JOURNAL OF THE
AMERICAN
SCIENTIFIC
AFFILIATION

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

PHILOSOPHICAL ? CHALLENGES

MEMBER EPA EVANGELICAL PRESS ASSOCIATION

Concerning SUBSCRIPTIONS, changes of address, requests for back issues, and other business requests, address: Executive Secretary, American Scientific Affiliation, Suite 450, 5 Douglas Ave., Elgin, Illinois 60120. The SUBSCRIPTION PRICE: one year $10.00, two years $19.00, three years $28.00. *Students*: $5.00. *Institutional rate*: one year, $15.00. *Gift subscriptions*: one year, $5.00. Single copies may be purchased at $2.00 each. Second class postage paid at Elgin, Illinois and at additional mailing offices. Postmaster: Please send POD form 3579 (change of address) to American Scientific Affiliation, 5 Douglas Ave., Elgin, Ill. 60120. Published four times a year in March, June, September and December by the American Scientific Affiliation. Telephone: (312) 697-5466. Back issues: $2.00 per issue from 1974 to date; $1.50 per issue from 1963 through 1973; $2.00 per volume or 75¢ per single issue before 1963; *Supplement* 1, 1976: $3.00.

INDICES to back issues are published as follows: Vol. 1-15 (1949-1963), *Journal ASA* I5, 126-132 (1963); Vol. 16-19 (1964-1967), *Journal ASA* 19, 126-128 (1967); Vol. 20-22 (1968-1970), *Journal ASA* 22, 157-160 (1970); Vol. 23-25 (1971-1973), *Journal ASA* 25, 173-176 (1973); Vol. 26-28 (1974-1976), *Journal ASA* 28, 189-192 (1976). *The Journal ASA* is indexed in the CHRISTIAN PERIODICAL INDEX. Present and past issues of the *Journal ASA* are available in microfilm at nominal cost. For information write University Microfilms, Inc. 300 North Zeeb Road, Ann Arbor, Michigan 48106.

Concerning MANUSCRIPTS and COMMUNICATIONS, address: Editor, *Journal ASA*, 753 Mayfield Ave., Stanford, California 94305. Manuscripts should be typed double-space on good quality 8½ x 11 paper, with references collected at the end, and with an Abstract of not more than 200 words. Duplicate copies of manuscripts are requested. Manuscripts longer than 15 pages will experience delays in publication. Figures or diagrams should be clear, black and white line ink drawings or glossy photographs, with a caption provided separately. The pages of the *Journal ASA* are open to any contribution dealing with the interaction between science and Christian faith in a manner consistent with scientific and theological integrity. Papers published in the *Journal ASA* do not necessarily reflect the position of the American Scientific Affiliation.

Concerning BOOK REVIEWS, address: Book Review Editor, Dept. of Chemistry, Houghton College, Houghton, N.Y. 14744. To avoid duplication in reviews, prospective reviewers should notify the Book Review Editor of their intentions at an early date.

JOURNAL OF THE
AMERICAN
SCIENTIFIC
AFFILIATION

DECEMBER 1977 PRINTED IN THE UNITED STATES OF AMERICA VOLUME 29, NUMBER 4

Limits of Testability of the Christian Faith

KENELL J. TOURYAN

Manager, Aerosciences Research

Sandia Laboratories
Albuquerque, New Mexico

In most realms of human activity tests are needed to distinguish what is good or acceptable from what is poor or unacceptable. Scientific endeavors are no exception to such a rule. Quite the opposite, the strength of a good scientific theory lies in its testability. The more stringent tests it undergoes, the more acceptable it becomes as it passes these tests. Few people, however, would admit that the same should hold true for a religious tenet. The fundamentally subjective nature of the latter may offer at best an experiential verification, with little hope for objective, or empirical evaluation of its claims.

Unlike most religions and philosophies, the Judeo-Christian tradition *must be* open to tests because of its claims to objective truth. In fact, it can be shown that these tests are not unlike the requirements placed on a scientific theory. In general, a scientific theory must pass some seven tests before it can be labeled good or valid. These seven are:[1] simplicity, generality, self-consistency, falsifiability, predictability, repeatability, and visualizability. These tests are of course interrelated and under some conditions, equivalent.

In this paper we examine each of the above seven criteria as they apply to the Judeo-Christian tradition and attempt to demonstrate that the Christian world view possesses all the qualifications that are deemed essential for a "good theory."[2]

Test 1: Simplicity

Given differing theories of apparently equal merit, the simplest is to be preferred. This is the Occam's razor of scientific ventures. Nature is exceedingly complex. The scientist, therefore, attempts to describe it via models which are conceptual frameworks that approximate reality, within which he attempts to correlate observable data and predict it. The success of a good

model lies in its simplicity, i.e., it has the fewest assumptions, the fewest variables and the smallest number of adjustable parameters. Often the simplest theory is also the most elegant. This is especially true for theories that are not amenable to laboratory experimentation, as with astrophysical phenomena.

According to Popper, there is a more rigorous, epistemological concept of simplicity. "Simple statements," Popper states, "if knowledge is our object, are to be prized more highly than less simple ones (a) because they tell us more; (b) because their empirical content is greater; and (c) because they are better testable."[3]

We contend that salvation by grace through faith, proclaimed by the Christian message provides the *simplest* (in the Popper sense) avenue to God available to man. "Believe in the name of Jesus Christ and you will be saved"[4] is truth that is simple enough for a child to comprehend but is profound enough that twenty centuries of theology have failed to exhaust its riches.

The good news of the Gospel tells us more about man's nature, God's character, and how the two interact than any other religious or philosophical system. Furthermore, the Gospel message has more empirical content and is better testable than any of the major religions. Compare, for example, the stringent requirements of Guatama Buddha's eight-fold way, or the crushing burden of asceticism imposed on the Hindu guru in search for salvation, with the full and complete salvation offered by Christ to the individual who, with a simple act of faith, puts his trust in Him. Even the Ten Commandments with their infinite Talmudic nuances constitute a formidable array of requirements for gaining salvation, with no assurances. It is significant that the "believe and you will be saved" message of the Gospel was often reflected in the Hebrew scriptures as precursors of God's ultimate act of reconciliation.[5] As one compares the New Testament accounts of Jesus Christ with Guatama Buddha's teachings, the Bhagavad Gita or the Koran, it becomes evident that Christianity has empirical content and this empirical content, inherent in "experiencing Christ" is more substantial than anything Buddha, Krishna, or Mohammed can offer because of the sweeping claims of Jesus Christ over all aspects of human life.[6] That the Christian faith is also more open to a falsifiability test is shown below.

