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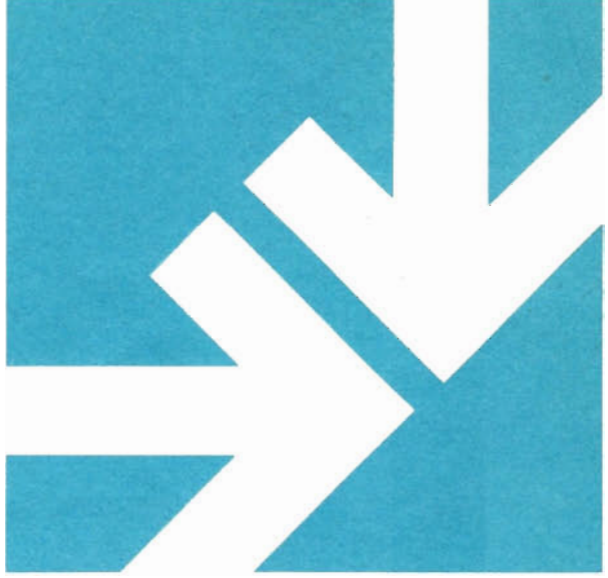

An evangelical perspective on science and the Christian faith (*US ISSN* 0003-0988)

An Evangelical Perspective on:

Newcomb's Problem

The Christian Far Right

Psychology's Philosophy of Change

"The fear of the Lord is the beginning of Wisdom." Psalm 111:10

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An Evangelical Perspective on Science and the Christian Faith

Over the past few months, as I pondered the responsibilities I have assumed as Editor of the *Journal of the American Scientific Affiliation*, I looked back over many of the past volumes of our *Journal*. This overview has confirmed my confidence in the strength of the ASA, at least in part, because of our diversity, and rekindled my enthusiasm for "an evangelical perspective on science and the Christian faith." We are a group of men and women who have a firm commitment to the Christian faith and, at the same time, we have a professional involvement in the sciences. As such, ours is the exciting, but often difficult and challenging task to present that perspective to our fellow Christians who are not scientists and to our fellow scientists who are not Christians. Among the most significant difficulties of this task is the problem of the definition of our terms, the words we use in our efforts to communicate with each other and with other people. This need for definition even applies to our "evangelical perspective on science and Christian faith."

To the ASA "Christian faith" has always meant and should continue to mean our unconditional acceptance of five basic convictions. First, we believe that Jesus Christ is the Son of God and we accept His atoning death on the cross as the only way whereby sinful human beings can be reconciled to a holy God. Second, we believe that He rose from the dead, is currently interceding for us with the Father, and will one day come again. Third, we believe that the Scriptures of the Old and New Testaments are our only infallible rule of faith and practice. Fourth, we believe that God is the Creator of the universe, including this earth and all of the life forms on it. Fifth, we believe that God has granted to human beings the right and the ability to investigate the laws of the natural world and thereby to appreciate His power and might. Science is a significant part of this investigative process of finite humanity seeking to know more about the infinitely complex universe.

For much of its existence the ASA has defined "science" in the broadest sense to encompass all areas of our search for knowledge and wisdom. Therefore, we include in our Affiliation, not only physical and biological scientists, but also social scientists and theologians. Such diversity enables us to avoid overspecialization and compartmentalization as we attempt to share with one another the insights from our own areas of knowledge and experience. Such diversity also challenges us to make ourselves intelligble to one another, since biologists are not always familiar with the jargon of astrophysicists nor can chemists always appreciate the terminology of psychologists. One of the real challenges we face in our local and national meetings as well as in the *Journal* is to present our evangelical perspectives in a way that will be professionally competent and, at the same time, understandable to people from other sciences. An even greater challenge is to speak and to write, at least sometimes, to the average pastor or church member about our science or to the average scientist or academic about our Christian faith.

An equally valuable form of diversity within ASA is that

our "evangelical perspective" on many issues is a pluralistic one within the confines of what we believe are the biblical parameters of "Christian faith." Therefore, the ASA has never had, does not have now, and never should have a "party line" or "THE" Affiliation position on controversial issues on which men and women of God, born-again, fellow evangelicals, have had or still hold differing opinions. Some people, who look for simplistic answers to the mysteries of God, have difficulty with that position, but we believe it is in keeping with New Testament principles. Furthermore, there are many examples of *the* accepted and prevailing opinion changing with time. "Discarded hypotheses" become "the only" explanations, and the "facts" of today become the "discarded hypotheses" of tomorrow. Such a phenomenon occurs in both science and theology. Therefore, as we discuss evolution/creation, determinism/free will, nuclear deterrence/nuclear freeze, and a host of other issues we need to constantly and humbly remember the limited nature of our knowledge and to be kind and patient with one another. As I edit the *Journal* I plan to emphasize the recommendation of Paul to the Ephesians that we should always "speak the truth in love." Besides, Jesus Himself reminds us that it will be through our loving regard for one another—not through the power of our logic or our data—that others will know that we are His disciples.

As your Editor I want to see us continue the free and open discussion of the many critical issues facing the Christian church in a dangerous and deteriorating world situation, and I want to see that discussion carried out in a scholarly manner and in an atmosphere of mutual respect and forbearance that will bring honor to the cause of Jesus Christ. To this end we now have an Editorial Board—whose composition is indicated on the inside front cover—who will help me with editing and with the development of *Journal* policies. In addition, we have a large group of highly qualified Editorial Consultants who will also be involved in the review process. Our aim will be to maintain the high quality of the *Journal* as authors seek to share with our readers their thoughts on various perspectives on science and Christian faith. I encourage all of our readers to contact me or members of the Editorial Board with ideas for improving the *Journal* or for subject areas that should be discussed. To properly communicate "An evangelical perspective on science and the Christian faith" we need your help.

WLB

The Blind Men and the Elephant

A HINDOO FABLE

It was six men of Indostan
To learning much inclined,
Who went to see the Elephant
(Though all of them were blind),
That each by observation
Might satisfy his mind.

The *First* approached the Elephant,
And happening to fall
Against his broad and sturdy side,
At once began to bawl:
"God bless me! but the Elephant
Is very like a wall!"

The *Second*, feeling of the tusk,
Cried, "Ho! what have we here
So very round and smooth and sharp?
To me 'tis mighty clear
This wonder of an Elephant
Is very like a spear!"

The *Third* approached the animal,
And happening to take
The squirming trunk within his hands,
Thus boldly up and spake:
"I see," quoth he, "the Elephant
Is very like a snake!"

The *Fourth* reached out an eager hand,
And felt about the knee.
"What most this wondrous beast is like
Is mighty plain," quoth he;
" 'Tis clear enough the Elephant
Is very like a tree!"

The *Fifth* who chanced to touch the ear,
Said: "E'en the blindest man
Can tell what this resembles most;
Deny the fact who can,
This marvel of an Elephant
Is very like a fan!"

The *Sixth* no sooner had begun
About the beast to grope,
Than, seizing on the swinging tail
That fell within his scope,
"I see," quoth he, "the Elephant
Is very like a rope!"

And so these men of Indostan
Disputed loud and long,
Each in his own opinion
Exceeding stiff and strong,
Though each was partly in the right,
And all were in the wrong!

The Moral:
So oft in theologic wars,
The disputants, I ween,
Rail on in utter ignorance
Of what each other mean,
And prate about an Elephant
Not one of them has seen!

By JOHN GODFREY SAXE

From *An Anthology of the New England Poets*, Louis Untermeyer, Ed., Random House, 1948, pp. 410–412.

The Impact of Psychology's Philosophy of Continual Change on Evangelical Christianity

EVERETT L. WORTHINGTON, JR.

Department of Psychology
Virginia Commonwealth University
Richmond, Virginia 23284

Hegel proposed that the content of truth was always changing. Only the dialectic process of change was permanent. This philosophy has been adopted, often uncritically, by scientists—including psychologists. Psychologists emphasize "processes" in their research, practice and public communication. Because psychologists use "objective" methods—even though their methods are directly influenced by Hegelian philosophy—and because they address subjects of great concern, psychologists risk undermining the Christian faith by assuming that nothing is unchanging except processes of change. I suggest that scientists who are Christians take the lead in restoring a balanced scientific methodology that supports eternal truths of Scripture.

Modern psychology has become a study of the processes of change in living animals including humans. The lexicon of psychology is replete with explicated "processes" and with concern over "development," yet thirty-five years ago these words were rarely used. This current state represents large-scale acceptance of a philosophy that could have detrimental consequences for evangelical Christianity.

This paper examines the historical development of this emphasis on change, especially within psychotherapy. Some of the dangers of this emphasis are explored, and Christians who are scientists are urged to exert leadership in restoring a balanced view of human existence.

Historical Conflict

Leahey (1980), in an authoritative history of psychology, identified an important intellectual polarity in the history of western thought. He called this the tension between *being* and *becoming*. Proponents of a philosophy of being argue that essential truths and values exist changelessly apart from the changing nature of the physical world. Proponents of becoming, on the other hand, argue that only the principle of change itself is immutable. Things never *are;* they always are *becoming*. Leahey traces the roots of these positions to two great spokesmen of the pre-Socratic period—Parmenides of Elea (fl. 475 B.C.) and Heraclitus of Ephesus (fl. 500 B.C.).

Parmenides, the champion of being, believed that Truth was eternal and unchanging. Stability was reality. The appearance of change, he believed, was an illusion based on our faulty senses. Because the senses were suspect, Truth has to be apprehended through reason and logical argument. Parmenides, thus, founded rationalism. Heraclitus, to the contrary, suggested that ever-changing fire made up the

Requests for reprints should be sent to the author at Department of Psychology, Virginia Commonwealth University, 800 W. Franklin St., Richmond, VA 23284. *The author wishes to thank Donald Danser who read and commented on the manuscript.*

elementary nature of the universe. Stability was thus an illusion. A river looks the same today as yesterday, but in fact the river is continually composed of different water molecules. Heraclitus proclaimed that no person ever steps into the same river twice. This conflict between being and becoming is at the center of western thought, and the ebb and flow of emphasis on one pole or the other has molded science into what it is today.

The main assumption of science today is that the universe is constantly changing and relativistic.

Plato (427–347 B.C.) agreed with portions of Parmenides' arguments and with portions of Heraclitus' arguments (Durant, 1953). He agreed that within the physical universe objects continually changed; thus, he argued, objects are not to be the object of knowledge. Rather, unchanging Forms (or Ideals) must be the Truth. For example, a cat grows older daily. It might become sick, diseased, or it might lose its leg, yet it remains a cat. Its "catness" must therefore transcend individual physical cats and depend on some transcendent Form of the cat. With Plato came an emphasis on being—on unchangeable Forms.

Aristotle (384–322 B.C.), Plato's student, did not distinguish between the physical universe and the realm of Forms as widely as Plato. For Aristotle, universals existed to be discovered. Although he believed that universals needed to be apprehended through the mind, he did not believe that they were created through the mind. Aristotle linked universals with particulars by creating intermediate steps—classes or species. He identified four types of causality and made possible a natural science (of sorts) by emphasizing the physical universe, physical causes, and a science of being that allowed people to investigate what existed.

The influence of Plato and Aristotle carried that day for a science of being. If Truth existed and was unchanging, then people could investigate and understand Truth. (Of course, opponents of a philosophy of being always existed, though they had little impact given its widespread acceptance.) In Europe the philosophy of being was solidified by the influx of the Israelites after the dispersion of 70 A.D. and by the spread of Christianity into Europe. Both Judaism and Christianity assumed a philosophy of stability and eternality to be at the core of existence. Thus, by the beginning of the sixteenth century, a rational-deductive science of being, which trusted mainly in logic and deduction from presuppositions rather than in observation, had been forged.

Still lacking was a formal, empirically-based framework on which the flesh of science could be draped, thereby building a materialistic philosophy of being. In 1687, Sir Isaac Newton (1642–1727) published *Principia Mathematica*. Newton's laws of motion legitimized the philosophy of being because they proposed that the physical universe was in essence unchanging—bodies at rest tended to stay at rest and bodies in motion tended to remain in constant motion. As philosophies of being had always assumed, deviation from (normal) stability required the intervention of an external agent (force, in Newton's system). Forces introduced instability. They needed explaining. Constancy of motion was assumed normal and consequently did not need explaining. Newton's laws, of course, formalized a philosophy of being and legitimized it as a materialistic explanation for the nature of the world.

Almost immediately, however, anomalies (findings inconsistent with Newton's theories) were discovered. These were ushered in on the arm of the "methodological revolution" (Rossi, 1975, p. 249). Inventions of the microscope and telescope, experiments on the vacuum, and the discovery of the circulation of blood suggested a science in which motion and change were normative and bodies at rest needed explanation. Yet, for years Newton's ideas continued to nurture growth of physical knowledge.

This changed in the late eighteenth and early nineteenth centuries with the articulation of a philosophy of becoming by Kant (1724–1804) and Hegel (1770–1831). Kant asserted what Koch (1981) calls four "antinomies of pure reason" (p. 262)—that human existence is concerned with questions that are meaningful but rationally undecidable in principle. This undermined rationalism, though it was not until years later that the structure collapsed. Hegel replaced the idea of absolute truth with the concept of the dialectic.

> Because the idea of change and development was so central to this thought, Hegel was forced to conclude that the traditional, formal and (as he called it in derogation) static logic of Aristotle was hopelessly inadequate, and that it had to be replaced by what he called a dialectical logic more adequate to deal with the Absolute. Aristotle had said that a thing must either have an attribute or its opposite at a given time but Hegel disagreed, usually calling attention to intermediate or twilight zones when, he said, a thing appears to possess neither. (White, 1955, p. 41)

Hegel's philosophy did not do away with all absolutes (as Schaeffer, 1968, has argued); rather, it proposed that content was ephemeral and always "becoming" while the process of change was universal or absolute. The process always involved the dialectic—thesis-antithesis-synthesis. Hegel thus delivered an apparently mortal wound to Plato (though it takes time to die). The philosophy of becoming slipped like a razor-sharp stiletto between the ribs of science.

In political science, Karl Marx (1818–1883) applied Hegel's dialectical reasoning process to a materialistic conception of nature. This dialectical materialism was the first truly acceptable application of "becoming" philosophy to a naturalistic science. Then, "becoming" entered biology. Although theories of evolution had been extant for years (Lamarck, 1744–1829), evolutionary theory was only widely accepted

after Hegel and Marx. In 1859, Darwin (1809–1882) published *Origin of Species*. Strangely, he had written down his ideas in 1842 but did not publish them for 17 years because the ideas were philosophically repugnant to him (Leahey, 1980).

By the 1900's even physics was reconceptualized by Einstein (1879–1955) and others (see Barnett, 1948 for a review of the remaking of physics). The nature of the universe was seen as relativistic and ever-changing. By 1927, with the influence of Heisenberg, the universe was conceptualized as probabilistic at base.

In general, the main assumption of science today is that the universe is constantly changing and relativistic. Scientific laws are concerned either with probability or with describing the process of an assumed change. For example, in a recent article in *The Chronicle of Higher Education*, Roark (1981) summarized the major questions in biology as "How fast do plants and animals evolve? By what means do they change? Through what processes do new species emerge?" (p. 3). No longer are assumptions of change debated. The basic questions involve describing the nature of the assumed change-process.

The most widely accepted philosophy of science (Kuhn, 1970, 1977) reflects the view of science as ever-changing. Kuhn (1970) presents science as a collective cognitive map, or paradigm, of the phenomenal world. This paradigm is subject to periodic extensive reorganizations—collective perceptual shifts—called scientific revolutions. When a scientific revolution is imminent, proponents of the extant paradigm are unable to solve significant problems (anomalies) within the paradigm, which because of focused attention on the paradigm's failure, induces a crisis. Proponents of different paradigms propose solutions. When scientists must choose between a new paradigm, which is supported by little research but which solves the anomalies, and the established paradigm, which is in crisis, then what Kuhn (1977) calls the "essential tension" occurs.

Kuhn has been criticized by other philosophers of science, notably Lakatos (1970), as proposing an irrational view of science in which "progress" is meaningless except from within a paradigm. Lakatos argues that scientific revolutions are not progress, but merely set science on *new* pathways. Toulmin (1972) has proposed a more rational philosophy of science based on evolution rather than revolution. Concepts are thought to survive or perish through natural selection. Concepts that make sense survive; those that don't make sense, perish. Both Kuhn's and Toulmin's philosophies embody the assumption of continual change.

The Evolution of Experimental Psychology

Within this philosophical climate, experimental psychology was born. Contrary to the emerging emphasis on change, at its inception psychology investigated content rather than change processes. Wundt investigated the content of consciousness; Freud, the content of the unconscious mind. Within the United States, however, a school of psychology arose from James' (1842–1910), and Dewey's (1859–1952) philosophizing. To these pragmatists, truth was a process of adaptation. James and Dewey lauded the "stream of consciousness," or the "functions" of consciousness. Their psychology was called functionalism. They abandoned the study of the content of consciousness to study the process by which consciousness operates. That influence is still prevalent in the United States today. For example, Zick Rubin (1981) described the state of modern psychology as follows:

> The rallying cry of the 1970's has been people's virtually limitless capacity for change—not only in childhood but through the span of life. . . . The view that personality keeps changing throughout life has picked up so many adherents recently that it has practically become the new dogma. (p. 18)

The study of morals and values provides an example of modern experimental (social) psychology. In contrast to a traditional Christian approach to morals, which emphasizes the content of God's laws and the demands those moral laws make on humans, psychologists have researched the process of moral development, irrespective of the content of morals. Two of the leading researchers in this area are Lawrence Kohlberg (1973) and William Perry (1970). Kohlberg has identified six stages of moral development. The notion of developmental states presupposes that reasoning processes change. Likewise, Perry has identified nine stages of intellectual and ethical development during the college years. Both of these scientists use longitudinal research to support their theories. Such research looks for, and finds, changes with time. Thus, their methods emphasize change. In a sense this creates the conception among consumers of research that change is the essence of human existence. Not all researchers on values employ methods that focus attention on value change. Milton Rokeach (1968) assesses the value structures of individuals. He has people rank order values in each of two lists—terminal values (desired end states) and instrumental values (desired ways of behaving). Rokeach, through this methodology, treats the content of value structures as important in predicting human behavior. Yet, among researchers in values, Rokeach is in the minority. The majority of researchers investigate the process of value clarification, the process of value development, or the process of influencing people to change values.

Modern Counseling and Clinical Psychology

Counseling and clinical psychology were spawned by Freud and are only recently (in their Oedipal stage) seeking to "kill" the father. Freud was largely a pre-Hegelian thinker. He investigated universals—universal structures of the mind and universal developmental stages. Prior to World War II the dominant theories of psychotherapy focused on stability of personality and on universal truths about human nature. Clinical psychology was formed and nurtured through personality and intelligence assessment, which assumed that individuals maintained stable traits. Counseling psychology also was originated through assessing traits and factors in vocational counseling. There were advocates of becoming, to be sure (e.g., behaviorism), but counseling and clinical psychology were largely based on assumptions of being rather than becoming.

In the early 1950's, Carl Rogers (1951) proposed client-

centered therapy. He not only propounded a counseling theory that focused on the process of counseling, but he also introduced a philosophy of continual growth and change and "becoming." Rogers' 1951 model of personality remained largely content-oriented, paralleling Piaget's cognitive theory by using constructs like the real self (experience) and the ideal self (a cognitive map of one's experience). He also borrowed heavily from Freud, by using such concepts as introjection of values and psychic defenses (denial and distortion), and by emphasizing the emotions. By 1957, Rogers had deemphasized these remnants from the age of being. He had begun to concentrate on the "necessary and sufficient conditions of change in psychotherapy," and thus on the process of counseling.

Each of these, [the modern theories of counseling and clinical psychology] shows enormous concern for processes and little concern for content.

At about the same time, Harry Stack Sullivan (1954) proposed an interpersonal approach to psychodynamic counseling. He attended to the interpersonal process of counseling and deemphasized the content of the patient's problem. Sullivan was a harbinger of modern interpersonal process theories of counseling, including more recent theorizing by Kiesler (1979). In general, these theories view the content of conversations during therapy as merely the veneer over an interpersonal fencing match between therapist and client. The thrust, parry, and riposte of interpersonal influence is termed the "process" of counseling.

With Rogers and Sullivan, therapies of being were swept relentlessly aside and replaced by a hoard of therapies of becoming. Notable among these were the existentialists (May, 1958), gestalt therapy (Perls, 1969), and behavior therapy (Bandura, 1969). The theories of Rogers and Sullivan introduced "counseling process" into the vocabularies of clinicians though few consider the philosophical underpinnings of attending primarily to "counseling process."

In recent years, theories of psychotherapy have touted therapy processes. The degree to which theorists attend to content of thoughts and to "universals" varies from somewhat to not-at-all. For example, three major approaches to psychotherapy currently dominate the field—cognitive-behavior modification, psychodynamic therapy, and family therapy. Each of these shows enormous concern for processes and little concern for content.

First, let us consider cognitive-behavior modification. One might expect that cognitive therapies would examine contents of consciousness. This is rarely the case. Albert Ellis (1962) proposed rational-emotive therapy (RET). At the core of RET is uncovering people's "universal" irrational ideas. Ellis views these "universal" ideals as culture-specific but, nonetheless, he shows some concern with content of cognitions. Ellis certainly does not espouse a modern psychology of being, however, for *A New Guide to Rational Living* (Ellis & Harper, 1975) is written in a language called E-prime. The primary characteristic of E-prime is that it uses no form of the verb to be. Ellis is not concerned with being, but with action (e.g., with becoming). Attention to the possibility of universal thoughts contrasts with other cognitive theorists. Aaron Beck (1975) also modifies clients' dysfunctional automatic thinking and faulty cognitive processes, regardless of their content. Donald Meichenbaum (1977) modifies self-instructions and faulty cognitive processes. Behavior therapy in the form of its founders (Eysenck, 1959; Wolpe, 1958) has all but been abandoned.

Freudian psychodynamic therapies have also become process-oriented. Currently, there are two major thrusts of psychodynamic psychology. Some therapists analyze ego processes and ego development. Others analyze interpersonal processes. Having begun with Sullivan (1954), this approach advocates an almost content free analysis of what happens between therapist and client in the counseling session.

Individual psychotherapy is rapidly declining in popularity—though it will probably never die—and more therapists are becoming attracted to family systems approaches (Bowen, 1978; Haley, 1976; Minuchin, 1974). Generally, family approaches are process-oriented rather than content-oriented. They do not assume linear causality. They are epitomes of relativistic theories, and thus they embrace the *zeitgeist* of secular psychology in the 1980's.

Consequences of Philosophies of Becoming and Being in Light of Scripture

Thus far we have traced the historical roots of a philosophy of becoming and suggested its prevalence in modern experimental as well as counseling and clinical psychology. This paper is based on the assumption that science in general and psychology in particular are among the primary molds through which modern thought is shaped. Psychologists, whether they are theorists, researchers or both, influence many people.

Psychologists influence researchers and theorists in training. Most psychology-trainees enter graduate school with little knowledge of the theories of psychology (though all have "implicit" theories). Throughout graduate school, trainees are exposed to (usually) an eclectic sampling of psychological approaches. The implicit norm is that students will learn what is taught; thus, a social pressure is applied for students to adopt or adapt the current secular theories of psychology. This is done through training students practically in research methods and/or in methods of counseling. Values inherent in research or counseling methods are often not specifically addressed because they are assumed. Psychologists-in-training are inculturated. Values are caught more than taught, and because of the small prior information base of most students, their graduate school experiences are very influential. It is not uncommon for a Christian to enter graduate training and

adopt methods that are philosophically inconsistent with Christianity. The values of secular psychology may, consequently, be transmitted unwittingly by the trainee (and even by the professor, too).

Psychological researchers and theoreticians only occasionally influence other practicing therapists and researchers. According to Kuhn (1970), established scientists are less susceptible to influence than are trainees. Perhaps they rarely read current research or books. Or perhaps they have a psychological commitment or resource commitment to an established treatment or research program. Or perhaps their information base is large enough to require a great "shock" to dislodge established beliefs. For whatever reason, established scientists or practitioners are not very susceptible to influence. Yet, through repeated exposure to philosophic assumptions or through personal crises, which open individuals' eyes to previously unconsidered beliefs, some established psychologists are influenced.

The philosophy of scientists determines scientific methods, which influence scientific findings, which confirm the philosophy.

Psychologists greatly influence the lay public. Consumers of psychotherapy are often affected. In successful counseling, clients often change their values to be more similar to the values of their counselors (King, 1978; Welkowitz, Cohen, & Ortmeyer, 1967). A philosophy implicit in counseling is sometimes embraced by clients without their awareness of the influence.

Consumers of psychological information are strongly affected by the assumptions inherent in the science. As C. S. Lewis (1970) wrote,

> Our faith is not very likely to be shaken by any book on Hinduism. But if whenever we read an elementary book on Biology, Botany, Politics, or Astronomy, we found that its implications were Hindu, that would shake us. It is not the books written in direct defense of Materialism that make the modern man a materialist; it is the materialistic assumption in all other books. (p. 93)

In the same way it is implicit assumptions inherent in the methodology of science that are later adopted by the lay public. Furthermore, psychology is assumed to be even more influential than institutionalized Christianity at transmitting values and beliefs to the public, for almost everyone is exposed to psychology through schools and through the media, whereas only a minority is exposed to institutional Christianity.

For the evangelical Christian, this means that science should promote values consistent with Scripture. Polanyi (1946) has argued forcefully that science is by nature value-laden. Recently this idea has been cogently applied to psychology by Sigmund Koch (1981) in the *American Psychologist*, psychology's most prestigious journal. He criticizes psychology, and science in general, for being slavishly wed to thought that "regards knowledge as the result of 'processing' rather than discovery" (Koch, 1981, p. 259). Koch clearly explicated the certain link between the methods of psychology and the assumptions of philosophy.

> Psychology is necessarily the most philosophy-sensitive discipline in the entire gamut of disciplines that claim empirical status. We can not discriminate a so-called variable, pose a research question, choose or invent a method, project a theory, stipulate a psychotechnology, without making strong presumptions of philosophical cast about the value of our human subject matter—presumptions that can be ordered to age-old contexts of philosophical discussion. (p. 267).

Given that Christians who are scientists want to behave consistently with Scripture, what does Scripture teach in this area? God is unchanging (Mal. 3:6). Jesus is unchanging (Heb 13:8), God's attitudes are unchanging (Ps. 118:2) his promises are unchanging (Gen 17:7), his kingdom is unchanging (Ps. 145:13), his way is everlasting (Ps. 139:24), and in our

Everett L. Worthington, Jr. is an Associate Professor of Psychology and Director of the MidLife Counseling Service at Virginia Commonwealth University in Richmond. He obtained a B.S. and an M.S. degree in Nuclear Engineering at the University of Tennessee-Knoxville and M.I.T., respectively. After four years as a Naval Officer, he entered graduate school, receiving an M.A. and a Ph.D. degree in Psychology (Counseling) at the University of Missouri-Columbia in 1978. He has published research on the cognitive-behavioral control of pain, supervision of counseling, and Christian counseling. He currently has an active research program in the effects of life transitions on marriage relationships and how to help couples cope with those changes.

lifetimes the law is eternal (Matt 5:18). There is clear evidence from Scripture that God is an Absolute Being, with unchangeable attributes. Acts by humans that are contrary to those attributes were, are, and always will be wrong. There is a strong case for assuming a permanence of divine and human attributes. On the other hand, there is a small amount of evidence of dialectical logic within Scripture, and there are some universal processes of human existence identified within Scripture (e.g., sanctification is a universal process by which Christians learn to rely more closely on God). It appears that stability, eternality, and "being" are extremely important to the traditional Christian world-view.

Furthermore, God saw fit to create and canonize the Bible within the Judaic culture, which clearly reflected a philosophy of being rather than of becoming. Since philosophies of becoming existed at least as early as 500 B.C. (Heraclitus of Ephesus), one would assume that God could have established Judaism and Christianity as embodying a philosophy of becoming if He had so desired. Yet, God called His people apart from the standards and philosophies which were "popular" or "accepted" within larger culture.

Thus, within psychology, a self-strengthening loop has been established. Most psychologists have adopted a philosophy that deemphasized the content of thoughts and behaviors and emphasized psychological processes. The philosophy of scientists determines scientific methods, which influence scientific findings, which confirm the philosophy. This "evidence" contributes to cultural acceptance of the philosophy, because scientists have objectively discovered the nature of "reality."

Therefore, although Scripture does not directly prescribe what the nature of scientific research is to be, we conclude that a Scripture-consistent position for psychologists to take would include general adherence to a philosophy of being. This suggests that psychologists concern themselves with universals—both universal contents of thoughts, motives, emotions, and behaviors and universal processes of interaction and development. Because of the prevailing emphasis on processes and on change, taking a position that affirms examining content in addition to processes can seem foolish. In the face of modern "reality" of empirical science that "proves" (by presuming) the all pervasive nature of change, it takes either foolishness or courage (depending on one's assumptions) to adopt a contrary position, especially with the possibility of rejection by peers—not to mention rejection by promotion and tenure committees. Unless Christian psychologists develop powerful new methods to assess content, we risk being seen as intellectually stagnant, as remnants of an epoch past.

Clearly, I believe that psychologists overemphasize assumptions of continual change in their research and practice and that this overemphasis undermines the foundation of the Christian faith by assuming that nothing is unchanging except the principle of eternal change. As scientists we need to be aware of the effect that our research and practice have on beliefs in our culture. We need to question our scientific assumptions and examine our consciences concerning whether we believe the current emphasis on change reflects the heavenly and earthly reality. I believe that as Christians who are scientists, we must attempt to refocus the attention of the scientific community through developing new methods that will lead to new findings and theories that will in turn restore a balanced view of nature. These new methods must be consistent with a philosophy of science that is checked against Christian standards (the Scripture, the witness of the Holy Spirit, and the wisdom of the ages).

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Newcomb's Problem and Divine Foreknowledge

EDWARD B. DAVIS

Department of History and Philosophy of Science
Indiana University
Bloomington, Indiana 47405

Newcomb's box problem, a well known puzzle in decision theory, may be useful as a model of God's prior knowledge of freely made human choices. This paper, which is intended to stimulate discussion on the nature of divine omniscience, contains three sections. (1) Newcomb's problem is presented and partially analyzed. (2) It has been argued elsewhere, on the basis of Newcomb's problem, that free choices must be inherently unpredictable for all beings, including God; the very possibility of divine omniscience as traditionally understood has been called into question. I refute this argument here. (3) Two types of infallible beings are proposed: a superscientist, who must calculate in order to predict; and the biblical God, who already knew the outcome of all free choices before the world was created, and who has already acted upon that knowledge. Only the latter type of being is compatible with real human freedom. Predestination is best understood as divine action predicated upon prior knowledge of human decisions.

The Problem

Suppose that on a table in front of you are two boxes, B_1 and B_2. B_1 is transparent and contains a $1000 bill, but B_2 is opaque. Across the table sits a being who has correctly predicted your choices in the past and has correctly predicted the choices of many of your friends as well. To the best of your knowledge he has never been wrong. The being gives you a choice between two actions:

C_1 to take only one box, the opaque B_2;
or
C_2 to take both boxes.

You are not permitted to take only the transparent box B_1, and you are not permitted to look inside the opaque box B_2 until you have made your choice. The being tells you that the contents of B_2 depend upon what he has predicted you will choose: if he has predicted (P_1) that you will choose only one box (C_1), then he has already put one million dollars ($\$M$) inside B_2 (perhaps to reward your moderation or your faith in his abilities); if he has predicted (P_2) that you will choose both boxes (C_2), then he has not put anything inside B_2, leaving it empty (perhaps to penalize your greed or your lack of faith in his abilities). Knowing all this, what would you choose to do, C_1 or C_2? Before reading any further, take some time to decide.

A strong argument can be made for either choice. Robert Nozick, the philosopher who first published this puzzle

An earlier version of this paper was read at the 1980 annual meeting of the American Scientific Affiliation in Upland, Indiana.

known as "Newcomb's Problem," gives this version (A_1) of the argument for taking only one box (C_1):[1]

> A_1 If I take what is in both boxes, the being, almost certainly, will have predicted this and will not have put the $\$M$ in the second box, and so I will, almost certainly, get only \$1000. If I take only what is in the second box, the being, almost certainly, will have predicted this and will have put the $\$M$ in the second box, and so I will, almost certainly, get $\$M$. Thus if I take what is in both boxes, I, almost certainly, will get \$1000. If I take only what is in the second box, I, almost certainly, will get $\$M$. Therefore I should take only what is in the second box.

But it is possible to argue (A_2) for choice C_2 just as convincingly (see Fig. 1):

> A_2 The being has already made his prediction, and has already either put the $\$M$ in the second box, or has not. The \$M is either already sitting in the second box, or it is not, and which situation obtains is already fixed and determined. If the being has already put the $\$M$ in the second box, and I take what is in both boxes I get $\$M$ + \$1000, whereas if I take only what is in the second box, I get only $\$M$. If the being has not put the $\$M$ in the second box, and I take what is in both boxes I get \$1000, whereas if I take only what is in the second box, I get no money. Therefore, whether the money is there or not, and which it is already fixed and determined, I get \$1000 more by taking what is in both boxes rather than taking only what is in the second box. So I should take what is in both boxes.

The arguments above are incompatible, that is, they cannot both be correct at the same time. Your preference will depend on how you interpret the information given in the problem regarding the nature of the being. There seem to be at least three possible interpretations consistent with the amazing record of successful guesses:[2]

> I that there is some connection between the Predictor's predictions and the choosers' choices which accounts for his past success, and which will ensure his success on other occasions, such as this one;
>
> II that there is some connection between the Predictor's predictions and the choosers' choices which accounts for his past success, without being such as to ensure his success on other occasions, such as this one;
>
> III that there is no connection between the Predictor's predictions and the choosers' choices, so that his past success is sheer chance, mere coincidence, and hence does not ensure, or even suggest, his success on other occasions, such as this one.
>
> More briefly: is the Predictor absolutely infallible (Explanation I), extraordinarily reliable (Explanation II), or incredibly lucky (Explanation III)?

It is important to realize that you will decide what to choose on the basis of which type of being you *believe* you are dealing with, regardless of whether or not you are correct to believe it. Suppose, then, that you perceive the being to be absolutely infallible (type I), a conclusion which you feel is justified by his past record. Given your belief, it would be perfectly rational for you to pick just the second box, as argued above (A_1). But suppose that you believe that the past record of the being is all a fake—something is fishy; the players have all been confederates of the being or you have been otherwise duped. Or perhaps his record is pure luck; while highly improbable, it is not impossible. Thus you believe that the being is of type III—he is utterly unable to predict your choice in any sense of the word. Since you believe that there is no connection whatsoever between what you will choose and what he has already predicted, then you should choose both boxes by argument A_2. It may be, however, that you are an agnostic about the being's abilities: you may think it likely that there is some reason other than chance or deception that accounts for his past successes, yet you do not think that this reason makes it *certain* that he will predict your choice correctly this time. Although you would estimate that the being's chance of a correct prediction is much better than 50%, it is not quite 100%. Nozick, for one, opts for this case, recommending the choice C_2 (both boxes) with considerable hesitation. Isaac Levi has shown that Nozick's argument is faulty, but he has also recommended C_2 on the basis of the maximin principle.[3] Without further information, as Levi has shown, the problem permits more than one correct strategy; one can defend either C_1 *or* C_2 if one believes the being is of type II.

