions can each be totally complete on its own level of description with-

out leaving gaps on that level for the other discipline to fill, and without demanding some kind of conflict. But complementarity recognizes that valid insights from science and theology both deal with the same reality and must be integrated. It does not hold the two different insights to be totally unrelated without interaction or effects on one another.

· Complementarity does not claim that no aspects of theology are or should be affected by science, or that no aspects of science are or should be affected by theology. It is indeed maintained that science is incapable of providing the foundation for ethics or of providing us with knowledge about the relationship between God and human beings, and that theology is incapable of providing mechanistic information about the “how” questions of the physical universe. But it is also freely recognized, as discussed earlier, that the form of theological models can and has been affected by growth in scientific understanding of the way in which God has actually created the world, rather than simply forming these models using cultural frameworks of the past. And it is also freely recognized that one’s choice of problems in the physical sciences, or even one’s choice of an integrating, descriptive model in the more culturally related sciences of psychology or sociology, where worldview can play as large a role as actual research results, can be affected by theological insights.

· Complementarity is not a thoughtless acceptance of contradiction, paradox, or dualism. It is a recognition of those circumstances where two or more different but valid insights are available to describe and understand something beyond the abilities of

known models to encompass. If it is possible by more complete understanding to remove the contradiction, resolve the paradox, or eliminate the dualism, then this is the course of action that must be taken. But if this is not possible in a particular case, then the full benefits of integrating complementary insights is manifest.

Conclusions

We will walk a philosophical tightrope in the years ahead between these various patterns of relating science and Christian faith. Christians need to be prepared to defend authentic science, and to recognize and contest those claims made in the practice of pseudoscience. And they need to be prepared to defend authentic Christian theology, and to recognize and contest those claims made in the practice of pseudotheology. Finally we need to bring together the complementary insights provided by authentic science and authentic theology and to integrate them into their lives, thoughts and actions. In this way we can most effectively live out what it means to be faithful disciples of Jesus Christ in all of life.

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