Test 2: Generality

The successful theory is able to account for a large variety of phenomena in a given system, or can correctly describe a particular phenomenon over a wide range of parameters. It is also independent of the state of the observer and his frame of reference. A good example of this is seen in the difference between Newtonian mechanics and Einstein's theory of relativity. The latter is applicable to terrestrial as well as cosmic phenomena whereas the former is restricted to moderate force fields and speeds much less than the speed of light. Einstein's General Theory of Relativity can correctly account for phenomena, such as the 43 seconds of an arc excess in the perihelion motion of Mercury or the bending of light rays in gravitational fields, neither of which Newtonian mechanics can predict. The general theory of relativity therefore contains the less general Newtonian mechanics as a sub-set, in the limit when gravitational attraction between bodies is small and speeds are much less than that of light.

Most religions satisfy some aspect of the generality criterion in that they are open to anyone who is willing to believe and accept its tenets (some exceptions are certain exclusive sects, Hindu caste system, etc.). Christianity through Christ, however, provides the most satisfactory and universally applicable solution to man's two most vexing problems: the nature of evil and the meaning of death. It is only in the Judeo-Christian tradition that one finds evil diagnosed as endemic to man (the concept of original sin). Irrespective of race, color or creed, man is depicted as suffering from a universal malaise exhibited in the form of a four-way alienation: alienation from God; alienation from self; alienation from fellow beings, and alienation from Nature.[7] Physical death is described as the direct result of this spiritual malaise. The solution to this dilemma is provided by God's universal love for all mankind, uniquely demonstrated in the life, death, and resurrection of Jesus Christ, His Son.[8] Christ's substitutionary death on the cross (as the penalty for man's alienation) provides the individual with salvation (irrespective of race, color or creed) and Christ's resurrection heralds a final victory over death; a solution which is at once the most fundamental and the most general available to man.

It is interesting to note that the good news of the Gospel includes in it the Ten Commandments of Moses in a manner analogous to Einstein's theory of relativity including Newton's laws of motion as a subset. This is illustrated, for example, by God speaking through Jeremiah, "I will put my law within them, and on their heart I will write it . . .";[9] a promise that is accomplished whenever Christ is allowed to come and dwell in the heart of an individual.

Test 3: Self-Consistency

In scientific research, it is a cardinal rule that a working theory must be consistent with the assumptions and presuppositions on which it is based. In other words, where logic is required it must be correct. For example, in analyzing the fluid flow over a given body, as a first approximation one may neglect viscous effects that occur very near the surface of the body. Let us assume the individual is able to solve the resulting equations on a computer. Even though, in principle, he can get numerical results very close to the body surface, it will be inconsistent with his original assumption to attach any significance to such results because he has neglected viscous effects in the formulation of the problem to start with.

Self-consistency is fundamental to the Christian faith. The following four arguments will serve to illustrate this point.

(a) There exists a mutual consistency between the two modes of revelation claimed by the Scriptures: general (Nature) and special (the Written Word). This is clearly demonstrated by the very nature of the biblical accounts that faithfully reflect the imperfect, problematic world around us with man's evil actions as well as his good intentions depicted in all its minutiae; a real Book in real life.

Self-consistency arguments appear in Psalm 19 where the sun is described as the source of physical

life and an analogy is drawn between it and God's Word, His Laws, as the source of spiritual life, both emanating from the same ultimate source, the Creator. When Christ summarized the Law,[10] He too used a self-consistency argument, "You shall love the Lord your God with all your heart (emotions), soul (will), strength (physical) and mind . . ."; an integrated approach that ties all aspects of man's existence into a self-consistent whole.

(b) The Christian can account for all physical phenomena in a self-consistent manner because the presupposition of a rational God gives *a priori* justification to the fundamental axioms of science.[11] For example, without God there is no *a priori* justification for the applicability of mathematical logic to reality. The former is an accident of cerebral biochemistry—a reductionist view which even atheistic communism rejects. Of course the Marxist-Leninist attempts to resolve the self-consistency dilemma by invoking, in an *ad hoc* manner, qualitatively different laws governing biological phenomena that cannot be reduced to laws of chemistry and physics. Their whole structure, then, is supported by the laws of dialectic materialism. It is interesting to note how such attempts have appeared in Western thought under the structuralist philosophy,[12, 13] in the wake of the positivist's failure to account for transcendentals. The structuralist approach invokes the argument of phylogenetic development to explain the dilemma of transcendental concepts.[14]

The case of biblical miracles could fall in the self-consistency category as well. God interacts with nature in a very self-consistent manner (see C. S. Lewis, *Miracles*[15]). For example, the Holy Spirit overshadows Mary, a miraculous fertilization of the ovum takes place, then the known natural laws take over and a child is born after nine months of pregnancy.

(c) An essential self-consistency exists between the claims, character and conduct of the central theme of the Christian faith, Jesus Christ. He claimed to be the Beginning and the End and everything in between, he led a blameless life,[16] and supported his claims by powerful deeds, the greatest and the most singular of which was His bodily resurrection. The strength of this consistency is equivalent to that of a triangle (Figure 1) where each side is supported by the other two—the fundamental reason for the triangle's rigidity. Most religious leaders have failed the crucial test of consistency between words and works.

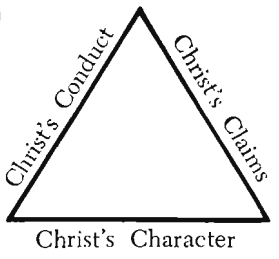


Figure 1

(d) The fourth evidence of self-consistency appears in the relationship that one finds between the Jesus of history, the written Scriptures and the living Christ manifested through the Holy Spirit. This feedback system can be represented by another triangle with arrows pointing at each apex (Figure 2). For example, at apex (1) we find the Hebrew Scriptures speaking of the coming Messiah (Isa. 9:6); Jesus Christ, as the Jewish Messiah fully supports the validity of Scriptures (Luke 4:21). At apex (2) we find Jesus speaking of

Unlike most religions and philosophies, the Judeo-Christian tradition must be open to tests because of its claims to objective truth.

the Comforter who would confirm His continued presence as the Living Christ (John 16:14); conversely, the Holy Spirit dwelling today in the individual confirms the reality of the Jesus of history, experientially (Rom. 8:16,17). At apex (3) the Scriptures speak of the time when God's Holy Spirit and His laws will be written in the hearts of man;[9] conversely, we find from experience that the in-dwelling Holy Spirit confirms the validity of God's written Word (I Cor. 2:12).

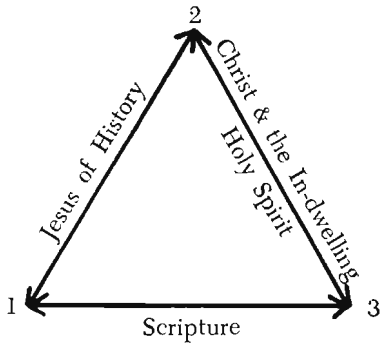


Figure 2

Test 4: Falsifiability

According to Popper[17] the mark of success of a good scientific theory lies in its openness to testability. The theory or hypothesis, in fact, should state how one can set out to disprove its consequences. The falsification principle is essential to all empirical sciences and is the Achilles heel of theories purported to be "scientific" in the empirical sense, such as Darwin's principle of natural selection.[18] It is for this reason that the latter has been modified under the synthetic theory, to include genetic knowledge, which at least on the level of micro-evolution can be made empirical.