Figure 1

Payoff Matrix for Newcomb's Problem

Choices	P_1	P_2
C_1	$\$M$	\$0
C_2	$\$M$ + \$1000	\$1000

Predictions

The Possibility of Perfection

The true nature of the being is in fact unknowable. For example, one would be unable to know for certain that the being is infallible even if an infinite number of trials were possible. And though a limited number of trials could readily show that the being is fallible, one could still not distinguish with absolute certainty between an extremely lucky being and a truly good predictor.[4] Nevertheless if one were to continue to find that the being has correctly predicted choices in repeated trials, one would seem justified in concluding that the being is either of type I or of type II.[5]

George Schlesinger has argued, however, that one could never be correct to believe that the being is the least bit reliable, let alone infallible, even if he has a long and unbroken string of successes, since the assumption of a perfect predictor, he argues, leads to a contradiction.[6] Briefly, his argument is this. Suppose that the Newcomb game is to be played by three parties: a being who has never been wrong, a chooser, and an observer ("Smith") who always has in view the contents of the opaque box B_2 (perhaps there is a window on one side of the box). If we assume that Smith is a perfectly intelligent person who always advises the chooser to do what is in the chooser's best interest, then what would he advise? If Smith finds that B_2 is empty, then he will surely advise that both boxes be taken, so that the chooser will not go away empty handed. If on the other hand Smith finds that B_2 contains $\$M$, then he will still advise that both boxes be chosen, since this will result in an extra \$1000 for the chooser. Now under the rules of the game Smith is not permitted to communicate his advice, but this is irrelevant since the chooser knows what that advice would be: under all circum-

stances, choose both boxes. Thus it is in the chooser's best interest to choose C_2. However if the being with the perfect record of predictions is assumed to be infallible, then by argument A_1 (above) the best strategy is to choose C_1. This is a contradiction. To avoid a contradiction, Schlesinger asserts that no being—not even one with a perfect record—should ever be assumed to be a perfect predictor of free choices; indeed he goes beyond this, denying any competence whatsoever to the being. The only way for a being to insure his infallibility, argues Schlesinger, would be for him to prevent the chooser by force from contravening his prediction, but then the chooser would not be free.

Is Schlesinger correct? If so, then free choices are in principle unpredictable for all beings, including God, a conclusion which Schlesinger takes as fundamental to his theism.[7] His argument is flawed, however. The contradiction does not arise by assuming that a being who has not erred in the past will not err in the future; the contradiction arises because Smith's (uncommunicated) advice is assumed to be in the chooser's best interest when in fact it is not. Smith advises the chooser to take both boxes only because that is what Smith would do if the choice were his own. It is not what Smith would do if he were in the chooser's place—and the fact that he is not is crucial, for it creates an asymmetry—it is what Smith would do if he were given the opportunity to choose *knowing what he does* about the contents of B_2 and, therefore, about the nature of the prediction. That knowledge makes all the difference because a revealed prediction is no longer in force. In essence, then, one must be well informed (as Smith is) in order to make out better by choosing C_2 than by choosing C_1. Since the chooser is *not* well informed (he does not know the contents of B_2), he is better off to choose C_1. And since Smith *knows* that the chooser is not well informed and therefore can not expect to fool the predictor, his advice should be to choose C_1, regardless of what he sees. Hence the contradiction vanishes.

The advice which Schlesinger would have Smith offer—to take both boxes—is useless because the chooser does not know *why* it is being given: he does not know if Smith sees \$0 or \$*M* in B_2[8] He can find out in one way only, by making his choice, but the very act of choosing will *logically* determine the state that obtains (if the being is infallible). It will not *physically* determine the state; the predictor's action has already done so. Neither will it change the state; Smith will note that the contents of B_2 remain the same after the chooser makes up his mind. By choosing C_1, for example, one does not *make it true* that there is \$*M* in B_2—this has been true for some time, as Smith can testify—but one *is* offering *conclusive evidence* that \$*M* will be found in B_2 when it is opened.

Is Schlesinger correct? If so, then free choices are in principle unpredictable for all beings, including God

Free Choices and Perfect Predictors

From what I have just argued, it might appear that the chooser is not really free. Since Smith can expect to take both boxes and sometimes find \$*M* in B_2 but the chooser can not expect the same thing, it appears that the infallible being in some way constrains the chooser so that he is not really free. This depends on our point of view. An infallible and omniscient being has sure and certain knowledge of a choice before it is made. From his perspective, it is not really a choice; it is an event that will occur. Smith has knowledge of the contents of B_2, and therefore he also knows what the choice will be, so it is not a choice for him either. (Nor is he given any opportunity to make a choice himself.) But for the chooser it really *is* a free choice—he can choose in harmony with his wishes. He is free to choose one box and receive \$*M* or to choose both boxes and receive \$1000. He is *not* free to choose both boxes and receive \$*M* + \$1000—it just is not in the cards as far as he is concerned.

Since the being knows for certain what the chooser will do, isn't the choice in some sense "inevitable"? Isn't it "bound to occur?" Yes, it is. But this need not imply (although it may) that the chooser is programmed to choose in a certain way. That depends upon the nature of the being's infallibility. Apart from the trivial case of a being who forces the chooser to "decide" in harmony with a previous prediction, I can

Edward B. Davis, a Charlotte W. Newcombe Dissertation Year Fellow, is in the Department of History and Philosophy of Science, Indiana University. He has a B.S. (Physics) from Drexel University and an M.A. (History of Science) from Indiana University. He has taught science and mathematics at Drexel, Indiana, and at Cedar Grove Christian Academy (Philadelphia).

conceive of at least two radically different ways in which a being could be an infallible predictor of choices: in one case, physical determinism holds; in the other, logical determinism holds.[9] It could be that the being is a superscientist who predicts choices on the basis of his present knowledge of the chooser's state of mind, deriving the future choice by some nomic statement(s).[10] All that would be required for infallibility would be a set of valid universal generalizations, full knowledge of the chooser's present state of mind, and the ability to perform any necessary calculations without error—all routine matters for our superscientist. In such a case, the future choice is as inevitable as the trajectory of a body in a gravitational field; of course, the being's prediction is just as determined. Both being and chooser would be subject to the real programmer, the laws of nature. In such a world I would hesitate to say that any choices are free.

An infallible and omniscient being has sure and certain knowledge of a choice before it is made. From his perspective, it is not really a choice; it is an event that will occur.

But there could be another kind of infallible predictor. Rather than a Laplacian Divine Mathematician who needs to calculate in order to predict, the being might simply *know* the future in the same way that he knows the past. He would have no need of deterministic laws (although such laws might still exist). For him, it would simply be a matter of knowing; the future would be as certain as the past. Events would not be inevitable in the mathematical or physical sense, but in the logical sense: if he knows that they will happen, then they will happen. The biblical God is just such a being. As Calvin put it, "that which God has determined, though it must come to pass, is not, however, precisely, or in its own nature, necessary."[11] In this case one's choice would not be determined by inexorable laws and could not be predicted by extrapolating a current state of mind into the future. It would be significantly free: if one were given the same choice under the same conditions in some other identical world, the outcome could be different. No matter what one decides, one would do so freely, only one could not escape being "seen" by God as he makes his free choice.[12] Since God would therefore have completely reliable foreknowledge of one's choice, He could have already prepared one's reward before the foundation of the world. He would not make a calculation; He would not make a prediction and then control the choice to insure its agreement; He would simply foresee free choices as if they had been made prior to His preparations.

But God does not play Newcomb games with His creatures. He does not offer cash incentives for people to take only one box. He offers salvation to all who will humbly trust Him and freely choose Christ; the same He did foreknow and did also predestinate to be conformed to the image of His Son, that He might be the firstborn among many brethren.[13]

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1. This quotation and the following one are from p. 115 of Nozick's article, "Newcomb's Problem and Two Principles of Choice," in *Essays in Honor of Carl G. Hempel*, edited by Nicholas Rescher et al. (Reidel, 1970), pp. 114–146. Nozick attributes the problem to Dr. William Newcomb of the Livermore Laboratories in California. Like many others, I first read of the Newcomb problem in Martin Gardner, "Free Will Revisited, with a Mind-bending Paradox by William Newcomb," *Scientific American 229(1)* (July 1973), 104–108. Reader responses to the problem (including one by Isaac Asimov) are analyzed by Nozick in another Gardner column, "Reflections on Newcomb's Problem: a Prediction and Free-Will Dilemma," *Scientific American 230(3)* (March 1974), 102–106.
2. This is taken from Don Locke, "How to Make a Newcomb Choice," *Analysis 38* (1978), 17–23; he argues for taking both boxes even though he expects to receive only $1000.
3. In his excellent article on "Newcomb's Many Problems," *Theory and Decision 6* (1975), 161–175, Levi shows that Nozick's statement of the problem is not precise enough to permit of a single correct answer.
4. The problem of distinguishing between an extremely lucky being and a good predictor appears to be logically equivalent to the problem of determining whether a given number is random, and even an infinite number of trials may be insufficient for this. See Gregory Chaitin, "Randomness and Mathematical Proof," *Scientific American 232(5)* (May 1975), 47–52. I want to thank Mr. Dennis L. Feucht for calling my attention to this article.
5. See Locke, p. 20.
6. See "The Unpredictability of Free Choices," *British Jour. Phil. Sci. 25* (1974), 209–221. A Jewish rabbi and philosopher of science, Schlesinger has written at greater length on these points in his stimulating volume, *Religion and Scientific Method* (Reidel, 1977). In this latter work (pp. 93ff) he anticipates my objection but fails adequately to deal with it. Other objections to his argument can be found in André Gallois, "How not to Make a Newcomb Choice," *Analysis 39* (1979), 49–53, and James Cargile, "Newcomb's Paradox," *British Jour. Phil. Sci. 26* (1975), 234–239.
7. *Religion and Scientific Method*, Part II: "Free Will, Men and Machines."
8. Since Smith can not relate anything useful—indeed he can not communicate at all—his presence is a red herring. Schlesinger's argument is merely a restatement of A_2 above, and we are left with the same situation: the nature of the being is a matter of conjecture.
9. Donald M. MacKay has discussed Newcomb's problem and these two types of predictors in *Science, Chance, and Providence* (Oxford University Press, 1978). I have independently reached many of the same conclusions, particularly with regard to the efficacy of prayer; since my handling of this would be the same as his, I have not dealt with it here. I am indebted to MacKay for emphasizing the distinction between physical and logical determinism. Anthony Flew's negative review of MacKay's book can be found in *British Jour. Phil. Sci. 30* (1978), 183–186. Richard Swinburne, writing in *Isis 70* (1979), 284f, is much more sympathetic, but he differs with MacKay (and with me) on petitionary prayer.
10. Nozick postulates such a being, although in his version the being is fallible. Since a being of this type could be defeated easily by basing one's choice upon the result of a chance event such as the roll of a die, Nozick explicitly rules out the use of such events in making one's decision.
11. *Institutes of the Christian Religion*, trans. by Henry Beveridge (James Clarke & Co., 1953) 1,181.
12. James Cargile calls this the "crystal ball" version of the story.
13. Romans 8:29. The interpretation of election suggested here, in which a sinner has true freedom to reject God's grace, is not one with which I am entirely happy. In his article on "Determinism and Free Will (A) Scientific Description and Human Choice," *JASA 33* (1981), 42–45, Richard Bube has rejected a view of this sort; many others will no doubt agree with him. But I am not entirely happy with other formulations of election, either. God's providence and predestination are tough nuts to crack—we are not likely to crack them completely in this world (or the next)—and Newcomb's problem suggests a partial solution which I find attractive at this time. In addition to the references previously cited, see Maya Bar-Hillel and Avishai Margalit, "Newcomb's Paradox Revisited," *British Jour. Phil. Sci. 23* (1972), 295–304; André Gallois, "Locke on Causation, Compatibilism and Newcomb's Problem," *Analysis 41* (1981), 42–45; and Doris Olin, "Newcomb's Problem: Further Investigations," *Amer. Phil. Soc. Quar. 13* (1976), 129–133.

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The Mind-Body Problem: Scientific or Philosophic? Implications for Apologetics

THOMAS J. BURKE

Hillsdale College
Department of Philosophy and Religion
Hillsdale, Michigan 49242

This paper analyzes the arguments for dualistic interactionism given by Karl Popper in The Self and Its Brain *and those presented on behalf of the identity theory by D. M. Armstrong in* A Materialist Theory of the Mind. *It is concluded that none of the arguments put forth by the disputants are truly scientific in nature, despite the claims to the contrary, because both positions are compatible with all the evidence cited. The problem, therefore, is not scientific, but philosophic. The logic of this problem, it is then argued, is isomorphic with that of God's relationship to the world. Consequently, empirical events of whatever sort imaginable can have evidential value only in conjunction with a verbal message arising in an historical context relevantly preparatory to both the events and the accompanying message. It is concluded that strictly scientific evidence for Theism is not possible, but belief can and ought to be rationally warranted.*

In his 1977 work, *The Self and Its Brain*,[1] co-authored with Sir John Eccles, Karl Popper argues in favor of a dualist ontology, positing both a material world and a world of nonmaterial, mental events. He begins by delineating 3 worlds. World 1 is the world of physical objects, world 2 that of subjective experience, and world 3 is composed of "the products of the human mind."[2] A prime example of world 3 objects are scientific theories. They are embodiable in worlds 1 and 2 objects, (books, for example), but are not identical with them. World 3 objects are not reducible to world 1 or 2 objects, but can exist, and, essentially, do exist, unembodied. They are abstract. Yet, he argues, we know they exist because through the medium of world 2 objects they have observable effects on world 1 objects. Popper then goes on to argue that minds cannot be mere material objects, for only nonmaterial minds could invent, grasp, and use abstract, nonmaterial, world 3 objects.

D. M. Armstrong, in a book predating Popper's,[3] has set forth a number of arguments for materialism and against mind-brain dualism. While both Popper and Armstrong muster divergent philosophical arguments for their respective cases, they have one major feature in common: both perceive the mind-brain problem as capable of scientific resolution. Either the mind will be fully explicable in terms of brain states, as Armstrong holds, or the positing of a nonmaterial mind will be scientifically necessary to fully account for our knowledge of the world, as Popper and Eccles believe. Presumably, then, if brain science could be shown to fully account for Popper's worlds 2 and 3, Popper and Eccles would give up their dualistic position and accept physicalism; likewise, if future scientific inquiry were only possible on the supposition of a nonphysical mind, Armstrong would forsake physicalism for dualism. In the eyes of the disputants, then, Dualism and Identity Theory are two rival scientific theories. Both parties recognize that our knowledge of the brain has not progressed to the point where these competing theories are capable of precise formulation and exact testing, and, therefore, neither can at this point be definitely falsified. They might better be considered rival research programs or scientific paradigms by which future research should be guided and within which it should take place. But even if exact mathematical precision forever escapes both "theories," eventually, they feel, one or both would come up against

experience for which it (they) could not account and would be falsified. For Popper, unless some startling new and totally unexpected discoveries are made, this is already the case for physicalism, i.e., it has already been faced with data for which it cannot give any adequate account. Armstrong, however, believes a physicalistic account of mental experience is not only possible, but scientifically more respectable given our present knowledge. The burden of proof, he feels, is on the dualist to demonstrate some aspect of mental life for which adequate account cannot be given in terms compatible with physicalism. In essence, then, the argument to date, granting its legitimacy, depends upon whether Popper can point to evidence which cannot be adequately accounted for on the basis of physicalism. Since both parties consider the problem a scientific one, requiring and being decidable on the basis of "concrete evidence," we shall bypass logical points such as Popper's reformulation of Haldane's argument against materialism, and concentrate on those which Popper bases upon, in however oblique and indirect a manner, "publicly observable data." In each case, we shall look at the response which Armstrong gives or could give to Popper's "evidence." Although Armstrong's book predates Popper's, he anticipates some of Popper's moves.

A 'mind-of-the-gaps' theory is no better than a 'God-of-the-gaps' theology.

Our analysis of this debate will lead us to the conclusion that the problem is not resolvable through scientific method, but that both positions nevertheless do assert different things, and that both are meaningful attempts to account for the world. It will then be argued that the nature of this problem is paradigmatic for the relationship of God to the world and that similar difficulties arise when trying to account for events in the physical world from a theistic or from a materialistic perspective. An attempt will be made to show that the theist-materialist argument is unresolvable through the scientific method for reasons analogous to those which vitiate a scientific resolution to the mind-body problem. Accordingly, some definite implications for apologetics will result.

The Inherent Inconclusiveness of Scientific Evidence for Mind

Mind and Processes

Popper's first move is to trace the development of physical science through the "push theory" of Descartes, the "pull theory" of Newton, and the electron theory of Thomson, until the modern theory of physical reality is arrived at, which theory, he stresses, virtually gives up "*the idea of substance or essence.*"[4] He concludes, "The universe now appears to be not a collection of things, but an interacting set of events or processes."[5] Materialism, Popper holds, has transcended itself, and no longer can the world be construed in the mechanistic terms of past centuries. The idea of substance and its materialistic counterpart, elementary particles, must give way to the more abstract concepts of processes and events.

This argument, however, does not necessarily lead to a rejection of materialism. The adjustments that need to be made can just as easily be interpreted as a more sophisticated materialism. If one examines Popper's discussion of "the real" closely, an ambiguity arises which is due to this possibility of an alternative interpretation in materialistic terms. To be real, Popper asserts, an entity "should be able to exert a causal effect upon the *prima facie* real things; that is, upon material things of an ordinary size."[6] He continues by adding that such entities, though not directly observable, ought, on the basis of indirect evidence, (e.g., effects on photographic emulsions), to be accepted as really existing. That is, they are not to be construed as mere convenient fictions. Some of these "entities," he notes, are "more abstract" than others, e.g., force fields.[7] He goes on to give a dispositional account of such things. "Forces and fields of forces are attached to material things, to atoms, and to particles. They are of a dispositional character: they are dispositions to interact."[8]

It soon becomes unclear, however, whether the "ultimately real" is the material entities and force fields are "abstract attributes" of these ultimates, or whether the abstract forces are the "really real" and material things are simply special forms of processes of these fields. Popper, it seems, would like to leave that question open to future scientific theorizing. Importantly, however, at this juncture the physicalist need only point out that in either case force fields and like "abstract" posits of modern physics, while not material in the older, crass sense of the word, are nevertheless not "nonmaterial" in the spiritual sense. They are either "attributes of," "relations between," "alternative forms of," or some such other construal of material entities. As such, they are part of physical reality. "Ultimate physical reality" is now simply conceived as a physical reality of such things as force fields and energy which, through a favorable concourse of events, can form what to us appear as physical entities such as bodies. That is, bodies, atoms, etc. are merely very "compact" organizations of what were previously thought of as immaterial forces. Energy can now be conceived as an alternative form of matter and matter as an alternative form of energy. Which is "really real" becomes a moot point. One need not hold that we have now come across a nonmaterial reality, but only that material reality is much more complex and multivaried in form than previously thought.

Armstrong would be quite happy with such an account of reality, for we would still not need to posit the existence of "entities" or "things" which have no necessary relationship to the physical at all, are not measurable in any sense, and cannot become a part of scientific theory. If Popper is willing to grant that the mental properties he dubs "nonmaterial" can become a functioning part of modern scientific theory, Armstrong will simply call them physical, and the dispute will then be merely verbal: should we or should we not label these particular theoretical entities physical or nonphysical.

It seems, then, that Armstrong has Popper in an extremely unfavorable position. If Popper can show good physical evidence which warrants the positing of nonmaterial entities, the reality of these "entities" becomes such that they can be included under the category of the physical. The fact that they stand in relation to such physical evidence brings them under the category of the physical. Popper's argument based upon the self-transcendence of materialism is, then, not even a good analogical argument, for the type of entities physical science has had to posit are not "nonmaterial," but a new sort of material (physical) thing. Science has not transcended the physical universe and thence found it necessary to deal with "metaphysical" or "theological" realities to explain physical reality. It has merely expanded our conception of physical reality and shown it not to be the sort of hard and firm aggregate of things we once thought it to be.

At this point it should be stressed that the difference between Popper and Armstrong here is not "scientific" but conceptual. It is more a question of what we are going to call things, how they relate to our concepts and our language. Both men spurn the importance of what they call mere conceptual or linguistic analysis in this "scientific" dispute. The above analysis has shown, however, that at least to this point there is little conceptual clarity about what is really meant by the material or physical and the nonmaterial. But until such clarity is achieved, how can we know what will really count as evidence for or against physicalism or dualism? No scientific investigation is going to tell us that, and so it becomes unclear and uncertain that Popper and Armstrong's claim that the dualist–identity theory debate is susceptible of resolution by means of science is at all tenable.

Mind and Emergent Properties

This same difficulty arises with Popper's second line of argumentation. He argues quite cogently that we find in nature emergent laws that are not reducible to laws governing lower levels of structural organization. He stresses the apparent inability of the reductionist program to account for all physical events. He argues not only that the reduction of all science to physics has not yet been done, but that it could not possibly be done. He is at pains to point out that many macro structures are not only not completely explicable in terms of their subsystems, but that the macro structures as a whole can act upon their "constituent elementary particles." He uses the simple example of a wedge. When used, he notes, "we do not arrange for the action of its elementary particles, but we use a structure, relying on it to guide the actions of its constituent elementary particles to act, in concert, so as to achieve the desired result."[9] Stars, he notes, are another example of macro objects which have effects upon the particles of which they are constructed. Such examples are excellent arguments of a two-way interaction between macro structures and the micro structures of which they are composed and, consequently, for the doctrine of emergentism. Laplacian, deterministic reductionism of all physical action to the action of the elementary constitutents of reality would seem highly unlikely, if not impossible. Popper's theory of two-way interaction between different structural levels of reality in accordance with emergent laws appropriate to each level would seem much better equipped to account for the complexity of the world than Armstrong's physical-chemical reductionism.

However, Armstrong could accept emergentism as long as it does not posit nonmaterial substances or processes, and so far, Popper does not. Armstrong writes,

> one can hold that certain processes in the central nervous system operate according to *emergent* laws, laws that cannot be deduced, even in principle, from the laws of physics and chemistry. As a result, behaviour occurs that could not be produced by something working according to purely physico-chemical principles. Such a view would still be a Materialism, for it would not demand any emergent qualities, still less an emergent substance, but it would not be a *physico-chemical* Materialism.[10]

New arrangements of atoms may indeed result in properties "not derivable from a statement describing the arrangement of the atoms, combined with a statement of atomic theory,"[11] but for Armstrong, they are still properties of physical objects. Again, he writes,

> If new basic principles for physics could explain, and could predict, ordinary . . . phenomena *at least* as well as those currently accepted, and if in addition they were able to predict the anomalous behaviour of the central nervous system, then we could switch to the new physics in the interest of a unified scheme of explanation.[12]

Thus, unless Popper can show that nonmaterial entities or processes are necessary, and in addition show that they are truly not material in the broadest sense of the word, he cannot refute materialism, but only cause its modification. Finally, it has also become apparent that these initial arguments of Popper's are not even good analogical arguments because he

Thomas J. Burke is currently Assistant Professor of Religion at Hillsdale College. He has a B.A. from Baylor University, a M.Div. from Trinity Evangelical Divinity School, a M.A. in philosophy from Michigan State, and a Ph.D. from Garrett Evangelical Theological Seminary—Northwestern University. He was ordained in the American Baptist Church and served as a pastor 1974–1982.

has not established a definite nonmaterial analogue for the mind. Force fields and emergent laws are still capable of physicalistic interpretation.

Mind and Consciousness

Popper's strongest arguments against a physicalistic theory of mind, then, become those which consider consciousness itself, i.e., the mind as we experience it. Simply put, Popper's argument is that a) world 3 objects cannot be purely physical—they are not capable of a physicalistic reduction, b) world 3 objects act upon world 1 objects, but only through the mediation of world 2 processes, and c) therefore, both worlds 3 and 2 are real.[13] (Popper's other arguments are subsumable under this major argument.[14] Language, e.g., is a world 2 activity and a world 3 object.)

No purely scientific evidence for God's existence or the nature of His attributes can possibly arise.

In world 3 objects, Popper has what we might call *prima facie* "objects" which are not mere physical objects. As he points out, while they can be embodied in world 1, they are not reducible to world 1 objects. A theory, for example, can be expressed by certain marks on a piece of paper or a chalkboard, but the marks are not the theory. Moreover, Popper argues that some world 3 objects can and do exist unembodied, e.g., mathematical facts such as unthought of numbers, the as yet underived logical implications of theories.

Armstrong would, no doubt, seek to analyze these in terms of physical things. For example, he might say that unthought of numbers do not exist until someone thinks of them; scientific theories exist only insofar as they are expressed in physical reality, written or spoken, or in brain states (thoughts); the abstract processes of arguing, theorizing, etc. exist only as a succession of brain states or insofar as they are recorded somewhere.

But note, first, that he can give only an analysis of these in physicalistic terms, not a scientific proof. Popper's arguments for a dualistic interpretation and Armstrong's arguments for a physicalistic one are both analyses, not scientific proofs. Not only is current scientific evidence neutral in regard to either interpretation, but it is difficult to conceive of scientific evidence that would not be. Second, Armstrong's analysis seems far from adequate. Popper has put forth facts of experience for which no purely physicalistic analysis can fully account. Third, these "facts," while open to public scrutiny, do not necessarily imply Popper's dualistic construal. The fact that they cannot be adequately analyzed in materialistic terms does not mean that we must posit a second sort of nonmaterial thing which does account for them. The problem again goes back to Popper's ambiguous definition of "real." Certainly, theories, works of art, and other world 3 objects have effects upon world 1 objects through the mediation of world 2. But this possibility does not place them in the same class with other "intangible" posits which can only be observed indirectly, e.g., electrons. As shown above, electrons are still physical things (as are force fields), predictions about them (within the limits of quantum mechanics) can be made, they can be quantified, etc. Theories, meanings, and other objects of world 3 are real, but not real in this sense, and it is only the ambiguity of Popper's criterion which allows this confusion. As Armstrong points out, some problem solving goes on unconsciously. Certainly an account of this sort of "theorizing" can be given in terms of brain states and processes. So while a complete identification of brain states with problem solving may not make sense, no nonmaterial realm of being need be posited in order to account for such things as problem solving. *Mutatis mutandis* the same can be said in regard to theories and other world 3 "objects."

Popper does make direct criticism of Armstrong's identity theory. It is noteworthy, however, that he does not present scientific evidence to refute Armstrong's position, but rather gives a philosophical critique. The closest he comes to a discussion of scientific ideas in relation to identity theory is his claim that it is inconsistent with Darwinism and his rejection of the validity of the "Gene=DNA" analogy for the mind-brain problem.

Popper criticizes all theories which posit consciousness but do not accept dualistic interactionism as being inconsistent with Darwinism because no such account of mind gives it survival value. Unless the experiences of consciousness have such value, there would be no reason for their continuance. Armstrong could well reply, however, that this argument presupposes that consciousness is nonmaterial. If it could be shown that it is not physical and that its relation to the brain is dualistic, then Popper would have a strong case. But until then, this argument begs the question.

Popper also points out that "Gene=DNA" is not a true analogue for "Mental State=Brain State." As he mentions, all such analogies are appropriate only if it is supposed that mental states are physical states. But this supposition begs the question. At most a correlation between brain states and states of consciousness can be shown, not an identity.

The problem here is not simply one of technology. Popper expresses this point well when he writes in regard to the views of Quinton,

> he does not suggest the kind of test which could possibly be regarded as a test of the identity thesis of mind and brain, as distinct from an interactionist thesis. . . .[15]

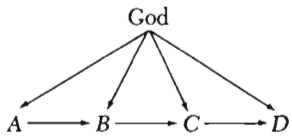
What Popper fails to notice is that no such test is possible for either theory. Armstrong outlines the sort of evidence which might give overwhelming support for dualism,[16] but the sort of inexplicable unpredictability which he proposes as a possible criterion for the truth of dualism would be analogous to arguments which seek to establish God's existence by pointing to gaps in scientific explanations of the world. Each time a gap is filled God's realm of identifiable activity becomes that much smaller. No scientist as scientist ever says, "God is the scientific explanation for the occurrence of these

events." Likewise, no scientist as scientist would ever say, "Now this event is due to the action of the nonmaterial mind." A "mind-of-the-gaps" theory is no better than a "God-of-the-gaps" theology. Until Popper and Armstrong are able to demonstrate the scientific testability of interactionist dualism or identity theory, one feels more inclined to believe that their starting place is erroneous and misleading, and that an appropriate solution lies outside the capabilities of legitimate science. The problem, it seems, is philosophic, not scientific.

The Mind-Brain and God-Word Analogy

The last paragraph hints at the parallel between the mind-brain problem and the providence-science problem. Just as any conceivable scientific evidence is compatible with either a physicalistic or a dualistic conceptual scheme, so any conceivable publicly observable events in nature (including historical events) are of themselves theoretically reconcilable to either a theistic or a materialistic ontology.

The impossibility of showing God's activity in the world by purely scientific investigation and argumentation becomes obvious when dealing with the Thomistic proofs for God's existence. If, for example, in the 1st mover or the First Cause argument, God's moving or causing is understood on the scientific level, it seems unnecessary, for we can give perfectly satisfactory scientific explanations of any particular event.[17] On the other hand, if we consider God's activity to be of a different sort, virtually absorbing the first two ways into the third way, we find it impossible to argue scientifically for this new sort of causality. John Morreall has clearly expressed this point. He refers to the following diagram in which a linear series of events, *A*, *B*, *C*, & *D*, are in direct causal sequence and simultaneously God has a distinct and direct causal effect on each event individually (from above), as well as on the entire sequence.



He writes,

> . . . this scheme makes clear what the dilemma is. If we want to hold that *C* is caused by *both* God and some creature *B*, we will have to explain how the word "cause" is being applied to each. If God and the creature are held to be causing in the *same* sense, then . . . God seems superfluous. *B* explains *C* perfectly well, and it is not even clear how God could cause in the way that *B* does. If we say that God's causing is a *different* kind of causality from *A* or *B* or *C* causing, . . . then the causal (the word being used here in its ordinary sense) regress in the natural order is irrelevant to any demonstration of God; for in the sense in which God is supposed to "cause," *A*, *B*, and *C* do not cause, and so could not have God as the first member in their series. God as a "cause" would not stop any regress of causes, since the word would not mean the same thing in the two cases.[18]

Morreall is concerned with meaning, not evidence, but clearly if meaning is in jeopardy, so is any potential evidential value. The Thomistic arguments might be salvable, but not by scientific means, for if we talk of God causing things, sustaining things, or upholding things, but mean this in a metaphysical sense, we have *ipso facto* ruled out scientific evidence in behalf of this divine activity. If God's activity is not on the same level or of the same kind as that of physical entities, his activity cannot be demonstrated by the scientific method, for that method is designed to handle only physical explanations of physical events. This does not mean that it makes no sense to speak of God's sustaining or providential activity; merely that it cannot be scientifically demonstrated, and, importantly, for the same basic reason that the existence of an immaterial mind cannot be demonstrated by recourse to brain studies, namely, the lack of any scientific criteria by which to test for divine activity. It may make more sense of the world to posit an infinite God as creator, sustainer, and ruler of the universe, just as it might make more sense to believe in the existence of an immaterial mind, but this "sense" will not, strictly speaking, be scientific sense.

Limitations of the Analogy

Certainly, the parallel has its limitations. But that is only to be expected when comparing a person and his brain with an infinite God and the universe. These limitations should be made clear at the outset. First, while the distinction between mind and brain can, at least conceivably, be left at the conceptual level, the distinction between God and the world must be existential. God is not merely the world as subjective experience, Spinoza's *Natura Naturans*, but is an infinite, self-subsistent being who exists separately from the world, even at that "time" when there was no world. Man's mind may only be conceptually distinguishable from his brain, but God is both conceptually and existentially distinguishable from the world.

Second, man is a psycho-physical unity. His physical body is part of him. This is not the case with God and the world. The world is finite and created, whereas God is an infinite and eternal Spirit. Thus, while God cannot be compared univocally with the mind, the *relationship* between man's mind and his body can still have significant features which parallel the *relationship* of God with the world. The basis of this analogy is the nonmaterial nature of God's being and the nonmaterial nature of man's mind, on the one hand, and the material nature of the world and of man's brain on the other. But while the brain is a part of a person's body, the world is emphatically *not* God's body, although that suggestion has been made by some process theologians of the Twentieth Century.

Third, while man's bodily experiences can, by way of his physical brain, affect his mental life, occurrences in the world cannot affect the life of God. As a psycho-somatic unity, events in man's psyche and his soma can affect one another; as a self-subsistent Spirit, God's being is not open to influence from his creation. He can decide to act in certain ways given certain situations in the world, but he cannot be "moved" so to act by an independent and prior act of any creature.

Strengths of the Analogy

Other dissimilarities may also exist, but let us now note the similarities. First, both God and man's mind exist in a nonmaterial, i.e., spiritual, "realm of being." Second, a nonphysical mind could be both imminent, (i.e., present with

all those parts of the brain which are used to explain mental events on the physical level), and yet transcend the brain, (i.e., not be identical with the brain); God is, according to Scripture, imminent in the entire world, but not identical with any part or even the whole of it. He transcends the universe. Here the transcendence of the mind of man over his body would be one way, perhaps a key one, in which man uniquely mirrors his Creator.

Third, the mind of a person is involved in every voluntary act of the person, but every act can also be explained in terms of previous physical states. Likewise, an infinite God is present and active in every event which occurs in the universe, yet all such events have physical explanations. Man's body (including his brain) can be conceived and accounted for sufficiently as operating as it does without any input by an immaterial mind; likewise, a purely scientific account of all events in the world can be given. But importantly, just as a physicalistic description of human acts is adequate as a physical explanation but inadequate as a total explanation, so a scientific and physicalistic explanation of events in the world, while adequate scientifically, is not a total and complete explanation. In both cases, however, the insufficiency is not scientific, but philosophic. It is on the conceptual level that any sort of physical reductionism of mind to brain is demonstrably insufficient; likewise, it is in the same philosophical, conceptual area that materialistic accounts of the world fall short.

Perhaps the closest analogy to God's "causing" is our mind's willing. When I will to tie my shoes, an action occurs which would not have occurred had I not decided to tie them. From the impersonal, scientific perspective, however, a causal chain of events can be posited which need take no account of my mind's willing, although it will include statements about my brain states and neuronal activity, etc. Likewise, when God acts in his creation—and He does this continuously—on the physical level, a complete and self-sufficient chain of physical events, causes, etc. can be given; yet from the personal perspective, the perspective of meaning, such an account is inadequate, just as it is for my shoelace tying. I know by personal experience that talk of persons willing is not nonsense even though I have no scientific need of such language; likewise, my talk of God's willing and acting is similarly meaningful.

The Reality of Minds and God

But just what is there about mind talk and God talk that make them inescapable? It is not some physical, measurable thing or event. We have already ruled that possibility out. It is our speaking, our meaningful use of words and sentences. Note, it is not the physical representations of our speaking, for they are part of measurable, observable reality. It is our confrontation with persons through language that makes the positing of the existence of persons inescapable and necessary. Our knowledge of God would also be impossible were it not for his verbal communication to us. Unless God speaks, through whatever vehicle, we can have no knowledge, or even a good reason, to believe He is there or that the world reflects His activity. No scientist, no matter how knowledgeable, advanced, and sophisticated could conclude from a biological study of Christ that He was the incarnate Word of God. Nor could a physical examination of the resurrected Christ or of the wine made from water or any other "supernatural miracle" tell us an omnipotent God was behind it. It is only their occurrence within the stream of the linguistic biblical tradition, the words and promises of Christ, and the further instruction of the Holy Spirit, that we know another dimension of reality is also present in each such event. It is no accident that Jesus never responded to requests for verification of his messiahship by performing and then pointing to miracles as naturalistically unaccountable events. He always pointed to his acts as fulfillments of the prophetic word, as having a character or nature which bespoke the presence of the same God who had redeemed Israel time and again in previous centuries. As pure physical events, his healings and other "miracles" were capable of adequate explanation by recourse to magic or the devil, and those explanations were no less satisfying to the men of the 1st Century A.D. than our scientific explanations are to men of the 20th Century.

Conclusion

If the analogy between mind and brain and God and the world is valid, and if the resultant view of God's causality is correct, then certain implications for Christian apologetics follow. First, no purely scientific evidence for God's existence or the nature of His attributes can possibly arise. Conversely, no purely scientific evidence against them can be given. Therefore, any argumentation for God's existence will be fundamentally conceptual in nature. It may include reference to particular facts recorded in scripture or observable in nature, but it will do so as these are understood in the context of a conceptual scheme or view of reality, not as isolated events which necessarily demand God as their efficient cause. Belief in God will be rationally warranted not because we have come across some anomolous events or facts for which we cannot conceivably account naturalistically, but because we have been confronted by God through the physical vehicle of language just as we are confronted by the presence of finite human minds through the means of meaningful linguistic communication and concepts.