Through the falsifiability test, Popper[17] poses a rather stringent criterion of demarcation which establishes an asymmetry between verifiability and falsifiability. Needless to say, setting out to perform a verification test is easier than to perform a falsification test because the former, by its very nature carries with it the bias of the observer, i.e., seeing in the data what one in fact *wants* or *expects* to see. Setting out to disprove a point and ending up with the opposite, or arriving at a result differing from that which the individual had set out to obtain, are powerful evidences for the validity of a scientific theory.

Now, by its very nature, a religious conviction or a metaphysical assertion cannot be falsified in Popper's sense as empirical science would. In fact, most religions do not claim to be capable of being put to a falsification test. Not quite so for the Judeo-Christian tradition. The consistency arguments posed above plus the fact that the Judeo-Christian tradition is rooted in history and makes explicit claims to objectivity expose it to certain

types of verification or even falsification tests. We suggest three possible verification/falsification tests, the first two of which are historical and the third quasi-empirical.

(a) *Historical Tests*—Speaking of God's redemptive act in human history, F. F. Bruce writes, ". . . whenever these events touch upon history they are *open to scrutiny* and *objective evaluation*."[19] It is because of this openness to scrutiny that the Bible, unlike any other religious book, has been the object of relentless historical examination and textual criticism. Two types of verification/falsification tests can be applied to the Bible:

(i) External-Archeological—In this category Yamauchi places material remains and inscriptional or epigraphical evidence[20] that cross-check numerous Old Testament accounts and a few New Testament events.

(ii) Internal-Biblical—These are eyewitness accounts and personal testimonies. Here the test is *indirect* and involves judgments concerning character and motivation of the witness. It also includes textual criticism. It is interesting to note that biblical accounts are replete with verification/falsification tests. For example: Gideon's fleece;[21] God's challenge through Malachi, ". . . put me to the proof and see if I do not open windows . . .";[22] the psalmist's declaration, "Thy promise has been tested through and through. . . ."[23]

(b) *The Resurrection of Jesus Christ*—Although this test belongs to category a-(ii) discussed above, it is of such immense significance it should be mentioned separately. The test that would probably come closest to being a genuine falsification test, in the historical sense, is the empty tomb.[24] Among the 500 or more who witnessed His resurrection there were sophisticated and skeptical individuals not unlike a trained 20th century observer. They were surrounded by hostile communities and individuals who could have quickly produced the counter-evidence, the missing body, and proved the witnesses wrong. What's more significant, none of the disciples or followers were looking for a resurrected Christ. They expected a finality in death, but witnessed an entirely unfamiliar phenomenon. It is also important to note that a good number of those witnesses offered the ultimate sacrifice to vouch for the veracity of their eye-witness accounts: their lives.

(c) *Experiential Test*—The Jesus of history who rose from the dead is claimed to be alive today and accessible to anyone willing to put his trust in Him. In one sense this kind of test is not strictly objective because it cannot be performed unless the individual is prepared to be involved in mind, heart, soul, and strength. However, very often it is clearly observable to outsiders by the positive changes it brings in the life of the individual. At times, these changes are dramatic, as with alcoholics or drug addicts who have encountered the living Christ and their lives have been literally transformed. A corollary to the above is the "falsification" test, suggested by the apostle James in the letter, in telling the difference between a true Christian (faith and works) and the one who *claims* to be but in fact is not (faith but no works).

To summarize, the falsification-verification criterion for the Christian faith is fulfilled in three interrelated parts that could be represented in the form of a triangle whose sides mutually support one another. Each part is necessary to the ultimate validity and truth of its claims but neither is sufficient by itself.

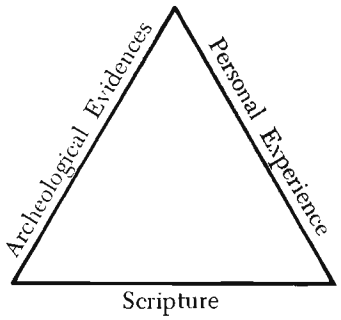


Figure 3

Test 5: Predictability

The usefulness of a scientific theory depends strongly on its ability to make predictions on the basis of a set of given initial conditions. The more precise these predictions are, the more practical will the theory be and the more exact will be the science. For example, accurate predictions of trajectories of a body moving in a force field make classical mechanics among the most utilitarian and precise sciences. On the other hand, Darwin's principle of natural selection fails in the prediction test. A true theory looks for confirmations which are the result of *risky predictions*.

It is uncanny how the Bible exposes itself to risky predictions with almost total abandon to the possible consequences—unless, that is, it contains the statements of a God who is fully cognizant of all future events. We can distinguish two types of predictions that are explicit in Scriptures.

(a) Biblical Prophecies—Over 100 specific predictions in the Hebrew scriptures have come true in the person of Jesus Christ. Even greater numbers of predictions speak of His second coming. The formation of a Jewish state after 1900 years of nonexistence clearly belongs to the category of risky predictions made by Ezekiel[25] 2600 years ago.[26]

(b) The second type of prediction is more in the spirit of criterion 4-c discussed above. The Scripture says that he who trusts God and believes on the name of His Son Jesus Christ will be filled by the Holy Spirit, his life will change and will produce fruit clearly visible and identifiable by the impartial observer. "By their fruits you shall know them"[27] is at once a call to a verification test and is predictive as to the outcome of trust in Christ.

Test 6: Repeatability

This criterion is similar to the generality test discussed above. A scientific theory must not only have general application and be falsifiable, but it should be repeatable when tested by anyone, any place, and any time, under the same controlled conditions.

The "controlled condition" for the Christian faith is stated in Romans 10:9,10. "If you confess the Lord Jesus with your mouth and believe in your heart that God has raised him from the dead, you will be saved."[28]

Over the past 2000 years, whenever the above has

been tried, by anyone, at any place, the basic results have been the same, indicating that the Holy Spirit, of whom Christ spoke, acts as a least common denominator to effect the transformation that validates the truth of the Christian faith.

Test 7: Visualizability

When discussing simplicity as an important test for a successful scientific theory, we made mention of the fact that a scientist attempts to model reality. Part of this modeling process is to construct visual examples to represent phenomena that are inaccessible to our senses in tangible or concrete forms. The Bohr atom with its central nucleus and orbiting electrons is the classic example of such a representation. The Feynman diagrams are used to depict interactions among subnuclear particles. Streamlines in laminar flows or eddy structures for turbulent flows are attempts at visualizing ordered or chaotic motion. Visualizability is not essential to a scientific theory, but it provides a powerful tool for grasping it.

The Incarnation is God's master accomplishment in enabling finite men to visualize the infinite personal God.[29] Colossians 1:15 and Hebrews 1:3 speak of Christ as the visible image of the invisible God, whereas John 1 speaks of God's Word, His abstract expression becoming flesh, thus accessible to the senses. This is eloquently articulated by the same author in his first letter I John 1:1-3 where he states, "Our eyes have seen him, we have looked upon him, we have felt him with our own hands. . . ." In answering Philip's request, "Show us the Father and we will be satisfied," Christ said, "If you have seen me, you have seen the Father."[30]

Conclusions

In discussing the testability of the Christian faith there always exists the danger of forcing a vast spiritual-metaphysical system into the confined mold of empirical science. As we mentioned in the introduction, the present discussion is more in the spirit of an analogy rather than a rigorous apologetic for Christianity. Yet we know that all truth is God's truth and the God of the Scriptures is a rational God. It should come as no surprise therefore that His manifestations in the physical world correlate with His self-disclosure in Jesus Christ and the Written Word. It is also clear from the above discussion that only Christianity, rooted in its Hebrew tradition (the Old Testament) satisfies all seven criteria to an acceptable degree. All other religious systems fail one or more of the tests, and in particular the consistency and falsification tests. In fact, these two criteria are not even valid for those Eastern religions where the law of non-contradiction does not apply.

My attempt has therefore been to demonstrate to the skeptic that Tillich's assertion, "there is no criterion by which faith can be judged from outside the correlation of faith," does not apply to the Christian faith. Far from claiming immunity against criticism, Christianity is open to critical examination for intellectual integrity.

REFERENCES

[1]Watts, W. W., *Journal ASA*, Vol. 25, No. 3, Sept. 1973, pp. 91-96.

[2]The study is proposed more in the spirit of analogy rather than as proof that Christianity is truly "scientific" in the sense empirical sciences such as physics or chemistry are.

[3]Popper, Karl R., *The Logic of Scientific Discovery*, Ch. VII, p. 142, Harper (1959).

[4]Acts 16:31.

[5]See for example Naaman's simple act of washing in the river Jordan (II Kings 5:14) and prophet Habbakuk's proclamation "the just shall live by faith" (Hab. 2:4).

[6]See for example Matt. 28:18; John 1:29; 4:26; 6:35, 48; 8:12, 58; 9:5; 10:7-14; 11:25, 26; 14:6; 15:1-4; Revelation 1:18, where Christ claims to be given all authority in heaven and on earth, is the Lamb of God, the Messiah, the bread of life, and light of the world, etc.

[7]Schaeffer, F. A., *Genesis in Space and Time*, (Intervarsity Press, 1972) p. 98.

[8]John 3:16.

[9]Jeremiah 31:32.

[10]Mark 12:29.

[11]Dye, D. L., *Faith and the Physical World*, p. 54 (Eerdmans 1966).

[12]Stent, G. S., "Limits to the Scientific Understanding of Man," Science, Vol. 187, March 1975, pp. 1052-1057.

[13]Burgers, J. M., "Causality and Anticipation," Science, Vol. 189, July 1975, pp. 194-198.

[14]Clearly a one-step-back argument, i.e., if you can't explain transcendentals go back to man's evolutionary development, if you can't explain spontaneous generation, go back to extra-terrestrial origins, and so on, ad infinitum!

[15]Lewis, C. S., *Miracles*, (Macmillan Publishing Co., 1947).

[16]John 8:46.

[17]Popper, *op. cit.*, 41.

[18]Ayala, F. J., American Scientist, Vol. 62, Nov-Dec 1974, pp. 692-701.

[19]Bruce, F. F., *The New Testament Documents, Are They Reliable?* (Eerdmans Publishing Co., Jan. 1963) pp. 7-9.

[20]Yamauchi, E., *The Stones and the Scriptures*, (Lippincott Co., 1972) p. 158.

[21]Judges, Ch. 6.

[22]Malachi 3:10, New English Bible.

[23]Psalms 119:140, New English Bible.

[24]Clearly, the empty tomb is not a falsification test in the empirical sense, but it is a historical fact of crucial importance which distinguishes it from all other religions.

[25]Ezekiel, Ch. 37.

[26]It is interesting to note that the Bible places its own conditions for testing risky predictions by using the verification/falsification criterion (see Deuteronomy 18:21,22).

[27]Galatians 5:22,23.

[28]Some other references are John 1:12, 7:37-39, Acts 4:12, etc.

[29]The incarnations of Vishnu are the only other attempt by a major religion to accomplish the task of visualizability for finite creatures in a physical world. Of course, this case neglects an important ingredient in the visualization process—objectivity.

[30]John 14:9.

[31]Tillich, P., *Dynamics of Faith*, Harper, 1957, p. 58.

If we really believe that God loved us while we were yet sinners, then we will not wait for the poor and the outcasts of society to earn the right to be loved in our eyes. Nor will we demand that they show due appreciation for what we are doing for them. We will avoid all the lame excuses that prejudice us against the poor, the needy, the dispossessed. We will love them because of the cross, because we have been shown in our lives that people do not need to deserve love or to earn love.

Mark O. Hatfield
Between A Rock and a Hard Place, Word Books, Waco, Texas (1976), p. 213

Logical Indeterminacy, Levels of Meaning and Mystery

DENNIS FEUCHT

Tektronix, Inc.

Portland, Oregon 97077

An understanding of the nature of mysteries involves a consideration of their logical status and an analysis of the paradigms and analogies used to describe them. Several powerful models for dealing with important mysteries have arisen, and their application to theological problems is considered here.

A central mystery of the Christian faith—the relation of God's sovereignty, man's freedom, and evil—is uncannily similar to the antinomies that arise in science[1], mathematics[2], and philosophy[3].

To begin, let us examine the nature of a simple antinomy. Consider the following two statements, both of which we assume are true:

(1) Statement (2) is true.
(2) Statement (1) is false.

If statement (1) is true, then statement (2) is also true. However, if statement (2) is true, then by its assertion, statement (1) is false. But if statement (1) is false, then it follows that (2) is also false and thus statement (1) *is* true. But if statement (1) is true, this leaves us where we started and the argument could go around in circles indefinitely. Notice that these two statements cannot be said to be contradictory since we cannot start with one of them and reason consistently to the negation of the other. Instead of converging, the logic "oscillates" without ever reaching a logical solution.

Sometimes the word *paradox* is used to describe this condition. Formally speaking, however, a paradox does not necessarily mean that a logically indeterminate state has been reached as happens in an antinomy. No amount of further clarification or careful attention to details will change the logical status of an antinomy; a paradox could possibly be resolved with further investigation. One question we will want to ask of a mystery is whether an antinomy is actually occurring or whether we could logically resolve the mystery with more information.