NOTES

[1]Karl Popper and John C. Eccles, *The Self and Its Brain*, (Springer-Verlag: New York, 1977).
[2]Ibid.
[3]D.M. Armstrong, *A Materialist Theory of Mind*, (Routledge and Kegan: London, 1968).
[4]Popper, pp. 6–7.
[5]Ibid., p. 7.
[6]Ibid., p. 9.
[7]Ibid., p. 10.
[8]Ibid.
[9]Ibid., p. 19.
[10]Armstrong, p. 358.
[11]Popper, p. 23.
[12]Armstrong, p. 361.
[13]Popper, p. 45.
[14]Ibid., pp. 48–49.
[15]Ibid., p. 96.
[16]Armstrong, p. 360.
[17]See John S. Morreall, *Analogy and Talking About God: A critique of the Thomistic Approach*, (University Press of America: Washington D. C., 1978), pp. 55–56 for an excellent illustration.
[18]Ibid., p. 60.

On The Humanism of Science

RAYMOND J. SEEGER

NSF Retired
4507 Wetherill Road
Bethesda, Maryland 20816

This paper addresses the following questions: What is humanism? What is humanistic science? What is science? What are the underlying assumptions of science? Its fruitful by-products? Its limitations? It also delves into some philosophical interpretations and religious implications of science, and briefly addresses the conflicts between science and theology. The scientific outlook is addressed.

John Donne, the poetic Dean of St. Paul's Cathedral (London), wrote in his *Devotions* (1624), "No man is an island entire of itself." We live in one world; we all live in the same world. There isn't an old world and a new world, a white world and a black world, a man's world and a woman's world, a starry world above and a moral world within, a natural world and a supernatural world, an objective world and an existential world, a world of science and a world of humanities, a world of sense and reason and a world of faith. We all live in one world, the same world.

Our experience, too, is one: we the subject, the world the object. Years ago when I was teaching a physics course, on "Our Physical Heritage" for non-science students, I invited a professor of history to lecture on the reciprocal influences of history and science. "What," he began, "is history?" "History," he proclaimed, "is the study of man and his environment!" I made a note of this; although I had studied history all my life, no one had ever bothered to define it for me. Later I asked a professor of philosophy to discuss philosophical implications of science. "What is philosophy?" he asked rhetorically. "The study of man and his environment!" he explained. For the moment I was nonplussed. The next year, however, I introduced the course with a query, "What is physics?" "The study of man and his environment!" I joyfully announced. I, too, had realized that we are all studying the same thing, namely, the universe with man at its focus—but different aspects of it.

The English Augustan poet Alexander Pope argued in his *Essay on Man* (1737), "The proper study of mankind is man"—usually understood to advocate a separation of man from his environment. This poem, however, which deals primarily with the justification of God's ways to man, connotes a quite different discrimination as shown in its preceding line: "Know then thyself, presume not God to scan." Ralph Waldo Emerson, the American transcendentalist essayist, also invoked the Delphic oracle in his famous Phi Beta Kappa address (1837) on "The American Scholar," "The ancient precept, 'Know thyself,' and the modern precept, 'Study nature,' become at last one maxim." Man is thus part and partner in his changing environment—what might properly be called human ecology. The Greeks never separated man from his environment. They looked at nature and discovered it to be real, interesting and comprehensible. Greece itself contained both scientific Ionia and humanistic Attica in continuous communication. (The word interesting, by the way, comes from the Latin *inter esse*, meaning "to be among," viz., man and his environment. One cannot conceive of a person without an environment.)

Nevertheless, we are wont to view our experience in differently colored lights, whether we look at a planet, a plant or a person. We can distinguish three primary cultural colors. There is sky blue signifying our aesthetic enjoyment—"how brief the beauty of the moon!" Grass green symbolizes the nourishment of scientific relatedness—how "the moon may draw the sea!" Earth red represents technological use—how "He appointed the moon for certain seasons!" Possibly a fourth light! an invisible aura—within the red, beyond the violet—that intimates mystically the unity of the universe! This many colored rainbow shines upon our everyday life. We need its integrated light to ensure the integrity of our personal experience.

Our outlook, however, is colored by our daily lookout

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through the tinted education spectacles furnished each one of us upon scholarly matriculation. Everyone nowadays is familiar with the two academic cultures publicized (1959, 1963) by Charles Percy Snow, the British novelist. He himself is always careful to indicate that these two cultures—so-called humanities and science—are strictly academic fields. He deplores the gap between them and urges that it be bridged (modern education is spuriously measured at times by their very distance apart). It is, indeed, remarkable that both the *Civilisation* (1969) by the English art connoisseur Kenneth McKenzie Clark and the *Ascent of Man* (1971) by the English humanist mathematician Jacob Bronowski exhibit so little overlap although they are presumably describing the same world. They reveal little evidence of the underlap of their common experience—a natural bridge. I must confess, however, my own deeper anxiety about the need to bridge a far greater gap, namely, that between these very academic cultures and the nonacademic—not our concern here.

Victor Cousin, the French eclectic philosopher, sounded a tocsin in his 1818 Sorbonne lectures: "*L'art pour l'art*" ("Art for art's sake"). Some modern scientists would counter with the slogan, "Science for the sake of science." More basic, I believe, is, "Art and science together for man!" We must comprehend them. I am personally dissatisfied with the academic compartmentalization of ideas resulting so often from an administrative departmentalization of fields of interest.

Like the pilgrim (1678) of the English non-conformist preacher John Bunyan we are eager to set out on a quest for ultimate truths. But like Alighieri Dante, the Italian philosophic poet, "Midway upon the journey of our life I found myself in a dark wood where the right way was lost" (c. 1307). It was the Roman epic poet Vergil who guided him through Hell, where he accosted the Greek empirically oriented philosopher Aristotle as "the master of those who know." Aristotle, indeed, had begun his metaphysics: "All men by their very nature feel the urge to know"—owing to an innate curiosity about their awful environment. Wondering Ionians sought eternal answers to their perennial questions: where am I? who am I? what will I be? This perpetual quest is a unique human activity. In his pursuit of it man has become enchanted with his mysterious universe; he zealously searches for a unifying pattern by a universal Designer—not a crazy quilt of his own making. I do not fathom a recent pronouncement of Harvey Cox, that apparently godless Harvard theologian: "Life is not an unfathomable mystery. . . . We know there is no ordered universe awaiting the discovery of it by man. . . . The universe is a human invention." Who would be so egotistical as to believe the universe to be man-made?

I pity modern Macbeths who regard life as "a tale told by an idiot, full of sound and fury, signifying nothing." I pity modern dramatists—the Czech Karl Čapek who would try to solve human problems with dehumanized robots (*R.U.R.* 1921); the Swiss Friedrich Dürrenmatt who would have physicists seek security in an insane asylum (1962). I pity modern novelists: the English George Orwell (Eric Blair) with his 1984 madmen seemingly united in a meaningless brotherhood (1949); the English Aldous Huxley seeking solace in his caricature of scientists as cringing creatures crawling blind to escape his so-called *Brave New World* (1932), only to become later (1958) a Buddhist drug addict to painless nihilism.

In his perpetual quest for knowledge, on the contrary, man has found some comfort in science's liberation from cultural bondage of some of his attitudes and thoughts. We shall now focus our attention on this humanistic science.

Confusion is rampant with respect to humanism in general and the humanities in particular. One speaks thoughtlessly of literary humanists, scientific humanists, Christian humanists, et al. The term humanities, in turn, varies from college to college (in their catalogues); it is actually defined in the final report (1964) of the U.S. Commission of Humanities, viz., "The humanities are the study of that which is most human. . . . The body is usually taken to include the study of history, the arts, religion, and philosophy." No science? Jacques Maritain, the French religious philosopher, whom no one can accuse of being partial to natural science, advocated in the Terry lectures (1943) on "Education at the Crossroads," "Physics should be taught and revered as a liberal art of the first rank, like poetry." We are liable to forget that one of the nine muses was Urania (astronomy). The Roman statesman Cassiodorus' seven liberal arts comprised the trivium (grammar, logic, rhetoric) and the quadrivium (astronomy, arithmetic, geometry, music (then largely applied mathematics)). What happened over the ages? Nevertheless, the liberal arts, in principle, have always been for free men, to set men free; free to drink hemlock or to die on a cross for the general welfare. In historical perspective we can see the omnipresent role of science in the spread of humanism.

What Is Humanism?

What is humanism? We might seek its origin in the Greek philosopher Socrates' ethical concerns in the golden age of antiquity or in the Renaissance's emphasis upon the dignity of an individual. It is amazing how often a representative humanist is popularly selected to be a non-scientist. My own preference would be a person like the Italian genius Leonardo da Vinci who doodled with art alongside his engineering notes and with engineering alongside the ones on art. Another versatile person was the Italian natural philosopher Galileo Galilei. In later life he reminisced about his youthful dream of becoming an artist (the American art critic Erwin Panofsky concluded that he probably would have been successful in this capacity). In the tradition of his family (his father was a composer) he himself played several musical instruments. He boasted, when young, of knowing by heart the entire *Orlando Furioso* (1516) by the Italian poet Lodovico Ariosto. His own writings in the vernacular were an expression of his overwhelming desire to impress his own convictions on the common reader of his day. That led to his celebrated social controversy with the ruling Church; the people understood him.

The popular formulation of humanism is credited to the Roman dramatist Publius Terentius Afer; in his comedy *Heauton Timoramenos* (168 B.C., *The Self-Tormentor*) a retired farmer justifies his own interest in the activities of a neighbor's son by the remark, "I am a man: I consider nothing

of man alien to me." There are, however, different levels of human interest, from the star light of idealistic youth to the earth dung of realistic babes. The intelligent (Latin *inter legere*—to choose between) person chooses between possible courses of action; he discriminates rather than behaving promiscuously at random. The Greeks, for example, chose the potential excellence of the individual; for them humanism meant man at his best.

Our perpetual quest: where am I? who am I? what will I be?

In this spirit, we, too, might regard humanistic science from purely classical viewpoints: "the glory that was Greece and the grandeur that was Rome," and the grace that was Galilee. We must, however, be careful not to become mere antiquarians; we must look also from a modern point of view. For example, it is not enough that we share Dante's feeling as he regarded the Ptolemaic universe of his day; we must consider how he might have felt in the Copernican universe of today. Regardless of our esteem for the classical vision (I myself began college as a classics major) or of our indebtedness to its later renascence (I still admire Galileo), we must be sensitive to the distinctive feature of our current culture, its new dimension of science and technology. To be sure, this itself is actually an extension of man's propensities and interests and capabilities. It is, therefore, surprising to find so little regard for science in *Democratic Experience* (1975) by the Pulitzer prize winning Librarian of Congress, Daniel Joseph Boorstin.

There is, moreover, understandably widespread popular confusion between these two technical terms, science and technology. They can be regarded actually as the extremes of a whole spectrum; scientific understanding per se and technological utilizing per se. The former leads to intellectual abstractions, the latter to social (including moral) applications. One cannot fix any artificial line of demarcation; that would shift with dominant interest from time to time. The picture is further complicated by their continuous interactions. For example, the amusing electric phenomena of the early nineteenth century gave rise to the engulfing electrical age at its close, while the contemporary powerful steam engine led inevitably to the fascinating field of thermophysics.

Different Types of Revolutions

It is helpful to distinguish three different types of revolutions in this cultural melée. First of all, there have been a number of technological revolutions, all of which have been concerned primarily with sources of energy and power. (As someone remarked, "The greatest invention in the nineteenth century was the invention of invention.") One begins naturally with man's use of mechanical energy, the energy of the wind and of the wave, with manpower and with horsepower. Then came his employment of electrical energy, which was succeeded by chemical energy, and now by so-called atomic energy (nuclear energy). As each new form of energy has come into prominence, new social (and moral) problems have been encountered.

Strictly scientific revolutions, on the contrary, have revolved about central ideas. For example, in the time of Galileo one might have properly inquired, "How does a stone fall?" "Let us consult Aristotle," would volunteer a classical scholar. "Why not Thomas Aquinas?" would urge a Christian thinker. Galileo, however, would probably ask, "Why not observe it directly as it falls?" Such a suggestion that one might obtain some answers directly from nature itself was truly revolutionary. In the nineteenth century some speculators were emboldened to seek answers to all man's questions in this manner (but not I). Today there are some who claim that man can obtain such answers solely by the method of the physical sciences (but not I). Even though we may be able pragmatically to describe behavior sufficiently for everyday use, we cannot necessarily explain it to our complete satisfaction; for example, the origin of matter and life, of mind and spirit. With each scientific revolution there are disclosed new intellectual problems of a decidedly personal concern because of their philosophical and religious implications.

Raymond J. Seeger received a B.A. (Physics) from Rutgers University, Ph.D. (theoretical physics) from Yale University, and an honorary D.Sc. from Kent State University and from the University of Dubuque. He retired from the National Science Foundation where he held various positions. His primary research interests have been in the foundations of quantum mechanics, the electric breakdown of solids, and shockwave phenomena. The humanistic aspects of the development and understanding of physics together with its literary and social interrelations, its philosophical and religious implications, have always been a personal concern.

The twentieth century ushered in a third type of revolution, which might be called scientific–technological. Certain (not all) fields of science and of technology apparently converge with beneficial interactions. Because one can describe certain phenomena scientifically, one then finds that one can make technological predictions. Accordingly, organized research, jointly basic and applied, has become sponsored by industry and by government and even by academia. In such common ventures, however, there is always a danger that one component will completely overshadow the other. In his *Grand Academy of Lagado in Laputa* (1726) the Irish satirist Jonathan Swift noted that while the dedicated projectors were trying to understand phenomena (e.g., the extraction of sunbeams out of cucumbers), "the whole country lies miserably waste, the houses in ruins and the people without food or clothes." Here was an extreme prevalence of personal scientific interests with dire social consequences. Nowadays the opposite is increasingly true: an anxious overemphasis upon harvesting technological fruits is leading to a careless neglect of sowing scientific seeds, a short-sighted search for social applications to the neglect of long-range basic science. In life one must always allow a margin for the unexpected, in science for technology and in technology for science.

Public Understanding of Science

Evidently a primary democratic need today is understanding of science by the public. We shall not be concerned here with reasons for the widespread current misunderstanding; to what extent it may be due to the spreading habit of technical jargon in all fields of human endeavor, to what extent it is a consequence of ever vacillating fashions of professional educationalists. Mommy consoles Johnny, "You are having trouble with the new mathematics? Don't worry; Mommy had trouble with the old mathematics. And look how she turned out!" (When Johnny did, he really became worried.) One time when I passed out problems to my sophomore Physics students, one of them exclaimed, "Do you expect me to do these? Who do you think I am? Einstein?" I looked at him quizzically and replied, "No! Einstein wouldn't be taking this course the fourth time." A Congressman once illustrated the scientific method as follows: Pluck the legs off a grasshopper, one by one. In each case tell the grasshopper then to hop; he will do so until all the legs have been removed. "Proving," said the Congressman, "by the scientific method that when a grasshopper has lost all its legs it has lost also its sense of hearing!" Our modern culture is permeated with such everyday misunderstandings of science.

Evidently the public needs to improve its understanding of natural phenomena, and, even more, the very understanding of that understanding, viz., the development of scientific thinking, including its interactions with politics and economics, with sociology and ethics, its philosophical and religious implications. Science, I am convinced, can and must be taught humanistically. After all, scientists are people, human beings. They are not the youthful (21) Mary Godwin Shelley's Frankenstein creating fantastic monsters; they are not the fanciful creatures lurking in the horror nightmares of science-fiction writers. On the other hand, one is well aware that even the so-called humanities are not necessarily taught humanistically.

What Is Science?

What is science? Essentially it is not such academic misrepresentations as the following: "Information, please!" Organized common sense. Black magic ("Beyond me!") Black-box gadgetry. Mysterious mathematics (with the imprimatur Q.E.D.). Technically, it is not primarily induction as popularized by the English lawyer/statesman Francis Bacon (1620), or deduction as argued by the French mathematical philosopher René Descartes (1637), or puzzle solving as advocated by the American historian of science Thomas Samuel Kuhn (1962). Each of these, to be sure, may be involved in scientific reasoning, but none of them is the fundamental criterion that was characteristic of the experimental work of Galileo.

The scientist as citizen cannot be neutral.

What, then, is science? Obviously the result of the so-called scientific method! And this? Something used by a scientist! It would appear that we are merely begging the question. On the contrary, we are emphasizing that the "what" of science is dependent on "how" this is reached, which is meaningless except in terms of "who" does it. This point of view can be illustrated with four essential elements that are inherent in any accepted scientific method.

First of all, I—and you (the scientific method is necessarily communal)—experience something, with nature as a source (possibly indirect). (One should preferably study nature—not science. Note that mathematics per se is excluded in this definition.) Out of our intellectual curiosity we frame questions, selected, but not necessarily answerable at the time. In religious studies, for example, typical questions were the following: Why cannot an omnipotent God make a triangular circle? How many angels can be placed on the point of a needle? In mathematics, why can't I try to square a circle if I wish to do so? Which is larger $\sqrt{1}$ or $\sqrt{-1}$? In physics, what is the color of that beautiful atom? Where is the elusive electron inside it? Selective questions allow for even fewer possible answers, obtained sometimes by penetrating insight, at other times through mystifying intuition. What is truly embarrassing is to have irrelevant questions reveal relevant answers, to find impertinent questions lead to pertinent relations. One's experience, to be sure, depends upon the questioner "who."

Secondly, I—and you—review these findings somehow, with imagination as inspiration—in the sense of the English romantic poet Samuel Taylor Coleridge, i.e., definitely not imaginary or fanciful, like a mermaid. An old lady once accosted the English romantic painter Joseph M. W. Turner, "I've never seen a sunset look like that!" He replied, "Don't you wish you could?" The French Fauvist Georges Rouault was asked how he was able to portray so brilliantly the glistening white birches of spring. "By observing the snow-clad fields of winter" was the reply. As the English natural philosopher Isaac Newton sat under an old apple tree, an

apple fell on his head. "What a lucky day!" he probably mused, "Suppose it had been the moon!" What a revolutionary comparison, a moonlike apple and an applelike moon! This was the first time man conceived of a physical *uni*verse, where the gravity of the earth acts on both moons and apples. Up to that time, man had actually inhabited a duoverse with the celestial heaven perfect and unchanging while in the terrestrial region below it there was a perfect mess ever changing. What a comprehensive imagination—made possible by the intellectual and emotional freedom of a scientist "who."

The third element is your ability—and mine—to deduce something else, with reason as a guide. We insist upon logical consistency with respect to man's mind. In this connection we note the role of mathematics that may insure sufficiency, but not necessity. Suppose, for example, the price x of an apple is given by the equation $x^2 = 25$. Is 5¢ the correct answer? No! there are two answers; the one we choose is determined by the marketplace. Mathematics, you see, may tell us about all possible worlds that fit our stipulations. The actual world, however, can be determined only by some experiential boundary condition.

The fourth element is that very criterion: I—and you—check our conclusions, with nature as a re-source. Our speculations must be bound by our experience. You may recall the antics that the Greek giant Antaeus exhibited when he was strangled mid-air by that work-force of the Greek gods, Heracles. The unforgettable trick was to keep Antaeus' feet from touching his mother earth where his strength would always be nourished upon contact. To me this is a parable of science—not to mention art and religion: one's vital strength is continually renewed as long as there is direct contact with experience—otherwise one merely goes through antics, regardless of how clever or complex.

The sequence of these four elements is not significant, being dependent largely upon the skill of the explorer. The success is a consequence mainly of the properties of the materials themselves. The whole process, however, is cumulative—not so much like the smooth ascent of a pyramid as the rough climbing of a mountain with its unexpected ups and downs, going arounds, and occasional lost direction amid engulfing fog.

In this concise review of what I call *the* scientific method (in preference to various incomplete statements which are often popularly dubbed scientific methods) we have ignored certain important tacit assumptions. The most familiar one is the seeming experiential unity of nature. Nowadays we have become accustomed to the apparent uniformity of matter whether it exists on the earth or on the moon, whether on the planet Mars or on evolving stars. More significant is the assumption of human comprehensibility. The German theoretical physicist Albert Einstein is said to have remarked that the one fact about the universe incomprehensible to him is its evident comprehensibility by man. Recently we have become more and more aware of the importance of a third requirement, viz. social acceptability. This assumption takes two prominent forms, viz., special professional dominances and the general cultural matrix.

Max Planck, the German theoretical physicist, who conceived the quantum theory, notes in his posthumous (1948) *Scientific Autobiography:* "A new scientific truth does not triumph by convincing its opponents and making them see the light, but rather because its opponents eventually die, and a new generation grows up that is familiar with it." In this connection one recalls the first presentation of the conservation of energy to professional scientists. When James Prescott Joule, the English experimental physicist, presented a paper at the 1847 Oxford meeting of the British Association for the Advancement of Science, the chairman of the session insisted that the Manchester brewer's son be brief, and allowed no time for any discussion. Fortunately a young Scotch-Irish professor of natural philosophy at the University of Glasgow, William Thomson (later Lord Kelvin), academically acceptable, rose to call attention to this epoch-making work that was about to be by-passed. Almost a century later (1937) the English experimental physicist Ernest Rutherford (Baron of Nelson) predicted the impracticability of atomic energy—only eight years prior to awesome Hiroshima. Senior scientists are wont to re-view current developments in the perspective of their own pioneering work—a reactionary procedure.

There will always be apparent conflicts between incomplete and imperfect science and incomplete and imperfect theology.

This retarding social behavior is even more widespread with respect to the current cultural matrix. If there had been a Vatican Digest in 1616, it would undoubtedly have presented Galileo's dilemma with respect to the Ptolemy-Copernicus issue in the form of a do-it-yourself analysis. Which is true: the hypothesis of the Alexandrian Claudius Ptolemy that all planets revolve about the earth, or that of the Polish Nicolaus Copernicus with the earth itself joining the planets all moving about the sun? What factors are critical in making such a decision? First of all, I suppose, is the requirement of agreement with observational data. In this case both hypotheses could be regarded as satisfactory, although the data themselves were wanting in precision (the Ptolemaic theory however, had been useful for more than 1400 years). The Copernican theory, to be sure, was more mathematically elegant than the Ptolemaic in the disuse of any large epicycles (there were still 34 circles in the Copernican theory in contrast with more than 80 in the Ptolemaic). Ptolemy's view, however, was enshrined in Dante's *Divine Comedy,* an epitome of the culture of the day, whereas Copernicus' radical conception would have to be regarded as philosophically wanting. What about usually reliable common sense? Francis Bacon believed that any "fool" could see the sun moving across the sky. On the basis of these considerations one would reasonably favor overall the Ptolemaic hypothesis. Such was the consensus of intellectual opinion in Galileo's day. Science is evidently culture-bound; hence the increasingly important new field, the sociology of science.

By-Products of the Scientific Method

Several fruitful by-products of the scientific method are noteworthy. First of all, there are the observed facts. Despite the German historian Leopold von Ranke's dictum to let facts speak for themselves, they don't! It is rather the scientist who selects, questions, observes, describes, and infers with respect to what, where, when, how, and how much (measures always approximate). These observed facts, in short, reveal man's fingerprints, like the soil that clings to a plucked root.

Science, moreover, is never merely a loose-leaf notebook of recorded facts; it at least has them classified. But the scientist again plays the chief role; he himself identifies associates, idealizes, and conceives. He transforms precepts into concepts, both empirical and theoretical. For example, it is truly amazing that there was not even a thermoscope to detect temperature changes until the advent of Galileo. Up to that time a thing was regarded as having either heat or cold. It was Galileo who viewed these two conditions as being different states on a single scale—thus leading to the invention of a thermometer.

Even more significant is the first theoretical concept ever formulated by man. The story is a familiar one. Hieron II, king of Syracuse (3rd century B.C.) ordered his goldsmith to make a new crown out of the royal gold. He was, however, suspicious of the goldsmith; he wondered if the gold was in the completed crown or under the goldsmith's gown. He called upon his chief scientist Archimedes (the first great mathematical physicist) for advice. Archimedes' celebrated bath in this connection was not an uneventful occasion. In his life of Marcellus, the first-century Greek biographer Plutarch notes that this action was community inspired every now and then. In his Roman bath Archimedes was certainly not striving to be the best bathed Syracusan. He was anxiously waiting for the ordeal to be over. Meanwhile he paddled playfully in the water and suddenly noted that just as much water would overflow as he himself became immersed. Rushing out down the street, he shouted, "Eureka!" ("I have found it!"). The townspeople were amazed—not because he was naked (Greek runners always ran naked), but because there was no race. Out of this simple experience Archimedes formulated the first theoretical concept in the history of mankind, viz., specific gravity, which relates two important factors, the weight of a body and that of an equal volume of water. The concept is just as valid and useful today as when it was proposed more than 2000 years ago.

In addition to observed facts and related factors, there is a third important by-product, namely, a factitious theory. (The word theory itself comes from the same Greek root as theatre; it signifies a view.) The scientist attempts finally to relate all his findings in a single view, to comprehend all the facts and factors. A scientist is thus a creative artist and science a human artifact. To change the metaphor, he is like an involved coach with a game plan—not a neutral referee judging the legality of each play. Max Born, the German theoretical physicist, concludes the Appendix of his Waynflete Lectures (1949) on *Natural Philosophy of Cause and Chance* with his conviction that "faith, imagination, and intuition are decisive factors in the progress of science as in any other human activity." Science in the making is adventure-some (one can always expect the unexpected), wonderfull, and joy-full.

The Progress of Science

What are the chief factors that determine the progress of science? Why does it flourish here and now, but not there and then? Why, for example, in colonial England and France, but not in colonial Spain? What are the essential developmental conditions? We would all like to optimize them. We mention just two important factors.

The progress of science depends in the first place on the definability of phenomena, which, in turn, is a function of their complexity and of the inevitable involvement of the observer. (Pure objectivity does not exist, although the object aspect may be distinguishable.) The second major factor is the reproducibility of the phenomena, which is dependent upon the multiplicity and interrelatedness of their constituents, e.g., the proverbial unpredictability of weather is a notable illustration. The rapid development of the physical sciences in comparison with that of the life sciences and of the social sciences is due largely to their relative simplicity—more so than to the interest of private investigators or to the funds available from social agencies (usually in proportion to the practicability expectation).

The progress of science is civilly LTD. There are definite limitations to any man's dream that the scientific method will achieve success at all times and places under all conditions. Blaise Pascal, the French philosophical physicist, noted in his fragmentary *Pensées* that man is seemingly suspended between the infinite and infinitesimal. Today man is floundering between ignorance of the very large (e.g., nebulae receding with almost the speed of light away from us) and ignorance of the very small (e.g., the German theoretical physicist Werner Heisenberg's uncertainty principle with respect to precise knowledge simultaneously of the position and speed for an elementary particle). A fog shrouds our scientific venture as it moves forward. Complete liberation seems more and more doubtful as we find ourselves bound not only by our mental processes, but also by our man-made instruments. As an expanding ball of light spreads its illumination, at the same time it reveals proportionately more the immensity of the surrounding darkness. This phenomenon has become increasingly evident in the well-developed physical sciences; one wonders how long it will take the life sciences, basking currently in the glow of success through utilizing fruits of the physical sciences, to reach a similar apparent impasse.

Philosophical Limitations

Let us now touch lightly upon some philosophical limitations—at least from my own point of view. There are four primary scientific approaches to the basic problem of man and his environment, viz., the avenue of the physical sciences, that of the biological sciences, that of psychology, and that of the social sciences. Each of these avenues is attendant with certain common questions: Pilate's, "What is truth?" Macbeth's, "Is this a dagger?" Hamlet's, "To be or not to be!" The

attempt to answer these three questions on truth, reality, and value is the philosophy of science. Physics, for instance, presupposes some metaphysics—not that metaphysics is essentially a part of physics, but rather it is part of the scaffolding used in building the physics edifice. In the twentieth century, accordingly, science has become more philosophical and philosophy, in turn, more science based.

Civilization has not been built by agnostics and sceptics, but by men of faith.

What is true? This formulation of the first question, more akin to Hebraic verbal action than to the Greek nominal abstraction of Pilate, is typical of a behavioral approach. (The legal demand to "tell the truth, the whole truth, and nothing but the truth" belongs to the "theater of the absurd." Who would claim to know all the truth?) In science, accordingly, one is content to insist only that a statement be true to observation and logic, and to hope that it may lead to a greater comprehension of the known and possibly to the unification of science itself. A scientist never pretends to know everything; on the other hand, he cannot deny knowing something. An illustration or two may serve to clarify how scientific thinking has influenced philosophical ideas.

Imagine a trailer with two newlywed students inside. As she lights a candle in the very middle of the trailer, she muses, "Have you ever had physics?" Chagrined by the very thought—particularly on his honeymoon—he grunts, "Yes." She then asks, "When I light this candle, will the light reach the forward end first, or the rear?" His countenance beams; he knows the answer, "It reaches both at the same time." You and I, however, standing outside, see that the trailer is moving. Obviously, the light will reach the approaching rear end before it gets to the receding front end. Which answer is correct? Both! The theory of restricted relativity is based on the experimental fact that the speed of light is the same for all observers, independent of any relative motion of the observed and the observer. If we are not positive about the simultaneity of such phenomena, how can we be certain about basic concepts like space and time? Our notion of these, indeed, has had to be revised. The essence of relativity, indeed, is not that phenomena may be relative to the observer; rather, that some (e.g., the speed of light) are invariant to all observers. It is unfortunate, therefore, that a popularizer like Joseph Fletcher, the Cambridge (MA) secular theologian, has made relativity per se the corner stone of his so-called new morality with respect to old situation ethics. What is requisite for relative mores are ethical invariances—what used to be called absolutes.

Another familiar misunderstanding seems to be inherent in the popular notion of atomic energy. (cf. Jacob Bronowski's comment (1973). "We should never have turned mass into energy.") By the end of the nineteenth century it had become customary to regard the world as containing electromagnetic radiation (light, x-rays, et al.) coexistent with material things. But how does radiation differ essentially from matter? Both have energy (E) and momentum. In addition, however, matter has mass (M); does radiation have mass also? Albert Einstein concluded from basic physical laws that radiation, as well as matter, has mass given by the universal formula $E = Mc^2$, where c is the speed of light. Its misinterpretation consists in thinking of mass transforming into energy, or vice versa. Actually neither is true. Mass is always conserved, and so is energy. The difficulty, I believe, stems from our shorthand way of speaking. We characteristically associate inert matter with its characteristic property mass and penetrating radiation with its dominant characteristic energy. Hence when matter is transformed into radiation, we carelessly think of their associated characteristics as being transformed.

Ever since the Ionian philosophers, the nature of matter itself has intrigued thinking man. Immanuel Kant, the German transcendental philosopher, first pointed out the paradox lurking in matter; one cannot conceive of its infinite division or of its limited divisibility (cf. the Greek radical concept of an atom). There was a time when the story of the universe could presumably be written with an alphabet of 92 letters, which could be formed with a single *p*, *e*, *n* (*p*roton, *e*lectron, *n*eutron). Then a number of new elementary particles were discovered: the positron, neutron, meson, and so on. Each year the situation became more and more puzzling as the number of so-called elementary particles increased to more than 200. In view of their approximate similarity of mass and electric charge, Werner Heisenberg proposed the possibility of these particles being merely different states of a single dynamical system—like the various energy levels of a single atom.

The second philosophical question is concerned with the reality of scientific theory. One would certainly prefer a behavioral approach here, too; largely because of the linguistic confusion inherent in the multiple usage of the word real. (The American experimental physicist Percy Williams Bridgman refused even to use the word real.) For example, how does realism in art differ from that in philosophy? or existence in religion from that in mathematics? Scientists, therefore, are wont to content themselves with a pragmatic use of the term. The gravitational force field, for instance, is generally accepted as real because of its usefulness as a concept. May there not be other logics? Some kind of Aristotelian potential reality, where a Newtonian material force and a Maxwellian force field may be regarded as different manifestations of the same reality? Reality appears as a tantalizing multi-faced creature facing many different points of view. Remember the confusion that arose in physics itself as to the basicity of particles and waves, both of which were unwarranted extrapolated speculations with respect to experiential phenomena.

The Question of Value

The question of value presents an immediacy of practical concern. Here, too, a behavioral approach is desirable; for scientists do behave like human beings. Noting their failures they make value judgements—in terms not always of scientific goals, but rather of pragmatic successes. They have

generally been successful when they themselves have been truth-full and hope-full, as well as cooperative, regardless of color or creed, class or country. In so doing man has found himself to be a partner in a creative coordination like snowflakes that crystallize out of chaotic vapor motion. Out of the complexity emerges order, out of uncertainty an apparent sense of direction. Not that a scientist ever attains ultimate truth—or even strives for it. Great scientists like the English natural philosophers Isaac Newton and Michael Faraday have been sincerely humble.

Materialists put their faith in their environment, atheistic humanists in man, theistic humanists in God.

Extrinsic values, however, are of greater concern nowadays than these intrinsic ones. For example, is science possibly evil? Some years ago I was invited to participate in a symposium on "Poetry and Science" sponsored by the American Society of Aesthetics. Another speaker was a poet-in-residence at a well-known college, the third was a philosopher at a major university. The poet began by addressing me, "I do not know you. I have nothing against you personally. Science, however, is essentially evil!" I was dumbfounded by this novel introduction to an academic discussion. I had to lay aside my notes, which argued that science, dealing with the whole universe, is probably more imaginative than poetry, restricted narrowly to man's own feelings. I was forced, however, to tackle the problem at hand. "Take a knife," I said, "Is it good or bad?" In the hands of a benevolent physician it can cut out a bad appendix; in the hands of a predatory man it can stab a good heart. The knife itself is neither good nor bad, but it can be used by its holder for either good or bad. Science, to be sure, in times of war helps to produce longer spears, sharper swords, and bigger bombs, but that same science can enable the partially blind to see better, the partially deaf to hear more, the very lame to get about from place to place. Science of itself is neither good nor bad; it is neutral. It can, however, be used by technological man for good or for bad. The heart of the war problem, for instance, has been, is now, and ever will be the heart of man himself.

Scientists, however, are people; their personality has many aspects. As citizens, for example, they cannot remain morally neutral. Recently I had occasion to note the Greeks whom Dante had assigned to the first circle of Hell; among the chatting throng was the mathematician Euclid, the astronomer Ptolemy, and the physician Galen. I was surprised, moreover, to find the famous adventurer, wise Ulysses, being tormented in the eighth circle for his abandonment of his old father Laertes, of his faithful wife Penelope, and of his infant son discreet Telemachus; he was pictured by the English poet Alfred Tennyson as still setting out in his last years "to follow knowledge like a sinking star." Each individual, scientist or not, must personally solve his own social problems. He may appear vacillating like Albert Einstein who, as a nationalist, recommended the making of an atomic bomb (potentially for war), and later, as a pacifist, deplored its actual use. Each one of us has to decide for himself; and no one knows just what he will do under stringent circumstances. Each scientist, however, should strive to tell just what he truly knows and the limitation of that very knowledge, beyond which he must act on faith. It is impossible to quarantine a scientist from the contagious ills of society.

Religious Implications of Science

Intimately related to philosophical beliefs are religious implications of science. Man, of course, is intellectually curious about his spatial environment and is awfully inspired by its challenging mystery. His personal concerns, however, are more apt to be confined to earth, which moves like a life boat in space with man himself seemingly the captain, without chart or compass. In addition to speculative philosophical issues, there is also Everyman's question (cf. the popular 15th-century morality Dutch play *Everyman*): "Alas, whereto may I trust?" There is a vital need for every man's commitment to some overwhelming pattern for his everyday living.

Whereas science is neutral, scientists themselves are people who have to couple their scientific experience and religious experience. They, too, may behave like the prophet Elijah who heard a still small voice, or like the patriarch Job who discerned an act of God in a whirlwind. Religious men of science have subscribed to many different personal beliefs. There have been Anglicans like Clerk Maxwell and Isaac Newton; Congregationalists like Josiah Willard Gibbs and Robert Andrews Millikan; Friends like John Dalton and Arthur Stanley Eddington; Lutherans like Werner Heisenberg, Hermann von Helmholtz, and Max Planck; Presbyterians like Arthur Holly Compton; Sandemanians, like Michael Faraday; Roman Catholics like Galileo Galilei, Albertus Magnus, Gregor Mendel, Blaise Pascal, and Louis Pasteur; Unitarians like Benjamin Franklin; et al.—to mention only a few about whose lives I am somewhat familiar. (An interesting study would be the reciprocal influence of science and of religion.)