Complementarity and the Mind-Brain Problem

A good example of a mystery in science is the wave-particle dualism of light. Under certain conditions light is best modeled as a particle, such as when it reflects off a mirror. Other behavior, such as interference patterns, causes us to consider it to be like waves in a water pool. Mathematical models of light from quantum physics give more depth to the picture as the particle can be viewed as a constructive superposition of a number of waveforms that cancel out everywhere else. A total model of light requires a consideration of both the particle and wave behavior in a way which does justice to both. Presently, by manipulating the mathematics, a model of light can "fade" from one view into the other in what has been called a *complementary* relationship between the two views.[4,6] As an electron, considered a particle, goes from rest to the speed of light, it changes from a particle to a wave in its observed properties, and by doing so, displays its complementary nature. This does not mean that some transformation of what it is has occurred; what changes is what we observe of it. The scientific question about light is open to further research (a search for "hidden variables") and does not necessarily present an antinomy.[5]

This idea of light being both a wave and particle in essence but only presenting itself in one manifestation when we observe it—the idea of complementarity—has been used to try to explain how the brain embodies the mind. The mind is somehow represented in its physical embodiment, the brain, and does not exist apart from it, yet is not the same as it. If this phenome-

non is viewed from a physical point of view, only the physical brain is seen, but if the meaning of the information which the brain upholds is considered, the mind is seen instead.

The same is true of a computer, since one could completely explain the physical operation in terms of Maxwell's equations, but in that explanation, never allude to any programming that has been done to effect its operation. From the mind-like view, a programmer may never know circuit theory but be able to explain the operating system software precisely. A part of the physical description would be that of the physics and chemistry of the ink and paper of the printout. However, the programmer views the physical embodiment with only a subsidiary awareness of its existence as he pays focal attention to the meaning contained in that physical embodiment.[7]

The meaning of a physical embodiment and that embodiment itself can therefore be different manifestations to us, depending on the viewpoint from which we observe. The entity in question is not a brain plus a mind, but a singular entity. The distinction between brain and mind is made by us. This does not mean that we can make what we observe into anything we want, but that our subjective understanding of what something is depends on our objective observation of it. In the example we consider here, it happens that we observe more than one manifestation which should ultimately be related in a singular view, since we presuppose that what we observe is a singular entity and not a separate one for each manifestation. Because we are confronted with different manifestations, or as they are often called, different levels of meaning, we face a mystery which is similar to the scientific wave-particle problem.

We are not dealing here with the existence of spiritual beings, but only with the problem we have of reconciling different levels of meaning for those things which have a physical embodiment. How God, who is a spirit, actively relates to the physical system, is a different mystery. Also, to say that man's spirit is only a different level of meaning is unwarranted.

Knowledge and Indeterminacy

Another mystery arises from a related but distinct topic which has a mathematical counterpart in Gödel's Incompleteness Theorem. This Theorem essentially states that if a mathematical system is developed from given postulates and a given set of rules of logic, then it is possible that true statements can be made which lie within the framework of the system but cannot be proven by the system.[2] Hence, all logical systems are incomplete in themselves. From this mathematical foundation, the concept of logical incompleteness has permeated the developing disciplines of information theory, cybernetics, and artificial intelligence. Along with it comes a basic antinomy which will be presented as a purely philosophical thought-experiment, though it is couched in a scientific-like setting. It is based on the idea that no system (whether physical or purely mathematical) can contain a complete representation of itself, for the representation which it contains would also need to include that representation. Now it needs another representation of this representation, *ad infinitum*. (A similar effect occurs when two mirrors face each other.) The only way the system could contain a complete representation of itself would be to have an infinite number of representations of representations.[8] This is known as *infinite regression* and is a default solution to the problem of incompleteness.

Several basic mysteries of the Christian faith and the philosophy of religion have analogous counterparts in science and mathematics, which may be applied to theological problems.

This argument was presented by Donald MacKay[9] to show that even if we were physically determined in our willful actions and decisions, that we would still be correct to regard ourselves as free; that is, that no prediction about our future actions would be true regardless of who knew the predictions. Let us say that some non-interacting observer could completely explain our physical operation by knowing enough about how we function physically. (Whether this could be done is highly questionable from a Christian view since it does not take into account God's immanent action in the physical system, but for the sake of the argument we assume it to show its inadequacy even if it were so.) This observer would then be able to predict, in a deterministic fashion, all of our future actions, taking into account not only our physical operation, but also including the effects on us of interaction with our environment. Now suppose that he were to offer these predictions to us. If we were to disbelieve them (i.e., discount them so that they have no effect on us) we would go along, and eventually they would come true as predicted, and we would have been wrong in our disbelief. If instead we believe them, they affect us, and that effect was not taken into account when the predictions were made, so the predictions are wrong because they do not adequately account for the effect they will have on us when we believe them. Thus, we are wrong to believe them. We are faced with an antinomy. The predictions are true, but if we accept them as true, then they are false; but if we regard them as false, they are then true.

To try to get around this, the observer may modify the prediction by including in it the effect it will have on us when we believe it so that it no longer will be false for us to believe it. This will not do, however, for we would be correct to disbelieve it, since in disbelieving it, we do not fulfill the conditions that it is necessarily based upon. Another attempt to foil the antinomy is to "close the loop" so that when a true prediction is believed by us and affects us, the observer recomputes and offers us another prediction which we believe. This new prediction reaffects us so he again computes, and this goes on and on. Does it ever converge to a logical solution? No, for this is just the infinite regress solution. Since the observer is constantly offering us corrected predictions, he is no longer in isolation from us as before, and now the system is not just "us" but us and him, and the Incompleteness Theorem applies.

Another rebuttal to this argument is that we may go ahead and do what is predicted whether we believe

the prediction or not, so its affect upon us is then negligible, and we are correct in believing it. For these cases, we may arrive at the same outcome only approximately, and we may not be surprised to be told what we are going to do—it's something we probably would have done anyway, like get out of bed in the morning. The point is that we did not necessarily have to decide to do as the prediction specified just because it was offered to us. All that is needed is one exception to invalidate the claim that the predictions are binding upon us (i.e., determinate for us regardless of our acceptance of them). If we were told that tomorrow we are going to decide to go swimming and as a consequence of our decision, drown—if we really believed this, we would decide not to go swimming at all, and we would not drown as a result of our future decision to go swimming. Therefore, predictions concerning our future decisions are invalid once they are disclosed to us, since future decisions we decide upon now are already made.

If predictions are given to us over which we have no control, then they are binding upon us regardless of our belief in them; but again, only one exception is needed to invalidate this as necessarily true. The observer would be correct in saying we make no decisions because for him everything we do has a causal explanation. But for *us* to say we make no decisions is incorrect since we are not the observer, and if we try to become the observer, our decisions interfere with our observations. The Incompleteness Theorem does not allow us to make accurate predictions about ourselves, so we never know whether we are acting deterministically or not; our knowledge of ourselves is never sufficient to decide that.

It is because we view ourselves as free that this argument is even relevant. In thinking of ourselves as capable of making choices which will affect the future, we wonder whether our choices are real, and it is because of this presupposition of individual freedom that we see ourselves in the place of the one being observed. Therefore, this argument brings across a very important conclusion: it is not possible to view the knowledge of a non-interacting observer in the same perspective (or logical framework) as the knowledge of the subject under observation. In doing so, in our thinking we would attempt to combine the knowledge of both into a single system (namely, our thought structures about this) and result in an incomplete view.