One wonders why there is a widespread notion that there are divisive conflicts between science and religion. In the 18th-century controversy was certainly focused on the physical sciences; in the 19th-century it was centered in the biological and earth sciences; in the 20th-century it is apparent in psychology and the social sciences. On college campuses it still lurks often beneath a veneer of academic sophistications. The laboratory is frequently too narrow to permit a look out upon the whole universe; the chapel door (usually closed) may be too narrow to let even God enter. The average person, I suppose, does not have any problem of science and religion. Here is a scientist: he has had genuine scientific experiences, he believes these experiences to be true, he hopes truth is single. If there is any apparent conflict between science and religion, he chooses science that he knows. Here is a man of religion: he has had genuine religious experiences, he believes these experiences to be true, he hopes truth is single. If there is any apparent conflict between religion and science, he rejects science that he does not understand. In both cases it is not a matter of science *and*

religion, but rather of science *or* religion.

There is naturally a desire by some for simply a theoretical world of science alone or for simply a theoretical world of religion alone; occasionally one finds an individual trying to straddle the two worlds despite a wide gulf between them. In my own judgement, however, conflicts between science and religion are always inevitable. Although each field deals with a particular aspect of our one world, each is continually imperfect and incomplete; their overlap, therefore, is necessarily full of inconsistencies and lacunae. One would, nevertheless, hope that the conflicts of a person at age sixty would not be the same as those of the same person at age sixteen; over the years there should have been both scientific and spiritual growth.

We began our discourse with the concept of one world. As we now look back, we can discern three essentially different scientific outlooks: first, every man looks out on the world of phenomena as a whole; second, a scientist's outlook covers selected phenomena; third, an individual's outlook beyond phenomena per se. Does science, however, ever visualize a "real" world of nature? At times scientists have emphatically shouted, "Yes!" But physicists nowadays are inclined to be cautious; they are more apt to point to a possible disclosure without insisting on a logical proof. To illustrate, consider the continual doubling of the number of sides of a regular polygon. One can visualize a circle emerging as the doubling increases without end, but one cannot actually reach it. Likewise in the case of the infinite series $1 + 1/2 + 1/4 + 1/8 + \ldots$ one expects the ultimate sum to be 2, although it will not ever be attained. (A limit is never reached unless included in the series.) In a similar manner, I believe, science in its successive approximations *discloses* the "real" world of nature; it points to it symbolically.

Everyone has to make his own choice with respect to the philosophical and religious implications he discerns personally in the world of phenomena. There are three primary attitudes. First of all, there are those who boastfully claim they do not know; they are called agnostics (or ignoramuses). (One wonders how they themselves know that they don't know.) Their closed minds, however, do not allow entrance into the storehouse of knowledge. Then there is a group of persons who modestly admit they do not know, but . . . These are skeptics who see the door ajar but hesitate to enter; their mind is open, but empty. Still others, admit that they do not know, but boldly enter and find out more and more. These are men of faith; their open mind steadily approaches answers to the perennial questions: where am I? who am I? what will I be? Civilization, including science, has not been built by agnostics and skeptics, but by men of faith.

People differ, however, as to what they put their faith in. Some have been thrilled by the gay flowers about them by day and by the bright stars above them at night. They put their faith in the material environment to provide answers to the basic questions; they may be called materialists. Others, however, have been entrapped in floods or earthquakes, in hurricanes or dust storms. They fear to put their trust in impersonal matter. On the other hand, they have been entranced by man's music and painting, by his writings and buildings. They put their faith in man; they are atheistic humanists. Still others have seen man's inhumanity to man, in his city slums about and in atomic bombs above. They are compelled to look up for salvation to some higher power, which for wont of a better name they call God; they are theistic humanists. Religion then becomes the binding together of the plane of man and his environment and God. One cannot prove that any of these attitudes is true or false. I myself have one life to live; I am a theistic humanist. I believe in the divine rights of man.

The world stands out on either side
No wider than the heart is wide;
Above the world is stretched the sky,—
No higher than the soul is high.
The heart can push the sea and land
Farther away on either hand;
The soul can split the sky in two,
And let the face of God shine through.
But East and West will pinch the heart
That cannot keep them pushed apart;
And he whose soul is flat—the sky
Will cave in on him by and by.

Edna St. Vincent Millay
Renascence

The Christian Far Right and Economic Policy Issues

THOMAS E. VAN DAHM

Professor of Economics
Carthage College
Kenosha, Wisconsin 53141

This article examines the position of the Christian Far Right (CFR) concerning three economic policy issues—the monetary standard, welfare activities, and deficit finance—as explicated in CFR literature. In each case the CFR position is set forth, including the arguments employed in support of the position, and the CFR case is evaluated in terms of quality of the reasoning, economic content of the arguments, and treatment of the Bible. Application of these criteria reveals serious shortcomings in the CFR analyses of these three policy issues.

The emergence of the Christian Right as a political force has been astonishingly rapid. Not surprisingly, therefore, those Christians among us who stand outside this movement often find ourselves without an adequate knowledge of where they stand on particular issues and, at least as importantly, exactly why they hold the views they do.

While many adherents of the Christian Right have not carefully thought through the relationship between their faith and their views concerning social, political, and economic issues—they have no monopoly on this weakness—there has been considerable effort on the part of certain individuals and organizations to articulate a reasoned defense of right-wing views from an evangelical Christian point of view. My purpose in this article is to present and evaluate the thinking of some of these theoreticians as applied to a few specific issues of economic policy. I shall concentrate on the views held by one faction of the Christian Right, namely, those who maintain that the social role of the state should be truly minimal. This faction I have labelled the Christian Far Right (CFR).

By thus limiting the scope of this article to a small number of economic policy issues, I am omitting consideration not only of the CFR writings on other economic subjects but also their considerable work in noneconomic topic areas such as education, science, and the family. Nevertheless, the article should provide a useful general introduction to the nature and quality of reasoning employed by the intellectual leaders of the CFR in their numerous books, pamphlets, and other publications.

Most notable among the theoreticians of the CFR are those associated with Chalcedon and its offshoot, the Institute for Christian Economics. Chalcedon was founded and is still headed by the Rev. Rousas J. Rushdoony, lecturer, prolific writer, and administrator. This organization was designated the "think tank" of the Christian Right in a recent *Newsweek* article.[1] Founder and president of the Institute for Christian Economics is Dr. Gary North. The points of view of the two organizations are indistinguishable; and the same authors, including Rushdoony and North, appear in the publications of both organizations. Accordingly, let us refer to them collectively as the Chalcedon group.

Although the economic policy views expressed in Chalcedon group publications may be taken as representative of CFR views, it must be pointed out that not all CFR adherents would accept all of the biblical/theological and economic arguments developed by Rushdoony and other Chalcedon group writers to support their views. Unfortunately, however, there does not exist, to my knowledge, any alternative well-reasoned evangelical Christian defense of the far-right stance concerning economic policies. We shall therefore regard the arguments of the Chalcedon group as "standard," for purposes of this article, bearing in mind the existence of these disagreements.

Before turning to specific economic policy issues, let us examine the general position of the CFR concerning the proper economic role of the state, since the CFR view in this regard strongly conditions its positions on particular issues. The CFR view may be reasonably summarized as follows: the proper economic function of the state is to maintain conditions conducive to a free-market economy, i.e., to enact and enforce rules supportive of private property, freedom of enterprise, freedom of contract, and the profit motive. According to CFR writers, particularly those of the Chalcedon group, the Bible clearly and explicitly teaches that not only is the free-market economy totally compatible with God's will but it is the only economic system acceptable to God.[2]

Romans 13:4 is the basis for much CFR writing on the economic role of the state: "for he [who is in authority] is God's servant for your good. But if you do wrong, be afraid, for he does not bear the sword in vain, he is the servant of God to execute his wrath on the wrongdoer." This verse Rushdoony interprets as follows: "Civil government is ordained to promote good by providing conditions for its welfare by punishing criminals and preventing crime."[3]

Many CFR adherents also take the position that any government activity not specifically required in the Bible is forbidden. Combining this position with their restrictive interpretation of Romans 13:4 yields this conclusion: "The only functions allowed to the state by the Bible are *defense of its people* and *punishment of criminals*. To go a step beyond this is forbidden."[4] Other CFR writers are willing to concede a somewhat broader role to the state than this, however, as we shall observe.

Despite their general "no" to state activity in the economy, the CFR spokespersons go considerably beyond this point in their discussions of particular economic policy areas, basing their conclusions primarily on their interpretations of specific Scripture passages. In the remaining sections of this article we shall examine the CFR position on three economic policy issues—the monetary standard, welfare activities, and deficit finance—not only presenting their views but also making an attempt to evaluate their supporting arguments.

The Monetary Standard

Efficient operation of the kind of economy which the CFR advocates—the free-market system—requires a monetary system characterized by stability. On this point there is probably universal agreement among economists. Consensus is also broad, though not universal, that monetary stability requires general oversight by the state—the central government—of the nation's monetary system. This does not imply that the state must engage in the issuance of money nor that it must exercise detailed control over its quantity, only that the operation of the whole complex of institutions involved in the provision of money cannot be left entirely to market forces in the same way as, say, the provision of apricots.

Is there, in practice, any kind of monetary system which will meet both God's requirements and the demands of economic stability? The CFR thinkers are confident that the answer is "yes" and that this system is one which is based on the gold standard, having these characteristics:

1. The monetary unit is defined as a specified weight of gold (e.g., one dollar equals .05 ounces of gold).
2. The treasury buys and sells gold at this price without restriction.
3. Gold coins may be melted down by their holders.
4. Gold may be freely exported and imported.
5. Non-gold money may be exchanged for gold money, and vice versa, at the option of the holder.
6. All money is either in the form of gold coins or backed, dollar for dollar, by gold.

The first five requirements are sufficient to define the "gold standard" as it existed in most of the Western world for several decades prior to 1933. Under this kind of regime the monetary system could include non-gold money that was not completely backed by gold, so long as this money was redeemable in gold at the option of the holder. But many CFR thinkers, including those of the Chalcedon group, believe that this kind of monetary system is inadequate; they insist that the only system acceptable to God is one in which the value of the money in circulation exactly equals the value of the nation's monetary gold, i.e., circulating gold coins plus the gold "backing" for nongold money.[5]

Why is it so important to these CFR thinkers that money be thus tied to gold? There are several parts to their case. The first is that the Bible demands that money be "wealth," or commodity. Chilton expresses the argument thus: "Throughout the Bible, money is spoken of as weight. The [biblical] law specifically commands that financial transactions be made in

Thomas E. Van Dahm is a Professor of Economics at Carthage College, having previously taught at Southern Illinois University (Edwardsville), Hope College, Augustana (Illinois) College, and Central (Iowa) College. His BA is from Hope College, MA and PhD from the University of Michigan. He has published a number of articles, principally explorations of the relationship between Christianity and economics, as well as a textbook in monetary economics.

terms of honest measurements of weight."[6] He cites Leviticus 19:35–37 as evidence.

These two quoted sentences are substantially correct—individually—but together they provide no support to the argument that money should be by weight today. The first sentence merely relates to a historical fact having no necessary applicability to today's world. Throughout the "Bible times" era transportation was by foot or animal power; but one does not therefore argue that Christians should eschew the use of motor-driven vehicles. And the second statement, too, is hardly controversial. However, taken together, they tend to mislead because the word "weight" in the Leviticus passage clearly refers not to money but to that which is exchanged for money. Thus the Leviticus passage is not relevant to the issue of whether money must be commodity in order to meet God's requirements.

The second reason for these writers' high regard for the gold standard is based on the belief that there are certain laws of economics analogous to the laws of the physical sciences.

> What we call physical laws . . . are simply the outworking of God's eternal decree and continual providence. And the same is true of economic laws. . . . Man—whether individual anarchist or totalitarian state—cannot transgress God's laws without suffering the pre-ordained consequences, in this world and the next.[7]

One of these "laws of God" is that the only kind of monetary system that has long-run viability is the one described earlier, in which the quantity of money is tightly linked to the quantity of monetary gold. Thus, to these CFR adherents, this strict version of the gold standard is not merely a desirable but optional belief; it is a necessary element in the faith of a true Christian. In fact, in this astonishing paragraph Rushdoony goes so far as to assert that denial of the biblical requirement of the gold standard is tantamount to atheism:

> A minister . . . stated emphatically that gold was an arbitrary and meaningless symbol and that, if men agreed to make wooden tokens the legal tender of a nation, it would be as well or better than gold. This minister . . . was, without intending to be one, implicitly an atheist. He was denying that there is any fundamental law order in economics or any other spheres, any God-given framework of laws that governs every aspect of creation. . . . God either governs in every sphere of creation or He governs in none, because the creation is then an independent existence and its own saviour. The question, are there valid laws of economics . . . is then a question with reference to the existence of God.[8]

I have not found in CFR literature an explicit statement of the biblical basis for the CFR belief in this "monetary law," but the reasoning apparently follows this pattern: (1) God opposes dishonesty and fraud; (2) only commodity money and fully-backed money are honest, while all other types involve theft and fraud; (3) therefore God commands that the nation use only commodity and commodity-backed money—in practice meaning gold coins and gold-backed money.

The first premise hardly needs either explanation or defense; but the conclusion depends crucially on whether, in fact, non-commodity money really does involve dishonesty and fraud, as the second premise alleges. Let us, therefore, examine the CFR arguments on this point.

The following quotation presents the fraud argument with reference to paper money:

> Paper money derives its value from the fact that it originally represented certain quantities of the money commodity, normally gold and silver. A paper bill was originally a demand claim . . . on a specific weight and fineness of a specific money metal. . . . The paper is valued because the metal it represented is valued.[9]

Therefore (the argument goes) when the state removes the precious-metal backing from, say, a $20 bill, the holder, still under the impression that he or she has title to the $20 worth of gold or silver supposedly backing the bill, has clearly been defrauded by the state.

Creation of checking-deposit money by banks in connection with their lending activities also entails fraud, according to North:

> When banks create credit . . . they charge interest on loaned funds which have been created by fiat. There are no gold and silver reserves backing this money, yet the banks profit by lending it. It involves fraud, and it is therefore immoral.[10]

How much validity is there in the argument that, because it consists of unbacked, irredeemable money, today's "managed" monetary system involves fraud? In answering this question it is important to bear in mind the fact that, in order for an action to involve fraud, there must have been misrepresentation. However, it is extremely doubtful that many citizens today feel themselves to be victims of misrepresentation when they accept, say, a newly-issued dollar bill. The issuer of this bill, one of the Federal Reserve banks, neither states nor implies that gold either backs or will be offered in exchange for that bill. An examination of any piece of United States paper money will verify this statement.

While the original basis for the acceptability of paper money undoubtedly was the confidence of the holders in their ability to obtain gold or silver in exchange for the paper if they so desired, this basis is surely of minimal significance today. United States money has been unrelated to gold for nearly a half century with no noticeable effect on its domestic or international acceptability.

As to bank money creation: again, there has been no misrepresentation, i.e., no claim that such money is backed by, or redeemable in, gold or silver, so fraud cannot have occurred. The fact that "banks profit by lending it," (i.e., the bank-created money) is irrelevant to the fraud question. Certainly banks profit by lending—or hope to—but so do borrowers by borrowing!

These CFR writers also allege that the issuance of non-commodity money involves theft. Referring to the situation in which the state "manages" money rather than allowing its quantity to be determined automatically as it is under the gold standard, Rushdoony states: "Money management is confiscation of private wealth by the state."[11] Theft is also involved, according to him, in the issuance of checkbook money by banks:

> Banks "create" money . . . by the unilateral action of simply recording a loan and a deposit on their books. . . . [Such] "loans" mean an element of robbery in that they reduce the value of all money units previously in existence.[12]

Rushdoony is mistaken, in the first quotation, in alleging "confiscation" because the state, as such, no longer issues any

new money other than coins. With some minor exceptions, all United States paper money now in circulation is issued by the twelve Federal Reserve banks, which, although controlled by a Presidentially-appointed board that is answerable to Congress, are owned by (private) member commercial banks. Contrary to popular belief, the Feredal government never prints money to pay its bills. The other major class of money, checkbook money (or "demand deposits"), comes into existence in the course of lending and investing by commerical banks, as Rushdoony points out, and also by certain other private depository financial institutions. Thus, the state is not engaged in theft by money creation.

According to CFR writers, the Bible clearly and explicitly teaches that not only is the free-market economy totally compatible with God's will but it is the only economic system acceptable to God.

Rushdoony's argument that bank lending constitutes robbery because it reduces the value of all other monetary units is not valid either. The value of a unit of money is reduced only if the price level rises, causing this unit (along with all other units) to lose purchasing power. While it is true that bank-money creation *may* result in a rise in the price level, this outcome is not inevitable. The result depends primarily on the relationship between the rate of growth of the money supply and the rate of growth of the nation's output. If money grows at a more rapid rate, prices tend to rise; if output grows at a more rapid rate, prices tend to fall. So, since bank-money creation does not necessarily cause the price level to increase, Rushdoony's "robbery" conclusion cannot be accepted.

Thus, having failed to demonstrate that noncommodity money issuance involves fraud and theft, these CFR adherents have no foundation for their claim that deviation from the "gold standard law" is inherently immoral.

The third reason for their allegiance to the gold standard is the belief, expressed by North, that

> Government prints the [unbacked] notes in order to increase their expenditures, while avoiding the necessity of raising taxes. . . . The state's actions are motivated by the philosophy that *government* can produce *something for nothing*, that it can *create* wealth at will merely through the use of the printing press. Government attempts to usurp the role of God by becoming the creator of wealth rather than remaining the defender of wealth.[13]

North offers no evidence for his assertion that the state maintains a philosophy "that government can produce something for nothing." (It is, in fact, difficult to conceive of something as amorphous as a state having a philosophy!) A more serious flaw in this passage, though, is the very first clause. As was stated a few paragraphs above, the government simply does not finance its expenditures by printing paper money. And, finally, the notion that the government is attempting to fool the public into believing that it (the government) has the divine attribute of ability to create wealth *ex nihilo* is impossible to take seriously.

In the fourth place, the gold standard is necessary, according to these CFR writers, because the issuance of unbacked money, whether by governments or by banks, is "inflationary." There is a definitional quirk here which must be noted: CFR writers, following the usage of economists of the Austrian School (e.g., Ludwig von Mises, Friedrich von Hayek) do not define inflation in the usual way, i.e., as a persistently rising general price level, but as an increase in the nation's stock of money. Consequently:

> If the general price level remains constant because of additional paper money being inserted into the economy, then by definition there is monetary inflation going on.[14]

Is this sort of thing inherently bad? According to North and the Austrians, yes, because the price level, under conditions of economic growth, ought to decline.

As a disciple of the Austrians, North asserts, in addition, that inflating the money supply with non-backed money inevitably generates price-level increases over the long pull because the "inflationary" process, once initiated, is addictive and leads to continued increases in the money supply.[15]

The only solution, once the process has begun, is depression. "The suffering imposed by depression is unfortunate, but it is *the price which must be paid for survival.* If the consequences of runaway inflation are to be avoided, then this discomfort must be borne."[16]

This is authentic Austrian economic doctrine. All that must be said here is that these are mere assertions which are based on assumptions considered questionable by most economists and have not been empirically supported.

Finally, failure to maintain a gold standard and turning instead to some form of managed-money system leads to all sorts of dire consequences, in the view of some CFR thinkers. Here are some of their predictions:

1. ". . . dishonest money introduces a false weight into every monetary transaction in a society, so that radical corruption and injustice prevail."[17]
2. ". . . money management produces communism."[18]
3. "Gold and silver, hard money, are conducive to economic stability and prosperity; managed money spells controls leading to dictatorship and economic chaos and collapse."[19]
4. "Money management . . . involves not only the confiscation of wealth and of economic liberty, but of political liberty as well. The state gains in power beyond the control of the people."[20]
5. "Money management produces progressively worthless money together with concentrations of power."[21]
6. "Money management . . . creates nationalism and fragmentation . . . and the more it [money] is debased, the weaker its [international] flow. The result is a collapse of the economic internationalism which gold and silver foster."[22]
7. "Either we destroy the fraud of unbacked paper currency and unbacked bank credit, or the fraud will destroy us—morally, economically, politically, and spiritually."[23]

It is difficult to know whether all of these prophecies are intended to be taken at face value. In any case, they are indicative of the gravity with which the problem of money is perceived by CFR writers.

Government Welfare Activities

The second economic policy area to be discussed, government welfare activities, does not have precise boundaries; but we can define this area adequately for our purposes as *those activities of government which are designed to alleviate the economic condition of people who are poor.* This definition neither expresses nor implies any judgment as to whether some or all of the people covered under programs of this sort really deserve to be poor, whether the government ought to involve itself in this area at all, and whether such programs are, or can be, successful. It also excludes programs designed to improve the conditions of particular disadvantaged groups—such as victims of racial discrimination, mentally retarded people, disabled veterans, and so on—because not all people in such categories are poor.

The means used to accomplish the goal of welfare activities are varied and include cash grants, vouchers for the purchase of designated goods or services, direct provision of services, and grants of commodities; and the direct intent of a particular activity might be to provide goods and services needed for a "decent life" or to equip the recipient vocationally, socially, or physically to earn his/her own living and to "cope" in other ways.

Not surprisingly, CFR spokespersons are generally opposed to government programs designed to deal with poverty. In the first place, their general principles concerning the role of government in economic affairs would imply this position: the state must not deviate from its Scripturally-required functions of maintenance of order and freedom. If God had intended the state to perform charitable functions, He would have specified this intention somewhere in the Bible. "The New Testament teaches that the individual and the church are responsible to aid the poor. This is never said to be the responsibility of government."[24]

Furthermore, the state must not attempt to enforce private charity either, according to Chilton:

> Charity is personal, though not purely "voluntary," since biblical law commands it—but on the other hand, those laws are not enforced by the state: the Bible mandates no civil penalties for failing to obey the charity laws.[25]

Besides citing the absence of any scriptural mandate for governmental welfare activites, CFR writers offer several specific reasons for their opposition to them. One is that such activities involve violations of the Eighth and Tenth commandments. With reference to the Eighth, according to Rushdoony:

> Theft is accomplished by indirect and legal means, i.e., by passing a law which steals from the rich, the poor, or the middle-class, for the benefit of a particular group. The state then becomes the agency whereby theft is accomplished, and a pseudo-moral cover is given by legal enactment.[26]

Redistribution by means of taxing income receivers in order to provide money to those unable to earn an income (due to old age or incapacity, or even temporary inability to obtain employment) would thus fall under the heading of theft, forbidden by the Eighth Commandment.

In Rushdoony's view, the Tenth Commandment is also violated by the public provision of welfare:

> If all desiring and taking by force or by law what is our neighbors' is strictly against God's law, it follows that the organization of such covetousness into a system is the creation of an anti-God society. A welfare economy—socialism, communism, or any form of social order which takes from one group to give to another—is thus lawlessness organized into a system.[27]

It is apparent that, in Rushdoony's mind, the important distinction is not between "desiring" and "taking" or even between "by force" and "by law," but rather it is between "our own" and "our neighbor's." *Nothing* will justify the taking of anything from one person and giving it to others—not even a tax-supported welfare program—without the express consent of the former. In CFR writings government welfare programs are not distinguished from outright theft—or, rather (in their view), from other forms of theft.

> The names for the society whereby men can covet everything that is their neighbors' may vary: socialism, communism, a welfare economy, rugged individualism, fascism, and national socialism are a few of the names common to history. Their goal is the same: under a facade of morality, a system is created to seize what is properly our neighbors'.[28]

A second specific reason for CFR opposition to government welfare programs is that such programs undercut the proper role of the family and the church:

> The *family* bears the major responsibility for financial (and other) aid and no other institution or group must usurp this responsibility. . . . When we are too quick to call for aid to the unfortunate from some non-family agency, we undercut the responsibility of families to care for their own. . . . God wants to build responsible relationships within families, and the church's responsibility in caring for needy members grows out of the fact that it is our larger family. . . . But any appeal to the larger family must be only as a last resort.[29]

This is an excellent prescription—for an agrarian community consisting solely of dedicated Christians. It is totally inadequate, though, for an urbanized and thoroughly secular society such as ours. Families and churches simply do not have the resources to deal with natural and economic disasters which sometimes strike particular locations.

The reader may also wonder about those "unfortunates" who are not affiliated with any church. What is to be their fate in cases where no family aid is forthcoming? Here is one CFR answer:

> We are to care for our own who are helpless. The New Testament nowhere calls upon Christians or the Church to assume the burden of the material support of the world.[30]

If aiding the poor is beyond the scope of the state's permitted functions and if the boundary of Christian concern extends only to "our own," evidently the non-Christian poor, here and elsewhere, are to be left to their own devices.

This position is not acceptable to all CFR thinkers, however, Professor Ronald Nash, a scholar whose views on the

economic role of the state place him in the CFR camp at least in this area, would permit the government to come to the aid of the truly destitute. However, the only reason he offers in support of this opinion is somewhat strange:

> Friedrich Hayek, an outspoken critic of statism, insists "There is no reason why in a free society government should not assure to all protection against severe deprivation in the form of an assured minimum income."[31]

CFR spokespersons are generally opposed to government programs designed to deal with poverty.

Thirdly, public welfare programs are said to have a tendency to corrupt their beneficiaries. It is generally assumed in CFR writings that most poor people are able but unwilling to secure employment and, therefore, fall under Paul's edict (paraphrased): "No work, no eat." This view is implicit in the following statement, for example: "What is the Christian solution for the problem of poverty? In a word—spiritual integrity and hard work."[32] The poor, in this view, generally deserve their lot because, for the most part, they lack spirituality and are lazy.

There is no explanation as to why welfare administered by the county welfare department is more corruptive than that administered by, say, the Salvation Army. Nor why free canned goods provided by the church are less likely to create a dependency pattern than a government-financed job training program.

Finally, government welfare programs are to be condemned because they are based on an improper source: a misguided sense of guilt. Basing his analysis largely on Rushdoony's *Politics of Guilt and Pity*, Gary North claims that our increasing prosperity generates guilt feelings in our minds. Unconsciously, we feel that we must somehow "pay" for these benefits when we see the rest of the world living in far less affluent conditions, so we eagerly embrace government programs which are designed to aid the poor as one way of atoning for our prosperity. But this attitude is unnecessary and wrong because the "Bible teaches that a godly moral order leads directly to an outpouring of economic, political, military, and familistic blessings,"[33] so we deserve all our blessings. Compassion for the poor, in other words, is mainly a sign of a misdirected conscience.

The theology behind the notion that individuals or nations are blessed because they "deserve" it is effectively criticized by Wogaman:

> [The] early Protestants would have objected strongly to the implicit self-righteousness of the laissez-faire idea of deserving. Ultimately, the Protestant reformers would have said, what we *deserve* is damnation! It is only by the grace of God that we have the possibility of real fulfillment as human beings; to speak of "deserving" so casually implies that we are capable of saving ourselves.[34]

If, despite all of these reasons, the nation nevertheless persists in tolerating the provision of welfare by government programs, it will suffer terrible consequences. Nash hints at this idea thus:

> . . . a growing number of theologically conservative protestants . . . insist that the Christian's undisputed obligation to demonstrate love for the needy is an integral part of justice. . . . It is unlikely that all proponents of this position understand the extent to which their views enslave them to the state.[35]

Rushdoony holds that the "state's intrusion into the realms of welfare and education leads to the bankruptcy of people and state,"[36] although he does not spell out the details of the process through which this is to take place. Moreover, he carries to the extreme the logic of his view identifying welfare and other legal income-transfer programs with theft in this statement: "If [a man] can legalize and 'justify' seizing his neighbor's wealth or property, he will then legalize and justify taking his neighbor's wife."[37]

As in the case of the monetary standard, we note that the CFR thinkers believe that not only is there a proper stance for the state to take in this policy area but that failure to follow this biblically correct route will result in the imposition of God's punishment on the offending nation in the form of such misfortunes as enslavement to the state or national bankruptcy.

Deficit Finance

The CFR position regarding our third economic policy issue, deficit finance, is opposition, a position shared by great numbers of Christians and others. It seems so right, so reasonable, to hold this position. Yet, how can we explain not only the common occurrence of deficits during both Republican and Democratic administrations but also the fact that most professional economists defend, even advocate, deficits under certain designated circumstances?

Before dealing with this question we must define a few terms. Briefly, a deficit, in this context, is *an excess of expenditures over revenues during a specified time period.* The deficit may be financed by borrowing, by creating money, or by a combination of the two. In practice, our national government utilizes only borrowing, as we noted earlier. Deficit finance,[38] therefore, is the operation of the national government under deficit conditions.

A deficit position in the national government budget could be due to one or more of these factors:

1. Political opportunism: instituting vote-getting government programs which require additional expenditures while refusing to pass (vote-losing) tax increases to finance them.
2. Recessions, which will throw a balanced budget situation into a deficit or increase the size of a current deficit because tax receipts decline while expenditures increase on welfare, unemployment compensation, and farm crop price supports, etc., when the economy slumps.
3. Deliberate action to improve a lagging economy, i.e., to reduce unemployment or stimulate growth, by reducing tax rates and providing various tax incentives to encourage private spending and/or by increasing government spending on goods and services and income-transfer programs.

Examples of all three of these can be found in our experience over the past two decades.

No self-respecting economist would defend the first of these three reasons. The second reason we usually deplore officially but, when we give the matter some thought, we generally acquiesce. We realize that a recession period is a poor time to increase taxes merely to fight a deficit: higher taxes would tend to aggravate the slump. Reducing government spending, too, while keeping taxes constant, would result in increased unemployment, reduced incomes and, hence, declining business sales—hardly brilliant methods of fighting a recession!

The deficit-maker which causes the most controversy is number 3, the deliberate deficit or increase in the deficit level. How can this be defended?

"Supply-side" economists might reply that what looks like an impending deficit will turn out quite differently. Their reasoning is that tax-rate cuts provide the incentive and means for more business investment in machinery, physical plant, and the like, thus increasing output, the capacity to produce a greater volume of goods and services, and additional incomes. As a result, tax receipts, which are tied to income, also will rise, thus gradually eliminating the deficit—a sort of secular "bread upon the waters" mechanism.

Other economists will answer that same question by saying that the deficit does not matter a great deal under the indicated circumstances and that the benefits of an increase in employment and output, which the tax reduction and/or increase in government spending will produce, far more than outweigh the "evils" of a rise in the national debt and the slight downward influence on business investment in plant and equipment caused by the "crowding out" effect of the rise in government borrowing.

Economists do not, as a rule, worry much about moderate deficits *as such;* but they recognize that, if the Federal Reserve permits an expansion of the money supply in order to enable the Treasury to market new issues of its securities to finance the deficit without making it difficult for private borrowers to obtain credit, the outcome may well be a higher rate of inflation.

The CFR case against government deficits, however, at least on the surface, does not depend on any economic or political arguments. Rather, the case is built on certain Scripture passages which express moral laws which deficit finance is said to violate.

One of these passages is Romans 13:8a: "Owe no one anything, except to love one another." This verse is cited by North, who labels it a "general principle [which] may legitimately be transgressed under certain emergency situations."[39] He then quotes this passage from Rushdoony:

> The believer cannot mortgage his future. His life belongs to God, and he cannot sell out his tomorrows to men, nor bind his family's or country's future. This means that long-term personal loans, deficit financing, and national debts involve paganism.[40]

Clearly implied in the quoted passage is this premise: deficit finance mortgages a nation's future. Rushdoony evidently assumes this to be true; but we must examine it because, if it is not true, this particular indictment of deficit finance fails.

First, bear in mind that nearly 90 percent of the national debt—the result of previous deficits—is owed by the Federal government to the individuals and institutions of the nation; and, of course, the institutions are, in turn, ultimately owned by individuals. Thus, in contrast to the true mortgage case, the nation *as a whole* is not significantly in debt to outside parties by virtue of the national debt.

Secondly, there is always a risk of default associated with ordinary mortgage loans. In the case of Treasury securities, though, default risk is considered by the investment community as virtually zero. With its power to tax and even to issue money, the Federal government experiences no difficulty in meeting scheduled interest payments and redeeming each securities issue as it comes due.

Finally, mortgage payments reduce the purchasing power of the debtor. Is this also true of the national debt? Is it in this sense that deficit finance "mortgages the nation's future"? The answer to both questions is "no." Recall that most of the debt is domestically held. Thus, interest payments on, and redemptions of, government securities transfer money from taxpayers to holders of government securities. While this transfer process is far from a negligible element in the whole national-debt issue, the important point here is that, being largely domestic, these transfers do not significantly reduce the wealth or purchasing power of the nation as a whole.

Surely one attribute of a responsible debtor, individual or institutional, is strict adherence to the contracted schedule of payments. A second major CFR criticism of deficit finance, at least as currently practiced, is that the Federal government does not live up to its responsibility in this regard. This is implied by North when he cites Psalm 37:21a—"The wicked borroweth and payeth not again"—as the basis for his indictment of the Federal government for failure to reduce the size of its debt. "From a biblical standpoint, this is utterly corrupt,"[41] he writes.

North seems to have confused two concepts: the *total* national debt and the *individual* debt issue. Observing the (obvious) failure of the total debt to decline, he then apparently deduced that the Treasury has not been meeting its debts as they have come due. This is not a valid deduction. When an issue of government securities comes due and the Treasury is not in a position to reduce the total debt, it customarily issues new securities to replace those that are maturing. Each holder of that maturing issue has the option of redeeming the securities for cash or purchasing newly-issued securities to replace them—there is no compulsion involved—and most holders choose to purchase the new ones. Thus, paradoxically, the Treasury is continually "paying off" its debt, piece by piece, but the total does not shrink.

Finally, a different basis for criticism of deficit finance is offered by Rushdoony: the government's motive for borrowing:

> Debt rests on covetousness, a desire to possess what our neighbor has. . . .

> The covetous man or nation goes into debt to gain added power, purchasing power, prestige, resources, and other forms of visible might. The result is indeed an increase of power, but it is short-term power. . . .[42]

While it is undoubtedly true that a covetous attitude predisposes an individual or society to desire to go into debt, it is not logically permissible to stand the argument on its head and claim, as Rushdoony does, that *the* reason for a nation's incurring a deficit is covetousness. In the opening paragraphs of this section several reasons for governmental borrowing were offered. There seems to be no reason, in the absence of any supporting arguments, even to accept covetousness as *one* reason for deficit finance.

As to the consequences for the nation guilty of the sin of deficit finance, CFR authors foresee serious trouble. According to Rushdoony:

> The result . . . is short-term power purchased at the price of long-term disaster. . . . The eventual outcome of a debt-economy, for men and nations, is bankruptcy.[43]

Conclusion

The foregoing three "case studies" do not begin to exhaust the variety of economic policy problems to which the CFR authors have addressed themselves. However, the purpose of this article will have been accomplished if the reader has gained a better understanding not only of the views of the Christian Far Right concerning these issues but also of the intellectual underpinnings of these views and, by extension, of the approach employed by CFR thinkers in their analyses of economic policy issues generally.

It should be evident that the three CFR analyses examined above contain serious deficiencies in logic, in economic content, and in treatment of the Bible,[44] deficiencies which, by their nature, carry over to their analyses of other economic policy issues, and, in all probability, to noneconomic policy issues as well. While CFR theoreticians are to be commended for their zeal in attempting to analyze complex social issues from a Christian standpoint and for their reverence for the Bible, the weaknesses in their methodology and grasp of modern economics greatly reduce the potential usefulness of their treatment of economic policy issues.

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[6]Chilton, *op. cit.*, p. 34.

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[8]Rushdoony, *op. cit.*, p. 235.

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[10]*Ibid.*, p. 41.

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[12]Rushdoony, *op. cit.*, pp. 251–54.

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[16]*Ibid.*, p. 40. Italics in the original.

[17]Rousas J. Rushdoony, *The Institutes of Biblical Law*, Nutley, New Jersey: The Craig Press, 1973, p. 470.

[18]Rushdoony, *Politics*, p. 203.

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[25]Chilton, *op. cit.*, p. 6.

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[28]*Ibid.*, p. 649.

[29]Chilton, *op. cit.*, p. 42. Italics in the original.

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[31]Ronald Nash, "The Economics of Justice: A Conservative's View," *Christianity Today*, XXXII (March 23, 1979), p. 29.

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[34]J. Philip Wogaman, *The Great Economic Debate: An Ethical Analysis*, Philadelphia: The Westminster Press, 1977, p. 83.

[35]Ronald Nash, *Freedom, Justice, and the State*, Lanham, Maryland: University Press of America, 1980, p. 62.

[36]Rushdoony, *Institutes*, p. 181.

[37]*Ibid.*, p. 649.

[38]Often the term "deficit spending" is used to describe this situation. However, this term implies that the cause of the deficit is excessive government spending; but the deficit could as well be considered caused by insufficient tax revenues. I am reminded of a cartoon in which the wife says to the husband, in connection with a checking-account balance crisis, "You say I'm overdrawn; I say you're underdeposited!"

[39]North, *Introduction*, p. 9.

[40]*Ibid.* The quoted passage is from Rushdoony, *Politics*, p. 249.

[41]*Ibid.*, p. 11.

[42]Rushdoony, *Politics*, p. 205.

[43]*Ibid.*

[44]This article did not deal with the basic issue of whether Old Testament laws and even New Testament "instructions" are binding on Christians—and others—in contemporary society. A recent treatment of this issue, offering a definite "no" answer which I found persuasive, is Walter J. Chanty's *God's Righteous Kingdom*, Carlisle, Pennsylvania: The Banner of Truth Trust, 1980, especially Chapter 9: "Are Mosaic Statutes Valid for the Kingdom?"

Eddington, Mystic Seeker

> Science is by no means independent of biography, not quite impersonal and certainly not inhuman.

At 47, Arthur Stanley Eddington (1882–1944) confessed in his Swarthmore Lecture at the Friends Yearly Meeting (London 1929) to "the wonder and humility we feel in the contemplation of the stars"; "the majesty of the infinitely great, the marvel of the infinitely small." "Mind," he insisted, "is the first and most direct thing in our experience."

> The idea of a universal Mind, or Logos, would be, I think, a fairly plausible inference from the present state of theory.
>
> Mind, however, perceives two realms, the physical and the spiritual.

On the one hand, sensations lead to the idea that "concepts of science are symbols which indicate a reality behind them." On the other hand, "the starting point of a belief in mystical religion is a conviction of significance"—a conscious awareness.

> In the mystic sense of the creation around us, in the expression of art, in a yearning towards God, the soul grows upward and finds the fulfillment of something planted in its nature.
>
> The desire for truth so prominent in the quest of science, a reaching out of the spirit from its isolation to something beyond, a response to beauty in nature and art, an Inner Light of conviction and guidance!
>
> The human spirit belongs to the unseen world.
>
> The soul is reaching out to the unseen world.

He cautioned that "religion or contact with spiritual power must be a commonplace of ordinary life."

> Primarily it is not a world to be analyzed, but a world to be lived in.

Mathematician and philosopher, scientist and mystic, Sir Arthur combined intellect and intuition. At 20 he entered Trinity College, Cambridge. From 24–31 he learned practical astronomy at the Royal Greenwich Observatory. He then returned to Cambridge, where he spent the rest of his life and became Trinity Fellow, Plumian Professor of Astronomy, and Director of the University Observatory, during a revolutionary period of physics. He sought early to understand the gravitational aspects of Einstein's general relativity and later explored its potential relation to quantum mechanics. His major scientific contribution, however, was about the internal structure of stars (e.g., the mass-luminosity law). He was unduly attracted by apparent mathematical relations inherent in natural phenomena, and was particularly intrigued by universal constants (e.g., the fine-structure constant (137)). He was bothered by the mass asymmetry of the proton and electron despite their numerically equivalent electric charges. Hence he sought to formulate a "fundamental theory" in terms of the observational methods employed and the algebraic structure involved. (Unfortunately, Eddington restricted natural science to metrical observations, thus not allowing qualitative investigations—or unknown factors.)

Eddington believed that experience and thought are inseparable in understanding natural phenomena. A favorite illustration was the dependence of fish sizes on the net used to catch them. Similarly, scientific discoveries depend on the experimental methods employed. Experience is bipolar, both subjective and objective; any attempt to separate these merely reproduces them, as when a magnet is divided. Eddington's philosophical outlook tended to be neo-Kantian (Immanuel Kant himself was nurtured in Germanic pietism, which is similar to Quakerism). Scientific theory for him was a work of art requiring contemplation for the understanding of phenomena.

In his Gifford Lectures (1927) on "The Nature of the Physical World" (1929) Eddington excited the interest of clergy throughout the world, who craved a solution to the perennial problem of the incompatibility of new science and old religion—an intellectual gap. The final four chapters are concerned with what he called the relations of recent physical discoveries "to the wider aspects and interests of our human nature." The last chapter dealt specifically with "Science as Mysticism." He noted that any attempt to hold science and religion mutually exclusive can not be achieved in view of their overlapping and changing frontiers.

Being a member of the Society of Friends, he believed that the spiritual realm is dominated by the conception of personality. "The hand that made us is Divine." As theoretical physicists do not have to subscribe to a creed based upon Newton's dynamics and Maxwell's electrodynamics, so, too, as a Quaker, he believed that a religious creed would be a restraining goal. Each person should be free to seek the truth—a moral responsibility of a rational man—motivated by the living belief of an imaginative thinker. "We need not turn away from the measure of light that comes into our experience showing us a Way through the unseen world."

Eddington was not too impressed with the theological dictum that "the heavens declare the glory of God and the firmament showeth His handiwork." He preferred to listen to the "still, small voice," which later asked, "What doest thou here, Elijah?" He regarded the tantalizing concern for a proof for the existence of God as of minor importance in comparison with "conviction of the revelation of a supreme God." For "consciousness alone determines the validity of a conviction."

> There shines no light, save its own light to show itself unto itself.
>
> To interpret man's religion to man's science in not only mutually intelligible, but mutually interdependent terms, remains, as I believe, the great task of our time if we are to see any stable order in events, or make any consistent sense of experience.

Raymond J. Seeger

NSF (Retired)
4507 Wetherill Road
Bethesda, Maryland 20816

This is the sixth in a series on religious scientists.

Reality According to Quantum Mechanics

"Local hidden variables theory is dead." These are the first words of an article by theoretical physicist Fritz Rohrlich of Syracuse University.[1] In this article he takes a look at the current state of quantum mechanics, some of the philosophical interpretations that have been spun off, and the current thinking of physicists themselves that gives no support for some of the bizarre quasi-religious implications so frequently claimed. In this communication, I summarize in a brief way some of the more significant of these inputs.

Although public recognition of the fact is low, the philosophical implications of quantum mechanics have often been perceived at a similar level of significance for theology as the much more popularly aired debate between creation and evolution. The reason for this is that the implications of quantum mechanics suggest a basic stratum of chance events underlying all of reality, a situation that may be conceived of as the antithesis of divine control and sovereign action. This is certainly a much more basic ground of possible conflict between science and religion than creation and evolution, which at least may be cast into a disagreement about mechanisms and processes rather than about the fundamental nature of physical reality. This so offended the religious sensitivity of Albert Einstein that he never did accept quantum mechanics as complete,[2,3] and his summary statement that "God does not play dice" has become famous. When several attempts on the part of Einstein to point out errors in Niels Bohr's interpretation of quantum mechanics failed, Einstein retreated from the position that the theory was in error, to the position that the theory was incomplete: i.e., that there were "hidden variables" underlying the apparently chance phenomena, which if known, would convert the theory into a deterministic one once again.

Two kinds of hidden variable theories have been proposed. The first of these can be called a "local hidden variables theory," so-called "Einstein locality," which holds that if two particles are spatially separated, then a measurement on one of these particles in no way affects the other. Since signals cannot travel faster than the speed of light, if the two particles are sufficiently separated in space, there will be no possibility of communication between them. This form of local hidden variables theory can be experimentally tested against quantum mechanics, since they predict different outcomes for a suitable experiment. A suitably defined correlation S between the two particles has been shown to be less than or equal to 2 if hidden variables theory is adopted (the so-called "Bell's inequality"[4]), whereas values of this correlation larger than 2 are possible according to quantum mechanics. In 1982 experiments were carried out in Paris using the polarization of two photons as the experimental parameter.[5,6] The results appear to have unambiguously refuted the hidden variables theory satisfying Einstein locality. Hence the opening words of this communication.

"Nonlocal hidden variables" theories have also been proposed, first by Bohm[7-9] and then by others.[10,11] They have been constructed to give the same results as quantum mechanics, and at the present time there is no way to distinguish between nonlocal hidden variables theories and quantum mechanics itself. As long as the nonlocal hidden variables theories remain untestable, they do not really enter into the meaningful realm of scientific theories. For them to achieve this status, it must be demonstrated that they are able to account for some experimental result that quantum mechanics is unable to deal with. Present trends do not suggest that this deterministic nonlocal hidden variables theory is likely to gain the advantage over the probabilistic quantum mechanics. Indeed, quantum field theory, a generalization of quantum mechanics developed to be consistent with special relativity, is even more probabilistic than quantum mechanics; e.g., in quantum mechanics one can speak of measurements at a precise time, whereas in quantum field theory one can speak only of measurements made in finite time intervals.[12]

Claims have been made that the new understanding of reality afforded us by quantum mechanics either without or with nonlocal hidden variables provides us with philosophical (and even theological) insights that we have not previously had. A number of books have appeared proposing that the new physics provides the basis for correlation with Eastern philosophy[13,14] and with a holistic metaphysics that sees the universe as a single giant organism.[15] Nobel Laureate Eugene Wigner has sought to relate physical reality to human consciousness.[16] It is appropriate that we stop and ask for the best assessment of these claims at the present time.

1. *Quantum mechanics applies to aspects of reality that are not part of our everyday experience.* Although most of this experience deals with the microscopic atomic and nuclear aspects of reality, it is not limited to these aspects: phenomena in superconductivity and superfluidity, as well as the quantum phenomena measured in the Paris experiments, can be observed in the macroscopic world. Just as the realization of the finiteness of the speed of light, c, caused us to make major changes in our everyday thinking about reality (such concepts as simultaneity and addition of velocities), the realization of the finite value of Planck's constant, $h > 0$, causes us to make major changes in our everyday thinking about quantum reality.

2. *Physical theories are approximate descriptions of reality with limited validity.* Sometimes this range of validity appears to encompass most of our macroscopic experience, and it is hard to accept the fact that it does not also encompass areas beyond our macroscopic experience. We must be prepared to accept the fact, however, that pictures and descriptions adequate for everyday experience may well not be adequate at all for areas of reality beyond everyday experience.

3. *The quantum world differs from the everyday world (commonly called "the classical world") qualitatively as well as quantitatively.* The basic particles of the quantum world, such as electrons, protons, photons etc., cannot be distinguished one from another. There is no way that we can label a particular electron and follow it; all electrons look alike—they are indistinguishable. Common language derived from our everyday experience often fails us in the quantum realm; classically we know what "particles" are and what "waves" are, but we do not know what an "electron" is, which sometimes behaves "just like a particle" and sometimes "just like a wave" depending on the experimental situation.

4. *In order for us to measure the quantum world effects we must use a "classical" apparatus.* We arrive at a measurement of quantum effects only after the quantum effects have left a permanent record in our classical measuring apparatus, e.g., a visible track on a photographic plate due to the passage of an electron. Human evaluation of this observation through the human consciousness occurs last of all and totally within the classical domain. It does not seem possible, therefore, for the human consciousness to play any role in determining the behavior of the electron itself.

5. *The measuring apparatus plays a significant role in the total experimental system.* Unlike the classical situation, where the measuring apparatus can be considered almost totally independent of the effect being measured, in the quantum realm the system-apparatus interaction can play an important role.

6. *Unlike the classical system for which all observables can be known at the same time with arbitrary precision (in principle), each quantum system is characterized by a set of observables that can be known with arbitrary precision and another set of observables that cannot.* The latter can occur with various different values; which of these values will occur in a measurement is precisely given by a probability distribution. An imperfect analogy is given by the sum of the faces of two dice; this sum can take on a variety of different values and the probability of a given value for the sum can be

precisely given by a probability distribution (we know, for example, that the sum "7" will occur six times more often than the sum "2" or "12"). If we consider two observables, one from the set that can be known (e.g., momentum if the system is in a given energy state), and one from the set that cannot be known (e.g., position), it follows that both momentum and position cannot be precisely known—leading to the well known Heisenberg Indeterminacy Principle. An analogy is given by our inspection of a famous masterwork painting: if we use a high power magnifying glass to look at the details of the brush strokes, or if we use our eyes when standing back a distance of 10 feet, we get different information in the two cases, which cannot be obtained simultaneously. Both pieces of information are necessary to describe the painting totally; they are said to be "complementary."[17]

7. *Changes in the state of a quantum system are not described in a probabilistic mode: the state of the system changes according to the deterministic Schroedinger equation and is uniquely given by the knowledge of its initial state.* If interactions occur between this system and another system, then of course changes occur that can be calculated only by taking into account both systems and their mutual interaction. When a system changes, then in general so do the set of observables that can be determined with arbitrary precision. A measurement constitutes such an interaction.

8. *Our inability to know precisely is not the consequence of our inability or imperfection, but rather simply because the requested information is not present in the particular state of the system.* This occurs when the observable has a distribution of values in that state of the system, rather than being capable of precise determination. This distribution can indeed be known precisely.

9. *The major difference between a quantum probability distribution and a classical probability distribution is that the quantum distribution is the square of a sum of probability amplitudes (coherent superposition of states) whereas the classical distribution is a sum of the squares of probability amplitudes (incoherent superposition),* i.e., quantum: $(A + B + C)^2$ vs classical: $(A^2 + B^2 + C^2)$. This fact means that in the quantum case it is possible that the probability for two different values of an observable to occur can interfere with one another, something that is impossible in the classical case. It is this interference that accounts for the difference between the local hidden variables interpretation and the quantum mechanical interpretation of the Paris experiments.

10. *The situation that an observable has a distribution of values will be encountered whenever we measure an observable that does not have precise values in a particular system.* The system and the measuring equipment enter into interaction according to the quantum mechanical treatment until finally one of the states of the system being measured leaves a permanent record in the measuring equipment,[18] e.g., a photographic track or a needle position. This position cannot be predicted for a single experiment, but the precise relative probabilities for all pointer positions can be calculated from quantum mechanics and can therefore be checked experimentally in a large number of measurements. Our imperfect analogy of throwing dice can again be invoked; before the dice are thrown the probability of obtaining a "7" is 6/36, but after the dice are thrown the probability reduces to either 1 (a "7" is thrown) or 0 (a "7" is not thrown).

11. *Reality is not created by the measurement.* A quantum mechanical system exists in a real state before the interaction with the measuring equipment. Two dice are real before they hit the table. Reality is not created by the observation; the system is present all the time. The claim that quantum mechanics requires us to believe that the universe does not actually exist "out there" independent of the observer, but rather is created by the observer, has no necessary support from quantum mechanics.

12. *There are certain questions about quantum mechanical systems that have no answers.* We can be seriously misled by our efforts to describe quantum mechanical effects using words from common experience that do not apply. The question of where the photon comes from when a electron drops from an excited state to the ground state of the hydrogen atom, for example, has no answer. An analogy would be the calculation of reflection from a highly absorbing medium using the classical wave model for light; the model gives accurate values for the reflection but is totally incapable of answering questions about what happens in the material to cause reflection. To get meaningful answers of a scientific model, one must ask questions consistent with the nature of that model. If we insist that quantum mechanics must supply the same kind of answers as classical physics, we have made the decision that classical question answering must be normative.

13. *Physical reality on the quantum level cannot be defined in classical terms.* The world of electrons, protons, photons etc. exists "out there" quite independent of us, and behaves (as far as we know today) exactly the way that quantum mechanics describes. The addition of probability amplitudes characteristic of quantum mechanics, rather than the addition of probabilities characteristic of classical physics, constitutes a qualitative difference between the classical and quantum worlds. This difference must be accepted as indicative of the actual properties of the natural world at the quantum level, just as the universal constancy of the speed of light is accepted as indicative of the actual properties of the natural world at the relativistic level. There is no known scientific reason today that would cause one to deviate from this position.

[1]Fritz Rohrlich, "Facing Quantum Mechanical Reality," *Science 221*, No. 4617, 1251 (1983).
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Richard H. Bube

Department of Materials Science and Engineering
Stanford University
Stanford, California 94305

Christian Guidelines for Biotechnology

The second half of the twentieth century has seen an explosion of biological knowledge, including knowledge of the structure and function of genes (genetics), of the molecular basis of living processes (molecular biology), of the control of reproduction and of the molecular basis of some disease processes. The result is that humans have developed the power to manipulate their lives and those of other living organisms to an undreamed of extent. Biotechnology is the name given to the application of the newer manipulative and invasive techniques to biological systems, and it includes genetic engineering which is involved in altering the genetic composition of organisms.

The use of biotechnology raises many ethical questions which need to be carefully considered since humans do not have complete understanding and control over life, and cannot predict all the consequences of their manipulations.

A group of scientists on the Guelph campus has been discussing some of the issues, particularly those affecting human life, from a Christian perspective, and has drafted the following statement.

As Christians, we look to the Bible for God's communication with us and His guidance for living in this world. There we read that God is Creator of the universe, that human beings are a special creation by God with a spiritual need and awareness, and that every individual is unique, and precious in the sight of God.

God has provided for the needs of all His children through giving them a capacity to love Him and to love and relate to one another through friendship and mutual support, and particularly in the bond of marriage and family relationships. Men and women are called to love God and their fellow human beings with the love He gives us.

God has also provided for our needs by giving us the capacity to wonder, to explore and to begin to understand the created universe. The knowledge which humans assemble is also a gift of God. We are called to be responsible stewards of creation and to use knowledge for the good of all mankind.

Based on the preceding principles, and in the present state of our knowledge, we hold the following:

Concerning Society

a) It is right that knowledge should be pursued.
b) It is right that humans should use this knowledge to care for and develop the earth's resources for the benefit of mankind, including future generations.
c) It is right that humans should use this knowledge to continue to relieve the physical and mental suffering of their own kind as well as others of God's creatures.
d) It is right that public policy and resource allocations, especially in the development of biotechnology, should take into consideration the physical, mental, emotional and spiritual needs of all people universally.

Concerning Human Life

Human life begins at conception and is a gift from God. Each human being is sacred and created in God's image. Furthermore,

a) It is wrong to terminate life at any stage except under highly special circumstances, when, for example, a pregnancy may be clearly life-threatening to the mother.
b) It is wrong to conduct invasive experiments on human beings after birth unless they volunteer and give informed consent.
c) It is wrong to perform experiments on a living human embryo when they are being done only to obtain new knowledge or to benefit other human beings.
d) To treat a living embryo in order to improve the quality of his/her future life as a human being is justifiable in theory. Whether it is justifiable in practice depends on whether the practitioner has prior informed consent, and also sufficient knowledge and proper advice to predict the possible consequences with a reasonable degree of assurance.

Concerning Human Relationships

The bonding between humans is nurtured in love and trust, and in respect of people for one another as creations of God. One very important focus of human relationships is the family. The biological techniques of artificial insemination by donor sperm, *in vitro* fertilization by donor sperm, and surrogate motherhood should not be used when they violate the exclusive bond of a Christian marriage.

Concerning Human Uniqueness

The manipulation of human genetic material by techniques such as gene splicing or embryo cloning (by nuclear transplantation or other means) should not be performed when it may lead to the birth of new human beings whose potential uniqueness has been distorted.

If you have any comments or suggestions regarding the above statement, please send them to Dr. Gary Partlow, Department of Biomedical Sciences, University of Guelph, Guelph, Ontario. N1G 2W1

Canadian Scientific and Christian Affiliation
A Statement by the Guelph Chapter

12th October 1983

Christian-Thinking on Philosophical Foundations for the Science of Psychology

Establishing a "Christian psychology" or practicing psychology "Christianly" has been previously posited by this author (Rosenak, 1983) to be dependent upon the issue of science in general as a Christian or a non-Christian activity. The "integration" question for Christianity and psychology, or for theology and psychology, is really a more basic philosophy of science question. Since the whole enterprise of psychology still struggles to maintain a position within science, it is not at all surprising that Christian psychologists also find the issues perplexing. Is psychology a science? Can a psychologist obtain objectivity to any degree when the object and the subject are one and the same (self-reflexivity problem)? If to study only behavior is insufficient, can psychology study consciousness and other abstract human constructs and still be scientific? What makes psychology scientific or not scientific? What makes science "scientific"?

These questions have not yet been sufficiently answered to establish an adequate paradigm for the psychological enterprise. Yet

there are two general ways Christians have attempted to "think Christianly" about philosophy of psychology questions. These two Christian viewpoints are mirrored in the secular world by others who are thinking about philosophy of psychology issues.

The Christian world-view provided a fertile soil for the growth of science and technology (Klaaren, 1978; Jaki, 1978). Because Western Christians are proud of this contribution of the faith, to find "objective Truth" versus succumbing to the monster of "relativism," has been valued and is judged to be a Christian activity. Generally, Christians who are scientists in this category have believed that the more scientific psychology can be, the more "Christian" psychology will be. An objective search will allow the researcher to come closer and closer to Truth.

Unfortunately, this line of thinking can lead to making scientific truth itself a deity. A host of other seemingly non-Christian assumptions closely follow. The search for objective truths can lead to a reduction of the person. From a desire to understand the "objective" functioning of the person, only part-processes are sufficiently examined and the whole person is lost. Construing the world as structured in an absolute way must also lead to deterministic assumptions. If all parts of the man or woman can be reduced to understandable segments from an objective standpoint, then the hope remains that eventually total knowledge will be obtained. Prediction and control then seem to be within the realm of possibilities. The Christian psychologist in this realm of thought is an empiricist who considers objectivity and absolutism to be biblical concepts. Out to preserve psychology as a legitimate science and with a loyalty to absolutes in reality, these Christians understandably cling to values of naive realism and empiricism as bases from which to think Christianly about a philosophy of psychology. Scientists in this category operate from the "parallels" model for integration, based on the schema developed by Carter and Narramore (1979).

Other Christians who attempt to think Christianly about philosophy of psychology issues proceed in quite an *opposite* direction. Believing that total objectivity and "absolutism" are not necessarily biblical values in the realm of science, these thinkers posit that in order to qualify as "scientific," psychology in general is being defined too narrowly. Psychologists must not be content to understand only the minute parts of humans that are predictable. Psychology should study the whole person. Psychologists must not ignore issues of values, morality, and spirituality. If in an attempt to retain objectivity man's spiritual nature is eschewed, or *at best* rendered unavailable for study, then objectivity as an ultimate value must be reconsidered. Truth (with a capitol "T") as an ultimate value, if viewed as *necessary* to construe all parts of reality, must also be reconsidered.

Christians who think Christianly in the former manner are in line with those scientists today who ultimately value empirical findings, the behaviorist and neo-behaviorist schools. Christians who think Christianly in the latter manner are similar to the "third force" psychologists who have insisted that "man is more than the sum of his parts" and that the science of psychology must begin to rethink its self-imposed limitations (Schultz, 1970).

The problem for the Christian who sees the latter direction as thinking Christianly is the possible implication for Truth. Does questioning objectivity mean questioning that we can know true Truth? (Schaeffer, 1968). The thesis of this article is that *a limited view of the structure of reality* is not only at the root of the quandary for the Christian, but is also the major reason psychologists have experienced difficulty in their claim for psychology as essentially scientific in nature.

In the attempt to achieve scientific status, psychologists have traditionally shied away from philosophy. Paradoxically, the answer to questions such as "what makes science scientific" and, more specifically, "what makes psychology scientific" can be addressed only from the philosophical realm.

A philosophy of psychology is important in the same way that a philosophy of science is important. Polanyi (1962) and Kuhn (1970) have shown the crucial importance of philosophy of science to the progress and direction of the scientific enterprise. Ludwig von Bertalanffy (1975, p. 10) noted that we "turn to philosophy not as an escape from rigor and detail, but as a means of assessing the meaning and significance of what we have done and are trying to do." What an investigator believes is possible or impossible and how he or she views the structure of reality will help to define what he or she can discover. Psychologists should not be embarrassed about a direct dependency upon philosophy. Other sciences have a like-relationship to philosophical assumptions.

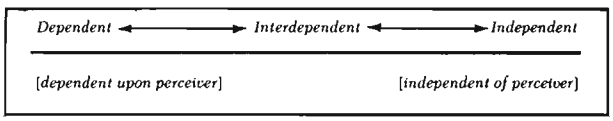
Maslow (1966, p. 5) wrote that psychology from a behavioristic philosophy is "too narrow and limited to serve as a general or comprehensive philosophy." An adequate philosophy of psychology must serve as an adequate foundation for scientific investigation and in doing so should allow for methodologies that are broad enough to investigate the entire scope of reality and humankind.

In the attempt to expand their discipline to be broad and relevant, psychologists can make a unique contribution to the discipline of philosophy of science. Physicists have made a similar contribution through their postulates concerning the nature of reality that come from an examination of the smallest "particles" of the material world. Scientists of every discipline should be challenged to look at the scope of their own discipline and its breadth.

How is a misunderstanding of the nature of reality at the root of the philosophy of psychology problem? When the whole of reality is viewed as being totally independent and absolute, a false framework for science and a deification of objectivity is created.

For the sake of communication, reality can be considered a continuum. At the left end, there is a reality totally dependent upon the knower. In between are realities which depend upon the knower and upon the known.

The first type of reality is termed dependent reality because it is totally or predominantly dependent upon the knower or the perceiver. The poet, the creative writer, and the imaginative child can create their own "realities." In this area of reality, relativity has legitimate existence. What is true for you may not be true for me. What a poem means to one reader may be absolutely different from its meaning for another reader. In psychology, psychological interpretations of a person's behavior can in varying degrees be a dependent type of reality—i.e., a reality that largely depends upon the activity of the human mind.



Dependent reality is often labelled as "subjective" and is often discounted as "real." This is a mistake. One's interpretation of a situation, a story, a poem, or a comment, is not less real because of its dependence on the perceiver. It is "objectively" present and valid.

At the other end of the continuum, there are realities existing that are totally independent of the knower or perceiver. Even though

many philosophers agree that reality is greater than human knowledge, that such a reality exists is still a type of a "faith" statement. This assumption is made on the basis of a consensus of human reasoning. There probably are structures and objects in existence without human perception of them. Earl (1955) argues for independence of objects from a phenomenological perspective.

What are these independent realities? That reality has independent aspects is an operative type of assumption; it is necessary to carry on every day activity. "I will still have to take a test tomorrow even if I dream that it is cancelled. I will still run into a tree even if I pretend it is not there. I have bills to pay, a plane to catch." These are realities that have independence. Independent reality also includes any structure in the universe that is inherent. The perceiver can only make intelligent guesses as to what these realities are. Structures that appear to be inherent may actually be a part of the construing process. The Creator of the universe is posited as an independent reality, as are spiritual realities that exist outside of human perception.

The final "type" of reality is "interdependent." Human realities are closest to this category—part of reality being dependent upon the perceiver and another part being independent, or determined by the inherent structure of reality. A wife interprets a comment made by her husband through her own perceptive framework but her interpretation depends to an extent also upon what her spouse actually said. Interdependent reality exists as interplay between dependent and independent realities. This is why the three types of reality are placed on a continuum: realities, and human knowledge and perception of realities can fall at any point on this continuum. Most of reality is not at either of the extreme ends.

What are the implications of these abstract concepts for a philosophy of psychology? Is the domain of independent reality the only legitimate domain of science? The writer posits that *all* types of realities are not only legitimate, but also imperative domains for science. Therefore, to have a firm epistemological foundation, psychologists must be aware that all three types of realities exist in varying degrees and identify which reality is being studied. Scientists traditionally have believed that they are studying independent realities. The world is "out there" and the scientist's task is to figure out what it is and how it works. While scientists may be still striving to work in this realm, they are actually investigating interdependent reality. Physicists know that how they construe reality determines what they can discover. Faulty human perception has always been known to be somewhat problematic. How much does the scientist's expectations and desires also help to determine findings? To what extent does one's point of view define discovery? Scientists work with interdependent realities.

Psychologists have been trying needlessly and vainly to work primarily in the realm of independent reality. By nature of the subject matter, psychology more than any other science needs to be open to all three types of knowledge. The subject of psychology is the person, the perceiver, and most of the realities which psychologists must pursue will be totally dependent types of realities. Though they must be aware of realities that are dependent, other scientists may be able to work primarily within interdependent knowledge realms, with a striving toward the independent. Psychology is no less qualified as a "science" because it needs to look at all three types of reality, even if it operates primarily in the dependent reality realm.

The terms "objectivity" and "subjectivity" purposely have not been used as descriptors because they carry unfortunate evaluative baggage. Traditionally, scientists want to pursue the "objective" and value it more highly than the "subjective." If dependent knowledge is equated with subjectivity and independent knowledge is equated with objectivity, that both have validity and that both are valuable must be realized. There is no reason to disdain subjectivity. Of course, either the objective or the subjective can be inappropriate when they are out of place: to try to label dependent knowledge as independent is to set up a false God; to try to label independent knowledge as dependent is to dethrone God. God has been posited, by logic and faith, as an independent Reality.

Rather than accept that all types of realities can be valid material for the scientific enterprise, psychologists traditionally have used the tactic of refining their empirical methods in hopes of finally seeing the independent truth about humans. Although there is something to be said for honing empirical techniques to their ultimate sophistication, that psychology should exclusively pursue this direction is questionable. This assumes that only independent truth is "valid" or "objective" and therefore valuable for pursuit. Stephenson (1953) and his attempt to operationalize subjectivity recognized the realm of dependent reality but mistakenly tried to treat it as an independent realm.

The oft-quoted psychological dictum that "the research question determines the design" is another fallacy based upon the assumption that the realities psychologists are out to discover can be independently correct, that these realities will dictate an appropriate research design. Lewin (1951, p. ix) wrote that metaphysical and epistemological assumptions "shape inevitably the nature of the descriptive concepts" the psychologist uses, "the phenomenon he observes, and the way he collects his data." There is no particular research design that is inevitably appropriate for a particular psychological question, given that different researchers operate from different assumptive systems that give them guidance as to how to find the answers to their questions. For example, Stephenson's proposed methods for investigating intelligence differ substantially from C. Berts' (Stephenson, 1981) because of their differing philosophical presuppositions.

The problem of reductionism versus wholism in science is also directly related to the scope of reality. Reductionism posits that the investigator can find independent realities, that if the object of study can be dissected in a sufficiently minute manner, surely it will be understood. The wholistic view takes other realities into consideration. The whole is equal to more than the sum of the parts because the investigator's part in the reflection is also real and because there are always relationships between the parts to be considered. Reductionism has its place, but it is only a part of science, not its entire philosophical foundation.

Based upon this model for reality, can science be qualitative as well as quantitative? An admission to a need for qualitative judgment does not disqualify a discipline as scientific. The physicist, the chemist, and the biologist use both modes of understanding because they operate primarily with interdependent realities. Anthropologists, sociologists and psychologists may need to make their sciences more qualitative than quantitative because their realities will tend to be more dependent as well as interdependent. Depending upon where the particular scientific discipline operates on the continuum of differing realities, its ratio of dependence upon the quantitative versus the qualitative means of expressing its subject matter will be different. Both must always be present because science cannot operate with the assumption that all of reality is independent.

The previous philosophical assumptions about the nature of reality broaden the possibilities for psychological research. Psychologists should have permission to go beyond mere hypothesis testing as structure for their research design. Testing a null hypothesis and desperately clinging to "statistical significance at the 0.05 level" are unnecessary attempts to preserve the view of psychology as scientific. Psychologists should have permission to let go of scientific lingo when they conduct research, write journal articles or assess client situations. Psychology's status as a science need not be endangered.

Given the presence of dependent reality, to investigate more than overt behavior is a worthy endeavor. The realms of emotion, thinking, values, and spiritual concerns can be considered scientific territory for the psychologist. Behavioristic psychology must be viewed as only a part of the larger scientific enterprise of psychology.

Psychologists need not shy away from making qualitative assumptions in research. (This "unassumingly" occurs regardless of whether researchers realize or admit to their qualitative judging.) Quantitative data should not be used as evidence for psychology's scientific nature; rather, it should be used when appropriate based on a qualitative judgment. This means that psychological research may rely less on statistically significant quantitative declarations, and more upon qualitatively-oriented types of research.

While a denial of God as an independent reality has occurred, the avoidance of *dependent* reality has been a predominant factor in steering psychology as a whole away from topics involving morality and religion. Claim to "value-free" psychotherapy which has predominated clinical practice exemplifies this avoidance. Psychologists should have permission to investigate religious/spiritual aspects of humans without apology. Bergin (1980, p. 103) noted that "religion is at the fringe of clinical psychology when it should be at the center." He gives supportive evidence for a trend beginning within psychology to deal more with religious and value issues. It is hoped that this trend will be allowed to become a part of the mainstream of psychological work without psychologists feeling that they are no longer being "scientific."

In summary, the more philosophers of science work toward an understanding of all parts of reality that need to be investigated, the more psychology will have permission to branch out in creative ways and still be considered a legitimate scientific enterprise.

As initially posited, the above analysis of the scope of reality also speaks to the Christian psychologist who fears the loss of the absolute and relativistic framework from which psychology seemingly must operate if and when it expands its boundaries. The absolute is not lost; rather, it is at the opposite end of the continuum from which the psychologist must spend the majority of his/her time in operation. To think Christianly, Christians in psychology must support a world view that realizes the importance of the whole spectrum of reality.

Christians often disagree with one another as to the "correct" solution to a moral dilemma. That there is more than one solution to a problem, that there is more than one interpretation of a clinical situation, or even of a scriptural passage, is not a blasphemous position. Ultimate Truth, by faith, is viewed as existing on the right side of the continuum. A new and expanded psychology is only a reflection of the complexity of realities that God has given us permission to recreate and that He Himself has created.

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Charlotte M. Rosenak

The Christian Counseling Center of Lawrence, Inc.
Lawrence, Kansas 66044

Realistic Faith Seeking Understanding: A Structured Model of Human Knowing

Introduction

It is mainly due to Michael Polanyi[1] that modern thinkers have come to understand the basic soundness of St. Augustine's Biblically-based insight—" . . . Believe that you may understand, since except you believe, you will not understand."[2] For Polanyi has convincingly argued that all knowledge is personal knowledge as all human knowing takes place through a framework of tacitly held, formally unprovable commitments (a faith-structure) that motivate and guide the knower in the acquisition of knowledge. These commitments are not open to formal proof for they are prior to logical reasoning and have to be employed as premises in any attempted proof. In all human knowing the commitment framework is tacitly assumed and then put to the test. In this context faith is not non-logical but a-logical.

Lack of formal proof, contrary to popular opinion, does not mean that faith arises without being based upon evidence. It is here that a Biblical understanding of faith is particularly helpful. Biblically, faith of all degrees arises due to the encounter of a whole person with the totality of human experience, a whole person being a complex unity including spiritual, volitional, emotional, rational, and physical aspects. Such experience I would call whole-person experience or evidence. Accepting this Biblical notion of whole-person evidence enables one to see the faith-structure as a continuum of beliefs ranging from ultimate, metaphysical beliefs (the universe is orderly) to very mundane beliefs (the sun will rise tomorrow). The latter beliefs are based upon specific sensory evidence, the former are not. This continuum view of faith is a natural consequence of the Bible's inherent realism for it always assumes that the objects of human knowledge truly exist (being grounded in Creation) and act independently of knowledge of them. Note that such realism should be grounded in intelligibility and not sensibility or picturability if phenomena of the quantum world are to be comprehended. Biblical realism sees a continuum of varied intelligible experiences serving as a source for a continuum of beliefs tacitly held by the knower (his or her faith-structure). Such a continuum of intelligible experience is based upon the existence of a multiplicity of differing objects that act independently of the knower's knowledge or activity.[3]

With this in mind let us now define faith in a realist context, list its important characteristics, thereby clarifying the prior discussion, and by means of a model of human knowledge acquisition, examine the complexity and breadth of the faith-structure as it guides all human exploration, i.e. the human knowing process. This, hopefully will lead to a greater appreciation of Polanyi's and the Bible's basic insight that faith is the motivating, unifying, and integrative component in all human knowing.