Relative Truth

Because what is true for the observer is not true for the subject seems to imply that truth is relative. If it can be shown that both of "us" know something that for one is true but concurrently is false for the other, then the relativity of truth has been established. This thought-experiment shows just the opposite. The observer is compelled to say that from *his* reference frame we are determined *and* that from *our* reference frame we are free. We are compelled to say the same concurrently. Our relation to the observer's prediction is that we must believe it is true though we do not yet know it, just as he must believe it is true. Either of us would be wrong to believe it was not true while it remained private with him and not disclosed to us. After offering it to us, we both would be wrong to believe it.

Furthermore, if more than one observer makes predictions about the subject, their predictions must necessarily agree and be true to what the subject is. The basis for truth is the determinate nature of the subject to which they all must appeal for correct predictions.

Theodicy

This conclusion may be helpful in dealing with some tough theological problems. Specifically, it may offer a working relation between the doctrines of God's sovereignty and man's responsibility for his willful actions, including the problem of evil in light of God's sovereignty. If we begin with the biblical teaching that all that God does is good in His sight, then if God is truly sovereign, we come to an impasse—God creates evil, yet it is good in His eyes (c.f. Prov. 16:4). From our point of view, good and evil are real and distinct as Scripture clearly bears out. If God is sovereign and views the world as determined by the counsel of His will, then from His point of view, all that He does is good, and only from our point of view are good and evil distinct (though God knows our point of view as well), as God has communicated this to us. ("From our point of view" does not mean "in our opinion" but positionally our knowledge as the subject before God who, in this regard, is like the observer.) Since God's ways are past our finding out and His thoughts beyond ours (Isa. 55:10, 11), His communication to us is not like the observer offering his predictions to us, but is already spoken in compatibility with our frame of reference. At the judgment, God would not judge us from His reference frame (knowable only to Him) but on the basis of the truth He has revealed to us in our reference frame. In this way, God does not judge His own sovereign actions that He predestined us to follow, but judges us from our point of view as free agents, responsible to what His communication to us was. In thinking about this, there is a natural tendency toward integration of the two points of view, but as we saw, this results in a contradiction where an antinomy should be instead. The Scriptures distinguish between the human and divine reference frames (c.f. Phil. 2:12, 13; Prov. 16:1, 9).

The value of this model applied to theological problems lies in its ability to provide operational solutions, but not complete and final ones. The thought-experiment does not account for how God acts into the physical world (in determining it) and this immanence-transcendence of God is perhaps the fundamental mystery (c.f. Col. 1:26, 27; 2:2, 3). This mystery finds its most dramatic expression in the incarnation of God in Jesus Christ, wherein God directly enters the physical system as a human being, concurrently observer *and* subject, yet not constrained by the limitations of the Incompleteness Theorem (c.f. Col. 2:9).

There is another school of thought in dealing with the problem of God's sovereignty and evil that deserves attention as an alternative approach. It sees the structure of the problem as a paradox without an antinomy, and is involved with a refinement of the problem by paying primary attention to distinctions between natural and moral evil, and the extent and nature of God's power and planning.[10,11]

Conclusion

Several basic mysteries of the Christian faith and the philosophy of religion have analogous counterparts in science and mathematics, which may be applied to theological problems. In doing so, it is necessary that such philosophical models be accurate to the Scriptures, since they attempt to provide tentative solutions which are not explicit in the Scriptures themselves. Since no ultimate resolution of basic mysteries has been found, an open examination of different alternatives is essential in gaining as comprehensive a picture of the problem as possible. Finally, to clarify the picture as much as possible, distinct problems should be examined as such, even though they may be ultimately related. Here, three have been referred to:

1. Inconsistent manifestations of a singular entity (mind-brain problem).

2. Logical indeterminacy of complete knowledge (incompleteness problem).

3. God's action in a physical universe (immanence-transcendence problem).

REFERENCES

[1]Wiener, Norbert, *Cybernetics*, M.I.T. Press, 1961, pp. 125, 126.

[2]Arbib, Michael A., *Brains, Machines, and Mathematics*, McGraw-Hill, 1964, p. 119 ff.

[3]Globus, Gordon G., "Unexpected Symmetries in the World Knot", *Science*, 15, June 1973.

[4]McGervey, John D., *Introduction to Modern Physics*, Academic Press, 1971. pp. 122, 123.

[5]*Ibid.*, pp. 124, 125.

[6]Bube, Richard H., *The Human Quest*, Word, 1971, pp. 166-178.

[7]Polanyi, Michael, "Life's Irreducible Structure," Science 160, 1968.

[8]Jeeves, Malcolm, *The Scientific Enterprise and Christian Faith*, IVP, 1969, pp. 148-152.

[9]MacKay, Donald M., *The Clockwork Image*, IVP, 1974, p. 76 ff.

[10]Plantinga, Alvin, *God, Freedom, and Evil*, Harper, 1974.

[11]Trueblood, Elton, *Philosophy of Religion*, Baker, 1973, pp. 231-256.

Does the Secular Scientist Find Himself Pressed to Support A Christian Philosophy of Science?

HAROLD T. WIEBE

Department of Biology

Seattle Pacific College
Seattle, Washington

Out of the vast amount of published materials in the field of science in the twentieth century it appears that only a limited segment has come to grips with deep philosophical implications. I am suggesting three possible reasons for this dearth. One is a deliberate attempt to bypass controversy; another calls for a line of thinking which admonishes scientists to stay clear of science's philosophical overtones; and a third recognizes that there is a fear of engaging in philosophical inquiry in the area of science because such endeavor will demand consideration of the metaphysical.

In this paper I explore and document reactions of secular scientists to some deep questions. I also present some of my own thinking and attempt to deal with the kind of philosophy of science that secular scientists are allowing in the field, and thus see if they find themselves pressed to support a Christian philosophy of science.

Prepared for presentation at the Annual Meeting of the American Scientific Affiliation in San Diego, California August 1975.

The use of the term "Secular Scientist" is not to be taken as judgmental regarding a scientist's theistic beliefs, but it is used in the sense that he shows a reluctance generally to give credit to a Divine Creator even though he does not exclude an admission upon occasion that a Superior Being could exist. This Superior Being of course is the One evangelical scientists do not hesitate to acknowledge as God and Creator.