A realist's perspective on faith is best understood by contrasting it to naive definitions which essentially define faith to be the attitude of holding certain propositions to be true without evidence for them, or even in disregard of contrary evidence. A realist, however, defines faith to be the attitude of holding certain propositions to be true based upon bold yet plausible extrapolations beyond existing evidence. Such an attitude is not strictly rational but it is not irrational either. Faith as bold extrapolation is ultimately always a personal response to the truth and goodness of God manifested in history and in the ongoing creation; whether acknowledged or not, such a response relies upon the truthfulness, consistency, and faithfulness of the Creator-God. Faith, in a realist context, has a number of important characteristics.

Characteristics of a Realistic Faith

1. Realistic faith is not a simple extrapolation from existing experience but a much bolder extrapolation that reinterprets such experience and formulates convictions that cannot be reduced to inductive summaries of data or deductions drawn from certain experiential facts. Examples of such bold reinterpretations are the conviction that the universe often chaotically perceived is ultimately orderly. Einstein expressed this conviction in the maxim—"God is deep (very subtle) but not devious."[4] Likewise there is the conviction that a scientific theory must possess a rational beauty and symmetry in an artistic sense.

2. A realistic faith is always based on evidence if evidence is understood in a whole-person context. Beliefs, ranging in continuum fashion from down-to-earth extrapolations of observed regularities or meaningful, unique events to ultimate (metaphysical) convictions not tied to immediate sensory experience, come about as genuine personal responses to the totality and richness of the flow *of all human experience*. Such human experience includes knowledge of the events of history contained in the records of the whole culture (and often seen through the eyes of faith as God revealing Himself in specific historical acts), personal relationships with other human beings, and observations of physical reality that often reveal pattern or order either directly perceived or eventually discovered to be present at a "deeper" level as relationships between observables are studied. Christian realism sees faith, at all levels, to arise as a personal response to the totality and richness of human dialogue with God, other persons, and all else in God's creation—living and inanimate. As the three persons of the triune God are utterly faithful to one another, so human beings, made in God's image, have the capacity to enter into relationships based upon trust.

A concrete example is now given of how whole-person experience can be the basis for an ultimate conviction of use to science. I would argue that belief in an orderly universe can arise not only from direct contact with order that is perceived in non-human reality but it also can arise from one's experience of a personal relationship with a close friend who is trustworthy, dependable, and purposeful in all his activities. This personal relationship enables one to better understand and commit oneself to the Biblical description of a supremely personal God who purposefully acts in history and faithfully holds continually in being all His creation, His purposeful faithfulness manifesting itself in nature's regularity and order.

Lastly note that faith's origin in whole-person experience most fruitfully arises in a community setting. In scientific and Christian communities one learns from and shares experiences of all types, sensory and non-sensory, with one's fellow explorers. Common convictions are thus tested, clarified, and deepened through the community's mutual criticism and conjoint verification. Furthermore the supporting community with its traditions provides the continuity necessary for convictions to be transmitted from generation to generation so that power and thrust is maintained in the community's search for deeper and ever-widening comprehension of reality.

3. Faith is an attitude of trust that is active, not passive, for it leads to specific actions being taken. A realistic model of faith is always in resonance with the Biblical injunction to be a doer of the Word and not just a hearer. Faith may be looked upon as an integration of volitional and cognitive insights and urges which precede all knowledge acquisition but guide and motivate all aspects of the knowledge acquisition process. Faith consists not in what can be *proved by results*. Faith *precedes* results; faith motivates *toward* results. Faith always without exception precedes logic, intellect, judgment, reason, and the seeking of experimental data; faith, as an act of the will, commits us to the soundness of these activities and then leads the knower beyond them to ever widening understanding and action.

4. Lastly, from a realist perspective, faith is an active, purposeful trust in an aspect of reality independent of the self so that, contrary to popular opinion, it is objectively, not subjectively, orientated. To be actively committed to a framework of beliefs concerning a reality independent of the self is a *responsible* activity implying universal intent, for as these beliefs guide one's participatory exploration of such reality they are continually evaluated and assessed. Thomas F. Torrance puts it well as he interprets Michael Polanyi on the responsible nature of faith in scientific knowing:

> "... Our fundamental beliefs are certainly personal convictions bound up with the elemental interaction between persons and realities other than themselves, but they are basic acts of acknowledgement in response to some intelligibility inherent in the nature of things, that is, to some meaningful order or message-laden pattern. As such they pivot upon the objective pole of the knowing relationship, and they cannot be reduced to merely subjective states of consciousness. That is to say, beliefs arise in us because they are forced upon us by the nature of the reality with which we are in experiential contact, as we allow our minds to fall under the constraint of its inherent intelligibility which we cannot rationally or in good conscience resist. Thus belief has to be understood strictly within the context of rational recognition of and willing submission to the claims of objective reality upon us and of obligation towards the truth laid upon us by the truth itself. It is this ontological anchoring of belief in reality transcendent to ourselves which prevents it from being subjective or arbitrary for it binds belief to what is independently and universally true. . . . Polanyi points out that truth is the external pole of belief and belief, far from being a merely subjective or private concern, is to be regarded as the obedience of the mind to the truth in recognition of its universal claims and normative authority. However while belief pivots upon the objective pole of the knowing relation, the subjective pole must be given its proper if subordinate place, i.e. the role of the person as rational agent in believing, and believing as he is convinced he ought to believe in fidelity to the truth. As Polanyi expresses it: 'The freedom of the subjective person to do as he pleases is overruled by the freedom of the responsible person to do as he must.' That is what is so distinctive about scientific belief, the combination of personal and compulsive elements in it. Polanyi brings these two elements together in his notion of commitment in which freedom and obligation, conscience and obedience, are bound inseparably together under the overarching authority of truth."[5]

To summarize, realistic faith of all degrees is objectively, not subjectively, grounded in that it represents responsible commitments to a reality independent of the self. Therefore a realistic faith is not

an ungrounded persuasion of the mind or a subjective feeling without evidential justification.

A Structured Model of the Human Knowing Process

Figure 1 summarizes the definition and characteristics of a realistic faith by schematically representing its structure as a key component in all human knowing. The person as knower is seen to be actively engaged in exploratory activity with respect to reality, responding to and asking questions of reality and perceiving responses and answers from reality (arrows up and down). This exploratory activity is motivated and guided by (downward arrow) a framework of ultimate commitments tacitly held by the person. Polanyi says that a person *indwells* such a framework of commitments in order to gain greater understanding of reality. Biblically this framework of ultimate commitments is called in the Old Testament the "Heart"[6] and is thought of as the center from which springs the deepest motivations that guide us as human beings in continual dialogue with God and all His created reality. From the "Heart" springs one's deepest personal commitments concerning the ultimate rationality of all reality, one's standards of intellectual and moral integrity, and, finally one's criteria for intellectual beauty to list but a few key commitments; all the commitments of the "Heart" play a central role in guiding the exploration of reality. As Joldersma[7] has shown this commitment framework consists of a hierarchy of three basic categories of commitments. Ontological commitments provide the guidance (downward arrow) for epistemological commitments which, in turn, guide (downward arrow) commitments concerning specific methodologies for exploring reality. Ontological commitments include beliefs concerning the origin of the universe, the universe's orderedness, and the nature of the entities that populate it including man; epistemological commitments include beliefs on how man can get to know external reality, as well as beliefs about criteria used to judge the resultant knowledge.

This commitment framework is not a direct result of empirical evidence; it comes prior to the gathering of such evidence and is necessary for that exploratory activity. The origin and maintenance of this structure of beliefs is due to feedbacks[8] (upward arrows) based upon whole-person experience; these feedbacks originate from the exploratory activity, itself grounded in the interactive dialogue with reality, and from the lower categories of belief in the hierarchy as the figure shows. Lastly note that a person always lives in a culture and the culture's tacitly-held framework of commitments may play a role in formulating the person's commitment framework. The beliefs of the culture can thus provide guidance (downward arrow) to the specific knower's tacitly-held personal beliefs and these personal beliefs may, in turn, through feedback influence the beliefs tacitly held by the entire culture.

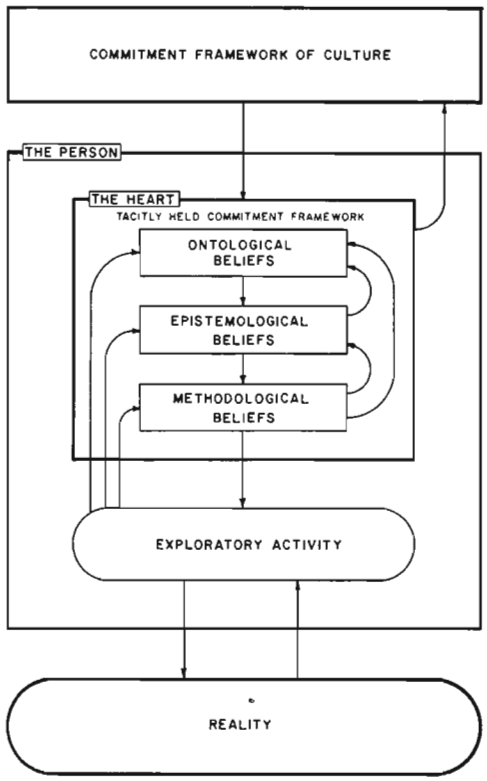

Figure 1. Faith Seeking Understanding—The Structure of Human Knowing (seen as exploratory activity of a person).

Summary

In summary this model sees all human knowing as originating in the exploratory activity of a person, such activity being guided by his or her tacitly held framework of commitments. This commitment framework of the person is, in turn, guided by the basic commitments of the whole culture. Feedback at all levels in this model keeps the entire exploratory-commitment structure viable and healthy. It should be noted that the exploratory activity is, in general, not limited to one approach but may be religious, scientific, or artistic to name but a few ways to encounter reality. Thus the model is intended to apply to all forms of knowing. The specific processes of such differing exploratory activities as religion, science, or art will differ, but some of the processes of each particular activity will be embedded in personal judgments and commitments as a consequence of guidance received from the person's commitment framework. In an earlier paper an Einsteinian schema for scientific discovery illustrates this point, taking science to be the particular exploratory activity.[9] To conclude, this model, based upon Polanyi's work, partially indicates the rich structure inherent in "faith seeking understanding" with its Pascalian corollary (freely paraphrased)—faith indeed tells what the senses (or logical processes) do not tell, but not the contrary of what they see. It is above them and not contrary to them.[10]

I would like to dedicate this communication to Richard H. Bube in honor of his outstanding years of service as editor of JASA *and as an expression of thanks for the long-term encouragement he has given me to probe the riches contained in the Biblical understanding of faith. Any misunderstandings in this essay are, of course, my sole responsibility and not his.*

[1]Michael Polanyi, *Personal Knowledge*. The University of Chicago Press, Illinois, 1958.

[2]M. Polanyi, *Science, Faith and Society*, The University of Chicago Press, 1964, pp. 15 and 45.

[3]I believe that the basic validity of the orthodox definition of realism will remain even as modified by the richness and openness of all reality which, at the quantum level, appears to have a participatory aspect (Wheeler-Bohr interpretation of quantum mechanics). I base my conviction upon:
[a]Its resonance with the Judaic-Christian doctrine of creation.
[b]The open-endedness of scientific truth. The current interpretation of quantum reality is a partial understanding, always open to further correction. Accepting the validity of Heisenberg's Uncertainty Principle the

question can still be asked: Is it really philosophically sound to argue that what cannot be measured exactly, cannot exist and take place exactly (Stanley L. Jaki, *Cosmos and Creator*, Scottish Academic Press, Edinburgh, 1980, pp. 96–97)?

"The willingness of the on-going scientific community to acknowledge realism as a fruitful scientific presupposition. To quote a recent editorial in *Science* concerning methodology in the social sciences: "It is not subjective, of course, but it is apparently very difficult, even for the scientifically sophisticated, to keep in mind that there is an external social and cultural world independent of the perceiving subject, a belief which, as Einstein said, is the basis of all natural science (Nancie L. Gonzalez, *Science*, 28 January 1983, vol. 219, number 4583, p. 345)"

[4]Thomas F. Torrance, *The Ground and Grammar of Theology*, University Press of Virginia, Virginia, 1980, pp. 127–132.

[5]T.F. Torrance, *Christian Theology and Scientific Culture*, Oxford University Press, 1981, pp. 67–69.

[6]James M. Houston, *Meaning of 'Truth' in the Old Testament*, an audio cassette available from the C.S. Lewis Institute, 1800 N. Kent St., Arlington, Virginia 22209.

[7]Clarence W. Joldersma, *Beliefs and the Scientific Enterprise: A Framework Model Based on Kuhn's Paradigms, Polanyi's Commitment Framework, and Radnitzky's Internal Steering Fields*, Master's thesis, Institute for Christian Studies, 229 College Street, Toronto, Ontario, Canada MSTIR4, 1983. I gladly acknowledge the great spiritual and intellectual stimulation I have received from Joldersma's thesis although I differ considerably from him in my understanding of the nature of faith and how it arises in a person.

[8]As has so well been documented by engineers and physiologists, feedback is essential for the healthy growth and stability of all living organisms; I would extend this concept to mental structures. I believe that Joldersma's framework model would be greatly strengthened if he explicitly incorporated feedback into the model's belief structure.

[9]W. Jim Neidhardt, *The Participatory Nature of Modern Science and Judaic-Christian Theism*, to be published in *Journal of the American Scientific Affiliation*. See figure 3 for a representation of exploratory activity in science.

[10]Blaise Pascal, *Pensees and the Provincial Letters*, The Modern Library, New York, 1941, p. 93.

W. Jim Neidhardt

Physics Department
New Jersey Institute of Technology
323 High Street
Newark, NJ 07102

The Limits of Human Wisdom: Scientific Knowledge and Religious Commitment

The question of how we come to know what we know continues to elicit abundant interest amongst religiously concerned scientists. Recent journal articles (Neidhardt, 1983a, 1983b; Poythress, 1983) as well as pertinent book-length treatments during the past decade (Barbour, 1974; Gill, 1981) are representative of various ways in which issues of epistemology in the current science/religion dialogue are being handled by scientists, philosophers, and theologians. This essay examines the parameters of human knowledge as they relate to the domain of the scientist personally committed to religious faith. In so doing, the present analysis expands on previous work by directly applying relevant insights from the biblical wisdom literature (e.g., Proverbs, Job, and Ecclesiastes) to more recent formulations pertaining to scientific knowledge and religious commitment.

Peculiar as it may initially appear, the ancient Israelite wisdom authors were faced with problems of knowledge quite similar to those encountered by contemporary scientists involved in tasks of religion/science integration. On the one hand, the Israelite sages confronted trends toward skeptical humanism which would dispute and/or deny humanity's dependent relationship to God. On the other hand, the sages met the challenges of obscurantist religiosity, wherein intellectual difficulties were blithely rationalized away as merely indicative of the utter lack of human wisdom vis-a-vis God and nature.

Israelite Wisdom Beyond Humanism

In response to the former position, i.e., skeptical humanism, the Israelite authors were radical in affirming all of nature as emanating from, and dependent upon, God. As Gerhard von Rad declares so unequivocally: "More than any other ancient people, Israel was aware that all spheres of life were encompassed in the most direct way by the power of God" (1972, p. 108).

The impact that such a profound notion of creation, as contingent upon God, had on the Israelites in their search for wisdom is reflected in several characteristic passages from the Old Testament wisdom literature (as translated in *Today's English Version*):

> To have knowledge, you must first have reverence for the Lord. (Proverbs 1:7)
>
> To be wise you must first have reverence for the Lord. If you know the Holy One, you have understanding. (Proverbs 9:10)
>
> Reverence for the Lord is an education in itself. (Proverbs 15:33)
>
> God said to men, "To be wise, you must have reverence for the Lord." (Job 28:28)
>
> There is only one thing to say: Have reverence for God and obey his commands, because this is all that man was created for. (Ecclesiastes 12:13)

It is apparent from these passages that the Israelite sages understood reverence for God as having precedence over human wisdom. Von Rad comments: "The thesis that all human knowledge comes back to the question about commitment to God is a statement of penetrating perspicacity. . . . It contains in a nutshell the whole Israelite theory of knowledge" (1972, p. 67). Thus understood, human reliance upon God was viewed as the only thing that places human observers into a satisfactory relatedness with objects of their inquiry. Relation to God facilitates the human seeker of wisdom in asking the most germane questions, in interpreting the data of experience most adequately, and generally, in facing with integrity all aspects of the created order (Scott, 1971, p. 226f.).

Israelite Wisdom Beyond Obscurantism

Such whole-hearted dedication to an essentially theistic hermeneutic, laudable as it was, left the Israelite sages at risk of being misinterpreted. Were they suggesting that human achievement and active participation in the accumulation of knowledge are only pagan illusions? Obscurantism under the mantle of religious devotion would support such a reading of the wisdom writers. Such an interpretation, however, maintains a distorted half-truth most likely based on a posture (no doubt, well-meaning) defending against over-secularization. Yet, as previously explained, the Israelite worldview was so all-embracingly a religious one as to alleviate most concerns about the possible influx of a secularistic epistemology.

Remembering the foundational considerations of religious commitment intrinsic to the Israelite people, what we see in the biblical

wisdom literature is no less a serious commitment to humans understanding creation and living in accordance with it (Beavin, 1971, p. 1105). The sages counseled their people to "beg for knowledge and plead for insight" (Proverbs 2:3 in *Today's English Version*). "Why the press for knowledge?" one might rightfully ask. The sages addressed this query by personifying wisdom as both primordial and omnipresent in God's creation.

> The Lord created me first of all, the first of his works, long ago. I was made in the very beginning, at the first, before the world began. (Proverbs 8:22–23 in *Today's English Version*) For wisdom . . . pervades and permeates all things because she is so pure. Like a fine mist she rises from the power of God, a pure effluence from the glory of the Almighty. . . . She is the brightness that streams from everlasting light, the flawless mirror of the active power of God and the image of his goodness. (Wisdom of Solomon 7:24–26, an apocryphal book in the *New English Bible*)

The Israelites transcended obscurantism insofar as they diligently engaged in the observation and setting down (in their wisdom literature) of empirically verified principles from the natural order. Preisendanz offers a comment suggestive of just how it was that the Israelite sages approached what was to them a dynamic equivalent of our present-day "science": "The proverb differs from a statement which communicates only factual material in that it is able to grasp not only the factual, but a human element, an inner attitude, *an intellectual relationship to the factual*" (as cited in Von Rad, 1972, p. 50; italics added).

The crux of our present treatment of the Israelite wisdom authors involves appreciating what Preisendanz refers to as "an intellectual relationship to the factual." In the course of their search for knowledge, the Israelite sages often used completely secular language forms (e.g., proverbs) to express the truths which they discovered (Beavin, 1971, p. 1102). Yet there was never the least consideration given to any possible bifurcation between knowledge *qua* knowledge and the Israelite's determinative faith in the Almighty God. The sages were incapable of intellectually apprehending the "factual" (i.e., empirical reality) outside of a sincere and profound relationship to God in his purview over all creation.

The sages personified wisdom (as depicted in the two previous passages) in an effort to clarify the radically personal nature of human knowledge in an ultimately theocentric universe. Objective analysis of the created order was deemed acceptable only insofar as it was accompanied by an abiding reverence for the Creator and a personal commitment to humbly receiving gratuitous wisdom pertinent to the rationality inherent in creation. Such truth, once encountered, comprised for the Israelites knowledge to which they were personally committed. For the Israelites, knowledge of the world about them had as much to do with personal character as with intellect (Von Rad, 1972, p. 64).

A Relational Epistemology For Contemporary Scientists

Insights gained from the biblical wisdom literature as regards human knowledge vis-a-vis faith in God are complementary to many more recent formulations by scholars invested in the interaction between science and religion. We find continuing precedent for current developments toward personalizing scientific knowledge in the history of ideas dating from the Israelite sages down through the Christian philosophies of Augustine and Duns Scotus and into the modern era with such diverse thinkers as Kierkegaard (1846/1941), Bergson (1903/1949), and Buber (1923/1970). Essential to all such epistemologies are the priority of relationship and commitment to God and creation over scientific conceptualization and/or rational comment. The limits of human wisdom are honestly acknowledged as represented in the healthy tension between scientific knowledge and religious commitment.

Such a rich historical backdrop permits latter-day observers (as ourselves) easier access into the labyrinth of innovations in such disciplines as the philosophy of science. When Poythress articulates our world as being "personally structured" by a benevolent Creator, we recall the Israelite sages' constant recognition of God's presence in, and governance of, the created order (1983, p. 66). Poythress focuses on the quest for scientific knowledge in a manner which the sages would have no doubt understood clearly, that is, he asserts that "God is the chief 'reality' with which to reckon; he is the center of things" (p. 69). Neidhardt concurs by establishing in religious faith that the truth which scientific observers would seek out is "open-ended in nature, always pointing beyond itself, ultimately pointing back to God, the author of all truth" (1983a, p. 39).

Once the priority of divine relationship is properly recognized (as in the preceding two quotations), scientists and those in related disciplines have much to say that is instructive in regards to accruing scientific knowledge. In our world, where God is Creator, Sustainer, and most characteristically, Love Himself, it makes sense to posit that knowledge of the created order (the work of science) is possible only insofar as the knowing subject actively engages with (i.e., loves) that which is known (Gill, 1981, p. 89). Are we suggesting hyper-subjective anti-rationalism and/or anti-empiricism? Not necessarily. Rather we maintain, with the Israelite sages, that human expectations and commitments greatly influence perceptions of the world about us. "There are no bare uninterpreted data" (Barbour, 1974, p. 95).

As contemporized from the Israelite wisdom authors to the present age, the proper human response within the scientific enterprise involves a mixture of: (a) open lines of communication with other seekers of wisdom (e.g., members of scientific and/or religious communities), (b) honest appraisal of one's own motives and candid exploration of one's overarching schemas of what is most "real," and (c) a preeminent reverence for the Author of all wisdom. We stand to gain much from the Israelite sages insofar as we would at times view our professional/scientific tasks as separable from our relation to, and contingency upon, God in His grace. For it is only as creatures committed to a truly personal God of Love that we will best gain, integrate, and share the wisdom which we seek.

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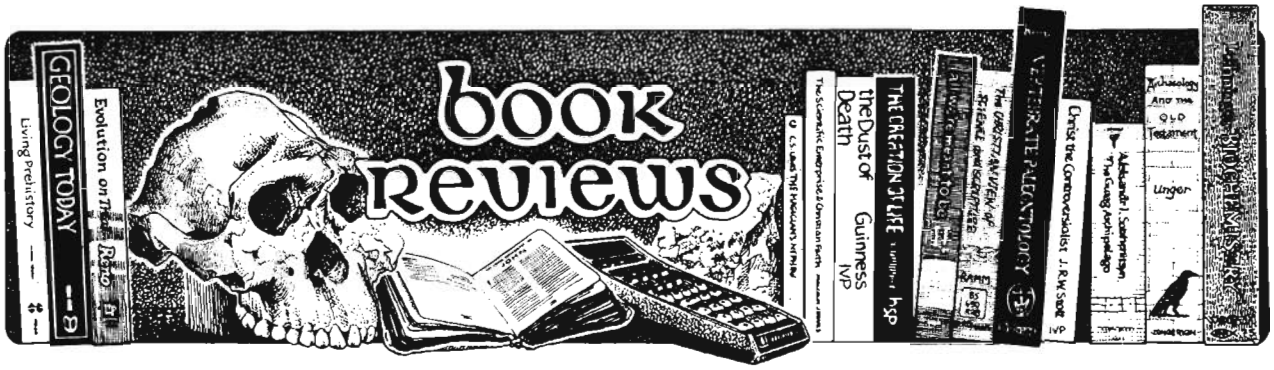
Robert S. Weathers

Graduate School of Psychology
Fuller Theological Seminary



THE ISLAM DEBATE by Josh McDowell and John Gilchrist, Here's Life Publishers, San Bernardino, California 92414. Paperback. 199 pp. (1983).

This book is a publication of Campus Crusade for Christ. It consists of three main chapters: the first gives some historical background on Islam, the second reports and analyzes the teachings of Islam, and the third gives the transcript of an actual debate that occurred in August 1981 in Durban, South Africa, between Josh McDowell and Ahmed Deedat, the President of the Islamic Propagation Center in Durban. The book provides valuable insights for any Christian who is encountering or expects to encounter men and women committed to Islam either personally or culturally.

The transcript of the actual debate is the strength of this book. The subject of the debate was, "Was Christ Crucified"? In a single mention, the Qur'an says about the crucifixion,

> They said "We killed Christ Jesus the son of Mary, the Apostle of God," but they killed him not, nor crucified him, but so it was made to appear to them, and those who differ therein are full of doubts with no certain knowledge, but only conjecture to follow. For a surety they killed him not: Nay, God raised him up unto Himself, and God is exalted in Power, Wise (Surah 4:157–158)

It is the obvious contradiction between this passage from the Qur'an and the biblical accounts of the crucifixion and resurrection that formed the background of the debate. In such a case we need to hear the strongest arguments of those who disagree with us; the debate format provides exactly that if we accept the fact that Ahmed Deedat is an experienced exponent of the accurate Islamic position.

Deedat's arguments can be briefly summarized as follows:

1. In Luke 24:36, the disciples were terrified when they saw Jesus three days after his alleged crucifixion. They thought he was a spirit because they had come to believe by hearsay that Jesus had been killed. Mark 14:50 says that all his disciples forsook him and fled; therefore what they thought about the crucifixion could come only from hearsay. But Jesus assures them that he is not "a spirit"; thereby assuring them that they are not looking at a resurrected, spiritualized body. In Luke 20:36 Jesus teaches his disciples that in the resurrection, they will be angel-ized; they will be spiritualized. When Jesus eats before his disciples, he assures them that he is still mortal man, not resurrected spirit.

2. John 20:1 tells how Mary Magdalene went to the tomb of Jesus to anoint him. But "anoint" means to "massage," and people massage live bodies, not dead ones. She must have seen signs of life when Jesus was being taken down from the cross.

3. Mary finds the stone rolled away and the winding sheets unwound. Physical bodies need to have stones rolled away and sheets unwound; resurrected bodies have no such needs.

4. Mary mistakes Jesus for a gardener. Why? Because he has disguised himself as a gardener out of fear of the Jews. He's afraid because he didn't really die.

5. Mary tells Jesus, whom she mistakes to be the gardener, that she has come to take him away if Jesus has been taken and laid somewhere to rest—which, of course, means to relax or to recuperate. Where would Mary take the dead body of Jesus?

6. When she recognizes Jesus and is about to embrace him, he tells her not to because he has not yet ascended to the Father. He doesn't want to be hugged because he hurts. Saying that he has not ascended means that he is not yet dead.

7. Who moved the stone? People frequently talk as if it would take 20 men to move the stone. But Matthew and Mark both say that Joseph of Arimathea put the stone in place by himself.

8. In Matthew 12:38–40 Jesus says that he will give the people no sign except the sign of the prophet Jonah. "For as Jonah was three days and three nights in the belly of the whale, so shall the Son of Man be three days and three nights in the belly of the earth." But Jonah went alive into the belly of the whale and came alive out of the belly of the whale. Therefore, the same must be true of Jesus. Just as Jonah did not die in the whale, Jesus did not die in the tomb.

9. Some argue that the point of this account is not whether Jonah or Jesus was alive or dead, but rather the time factor. Anyone can see, however, that three days and three nights did not elapse between the events of Good Friday and the events

of Easter Sunday morning.

10. Jesus' reference to Jonah as a sign of his Messiahship would authenticate his claims *only if he did not die.* It was a miracle that Jonah was in the belly of the whale and did not die. The same must be true of Jesus if his reference is to make his case for him. If Jesus died, then he is not Jonah, and his case fails.

11. Throughout the entire 27 books of the New Testament, there is not a single statement made by Jesus Christ that "I was dead, and I have come back from the dead."

12. Not only was Jesus reluctant to die, but he was preparing for a show-down with the Jews. That is why he took swords and all 11 disciples to Gethsemane. That is why he makes an inner line of defense with Peter and the two sons of Zebedee. Finally he prays in great agony to be delivered. An angel comes to strengthen him. From that moment on God plans his rescue.

13. Pontius Pilate marveled when he was told the Jesus was dead after only three hours on the cross.

14. The Bible tells us that it is a fulfillment of prophecy that Jesus' bones were not broken. But broken bones count nothing for a dead person, only for a living person.

15. Christians are programmed through the years to prove by hook or by crook that Jesus died on the cross, for Paul has taught in I Corinthians 15:14 that his preaching and faith are worthless if Christ did not rise from the dead. Caught in this error, Christians have been taken for a ride on the cross ever since. Each person must bear his own responsibility, not push it off on someone else; this is what Islam teaches.

I leave to you the biblical answers to these charges. Or perhaps you may wish to get this book and see how Josh McDowell answers them. It is not surprising that Campus Crusade has seen the actual transcript of this debate as a vital argument for the Christian position.

Reviewed by Richard H. Bube, Department of Materials Science and Engineering, Stanford University, Stanford, California 94305.

AND THE TREES CLAP THEIR HANDS: *Faith Perception, and the New Physics* by Virginia Stem Owens, Wm. B. Eerdmans, Grand Rapids, Michigan (1983). Paperback. 148 pp.

I suspect that few readers will respond without emotion to this book by Virginia Owens, who is introduced to the reader via the book's back cover only as "the author of several books, including *The Total Image* (Eerdmans, 1980)." Seldom have I felt basic agreement with an author and at the same time been so infuriated by parts of a text: perhaps that should be considered as an essentially positive comment.

The author presents to us an extended poem in the form of prose. When every line of a book blossoms with the fruit of poetical imagery, the ultimate effect can be to cry, "Enough, enough!" This is particularly true when the book is being used to make a point, but all too often the poetry leaves the reader uncertain as to what is intended factually and analytically, and what is intended metaphorically and poetically only. The contact with the "New Physics" is peripheral and superficial, a few ideas being used to bolster the general theme that the world is a unity, rather than being explored in any depth by themselves.

I believe that if the author and I were walking in the woods, we would find ourselves kindred spirits in great agreement. When we reflect on the unity of the human being as opposed to the imposed dichotomy of body and spirit, or when we experience the Creator in the created stuff of the world, in the very matter of existence, or when we share in a wholistic Hebraic view of the world without some of the reductions introduced by Greek thought, we certainly share a common commitment and perspective. And such material takes up a major portion of this book.

On the other hand, it is never clear that this is really a *Christian* book at all, and some of the poetic statements leave one in considerable ambiguity. She says that "everything is related to everything else" (p. vii), that science "denies the permeation of matter with meaning," (p. viii), that "matter is at some level sentient, *in*formed with knowledge," (p. ix), that "mind *is* matter," (p. xi). She seems to be developing a kind of poetic natural theology when she writes, "all the vital information for a comprehension of the cosmos proper to our species, is there before our very eyes." (p. 18)

And what does the author mean when she says,

> Am I looking at the pond or is it looking at me? (p. 55)
>
> The heart of a shrew . . . beats up to 800 times a minute. Such creatures experience more in an hour than we do in a day. (p. 55)
>
> For in the subatomic world, the billiard balls all seem to know *simultaneously* their parts in the game, their steps in the dance. . . . intelligence is passed around. . . . the particles gyre in concert . . . this is telepathy on what we have come to think of as an inorganic, dead, deaf-and-dumb level. The universe is dancing. (p. 57)
>
> My fear of asking too little is greater, I find, than my fear of my own immorality . . . I want Life itself. One must be willing to risk immorality as a spy, to sin, as Luther advised, boldly. (p. 68)
>
> Who knows but what the clay does not itself demand a hand to shape it. We may push and prod protons into waves or particles, but they also push back. They make their own demands on the situation of which we are a part. (p. 94)
>
> If individual particles are not significant, then neither are individual people. (p. 96)
>
> Those who place their faith in what they call "objective truth" ignore the fact that they *create* the objects, the phenomena, out of undifferentiated being through their own consciousness. (p. 111)
>
> There are no such things, no objects, without a consciousness to conceive them as such. (p. 113)
>
> Perhaps our molecules, if nothing else, struggle to push us in the right direction. (p. 116)

> We know truth when we find it because it is already within us. All creation is internally consistent, true to the nature of the one who made it, not really *ex nihilo*, but out of himself. (p. 118)
>
> There is much more information zinging around the world than we are ordinarily aware of, and it makes use of channels no cyberneticist has yet discovered. (p. 121)
>
> I am really only a river of dissolute stones. (p. 126)
>
> What was once a sparrow becomes a thumb, and a lily turns into a tooth. (p. 128)
>
> Not loving things comes very near to despising God. There is only one fountain filled with blood, the world's blood, from which flows all the life there is. (p. 131)
>
> We have a word, "technology," which is another name for predicting, which is another name for control, which is another name for distrust. (p. 134)

The book closes with a bibliography of twelve volumes, from which the author draws heavily in her thinking primarily from Bohm and Bell. Although her writing is reminiscent of Teilhard, he does not appear in her bibliography, and although she cites Polanyi in the text, neither does he.

Perhaps the greatest weakness of the book, however, is the adoption of a particular response to modern scientific findings to draw metaphysical and philosophical conclusions without being apparently aware that the situation is much more complex and many faceted than that. She seems to suppose that science must tell us the nature of reality, rather than just giving us human descriptions of that reality. Historic fluctuations in these descriptions take on metaphysical significance for the author:

> Science has seemed unable to commit itself to either a universe of continuous reality or one of disparate, colliding bits. It is still stuck in the middle, unable to choose between particles and waves, and impotent to create a new image of physical reality for us. (p. 32)

She finds physicists guilty of "abandonment of actuality" when they provide statistical descriptions of radioactive decay, and complains that when they apply their mathematical models to a single atom, "the mathematics is not equal to the test." (p. 34) She expects too much of science and is disappointed when scientists are willing to settle for descriptions of reality rather than reality itself, forgetting that this is the very nature of the scientific enterprise. The seekers after "hidden variables" like David Bohm are to her the true prophets of science, and she treats as settled what is far from settled in the interpretation and development of quantum mechanics. She jumps from the possibility of a "unified field theory" (even in its present non-existence) to the conclusion that this means that the "universe is one flesh, existing as an undivided whole." (p. 80) She misses the fact that the demonstration of such a unified field theory would merely show that we have a description with enough generality to include within it all the phenomena of which we are aware at this time, and not that we have some fundamental breakthrough in our understanding of reality. To realize historically that both electricity and light can be described by electromagnetic theory does not mean that therefore electrons and light are the same. There is one creation, to be sure, but Christians have always known that since we believe in one Creator.

The author would have us believe that the success of Einstein's efforts to connect gravitational and electric fields in one coherent set of equations would unambiguously give us a "picture of the universe as a pulsating single organism." (p. 82) In a sense this is the ultimate reductionism. The realization that all matter is made up of the same group of atoms does not therefore make all matter identical. Missing completely from the author's exposition is the role of structure in matter, of emergent properties as the result of a hierarchy of structures, of the intrinsic difference between the whole and the parts—realizations, it is true, that arise more readily perhaps from a study of biology than from physics. Absent also is the realization that scientific descriptions of necessity must provide us with either a deterministic description (which raises the problem of human freedom and responsibility) or a chance (probabilistic) description (which raises the problem of meaning and significance). The acceptance of either of these scientific descriptions as an ultimate basis for philosophy or metaphysics leads only to an anti-biblical position. We have not made some major breakthrough if we substitute a deterministic scientific description for a statistical scientific description; we have merely traded one philosophical dilemma for another.

As an introspective and subjective summary of a sensitive person's reaction to the world around her, tied tenuously to some thoughts under debate in the philosophy of physics, this book can provide warm moments and luminous descriptions. As an informed assessment of the relationship between faith, perception and the new physics, it contributes little.

Reviewed by Richard H. Bube, Department of Materials Science and Engineering, Stanford University, Stanford, California 94305.

DARWIN FOR BEGINNERS by Jonathan Miller, Illustrated by Borin Van Loon, Writers and Readers Publishing Cooperative, London, 1982. Paperback. 176 pp. UK £2.95, CAN $6.95, US $3.95.

In that memorable phrase of the English evolutionist Monty Python, the aim of neomarxist historiography is to produce "something completely different." This entertaining introduction to Darwinism wins a prize for differentness in the literature on evolution. The reviewer of this book in *Creation/Evolution*, X (Fall 1982), p. 40, pronounced it "very informative" and praised its "remarkable clarity and attention to detail." *Darwin for Beginners* deserves a second more critical look, if only because it is such a popular, witty work, addressed to a wide audience, and designed especially to appeal to the recently evolved.

1982 marked a full century since Charles Darwin was laid to rest in Westminster Abbey. To cash in on public interest, as well as to honor a great naturalist, certain publishers in that year brought out Darwin books as part of ongoing biographical projects. Wilma George wrote her *Darwin* for the Fontana "Modern Masters" series, for example, while Jonathan Howard's *Darwin* was added to the list of "Past Masters"

published by Oxford. Not to be left behind, the London-based Writers and Readers collective, ranking Darwin alongside *Marx, Einstein,* and *Jesus,* decided to produce one more small book about a large subject. Written by nonhistorians, all of these centenary *Darwins* re-tell the old, old story of the *Beagle,* the argument of the *Origin of Species,* and various pre-and-post-Darwinian controversies. They also tend to repeat the standard myths dear to the hagiographer's heart. Thus, Bishop Samuel Wilberforce gets re-bashed by Thomas Henry (the righteous "Bulldog") Huxley, religion (especially natural theology) gets badmouthed, and Darwin emerges as the positivist archetype of the ideologically-pure scientist.

It is disappointing to see mindlessly literalistic "creationism" equated with orthodox Christianity, as it is by Miller. It is tiresome to see once again "natural theology" equated with simpleminded antievolutionary arguments from design. It is surprising to learn that for "all" nineteenth-century believers, evolution was an "inconceivable" heresy. It is frustrating to be told that criticisms of Darwin's theory were not, at the time, scientifically legitimate but blindly religious. Wilberforce is once more, and wrongly, portrayed as a "stupid" and "scientifically illiterate" churchman who denounced Darwin as the "Antichrist" and his theory as "blasphemy" (pp. 127, 173). All these hoary misconceptions are depressingly common. However, Miller and Van Loon's comic-book *Darwin* is different in some respects. It is fun to read—lighthearted, irreverent, and even (p. 134) downright cheeky. Taking a cue from radical historian Robert Young, it also includes some canny comments about the relations of the natural and political orders (pp. 25, 49). Yet, despite its humor, the book has a serious educational intention, which is why it is worth pointing out some of the mistakes with which this book is loaded.

I am not talking about questions of interpretation. According to Miller, the rise of geological uniformitarianism "made biological evolution inevitable" (p. 29). This unattributed claim is Huxley's and I think he was wrong. But there is some room for argument. What vitiates the value of this romp through Darwinian wonderland is the careless editing which allowed so many errors of fact to mar the text. Granted, some of these are insignificant. Still, students and general readers should be aware of the errata.

Consider personal names: Jean Baptiste Pierre Antoine de Monet, Chevalier de Lamarck's is given incorrectly (p. 41), which is perhaps forgivable, but surely co-discoverer of natural selection Alfred Russel Wallace deserves better (p. 123 and back cover). And Catholic biologist St. George Mivart's initial is "J" (for Jackson), not "H" (p. 130). Books fare no better than people: Robert Chambers' *Vestiges of the Natural History of Creation* is mistitled two different ways (pp. 43, 116); further, it was first published in 1844, not 1845 (p. 31). The design arguments of William Paley—who was an archdeacon, not a bishop—were presented in his *Natural Theology* of 1802, not in *Evidence [sic] of Christianity* (p. 18). John F. W. Herschel's *Preliminary Discourse on the Study of Natural Philosophy* (1831) is misnamed (p. 60). Darwin's "Essay of 1844" was 230, not 250 pages in length (p. 115). And the familiar story that all the copies of the first printing of the *Origin* (1859) were sold on the first day is apocryphal (p. 5). 1,250 copies were printed, but 1,500 were subscribed for by booksellers at John Murray's November 22nd sale; the *Origin* was available to the public from the 24th. For those who love trivia there are other mistakes to be found. The *Beagle* voyage lasted four years and ten months, not five years (p. 66). The ship set sail from Devonport not on December 10th, but December 27th, 1837.

Perhaps excusable in a primer, Miller generally skirts the problem of "social Darwinism" and evolutionary ethics. He also ignores the late nineteenth-century and early twentieth-century resurgence of natural theology, neo-Lamarckism, orthogenesis, and theistic evolution. After Darwin's demise, Miller turns his attention to the story of genetics and the establishment of the neo-Darwinian synthesis. Among the many chuckling readers of *Darwin for Beginners,* the advocates of "punctuated equilibria" will be especially pleased to discover that evidence for their interpretation of the fossil record is "now overwhelming" (p. 133).

Reviewed by Paul Tayler, Institute for The History and Philosophy of Science and Technology, University of Toronto, Canada

SCIENCE, FAITH AND REVELATION: *An Approach to Christian Philosophy,* edited by Robert Patterson, Mercer University Press, Macon, Ga. 1979. 371 pp.

Science, Faith, and Revelation is a series of 19 essays, loosely incorporating the thoughts and philosophy of Eric Charles Rust. The essays are written for the purpose of honoring Rust by various scholars, his colleagues and former students.

In the first chapter, a concise and interesting biography of Rust is presented. The remaining text is divided into four sections: faith and transcendence, faith and the historic process, faith and the biblical revelation, and faith and the natural order.

The chapters within each section are varied and seem to be an eclectic collection of essays rather than a related set of papers supporting a central thesis. *Science, Faith, and Revelation* is a misleading title for this work; perhaps *Theology, Faith and Revelation* would be more fitting. The reader will be disappointed if he or she expects the science-faith question to be addressed in a systematic fashion, though the question is addressed sporadically throughout the text.

Section four, Science and the Natural Order, comes closest to dealing with the relationship between science and faith. Indeed, several papers in this section are thought-provoking and relevant to the topic. William Pollard addresses the ideas of chance and purpose in creation. Robert Baird describes the relationship between metaphysics and science in the works of Leibniz and Locke:

> Locke believed that man could have intuitive knowledge of his own existence, demonstrative knowledge of God's existence, and sensory

> knowledge of the existence of finite beings, but scientific knowledge was beyond his capacity.

and

> This relationship between metaphysics and science is summarized most succinctly by Leibniz in his claim that "these two kingdoms everywhere interpenetrate without confusing or disturbing each other's laws.

Though not directly addressing the science-faith question throughout, there are pertinent and interesting essays in the text. Patterson has done a good job in selecting a varied group of papers which incorporate the thoughts of Rust and I believe that many who read the book will be prompted to learn more of Eric Charles Rust.

Reviewed by Bradley C. Bennett, Department of Biology, University of North Carolina, Chapel Hill, North Carolina 27514

FUNDAMENTAL THEOLOGY by Gerald O'Collins, S. J. Ramsey, N.J.: Paulist, 1981. 283 pp. $7.95 Paperback.

"Fundamental theology" in the Roman Catholic theological tradition essentially parallels the Protestant notion "prologomena" ("introduction" to systematic theology), in which methodology and sources for the theological task are outlined. In this work, O'Collins, professor of fundamental theology at the Gregorian University in Rome, articulates the task of this enterprise, which he sees as twofold:

> (a) methodically reflecting on the source of theological knowledge in the divine revelation recorded in tradition and Scripture, and (b) calling attention to the way human experience is open to receive that revelation. (p. 22)

According to O'Collins a valid fundamental theology ought to entail a reflection on the human experience of the "divine self-communication," a thesis which in turn introduces the three major concepts explored in the book—revelation, tradition, and inspiration. Each of these is dealt with by looking at its meaning, the surrounding questions needing clarification, and the direction in which the answers to these lie. Although speaking within the Roman Catholic setting, the author consciously interacts with major Protestant thinkers in order to appeal to the wider Christian community.

Chapters one and two lay the groundwork, the first dealing with the task of theology and the second probing the nature of human experience, which is crucial because of the foundational role which experience plays in Catholic fundamental theology in general. Chapter three articulates the core thesis, which is the most important contribution of the book: rather than "revelation" or "salvation," "divine self-communication" is the basic way of understanding God's program, for it encompasses the other two and more adequately expresses humanity's religious experience.

Arising out of this thesis is the author's distinction between "foundational revelation" (the experience of Israel and the apostles), which is related to the direct experience of Christ who is the full self-communication of God, and "derived revelation" (the experience of subsequent believers). Bound up with the former is the notion of inspiration, which refers to God's presence in the biblical writings. Tradition is related to the latter, and is significant as transmission and contemporization of foundational revelation and not as a body of propositional truths.

O'Collins is to be complimented on a well-organized work which seeks to incorporate the positions articulated by Vatican II. Evangelicals will be impressed with his stress on faith as "a personal relationship with Jesus Christ" (esp. p. 146) and his attempt to reinterpret tradition in dynamic, rather than propositional terms, as had been the case in the Counter-reformation. Of added interest is his desire to speak of inerrancy in the context of being-in-truth, rather than scientific accuracy. Conservative Protestants will, however, remain skeptical of several distinctly Catholic motifs—the attempt to ground theology in human experience, an inclusivistic attitude toward world religions, and, of course, the attempt to incorporate the magisterium and church tradition into prologomena.

Reviewed by Stanley Grenz, Associate Professor of Theology, North American Baptist Seminary, 1321 W. 22nd Street, Sioux Falls, South Dakota 57105

READINGS IN MORAL THEOLOGY, NO. 2: THE DISTINCTIVENESS OF CHRISTIAN ETHICS Charles E. Curran and Richard A. McCormick, S. J., editors. New York/Ramsey N.J.: Paulist, 1980. Pp. vi + 305. $5.98 Paperback

As the title indicates, this book is the second in a series which deals with foundational issues of moral theology in current debate. As with volume one, which was subtitled, "Moral Norms and Catholic Tradition," the second volume approaches the subject matter from a largely, although not exclusively, Roman Catholic perspective, and this because, in the words of the editors, "The discussion has taken place primarily in Roman Catholic circles" due to "the very nature of the Roman Catholic theological tradition."

Curran and McCormick, ethics professors at the Catholic University of America and Georgetown University respectively, outline a fourfold criterion for selection of articles for inclusion: contribution to the debate, presentation of all sides, international representation, and discussion among the authors—a criterion which is readily visible in the book. Of special merit is the level of interchange among many of the authors presented. The views of Joseph Fuchs (Gregorian University, Rome), whose seminal article dealing with Christian ethics as "intentionality" begins the book, are treated repeatedly in subsequent articles. The editors were less successful, however, with international representation, as they themselves readily admit (only American and European articles are included, with the U.S.A., Germany, and Italy dominating), this due largely to the lack of articles on the subject published elsewhere, especially in the third world.

The volume's subtitle indicates its major thrust, for each article in some way interacts with some facet of the central question of "specificity"—Is Christian ethics or Christian morality unique vis-a-vis philosophical ethics, human morality or natural law? And if so, in what way, and where does this uniqueness lie? Subthemes include various doctrines of systematic theology which affect or are affected by the theologian/ethicist's response to the central issue, such as Christology (the place of Christ in ethics), anthropology (Christian ethics and "humanness"), and soteriology (universalism).

Although each article has a special contribution to make to the whole, two articles in addition to that of Fuchs stand out as especially noteworthy. Dionigi Tettamanzi (Milan) provides an important introduction to the central issue by delineating the contemporary context in which the question has arisen and by succinctly summarizing several major responses (including those of some contributors to the volume), before offering his own critical evalution. The second article to be mentioned is that of John Macquarrie (Oxford). Its inclusion is noteworthy in that it consists of a strong call for a positive evaluation of natural law, in part as a safeguard against moral subjectivity—this call, issued by a Protestant in a volume in which Roman Catholics are struggling with the uniqueness of Christian ethics and the whole question of natural law!

The book closes with this general evaluation by the Florentine ethicist, Enrico Chiavacci:

> It is unacceptable that eleven years after the Second Vatican Council . . . Catholic moral theologians should still be looking with suspicion on the contributions of non-Catholic or even non-Christian moralists.

Perhaps his words constitute a fitting ending to a volume in which leading Catholic thinkers seek to answer the question concerning the distinctiveness of Christian ethics.

Reviewed by Stanley Grenz, North American Baptist Seminary Sioux Falls, South Dakota.

REINCARNATION: A CHRISTIAN APPRAISAL by Mark Albrecht. Downers Grove: Intervarsity Press, 1982, 132 pp, $4.95. Paperback

As the West rejects the Christian world-view, new ideas grip the minds and imaginations of those yearning for some understanding of cosmic justice and meaning. How can seemingly meaningless suffering be squared with a meaningful world? What world-view insures proper moral rewards and punishments for all of humanity? Will we live again?

The answer for many is the ancient one of Karma: the cosmic law of cause and effect that sets in motion the cycles of rebirth or reincarnation. "What you reap, so shall you sow" from one life to another.

Mark Albrecht, formerly of Spiritual Counterfeits Project, faces this challenge head-on and gives the best Christian treatment of the issue in print for the general reader. Maintaining that many trust in reincarnation uncritically, he refutes the idea as illogical, unjust, and unnecessary.

First Albrecht indicts the West for adjusting the Eastern view of reincarnation to suit its own predilections. No longer is it viewed as pessimistic and fatalistic ("the wheel of suffering") or as something to be escaped, but as a positive evolutionary possibility. This, Albrecht argues, is unfaithful to its origin in Hinduism and Buddhism.

Next, the reincarnationist mind-set is unraveled as occultic and gnostic: 1. All is one (monism); 2. man is divine (pantheism); 3. life's purpose is to experience one's divinity; 4. mystical techniques (yoga, meditation, etc.) lead to this realization. Karmic advancement is a process of self-salvation.

After giving a short history of reincarnation teachings from antiquity to the present, Albrecht soundly refutes the notion that Christianity is compatiable with it. He properly interprets scriptures falsely used to support reincarnation and argues that early church fathers such as Justin Martyr, Origin, and Jerome did not teach it, modern wishful thinking to the contrary.

In dealing with supposed cases of "past life recall," the author offers compelling counter-explanations. Supposed memories from previous lives may be explained naturally as intentional or unintentional fraud, as hidden memories from this life (cryptoamnesia), or as the result of genetic memory or the collective unconscious. Demonic intervention is a supernatural explanation. Evidence that "scientifically" validates reincarnation is honestly faced and interpreted both logically and Christianly.

The book concludes with the moral, philosophical, and theological case against reincarnation. Far from establishing cosmic justice and hope, reincarnation fails miserably in light of the grace shown in Christ. Furthermore, how can future punishments and rewards be morally just if the one reincarnated can not always remember why or for what he is being punished or rewarded? The Eastern teaching also brings into question just what or who is reincarnated, for the individual soul is abolished at death. Also, is it bad karma to inflict karmic vengence on another who deserves the punishment? Was Hitler simply carrying out his Karmic destiny and duty?

Albrecht then criticizes the monistic basis of reincarnation for not providing a transcendent or wholly good God. A useful chart comparing Christianity and the Gnostic-Pantheistic view of reincarnation is provided.

This book is a well-argued and well-documented apologetic gem; it shines by internally critiquing reincarnationist ideas rather than shouting them down or merely condemning them. It then shows the supremacy of the Christian revelation standing strong and firm apart from the rubble of reincarnation. If, as Albrecht reports, 23 per cent of the U.S. population

believes in this ancient error, Christians had better take it seriously.

Reviewed by Douglas Groothuis, staff member of Christian Alternatives—a Christian educational ministry in Eugene, Oregon.

GENESIS AND EARLY MAN by Arthur C. Custance, Zondervan (1975, reissued 1981). $8.95, 331 pp.

The creation/evolution debate rages on but this reissue of Custance's writings from the 1960's (one chapter from the early 1970's) does little to clarify the debate in the 1980's. The arguments in this book seem as old as the fossils being vilified.

Most references cited by Custance—probably 80% or more—are from before 1960. For this reason nothing is said about *Australopithecus afarensis*, the continuing detailed work on Peking Man, phylogenies being developed from biochemical data, punctuated equilibrium, or recent archaeological treasures such as Ebla. During the time Custance was writing, the controversial work of the Leaky family was in the news and the early results regarding the language ability of a chimpanzee named Washoe were being published. And since Custance's book was first issued, fashions within science have changed. The ape-dolt image of Neanderthal man, so unappealing to Custance, has been replaced with one that recognizes their humanity. *Genesis and Early Man* is the kind of book that should not have been reissued without an extensive update to reflect these new currents in scientific thought.

Although now a dated book, *Genesis and Early Man* has a worthy objective—to interpret factual knowledge of science in a manner harmonious with the biblical picture of early man. Custance believes the Genesis account of man's origins to be literally correct, and for good reason. If, as he says, "we abandon the concept of a truly historical Adam and Eve . . . we undermine the logical basis of the plan of salvation because that plan involves an undoing by a Second Adam of what the First Adam did" (p. 7). However, in order to bring about the desired harmony between science and Genesis, Custance purposely ignores the question of time and chronology. In reference primarily to C-14 dating he says: "the whole question of chronology [in archaeology] is still in a state of flux and the techniques of establishing the time frame are by no means yet entirely dependable" (p. 8) and so neither is considered. If one ignores chronology, anthropology and archaeology are open for major reinterpretations in a manner that "makes wonderful sense" (p. 53). One can hold that fossil men are no more than 4000 to 5000 years old and that variations in the skeletal remains are simply the result of harsh environment. Ignoring chronology also allows for a radically different view of primitive cultures—they are the product of "devolution." Custance asserts that following the Noahic flood the Near East very rapidly became the cradle of civilization from which people moved out in waves across the continents. As distance between these various human populations and the Near East center increased, their cultures and technology degenerated or devoluted in the face of harsh environment. Acceptance of these views proposed in *Genesis and Early Man* rests squarely on being able to discard all accumulated dating evidence. Although some creationist schools find this assumption acceptable, it is clearly not the view of many Christian scientists and certainly is antithetical to secular scientists who routinely employ available dating techniques.

A further flaw in the book, which as a student of the biological sciences I find especially appalling, is the author's imprecise understanding of the evolutionary mechanism. He says: "Somewhere there had to be a first man and a first woman who were of the species Homo sapiens." Otherwise we must "assume that a [human] baby was born to some primate family. . . Are we to imagine that the ape-family is going to make a supreme effort to keep this new man-child alive? (pp. 128-9) It is a familiar argument—which came first "the chicken-or-the-egg" or in this case the human adult or human baby. Arguments of this kind, based upon sudden large mutational changes, were largely discarded by evolutionary biologists after the 1930's.

Misunderstanding of evolutionary change is evident elsewhere. In the chapter entitled "the supposed evolution of the human skull" Custance argues confusingly that primitive skull features are the result of "historical factors." By historical factors Custance sometimes means the effect of the environment on the phenotypic expression of an individual, similar to the effect of low temperature on pupal development in certain butterflies (p. 215) or the effect of high temperature on the body form of white mice (p. 216). Elsewhere historical factors mean natural selection producing changes in gene frequency. This usage of historical factors is evident in the discussion of varieties and race (e.g. p. 212) and skull modifications due to diet (p. 204). Finally historical factors mean acute glandular malfunctions. In modern human populations these malfunctions are so rare that most of us never witness a single example in our lifetime. And yet Custance concludes that these alone make "any attempt to fit [fossiles of man] into a genetical series . . . a waste of time" (p. 219). Of the three usages of historical factors only the first, phenological change, seems to me to be pertinent to the discussion. The second is evolution within the human population, the very idea the author hopes to disprove. Custance's third usage of historical factors, that of glandular malfunctions, has been ruled out in studies of ever-growing numbers of fossil skulls.

The dilemma of *Genesis And Early Man* will undoubtedly be with us for a long time to come. Hopefully a new generation of Christian scientists, committed to inerrancy and the essential doctrine of salvation by faith, will fashion a cogent synthesis of faith and science. Hopefully publishing houses like Zondervan will be willing to bravely push ahead and publish these more timely authors.

Reviewed by Paul E. Rothrock, Department of Biology, Taylor University, Upland, Indiana 46989.

A GUIDE TO CULTS AND NEW RELIGIONS. Ronald Enroth and others, InterVarsity Press, 1983, 215 pp., $5.95, paperback.

If you are outraged or confused about "the cults," or even just interested in them, this book is for you. Just what is a "cult" anyway? How do they differ? What do they teach? How can they be reached with the gospel?

This fine handbook will equip Christians to cut to the heart of spiritual error with both discernment and love. Sociologist Ron Enroth's opening chapter, "What is a Cult," sets the stage by defining cults theologically and sociologically. Laboring to give specific meaning to the ambiguous word "cult," Enroth identifies nine characteristics of cults such as authoritarian, esoteric, subjectivistic, and finds several categories of cults such as world-denying (Hare Krishna, Children of God), world-indifferent (Way International), and world-affirming (Transcendental Meditation, est). Five other conceptual categories are Eastern mystical, aberrational Christian, psychological or self-improvement, esoteric-syncretistic, and psychic-occult-astral. Having absorbed Enroth's treatment, one is less prone to commit "the generic fallacy" of labeling everything and anything a cult.

The following ten chapters deal with specific groups: The Bahai faith, Bagwan Shree Rajneesh, Eckankar, est, Hare Krishnas, Jehovah's Witnesses, Mormons, Transcendental Meditation, The Unification Church, and The Way International. The various authors outline the history of the movements, their basic doctrine and practices, their internal inconsistencies, and then present the Christian alternative and challenge.

Spiritual falsity is confronted without obnoxious antagonism or callous ridicule. The authors expose cultic deceptions such as TM posing as non-religious to infiltrate public education, the founder of Eckankar's plagiarism, The Way International's intentional mistranslation of Scripture, various Mormon hoaxes, and others. They also spotlight aberrations such as guru Rajneesh's anarchistic spirituality, the Hare Krishna's idolatry, the Jehovah's Witnesses eschatological miscalculations, and more. Yet no chapter should unnecessarily offend members of these groups. The criticism is not overbearing, instead it opens the way for calm but cogent presentations of the gospel. Several chapters directly address the cultist; others instruct the Christian how to personally reach the cultist.

The closing chapter handily summarizes the cultic errors by pitting them against the Apostle's Creed. Eleven key questions are also given for evaluating the cults effect on individual members and their families. A sobering statement concludes this helpful book: "Cults and new religions will not evaporate in the heat of Christian argument. They may, however, lose their reasons to exist when the church is alive and well. If the persistent presence of cults causes Christians to take a hard look at our own faith and practice, they will indeed be doing us a great service."

Reviewed by Douglas Groothuis, McKenzie Study Center, 1883 University St., Eugene, Oregon 97403

TEACHING IN THE COMMUNITY OF FAITH, by Charles R. Foster. Nashville, Abingdon Press, 1982, $6.95, 160 pp.

Charles R. Foster, professor of Christian Education at Scaritt College is concerned with continuity in transmitting Christian values. He believes that these values are being challenged in unprecedented ways, and that the church needs a new philosophy of Christian education.

The new philosophy he suggests is seeing the people of God as a community of children who need to have the community's values passed on to them. He defends this theologically, by showing that the Bible treats the whole community as God's children, without regard to the ages of the individuals. He also points out that dealing with each other as children lessens hierarchies and facilitates learning.

Foster believes that Christian *teaching* is vital, as contrasted to a contentless approach in which educators are given the role of facilitators or enablers. There is content to be transmitted from one generation to another, and only those committed to that content can move a new generation to adopt and retransmit the values of God's community. Foster therefore advocates teachers who incarnate what they teach—who live the values expressed in their words. Teachers must be convinced if they are to convince others.

While he advocates childlikeness, Foster is not promoting childishness. His goal is maturity which maintains the openness and confident faith of childhood, in which dependence is accepted as a matter of course. In the community of God's people, all can learn from each other. Adults learn from children while children learn from adults, in interdependence.

This book is about Christian education, but at a number of points reference is made to public education. This is useful, in showing how Christian values can permeate society. It is also at times confusing, because these values are admittedly of a minority movement, and can only be fostered in the community life of God's people. Indeed, this fact is both the theme and the need for this book!

Teaching in the Community of Faith is a challenging and helpful book. Its suggestion of a new approach to Christian education has value and should lead to healthy changes when heeded.

Reviewed by Joseph M. Martin, Professor of Missions, Eduardo Lane Bible Institute, Patrocinio, M.G., Brazil

CHRISTIAN PERSPECTIVES ON SOCIOLOGY edited by Stephen A. Grunlan & Milton Reiner, Grand Rapids, MI: Zondervan Publishing House, 1982. 457 pp., n.p.

Christian Perspectives on Sociology is an introductory reader composed of twenty individually written chapters mainly by social science professors at Christian colleges on

such topics as research methodology, socialization, economics, and sociology and the Christian. A reviewer is not likely to come up with uniformly applicable generalizations for so many authors, but he can cautiously note a few tendencies in the book as a whole. However, one generality which the editors straightaway provide for us is the authors' commitment to the lordship of Christ and the infallibility of the Bible as the divine rule for Christian faith and practice.

Evangelical Christians stand in a similar relation to sociology as blacks did to white society before the 1960's. For years sociologists have used evangelicals as whipping boys and bogeymen. Sociologists ruthlessly hunted down believers, their beliefs and institutions. They sought to destroy, if not Christians' bodies, at least their social reputation and sense of self-worth. Comte crooned his Religion of Humanity; Max Weber urged us onto "mental suicide"; Lester Ward peddled his social telepsis; and Robert Merton set up his liberal-secular social denaturing still. Sociologists who are evangelical Christians face quite a dilemma in introducing their colleagues to an audience of their fellow believers. Introducing the wicked witch of the west at a Miss America beauty pageant might be easier.

Although sociology as currently practiced has several unChristian assumptions, the authors strongly believe that sociology, or at least its tools, is religiously and morally benign. "The discipline of sociology is in itself neutral and descriptive, not normative" (p. 20). Where sociologists have called Christians inadequate or deforming, we should entertain the possibility that the social scientists are correct before jumping to the conclusion that they are anti-Christian bigots (cf p. 261).

Essentially, sociology, the authors generally agree, can provide us with the facts—the light—while the Bible provides the norms—the salt. Indeed, sociology frees us from the straitjacket of the culture found in the Bible by showing that the Bible is a culturally relative book in which are embedded sacred meanings (p. 413–414). Sociology can be our eyes and our guide for how to be a viable part of human society (p. 24), while the Bible tells us what our participation means. Of course, if in the end sociological fact conflicts with the normatively infallible Scriptures, the Scriptures win out.

The main point of conflict that the authors find between sociology and Christianity is their ideas about the person. Sociology over-determines and denies personality and choice while the Christian affirms them. Consequently, sociologists also overlook the inherent sinful nature of humans. Still, the authors find that the fitting of the Christian perspective into a sociological framework is the best way to integrate the two. So, for example, sociology defines the situation (say, "collective behaviour," i.e., a crowd, a social movement, etc.), the Biblical data is brought together in terms of the sociological definition ("collective behavior in the Bible"), and the normative implications for the Christian are brought forward (the importance of self-control during "collective behaviour").

Regarding politics, at least a plurality of the authors believe that the sociological principles favoring left-wing politics are supported by left-wing political norms in the Bible. (This is fortunate for the authors since sociology has been such a part of the political left that if left-wing politics were not also seen as the Biblical norm, the discrepancy between sociological fact and Biblical valuation might be so large that this book could not have been written in its present form.) Grunlan reiterates the case against familial subordination of women (p. 61; also cf p. 240). Other authors raise questions about laws against homosexual acts, drug usage and other "victimless crimes"; suggest that the church has been unfaithful in the criminal justice area because of a tendency to identify with conservative social and political viewpoints (p. 148); promote Ron Sider's very left-wing political economics (ch. 10 & other places), Christian socialism (ch. 11), and various other attacks on American capitalism (none on socialism); and worry about projected food riots in the 1980's in America (p. 348). Except for a small minority of the authors and on the abortion issue, wherever the discussion of political or social issues involves contemporary political ideologies, the side of right is found to be on the left.

Finally, since so much of sociology is taken as given, an important question then is, How well do the authors summarize sociology? They do a competent job. However, one should note that while some of the authors summarize the various theoretical approaches to a topic, others opt for a more detailed account of just one approach. Also, I was surprised that in general there is little or no mention of the newer sociologies such as ethnomethodology, existential sociology, phenomenology, structuralism, poststructuralism, neo-Marxism, etc.

In sum, *Christian Perspectives on Sociology* gives a competent and accepting summation of the sociology which it discusses and a Christian viewpoint that tends to be "neo-evangelical" in theology and politics. The authors undoubtedly believe that they are freemen tilling the fields of sociology, but others may conclude that the authors are instead close to becoming serfs bound to those fields.

Reviewed by Tony Carnes, Center for Biblical Analysis, Albany, California

DILEMMA: A NURSE'S GUIDE FOR MAKING ETHICAL DECISIONS by Judith Allen Shelly, InterVarsity Press, Downers Grove, Illinois 1980, paperback, 165 pages, $4.95

In 1980 the American Nurse's Association passed a number of resolutions calling for increased awareness of the ethical dimension of nursing practice along with specific suggestions for increasing this awareness including giving ethics greater emphasis within the nursing curriculum. These resolutions are expressive of a renewed interest in ethics within the nursing profession. Not since the 1930's has there been as much written and published on this subject. In fact the amount published in the last several years probably exceeds all that has been published since the beginning of this century. There are several explanations for this sudden interest and productivity. It is, in part, an outgrowth of the

general concern in society about the ethical implications of biomedical technology. These advances in medical technology have created problems that were undreamed of several decades ago. Thus, the problems are new, the implications uncharted. Nurses, as well as other health care professionals, need to think about problems and issues their professions have never before encountered. Not only have the problems changed, but so have the nurses. They are increasingly autonomous and no longer see themselves merely as obedient instruments of a physician's will.

Shelly's rather unique contribution to this growing field of nursing ethics is perhaps not unfairly described as Christianized values clarification. Like other books that have applied values clarification to ethical issues in nursing the emphasis is placed on becoming aware of what values one holds. In secular books a "correct" decision is often measured in purely subjective terms, such as personal satisfaction and congruence with one's value system. What is distinctive about Shelly's approach is that there is added a more objective standard of how well the values and decisions reached comport with the Christian faith and biblical imperatives. This is the only book in this field which attempts to explore nursing dilemmas from the perspective of the Christian nurse.

After a number of preliminary chapters which outline a way of going about ethical dilemmas, the importance of doing so, and how to discover what the Bible says about the moral issues which may confront the nurse, she presents a series of eight case studies for analysis. The idea is to apply the recipe for ethical decision-making provided in the early chapters to each of these cases. The case studies raise such issues as participation in abortions, refusing a physician's order, deception, joining unions, whistleblowing, and evangelism on the job. The most valuable portions of the book are the collections of biblical texts and relevant readings which speak to the issue at hand from a Christian perspective.

Reflecting on the moral issues presented in this book, coming to a greater explicit awareness of what one believes about them through values clarification, and of how one's faith impacts on one's vocation, are undoubtably worthwhile. The problem with such an approach, however, is that it goes no further: the self-understanding which should be a first step becomes an end in itself. What is absent from Shelly's book (and most values clarification approaches) is any discussion of justifying positions taken to third parties, or of moral theories which may provide a way of justifying them. A Christian nurse needs to be sure of his or her own values, but also to have the ability to persuasively communicate and justify them to others. One way of doing this is by placing them in a broader context of appeals to moral theory and shared moral principles. For this second step, one must move beyond Shelly's approach.

Reviewed by Terry Pence, Assistant Professor of Philosophy, Northern Kentucky University, Highland Heights, Kentucky 41076.

THE CREATION, by Frank B. Salisbury, Salt Lake City, Deseret Book Company, 1976, xv + 314 pp., $9.95.

Frank B. Salisbury may be familiar to some of you as author or co-author of texts in plant physiology and botany. He first came to my attention with his article "Doubts about the modern synthetic theory of evolution," published in no less a periodical than *Nature* (224:342–343, 1969). A similar article was published in *American Biology Teacher* (33:335–338, 1971). In both of these papers, Salisbury argues that there is an incredibly small probability that any particular macromolecule could have arisen from a mixture of components by chance. There are some flaws in his arguments, such as that the *Nature* paper does not allow for the degeneracy of the genetic code, but the basic conclusion seems to be unassailable.

In *The Creation,* Salisbury exposes clearly what appear to be more fundamental reasons why he questions current scientific dogma about origins. These are that such dogma conflicts with his religious beliefs. As perceptive readers will have deduced from the place and publisher of the book, Salibury is a Mormon. This is not the place, nor do I have the expertise, to mount a full-scale attack on what most readers of this journal probably consider to be a monstrous heresy. Suffice it to say that the religion of the author limits the usefulness of the book. Salisbury is writing for intelligent Mormons, and draws heavily upon Mormon writing, which he accepts as inspired. He even refers to temple rites, but does not go further, for "this cannot be considered outside the temple. . ." (p. 108)

What, then, is the usefulness of the volume? It seems to me that it is fourfold. First, it gives a Mormon view of origins, should anyone need to have a source for such. Salisbury makes clear that his is not the Mormon view, also stating that there is no official position, but he also seems to be in his religion's mainstream. Second, the book gives a sort of outsider's perspective on the flood geology vs. secular humanism controversy. Salisbury is familiar with *The Genesis Flood, Evolution: The Fossils Say No!,* and other such books. (But apparently not with this journal.)

Third, Salisbury does an excellent job of presenting the philosophy of science to non-scientists, and of considering the implications of that philosophy at the interface between science and religious belief. As I mentioned above, the book was written for laypersons. Chapter Two is devoted to counter-arguments commonly used against Christianity (by which I suppose he means Mormonism—in this case, no matter, the arguments are relevant to Christianity). The author notes these, and points out flaws with each. In chapter Four, he presents six arguments commonly used against the scientific enterprise (e. g., science has made mistakes, the existence of the universe cannot be explained by science) and demolishes these. Between these two is a chapter introducing the methods of science. I found these chapters, and some of the rest of the book, to be nearly as good as, say, Ramm's *The Christian View of Science and Scripture.*

Fourth, and last, the book is valuable because of Salisbury's insights about origins. He begins the last section of the book

by asking "Can we reconcile what God has revealed and what science has discovered? The answer . . . is clearly *no*. Certainly we cannot reconcile science and relevation in a way that will satisfy everyone. . . . God hasn't told us the whole story, and science hasn't collected all the data." (p. 219). He then discusses the major evidences for evolution in four chapters. It is clear that he wants to believe in a young earth, for example, but Salisbury is about as unbiased as anyone can be expected to be in his evaluation of the fossil record, supposed relationships, molecular similarities, and other evidences for naturalistic evolution of life. Because of this unwillingness to go off half-cocked, the weaknesses he does find are all the more convincing.

The book is not perfect, of course, even allowing for the Mormon slant. For example, Salisbury accepts the higher critical views of the documentary origins of Genesis too uncritically, and claims that the red shift is the only evidence that the universe is expanding. Nonetheless, an interesting volume by an important scientist.

Reviewed by Martin La Bar, Visiting Professor, Bryan College, Dayton, Tennessee 37321

TWO INTO ONE: RELATING IN CHRISTIAN MARRIAGE by Joyce Huggett, Inter-Varsity Press, 1981, $3.95, 128 pages.

With marriages breaking up at an alarming rate and with many other couples remaining together but being miserable, a book such as this one is welcome, since it is aimed at preventing newly married couples from succumbing to the pitfalls which afflict many marriages. Joyce Huggett, a counselor at St. Nicholas' Church in Nottingham, England, has written a clear, brief introduction to biblical principles as they relate to marriage, focusing especially upon possible areas of marital conflict.

Beginning with chapters that set forth the foundational principles of commitment, communication and dedication, Huggett tackles the problem of role relationships in marriage, sexual bliss and sexual difficulties, conflict and anger, and in-laws and finances. She concludes her book with some special counsel for those whose marriage is shaken by personal tragedy and offers some suggestions for mending a broken or, at least, tattered marriage.

The strengths of this book are numerous. The counsel given is certainly in keeping with basic biblical principles concerning marriage, and occasional reference is made to specific biblical texts for insight and guidance. There is an appropriate emphasis upon the time and energy necessary to make a marriage work ("fidelity is a time-consuming vocation") and a realistic appraisal of one's mate ("at best, your partner is no more than a wounded healer who will sometimes prop you up and who will, on occasion, require support from you."). Extremely useful study questions throughout each chapter force the reader to interact with the text, thus accomplishing Huggett's goal that this book be "not so much something to be read, as preparation to be done."