Philosophical Inquiry Valid in Science

In harmony with the contention that philosophical inquiry in science has a valid place and should be engaged in, I refer to David A. Hollinger's article which appeared in the April 1973 issue of *The American Historical Review*. In it he draws attention to Thomas S. Kuhn's point of view. Perhaps you will recall that Kuhn authored a book, *The Structure of Scientific Revolutions* (1970). Hollinger says, "Kuhn seems to assume that physical inquiry, philosophical inquiry, zoological inquiry, political inquiry, or whatever, whether or not they have become developed sciences,

or whether they ever will, do possess a kind of primal validity. . . ."[1]

Furthermore, Nicholas Wade, who is on the editorial staff writing in *Science* April, 1975 under the caption "Daniel Bell: Science as the Imago of the Future Society" quotes Bell, professor of sociology at Harvard University as saying, "I am old fashioned enough to believe that the genuine questions are philosophical questions."[2]

The Origin of Life

In this exploration I refer first to Sidney W. Fox's article "How Did Life Begin" which appeared in *Science*, July 22, 1960. Fox is affiliated with the Oceanographic Institute and is a member of the chemistry department of Florida State University, Tallahassee. Fox says,

> The scientific question of the mechanism of life's beginning is a more sophisticated version of the personal question, 'Where did I come from?' This question appropriately phrased is one which man generally has long asked himself and which man individually asks from his early childhood. If we accept the proposition that the impetus of the scientist is truly curiosity, virtually all thinking men are to a point scientists because of their special curiosity about this problem.[3]

Jere P. Segrest in the October 26, 1973 issue of *Science* under *Science and Society* echoes very much the same note:

> Many scientists avidly follow developments outside their areas of specialization in such exciting fields as cosmology and the origin of life, mind research, and geophysics and paleontology. Everyone, scientists and public, shares an interest in these questions.[4]

Gideon E. Nelson, et al state in their book, *Fundamental Concepts of Biology*, "The origin and early evolution of life remains one of the baffling puzzles of biological science,"[5] and in another place of the same book comment is made, "All the evidence that supports evolution has not by itself yielded any explanations of the actual mechanism that governs the process."[5]

To add to the above I cite a brief portion of Hampton L. Carson's presidential address delivered before The Society for the Study of Evolution. In this speech given in December 1971 Carson said, "The origin and evolution of life provides us with some of the most fascinating and challenging questions in any field of scientific endeavor."[6]

At this point I would give special emphasis to Frank B. Salisbury who has served as Head of Plant Sciences and Professor of Plant Physiology at Utah State University. He has written under the title: *Doubts About The Modern Synthetic Theory of Evolution* (1971),

> Surely our ideas about the origin of life will have to change radically with the passage of time. Not only is the gene itself a problem: think of the systems that would have to come into being to produce a living cell! It's nice to talk about replicating DNA molecules arising in the soupy sea, but in modern cells this replication requires the presence of suitable enzymes. Furthermore, DNA by itself accomplishes nothing. Its only reason for existence is the information that it carries and that is used in the production of a protein enzyme. At the moment, the link between DNA and the enzyme is a highly complex one, involving RNA and an enzyme for its synthesis in a DNA template; ribosomes; enzymes to activate amino acids; and tranfer-RNA molecules. Yet selection acts only upon phenotypes and not upon genes. At this level, the phenotype is the enzyme itself. How, in the absence of the final enzyme, could selection act upon DNA and all the mechanisms for replicating it? It's as though everything must happen at once: the entire system must come into being as one unit, or it is worthless. There may well be ways out of this dilemma, but I don't see them at the moment.[7]

Salisbury obviously sees inadequacy in the Modern Synthetic Theory to explain the origin of life and proposes that requirements call for everything to happen all at once.

Lawrence Bogorad, professor in the Department of Biology, Harvard University wrote in *Science* (May, 1975) under the title: *Evolution of Organelles and Eukaryotic Genomes*, as follows: "All the genes for a structure as well as their products were together when or just before a eukaryotic cell formed."[8] This observation appears to support the "all-at-once" demand proposed by Salisbury and harmonizes with the concept of a purposeful, immediately functioning, creation brought into being by a Designer.

John A. Behnke, Editor, *BioScience*, AIBS, Dept. of Biology makes a very significant comment in *BioScience* September, 1974, about Paul A. Weiss' book, *The Science of Life: The Living System—A System for Living*, stating,

> The widely accepted explanations for the origin of life are seriously questioned by the author who finds the idea that an organism could be created stepwise by the serial synthesis of biochemical moieties over a long period of time untenable. He argues that the survival of an organism is dependant upon a workable system and that primordial organisms had to 'originate' rather than 'evolve'.[9]

Here again we see the call for the "all-at-once" concept.

Weiss, earlier in 1962 had a publication in *Science* entitled, "Experience and Experiment in Biology" in which he said,

> This is not to question our success in reducing cellular phenomena to molecular terms. However, to pretend that the process can be reversed, that the molecular shambles can reassemble themselves into a functional living system without the cheating intervention of another living system is a conceptual perversion, whatever one may think of the primordial origin of life.[10]

The question I raise here has to do with "another living system". Could one read into this that Weiss is pressed to support a Christian philosophy of science which acknowledges Divine intervention in making the inanimate come to life?

Alfred S. Romer who formerly was professor of zoology and curator of vertebrate paleontology in the Museum of Comparative Zoology at Harvard University visited Seattle in 1967. On April 4, 1967 I had the opportunity to hear him speak at the University of Washington about vertebrate evolution. In his talk he recognized that the move of vertebrates from water on to land was a major jump. Striking to me was his comment to a sizable audience that they should not put the Supernatural in unless they had to. I wonder if he found himself pressed to this answer from time to time as he faced insurmountable scientific problems.

In my paper "What Can Be Learned from the Evolutionist Who Takes a Hard Look at His Own Theory," presented at the ASA Convention in New York state in 1965, I drew attention to a couple of scientists from the University of Illinois, my center for graduate study, who dealt with the origin of life in their publication, *College Botany*. What they said fits in so well here that I refer to them again. Harry J. Fuller and Oswald Tippo stated as follows:

> Some people assume, entirely as a matter of faith, a Divine Creation of living substance. The only alternative seems to be the assumption that at some time in the dim past, the chance association of the requisite chemicals in the presence of favorable temperature, moisture, etc., produced living protoplasm. In other words, if one subscribes to this theory, he admits that the first protoplasm to appear on our earth was a product of spontaneous generation. Then, if he accepts the evidence of Pasteur and others against spontaneous generation, he must reverse his explanation of the origin of the *first* protoplasm to explain the origin of all subsequent living protoplasm from that first protoplast. In other words, spontaneous generation, according to these opponents of the idea of Divine Creation, worked when the first living substance was formed, but probably hasn't worked since. Actually, biologists are still as far away as they were in their attempts to explain how the first protoplasm originated. The evidence of those who would explain life's origin on the basis of the accidental combination of suitable chemical elements is no more tangible than that of those people who place their faith in Divine Creation as the explanation of the development of life. Obviously, the latter have as much justification for their belief as do the former.[11]

To me it is heartening to see such forthrightness in a scientific publication regarding Divine Creation when the scientific climate is and has been so strongly anti-creation and so overwhelmingly pro-evolution.