In comparison with its strengths, the shortcomings of the book are relatively minor. Some topics, such as the importance of communication, are not developed as extensively as one might desire. The primary flaw of the book is Huggett's tendency to move too far away from her biblical base and to slip into psychological jargon. In discussing the concept of oneness in marriage Huggett writes, "A true one-flesh relationship includes both togetherness and space." In presenting a model for communication she suggests that one spouse should gently ask, "I seem to hear you saying everything is all right. . . ." Often Huggett's points would have been made more forcefully had she laid a greater emphasis upon explicit biblical texts.

While it is not as helpful as R. C. Sproul's *Discovering the Intimate Marriage* or Charles Swindoll's *Strike the Original Match, Two into One: Relating in Christian Marriage* is a very readable book which should prove useful to many engaged or recently married couples.

Reviewed by James Bibza, Instructor in Religion and Philosophy, Grove City College, Grove City, Pennsylvania 16127.

Books Received and Available for Review

(Please contact the Book Review Editor if you would like to review one of these books.)

Blitchington, W. Peter, *The Christian Woman's Search for Self-esteem*, Nelson.

Clark, Gordon H., *Faith and Saving Faith*, Trinity.

DeGruchy, John W. and Villa-Vicencio, Charles, *Apartheid is a Heresy*, Eerdmans.

Gunton, Colin E., *Yesterday and Today* (A Study of Continuities in Christology), Eerdmans.

Harbison, E. Harris, *The Christian Scholar in the Age of Reformation*, Eerdmans.

Hasker, William, *Metaphysics, Constructing a World View*, IVP.

Kilpatrick, William K., *Psychological Seduction* (the Failure of Modern Psychology), Nelson.

Kirk, J. Andrew, *Theology and the Third World Church*, IVP.

Marshall, Paul, *Human Rights Theories in Christian Perspective*, Institute for Christian Studies.

Mouw, Richard J., *When the Kings Come Marching In* (Isaiah and the New Jerusalem), Eerdmans.

Noll, Hatch, Marsden, Wells and Woodbridge (eds.), *Eerdman's Handbook to Christianity in America*, Eerdmans.

Novak, Michael, *Moral Clarity in the Nuclear Age*, Nelson.

Schaeffer, Edith, *Common Sense Christian Living*, Nelson.

Schaeffer, F., Bukovsky, V. and Hitchcock, J., *Who is For Peace?*, Nelson.

Sumrall, L., *Supernatural Principalities and Powers*, Nelson.

Wainwright, Geoffrey, *The Ecumenical Movement* (Christ and Opportunity for the Church), Eerdmans.

Wolferstorff, Nicholas, *Until Justice and Peace Embrace*, Eerdmans.

LOST CHRISTIANITY by Jacob Needleman, New York: Bantam Books, 1982 (previously published by Doubleday, 1980), 224 pages, $3.50 pbk.

In the face of the fragmentation of life and of widespread disillusionment with activism, spirituality and inwardness have gained the renewed interest of Western thinkers both within and outside of the Christian Church. It is within this context that Needleman's book is to be understood, a work that reflects the author's personal rediscovery of the "lost Christianity." Needleman's search was triggered by a chance meeting with a Christian monk, Father Sylvan, whose unpublished writings form the basis of the book's thesis and are extensively quoted. Much space is devoted to the narrative recounting the author's ensuing experiences with other contemporary contemplative thinkers and his discovery of the writings of the contemplative tradition.

Needleman's thesis is

> . . . that it is precisely this intermediate, or conscious, Christianity that is being sought by the numerous Christians turning now toward Eastern teachings or responding to the challenge of the new religions by delving into the Western contemplative forms and texts that have survived over the centuries (p. 140).

As to what this "intermediate Christianity," which is the "lost Christianity," entails is disclosed slowly in the second half of the book. According to the author, the pull exerted by contemplation on Christians today is not that of the desire for an experience of God, but rather that of the discovery of one's personal existence, a depth of life that must precede the practice of life, with which it is often confused (pp. 113–115).

The lost "intermediate" is that which is between God and the animal world, that which makes humanity unique. Yet this uniqueness does not lie in mind, emotion, or the social self, nor in the "soul" as a fixed entity, as is commonly assumed. In fact Christianity's adoption of the notion that man's soul "exists in finished form within human nature" was a disaster (p. 171). Rather, the soul is developed by "the power of gathered attention:"

> "Lost Christianity" is the lost or forgotten power of man to extract the pure energy of the soul from the experiences that make up his life. This possibility is distinct only in the most vivid or painful moments of our ordinary lives, but it can be discovered in all experiences if one knows how to seek it. Certain powerful experiences—such as the encounter with death or deep disappointment—are accompanied by the sensation of *presence;* an attention appears that is simultaneously open to a higher, freer mind ("Spirit") and to all the perceptions, sensations and emotions that constitute our ordinary self. One feels both separate and engaged in a new and entirely extraordinary way. One experiences "I Am." This is the soul (in inception).

As such, the soul as an idea is a powerful symbol with the result that the search for "lost Christianity" becomes the attempt "to bring back Christianity as a guide to the search for ourselves" (p. 184).

In the Conclusion, Needleman applies his findings to the area of activism. Christianity is the religion of love, he maintains. The outworking of love toward one's neighbor consists neither in mysticism and spirituality nor in "social action and therapeutic caring," but rather in the attempt "to nurture the growth, in my neighbor, of the soul." This begins with a genuine, inner seeing of suffering that goes beyond mere emotional reaction to injustice, for even emotion belongs to the outer aspect of one's life. The lost element that must be regained is the force within oneself that can attend to both outer and inner movements (creation and return) of human nature and "can then guide the arising of this force within my neighbor in a manner suited to his understanding" (p. 217).

Needleman's book is of significance for two related emphases: the soul must be understood as a process, not as a fixed entity; any return to mysticism, contemplation, or spirituality, while important, is insufficient. Many readers, however, will wish that more space had been given to the development of the author's theses, rather than to his journey toward their discovery.

Reviewed by Stanley J. Grenz, North American Baptist Seminary, Sioux Falls, South Dakota

THE SUFFERING GOD by Charles Ohlrich, InterVarsity Press, Downers Grove, Illinois, 1982. 130 pages, $3.25.

In *The Suffering God,* Ohlrich tackles the question of what is God like, particularly in light of the problem of suffering. If God is good, and God is all-powerful, then why does He allow pain and suffering? Clearly, traditional explanations of human suffering seem to create more problems than they resolve: e.g., that suffering is God's punishment, that suffering is a means God uses to teach us lessons, that suffering is a means God uses to test us, that suffering will be rewarded beyond the grave. Such explanations bring little comfort to the suffering. So, what kind of a God is it that we worship? Ohlrich's answer is that we worship a "suffering God." The God that we worship is one who loves us so much that he shares our pain and suffering.

Most of this book is devoted to developing the argument that the God of the Scriptures is a God who suffers for us and with us. In the Old Testament, God suffers over the sinfulness of Israel. Hosea especially, pictures God as a tender and compassionate father, who suffers when his children turn their backs on him. The "suffering servant" of Isaiah 53 reveals God as suffering on behalf of his people, bearing the sins of many and making many righteous. In the New Testament, we see God entering the world as Jesus Christ, and suffering and dying on our behalf. Throughout the Bible, God is revealed suffering for us and suffering with us. This knowledge, Ohlrich argues, makes our own suffering easier to bear.

Ohlrich does not attempt to answer the question of why God permits suffering, but rather points out that God has chosen to forgive and chosen to suffer. Faced with the scandal of human sin, God could have destroyed the world entirely. Instead in his great love, he chose to forgive through suffering. God by the act of creation so placed himself that if man sinned, it meant suffering for God. Why God should have

created a world in which suffering plays so large a part is not revealed to us.

Perhaps the nature of creation is such that things just happen. All events may not have an ultimate meaning. Any meaning they have is what we ascribe to them. "Why did this happen to me?" is then the wrong question. What we need to ask is, "How am I going to respond to this?" Ohlrich's book should help those who suffer to make the right response.

This is a well written and easy to read book and should be successful in achieving the author's objective which is to provide "hope and comfort for those who hurt."

Reviewed by Steven R. Scadding, Department of Zoology, University of Guelph, Guelph, Ontario, Canada N1G 2W1.

THE COSMIC CODE: QUANTUM PHYSICS AS THE LANGUAGE OF NATURE by Heinz Pagels, Simon and Schuster, New York, 1982, 370 pp. (with index).

This book by Heinz Pagels does much to clarify some of the confusion in the realm of quantum physics. It explains the overall current state of quantum physics better and in a clearer manner than can be found in most other sources. Further, the topics are discussed as clearly as possible without resorting to the complex mathematics that is almost imperative in explaining some of the phenomena.

Pagels begins with the history of physics in the early twentieth century, particuarly the work of Einstein, his 1905 work in the photoelectric effect, and his subsequent special and general relativity. The author moves on to quantum physics and shows Einstein's inability to deal with the philosophical implications that emerged from this new physics. In a few short pages the new physicists are discussed: Heisenberg, Bohr, Dirac, Schroedinger, Pauli, and Planck. Their contributions to quantum physics are also discussed: complementarity, the uncertainty principle, the wave-particle nature of matter, etc.

As the author completes the first section of his book, "The Road To Quantum Reality," he then proceeds to a "Voyage Into Matter." In this section there are clear and lucid discussions of quarks, leptons, and gluons. The four types of gluons are associated with the four forces between matter: gravitational, electromagnetic, weak, and strong. Completing this section Pagels discusses gauge field theory, unstable vacuum, and the unified field theory, relating the latter two to the origin of the universe as hypothesized in the Big Bang Theory. In a final chapter in this section the author discusses one of the more recently developing topics, proton decay.

In the physics of these topics the author gives us little problem; his explanations are clear and understandable. It is in the philosophical and even theological implications that he gives us that there is cause for concern. Interpretations of mathematical formalisms have given scientists problems that are often more difficult than the science itself. In this context Pagels gives readers both his physics and his own personal interpretations.

The problem with Pagels' trying to convince us of his views is that he attempts to lend the certainty of his physics to his philosophical interpretations. Further, even though his physics may be well thought out, his philosophical arguments are often incomplete, and sometimes faulty. A good example of this approach to philosophical interpretation is found in Pagels' discussion of the Copenhagen interpretation of quantum physics. A few years ago this point of view was considered only one of the viable alternatives. Pagels, however, appears to accept it as almost axiomatic.

In some of Pagels' philosophical interpretations he is merely vague and appears to want to convince readers of his viewpoint by the age-old method of "proof by intimidation." One area in which Pagels attempts this method of persuasion is found in the applications of the methods and implications of quantum physics outside that area. Pagels shows what "quantum weirdness" means, how quantum reality is statistical in nature, and how classical causality does not apply at the quantum level. As "real" as these implications may be at the quantum level, Pagels tries to apply the implications to the realm where we humans live. To do this he does not give us a convincing argument; rather, he almost expects us to believe him on "faith." Pagels chides Bohr for his applications of the principle of complementarity into the realm of biology (p. 94), but then does much the same thing himself. In his discussion of probability he alludes to the lack of freedom for humans in their political and creative lives. He says we are guided by the "invisible hands." (p. 115–116) Pagels wants his applications of the interpretations of quantum physics where he wants them and nowhere else, and he wants his readers to agree with him.

A second area of difficulty in Pagels' applications of quantum methods and their implications is found in his interpretation of the statistical nature of quantum physics. At the quantum level Pagels rejects causality as a central tenet of physics and turns to statistical distributions as the "new reality." He introduces the concept of invisible hands that shape quantum reality and then seems to realize that he has introduced a new causality. He backs off from such a strong position (p. 114) but before he is through with Chapter 7, he has virtually come out four-square in favor of his new causality; he claims that, ". . . the invisible hands are touching everything in the microworld." In essence Pagels seems to be rejecting classical determinism in favor of a new type. Further, even though he rejects the traditional Judeo-Christian Jehovah in favor of the "God who plays dice," he in turn rejects that god and turns to one who has the hands that touch everything in the microworld.

One final philosophical interpretation that Pagels' book gives us is found in the concept of observer created reality. This is not the traditional concept of solipsism; it goes beyond that and introduces the observer into the whole of ontology. To quote Pagels, ". . . with quantum theory, human intention influences the structure of the physical world." (p. 94) Much of this viewpoint comes from the uncertainty principle where the position and momentum of a particle cannot be determined simultaneously. With such a condition, the observer

creates the reality he wants by choosing which one he intends to measure. This is certainly a simplistic explanation of the uncertainty principle, but it suffices to show how observers are supposed to become the "creators of reality."

There are several objections to this concept of reality. The first has already been discussed briefly, i.e., there is no basis for applying quantum reality outside of the realm of quantum physics. In spite of this lack of basis, there is the constant attempt to apply any method at hand as long as it suits a purpose.

Such an "observer created reality" is in fundamental opposition to the Judeo-Christian concept of God and carries the current trend toward relativism in philosophy even further. We have already seen the demise of absolute value and absolute truth. With the implications of quantum physics presented to us as a relative ontology, we see another attempt to set aside the God-man in favor of the man-god. Under these conditions, it is imperative that the implications of the philosophical interpretations of quantum physics be more widely discussed.

Reviewed by Donald L. Grigsby, Associate Professor of Education, University of Alabama in Birmingham, Birmingham, Alabama 35294.

THE ENVIRONMENTAL CRISIS: THE ETHICAL DILEMMA ed. Edwin R. Squiers. Mancelona, Michigan: AuSable Trails Institute of Environmental Studies, 1982. 375 pp., $6.95.

Ours is a century of significant conferences, congresses, and conventions. In June, 1980, a gathering convened among the woods and lakes of northern Michigan. The task was to wrestle with the environmental problems of our age in a cross-discipinary, Christian forum. This book, *The Environmental Crisis*, is the product of that forum. It provides a valuable contribution to our understanding of the most perplexing question of our age—how can man live in harmony with God, his fellow man, and nature.

Although the forum participants exhibited a wide diversity of viewpoints and backgrounds, almost all expressed concern over the attitude the church and individual Christians have toward the creation and environmental problems. Kroll (p. 184) beautifully summarized many of these ideas and the tone of the forum:

> The Old Testament prophets spoke out mostly to God's people, rebuking sin and pointing toward a direction that involved obedience to the Lord. Much of the evangelical world is of no particular viewpoint on environmental issues. If the underlying materialism responsible for many of the issues is exposed, along with the issues themselves, the Spirit of the Lord is able to move His people to response.

So there is a need to deal with the sin of materialism and apathy. There is a further need to educate Christians in the ethics and complexities of the environmental crisis, an education that can occur in both our churches and Christian schools.

The first section of *The Environmental Crisis* attempts to work toward a Christian environmental ethic. Here the conference participants grapple with what relationship man should have with God's creation. It is evident from the scriptural studies presented that God has given man particular responsibilities toward nature. However, depending upon the scriptural and theological emphasis, our exact role may vary. For example, Walker sees man as a steward of the natural world in which man seeks to manage resources for the greatest benefit of all mankind. Wilkinson hopes that Christians will see themselves as redeemers of nature (in the sense of Rom. 8). He believes that like Christ, we should be willing to sacrifice self in our relationship with the natural world. In yet a third view, the Process view presented by Keener, the Christian is thought to be co-creator with God. Of all the discussions, I found that of Westphal to be the most provocative. He boldly argues for a form of "nature's rights." By this he means a right for nature to be itself with man by our seeking a new "subject–subject relationship" with nature in place of the present "subject–object relationship." All of the participants properly focus on the need for real progress to have "its origin in God the creator and its goal in God the perfector" (Schwartz, p. 35). Without such a focus, the resulting ethic, Yandell points out, will be inadequate, piecemeal, and utilitarian.

Many of the essays supply case studies and historical perspectives. The resources and technology section has especially insightful examples involving the tall grass prairies of our Midwest and the effect of advertising on our perception of nature. The mining of Montana coal provides a fascinating case study of the conflict between local and national interests. In another essay, Terman reveals his frustration over controlling the spread of the toxic chemical kepone in the James River of Virginia. His experience beautifully illustrates the "wish it would disappear" approach to environmental crises often adopted by bureaucrats and business.

I found several essays particularly helpful in my thinking about solutions to environmental problems. Adkison showed the value of systems analysis in working through problems. Phil Loy's discussion of politics and the environment clears away cobwebs regarding what government can and cannot do. Systems of government, according to Loy, are meant to be only agenda-clearing processes rather than problem-solving mechanisms and as such will have only limited success in protecting the environment.

The essays stimulate us to address many important questions. What action can we individually take as Christians and earth redeemers? What role will the church and Christian educational institutions play in the long-term working out of our environmental dilemmas? Will a new moral base be awakened? Will we begin again to see some things "as sacred and holy"? Might we eventually want to write environmental stewardship into our catechisms and creeds as suggested by Gelderloos? Can the American evangelical Christian live an alternate lifestyle amid affluence without accepting it as the norm? Can he speak clearly and forcefully from the eternal perspective exemplified by Jesus and taught us by the Holy Spirit?

Reviewed by Paul E. Rothrock, Department of Biology, Taylor University, Upland, Indiana 46989.

Letters

A Response to George Jennings on Marx and Kraft

In his writing, "Living in Babylon with Darwin, Marx, Freud and Deloria" (Journal ASA 9/83), George J. Jennings has given readers a grand tour of the phenomenon of modern-day Babylon as seen from four perspectives.

I would like to comment upon two statements made by Reverend Jennings—the first: "It goes without saying that Marx must have been influenced more than he perhaps would cared to have admitted by biblical ethics despite his disavowal of religion."

This statement demands a refutation, and ironically is done so in a sense by Jennings' writings themselves within the same paper. Just prior to the quote above (pg. 140), is a statement of those things that Marx championed in the cause of man. On page 141 note Vine Deloria, Jr.'s attributes of a society prior to its exposure to Christian thought. The degrees of sophistication perhaps are not the same, but the 'flavor' is close. Without the Scriptures, the Native Americans came to their own code of ethics, and I say that it was without the Scriptures' influence that Marx came to his code of ethics in spite of the fact that he was born a Jew and as a child was a Lutheran. Man is capable of "manufacturing" good—a sociological 'good' that does, in fact, benefit society; but in many cases, this good has nothing to do with any God-man orientation.

Thus, the question must be asked: "Why would anyone be motivated to do 'good' if not to please God?" A question asked by Erasmus . . . it could be answered that to create and do sociological 'good' is in reality the path of least resistance through life's challenges. At its basest denominator, society strides progressively forward more easily on the path of 'good' than on the path of 'evil' and turmoil. The path of good is paved with harmony and cooperation; the path of evil is paved with frustration and discontent and sometimes annihilation.

At this juncture, it is important to point out that in the Marxist society—and to varying degrees within the Native American societies—there is no accommodation for dynamic individualism. The Marxist society is viewed in much the same way as we would view human body cells grouping together to form a larger bodily unit. Marxist society is, in fact, a functioning body organ—which if it were ever to cover the entire globe would then become the superbeing as envisioned during the early days of formulation of Marxist-Leninist thought. Instead of our "body of Christ," it would be the Marxists' "body of man." However, for the organ to produce—and to not feel the 'pains' of illness (social upheaval)—a common code of 'good' quickly forms. This form of 'good' really has no relationship with the 'good' of God because the 'good' of Marx is a good of social expediency. The good of the State can have redeemable features that closely resemble the attributes and desires of God. However, there is the one big difference: man's 'good' is from man and thus serves man advantageously as deemed proper by the ruling power.

When the 'good' of the Marxist society, for example, is stimulated to march a path of self-serving crrancy, then as Alexander Solzhenitsyn comments throughout his Gulag "triptych," the organ becomes cancerous and the cancer metastasizes—as has been the case since 1920 in the Soviet Union.

Marx's 'goods' came not from any biblical influence. He just closely scrutinized the results of men like Robert Owen (CAPITAL, Vol. 1) who had conducted limited "worker society" experiments, and along with Frederick Engels took note of the results and the factors that lead to the various outcomes. Both men saw the exploitation of the working class by ruling capitalism, and formulated a new and workable philosophy.

Marx's entire systematology presses for the betterment of the working class 'whole', even to the extent of suppression of individualism. What is surprising is that workers around the world, shortly after Marx's death, considered his writings as their bible—even though few could understand what was written. Marx's abstractions, in some cases as difficult as mathematics, nonetheless appealed to a working class that used the philosophy to create their own state religion; a counter-Christian force that changed the world. This was a choice of "proletarian reason" over "religion."

The second point that I wish to comment on is Jennings' referral to Charles Kraft's statement on page 142: "Theologians need to use the language of the behavioral science in terms of their approach to problems, their conclusions, and their articulation."

What a true but grossly-ignored statement!

In all frankness, it must be asked, when was the last time 'recognizable, definable and contemporary' theology had witnesses as to its viable penetration of religious society? Within observed church communities, I have not picked up on any discernible awareness on the part of the congregation toward any theology other than Scriptural hermeneutics. (These observations were made within the Baptist community.)

Obviously, the reason for any gap between theology and the laity is because there is not an existent, accessible avenue of cross-communication.

In all too frequent cases, theology has generated unto itself an elitist society of membership of which I admit reluctant participation. Theology should support and amplify the Scriptures and not go off onto vistas of esoteric questionableness. Christian theology has a tendency of muddying the waters of Christian faith. Can we not all point to instances where varied theological contributions into the thoughts of a believing Christian served only to confuse that person? Of course, the prime modern example (from a bona fide theologian) is Rudolf Bultmann's theology. In his move to demythologize the New Testament, Bultmann sorely 'muddied' the waters of many believers. For others, like myself, however, Bultmann's works added one more diopter power to my spiritual eyeglasses.

As Kraft says, ". . . theology needs to use the language . . ."; may I add that theology needs also to exercise responsible maturity and a direction of purpose before thrusting itself upon a given society. To paraphrase a quote of Marx from his *Theses on Feuerbach*: "Philosophers (ne: theologians) have only *interpreted* the world, in various ways; the point is to *change* it."

Let also this question be asked: "How viable is theology?" A fair question, especially when Christian society claims that theology and theologians do not communicate with them.

When a venture is made into theological situations, one factor should be kept in mind: the Scriptures were written in koine Greek to be read by every walk of society—from the simplest of us to the most intelligent. Where, then, is the sanction for a theology that does not communicate as straightforwardly as God's Word does? Where is the value of such thought if it doesn't communicate? It would be likened to shouting into a cave and hearing no echo.

There comes a time for every man, upon reading Scripture and applying to life what has been absorbed, when confusing (and even threatening) theologies must fade away and the Holy Spirit takes a precedence of clarification and understanding while providing direction. It is not to be said, though, that man should not use his intellect to its fullest, but let it be remembered that the Scriptures are the primary building block in any rational construction of interpretation of God's nature and methods.

Scripture is our only benchmark of reality. A bold statement, but history, as man can record it, is transient at best when it comes to documentation of motivational occurrence. Theology can become even worse; it can degenerate into pure legalism and serve to hamstring otherwise faithful believers. Fortunately, in its opposite form, theology can draw the mind closer to God—if, and only if—it is under the guidance of the Holy Spirit.

Theology is at its true calling when it strives to correlate the physical world with the existential Christ happening. Theology should not waste the time of everyone concerned with "God is Dead" and on-again and off-again themes of Jesus is God and Jesus isn't God, etc. Such themes cannot be entertained if any 'good' is the expected outcome. I have often felt that if a choice had to be made between a theologian or a good Sunday school teacher to guide Christians, it would be hands down for those cut from the "Moody cloth."

There are times when theology shares a common trait with the 'good' of Marxism—it, too, seeks a path of rational least resistance and in some cases strives to do away with the element of faith; and the sometimes hard-to-obey demands of discipleship (this is to be found in today's "pop" theologies.)

Contributors to *The Journal of the American Scientific Affiliation,* such as Jennings and Vern Sheridan Poythress, do not fall into such a trap. They are methodological realists and because of their orientations, these eminent writers do not take their eyes from the 'benchmark' and stray off on to some disassociated tangent. How refreshing it is to read the works of people who are not only aware of, but who strive to manifest for all, the logical portrait of the theologic/physical vista without the overusage of three all too familiar terms: *a priori, creatio ex nihilo* and *Deus ex machina.* Just once it would be surprising to see a writing using—instead of *Deux ex machina,* the phrase *δύναμις τοῦ θεοῦ.*

The *'Journal's'* commodity of mature reason and concise delivery on the part of its contributors is becoming harder and harder to find in today's society and religion. It can only be hoped that others will take notice and follow suit.

Donald N. McKay
735 Nelson St.
Cazenovia, NY 13035

A Response to George J. Jennings on The American Babylon

George Jennings's exposition of the American Babylon (*JASA,* September, 1983) is typical of recent theologically based interpretations of wealth and poverty. This has been true for three generations in traditions that have been called liberal, and in recent years those associated with conservative theology have followed suit. Extremes of poverty and wealth coexisting on the same planet have become *prima facie* evidence of injustice, with guilt inhering in those who are not poor. As one leader on the theological right puts it: poor people are poor "*because* we are rich." That is the thesis that dominates the approach Mr. Jennings has taken in his article.

In spite of the impressive array of biblical references that invariably accompanies declarations of this type, there is no relationship between this thesis and a truly biblical approach to issues of poverty and wealth. That is clear enough from the reference from James that Mr. Jennings chose for his masthead. We are told there that the rich who are to weep and wail are those who have defrauded field workers by failing to pay them the wages they were due, and who murdered innocent men. In other words, these are people who gained their wealth by despising the divine commandments against stealing and killing.

I have argued at length elsewhere that this monomanic and unbiblical set of views borrows from and assists the most destructive of the idolatries of the western world and can have no other end than to destroy the people it ostensibly wishes to help. (Schlossberg, *Idols for Destruction,* Thomas Nelson, 1983). I have no wish to repeat the arguments and evidence here, but would like to make a few comments on specific points that Mr. Jennings has made. This is not a criticism of his article as much as it is of the tradition with which he has chosen to ally himself.

1) He is filled with feelings of guilt over the fact that he is not poor, in spite of his modest (by American standards) financial standing as a member of the professoriat. God's blessings for this position must always be interior, never external. This is a semi-Manichaeanism wholly outside of the biblical tradition, rooted in a misapprehension over how creation applies to our understanding of our position. The traditions he cites so uncritically (Darwinism, Marxism and animism) have no doctrine of creation and thus can have no conception of material blessings that is rooted in reality. And they have no conception of grace either, which is why those who follow them suffer from the guilt that is consuming Mr. Jennings.

2) Mr. Jennings apparently believes that the dominating feature of the American economic system is competition. Therefore he links it with social Darwinism and contrasts it with the biblical notion of service as the motivating force of economic life. Reinhold Niebuhr, whose depression-era work contained similar misconceptions, later called the idea that a Christian socialism would replace motives of profit with motives of service a "complete confusion between systems and motives" which invested collectivist systems with completely undeserved moral sanction, unfortunately popular in theological circles. Mr. Jennings does not apparently advocate any particular economic system in his paper, but the nature of his dismay over our system and his preference for an alternate in which there is no prosperity to provide guilt-inducing contrasts implies a preference for those third-world solutions which in fact feature both oppression and want.

3) Using the term *Babylon* to describe the United States poses an interesting problem of interpretation. If that is taken to mean that we have fallen into idolatry and the practice of injustice, it is unexceptionable, and I have taken a similar position. But if that is what is meant, then it is essential to explain exactly what is meant by idolatry and injustice and just how the nation practices them. Otherwise it is impossible to avoid the shabby and uncritical anti-Americanism that today passes for prophetic Christianity. And it will not do simply to assume that other societies—principally poor ones, it turns out—are the righteous ones surrounding our Babylon.

4) If Mr. Jennings is serious about understanding *culture* to be "a system of meanings shared by a society," then he is incorrect in supposing that African and Near Eastern cultures are closer to the ancient Hebrew culture than ours is. This misconception is related to his improper use of social science insights to provide theological understanding. Even in its presently-debased form, our own culture is far closer to that of ancient Israel than is any other. Only if one thinks of culture in a superficial sense as being primarily geographical in derivation is his statement true. If Mr. Jennings took more

seriously his definition of culture, he would be able to place more firmly in a biblical context "insights" he derives from both social science theory and primitive cultures that are as thoroughly pagan as they ever were.

It's a disquieting thought that a missions consultant should have these ideas about the relationship of cultures. How can evangelism based on them result in anything but a gospel that is completely impotent and irrelevant to the lives of those it is supposed to change?

Herbert Schlossberg
5328 Colfax Avenue So.
Minneapolis, Minnesota 55419

Need Fundamental Definitions

In reading the *Journal ASA* I am always taken by the sincere attempts at vigor and logic which many of the authors and letter writers exhibit. I wish to carry the teaching of science analogy a little further.

In reviewing thermo you find that most students are brought up on the chemists' tradition of dealing only with ΔG, ΔH, etc., as though G, H, didn't exist. Now I submit that we who are scientists and Christians do precisely the same thing. We spend an enormous amount of time on "acts of God," (e.g. evolution), interpretation of a particular Biblical passage, ethical impacts, etc., which are the analogues of $\partial^2 G/\partial T^2$ in terms of higher derivatives. But we rarely talk about the integral terms G, H, S, etc. The important integral terms of faith are indeed "God," "Behavior (subset: love), "Bible," etc." I believe that Christian evangelization of the world has stopped and will retreat until we straighten out what we mean by these integral terms and proclaim to the world in simple, Jesus-like language and metaphor, what the good news is.

In 1979, I gave the Hibbert Lectures in London. These were published as *Experimenting with Truth,* Pergamon Press, 1981. In that book I tried to address the question: What do we mean by the term "God"? As scientists we must define our terms. I emerge at a Christian pan-entheist position (strongly modified Whitehead, Teilhard, Cobb) in which I believe that in order to convey an accurate picture of what we mean we must avoid the word "God" because that means so many different things to different hearers or readers.

What is the relation of Christianity to the "Bible?" The Bible clearly and absolutely was not essential to being a Christian, since several generations, including the founders, didn't have it. Is a Bible necessary to being a Christian? In Galatians 2, Paul answers the question: Must you be a Jew to be a Christian? Answer: No. Why do we persist then in the "Judaeo-Christian" appellation? Can there be no Hindu-Christians? or Tao-Christians? Or humanist-Christians? If not, is Christianity merely a Jewish sect? Gandhi, by self-proclamation, was not a Christian. Yet he knew the Bible better than 90% and followed Jesus 99% better than most pewsitters. So, how does "Behavior" relate to God, and Christianity?

Rustum Roy
Director, Materials Research Laboratory
The Pennsylvania State University
University Park, Pennsylvania 16802

Biological Interpretations of the Virgin Birth

I am glad that Dr. Kessel accepts as true the biblical record of the virgin conception of our Lord. However, I question the propriety of explaining it. For nineteen centuries the Christian Church believed this doctrine, accepting it as a matter of fact. Then in the twentieth century in our so-called enlightened age two Christian believers attempted to explain it.

The First explanation was the DeHaan hypothesis. According to this idea, sinful nature is inherited through male parentage, and Jesus avoided having a sinful nature by not having a human father. The joker to this theory is that chromosomes with genes are transmitted by the mother as well as by a father and that through Mary, Jesus had male ancestry. Also, God does not need protection from sin, and since Jesus is God Incarnate, as the Gospels tell us, the God Christ needs no protection.

A later writer, Henry M. Morris, presumed to protect God from inherited human depravity by another theory, according to which God created an embryo independently of the germ cells of Mary, and implanted the fetus within Mary's virgin womb. Thus, Jesus had no genetic relation to Mary, his theoretically surrogate mother. In this theory Jesus might be a human being by special creation, but he was not a member of our human race; he would not be a Son of Man, which was the title to describe Himself which Jesus used most often. This theory is anti-biblical and should be rejected by all thinking Bible believers.

The Kessel theory is as objectionable as the two previous theories. God can do as many miracles as He wants to in order to accomplish His purposes. Parthenogenesis (by miracle) seems to be a logical description of the origin of the body of Jesus. A second miracle is necessary to produce a male body, for simple parthenogenesis would have produced a clone of Mary. The clone, as Dr. Kessel notes, would have two X chromosomes and no Y chromosome. Dr. Kessel postulates somatic sex-reversal through some inter-chromosomal transference of a gene in Mary's father. Thus, before Mary's actual existence it was pre-determined that a certain future virgin would be the mother of Christ; but it seems that Mary was given the privilege of accepting or rejecting her high honor, (Luke 1:38). Mary believed the angel Gabriel and said, "Be it done to me according to your word."

We wonder what quantity of male hormone, testosterone, would have been needed to accomplish complete sex-reversal to produce "the androgynous Christ." In our human race there have been a number of pseudo-hermaphrodites but no complete hermaphrodites. The second miracle may as well have been the removal of one X chromosome and the creation of a Y chromosome.

One serious objection to Dr. Kessel's proposal is the assumption that there have been other virgin births in the family of Homo sapiens, the case of Mary and Jesus not being unique, whereas the Gospel accounts and the prophecy of Jeremiah 31:22 suggest something unique. If we accept the Kessel hypothesis we must say that the virgin conception of Jesus Christ was true, but not a miracle, and that the ancients just thought it was a miracle.

Should we not simply believe the Word of God, accept as true the fact of the virgin conception that occurred only one time in human history and admit that we cannot explain it? We must admit that there are some things we don't know and cannot know. God is not dependent on things we discovered in this century and is not accountable to us.

Statement No. 6 in the summary is not a necessary conclusion from Dr. Kessel's biological interpretation of the virgin birth. There is no relation between ideas of the government of the church and

whether Christ was a man, a woman, or both. No one needs to argue against the ordination of women in the church on the grounds that Christ was a man; the argument is based on Paul's letters to Timothy and Titus.

Harold H. Bowerman, MD
7 Clayton Terrace
St. Louis, MO 63131

In Defense of Edward Kessel

I am concerned to learn of some of our readers who felt that the article, "A Biological Interpretation of the Virgin Birth," by Dr. Edward Kessel, published in the September 1983 issue of the *Journal ASA*, was theologically offensive. Perhaps a few comments will help clarify the editorial decision to publish the paper and some of the mistaken notions of its critics.

Dr. Edward Kessel is a devout Christian with many years experience in the field involved in his paper. I know that it is his desire to exalt his Lord, and not in any way to lessen his Deity. Readers of the article who see in it an attempt to attack the person of Jesus Christ as our Lord and Savior, must recognize that this is totally their own emotional reaction and neither the purpose nor the result of this article. Implications of such an attack cannot be obtained from the paper itself.

The manuscript was duly circulated to several reviewers of the *Journal* and their suggestions for revisions were duly incorporated before publication.

Violent objections to this paper must come, it seems to me, from the classic and tragic fallacy of believing that a mystical event incapable of scientific description is somehow more properly seen as having supernatural significance than an event that is capable of scientific description. The church has stumbled on this fallacy repeatedly through recent centuries, and sadly it still remains an unconscious inheritance from the past.

God is free to act in whatever way He will. The Bible establishes the fact, the truth, and the meaning of His actions. Ordinarily the Bible does not give us the specific process by which human beings might be able to describe God's activity. The fact of the Virgin Birth and all of its theological significance is established by the biblical relevation. *How* God took the ovum of a single woman and caused it to develop into a male human being is not told us by the Bible. It may have been by a *fiat* act that defies all scientific description. Or it may have been by a process that can at least partially be scientifically described. The Bible does not tell us this, and we cannot presume to know *how* God accomplished His purpose. If we have the opportunity to investigate and explore possible ways in which God may have accomplished His purpose, it is right and good for us in this way to "think God's thoughts after Him."

Dr. Kessel does not claim that the Virgin Birth did occur according to the processes described in his paper. He merely suggests that it *might have* occurred this way in the accomplishment of God's purpose to become sinless mankind through the Virgin Mary. And *if it did*, he is delighted to discover, it would have been a remarkably appropriate way for the Lord Jesus to be a biological representative of all human kind, both male and female.

However unusual and off-beat this paper might be considered to be, I do not believe that any thoughtful reader can accuse the author or the *Journal ASA* of publishing material damaging to the person or cause of Christ.

Richard H. Bube
753 Mayfield Ave.
Stanford, CA 94305

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