Referring again to Frank Salisbury, I draw attention to his visit to Seattle in 1969. At that time I had occasion to talk with him personally, and he indicated that he would like to discuss the area of creation and evolution with me. One point that came out definitely in our conversation was his admission that he was a theist. This fact is born out in his article mentioned above; he does not rule out a Creator but says,

> We are entitled to think about another solution: an intelligent Creator of life. We can try to write Shakespeare by piling computers on top of each other and letting them rearrange letters of the language, but a much better way is to let Shakespeare apply his intelligence to the job. Could God apply his intelligence to the ordering of nucleotides in DNA chains, providing the genes for selection to act upon? Certainly, if He exists. I believe in such a God for reasons quite independent of the discussion here. But scientifically this solution is not satisfying, because it does not (to me, at least) suggest reasonable scientific tests; indeed, it might even lead to a complacent loss of desire to use science in the first place. The idea may be an important part of my personal life, but so far I see no suitable way to make it a part of my scientific life.[12]

To those who see integration between science and Christian faith a viable option, it would be a real inspiration to have Salisbury accept that option as a feasible scientific rationale to explain one of the great questions in the philosophy of science. If the naturalistic theory for the origin of life which involves a whole series of hypotheses can be accepted as a scientific rationale, obviously calling for a belief in such an explanation, then surely another explanation also involving belief, in this case acknowledging design and Intelligence, a Designer, should not be excluded as a rationale.

Admittedly secular scientists have a wealth of factual information, but how to infuse the facts with purpose in order to give meaning to life and the universe without introducing the metaphysical becomes a monumental struggle.

Science and Faith

If the secular scientist finds himself resorting to a belief or a faith to build the bridges required in accepting "Evolution" as an answer for origins, and if we admit the element of faith in the process of scientific thought and philosophy, then surely the activity of faith which is not foreign to a Christian philosophy should easily permeate the whole area of science in the thinking of an evangelical scientist and this process should be no embarrassment.

Warren Weaver who in 1957 was on the staff of the Rockefeller Foundation wrote in *Science* of that year under the caption, *Science and the Citizen*, "The average citizen tends to think that science has destroyed the element of faith in religion; instead, he should realize that science is itself founded on faith."[13] Even though many scientists step with trepidation when discussing the tie-in of science with the metaphysical, yet the pursuit, outreach, and search for satisfying answers continues.

In an article entitled "Scientists as Philosophers" Alfred P. Stiernotte in the *American Scientist* says:

> And then I am very astonished that the scientific picture of the real world around me is very deficient. It gives a lot of factual information, puts all our experience in a magnificently consistent order, but it is ghastly silent about all and sundry that is really near to our heart, that really matters to us. It cannot tell us a word about red and blue, bitter and sweet, physical pain and physical delight; it knows nothing of beautiful and ugly, good and bad, God and eternity.
>
> This solution is one which has a respectable history and is given by the British empiricists, Locke, Berkeley, and Hume, the subjective idealists, and the modern positivists—with this important difference, however, that Schrödinger regards the idea of God as "the most sublime idea that presents itself to the human mind" whereas the sterner band of Viennese positivists regard any metaphysics whether it be of God, of mind, or of matter, as so much non-sensical baggage that should be dropped from the emancipated excursions of the scientific traveler. Such positivists, however, are in great danger of suffering the greatest loss that can be imagined, namely, what Paul Weiss calls "losing the world."[14]

Another expression of this outreach for the intangible is revealed in the October 1961 bulletin of AIBS. The principal address at the 1961 AIBS meetings at Lafayette, Indiana delivered by H. J. Muller of Indiana University appears in the October issue. He explored this quest by saying, "If so, it is hoped that in our future wanderings in space we will come upon a form of life

or mechanism that embodies a higher combination of realism and idealism than ours. Perhaps this encounter will bring us to our senses in time, but more probably it will be too late."[15] Could this be a reaching out for a Personality in the Universe called God? In Hollinger's article referred to earlier, attention is drawn to T. S. Kuhn's quest which might fit in at this point. Hollinger says, "But for Kuhn the crucial questions are: whose word do we take concerning what's 'out there' (in other words, which theory explains the relevant phenomena the most satisfactorily?)"[1]

Aligned with the search for answers in this field we find the development of a new theory built on an old one. Albert Rosenfeld, science editor for *Saturday Review/World* wrote in the November 20, 1973 issue about this theory. He says,

> Leslie E. Orgel of the Salk Institute has for some time been dissatisfied with current theories that all living creatures derive from precursors of life that sprang into being in the seething primordial atmosphere of early earth. If that was the case, why don't we see creatures with varying codes? Now Orgel, in collaboration with Francis H. C. Crick—who shared the Nobel Prize with James D. Watson for elucidating the architecture of the DNA molecule—has offered a new theory: "directed panspermia."
> In the first panspermia theory, put forth in 1908 by the Swedish chemist Svante Arrhenius, the earth was seeded inadvertently by living cells wandering at random through the cosmos. But Crick and Orgel see no reason why the seeding couldn't have been deliberate.[16]

Toward the end of his article, he writes,

> Remember the strange monolith in Stanley Kubrick's 2001, left on the moon by never-seen beings millions of years earlier to signal them of man's arrival on the lunar surface? Arthur C. Clarke, who co-authored 2001, says he and Kubrick never tried to visualize or explain these beings for one simple reason: They would be utterly beyond human imagining, and anything they could do would have to seem like magic to us. To attribute to them motivations similar to man's—as these theorists do—is thus at least as chauvinistic as the notion that life can exist only as it is organized on earth.
> I remember, as a child, being puzzled by the readiness of people (and Bibles) to attribute all-too-human motivations to God. I thought of that the other night when I was chatting about all this with a nonscientific friend, who finally commented: 'As an early reader of the Book of Genesis, I'm somehow not surprised at the idea that Someone Out There put us here. And if such a magical, mysterious, and powerful intelligence exists that is utterly beyond human imagining, can you give me a good reason why I shouldn't call it God?' I could give him no good reason why not.[16]

Man's reaching out with his mind for an answer to the big questions, "What is man?" and "What is his origin?" could ponder with profit the comments of many men. I will refer to four. Fred Hoyle, internationally recognized cosmologist, stated in his lecture, "Extrapolations into the Future", "I am going to make one big hypothesis—a religious hypothesis—that the emergence of intelligent life is not a meaningless accident."[17] The narrator in *The Hellstrom Chronicle* released on television channel 4, Seattle, Washington. February 20, 1974, said that only man ponders his existence; and Einstein is quoted as saying, "The most incomprehensible thing about the universe is that it is comprehensible."[10]

George Santayana, in a kind of summary says, "Whoever it was who searched the heavens with a telescope and found no God would not have found the human mind if he had searched the brain with a microscope."[19]

John Archibald Wheeler, Joseph Henry Professor of Physics at Princeton University, wrote in the *American Scientist* (1974), "Nothing gives one more faith that we will someday understand the mystery of creation than the ability of the human mind to predict, and predict correctly and against all expectation, so fantastic a phenomenon as the expansion of the universe."[20]

Beyond Science

In the search for answers the process often goes beyond routine science as Alvin M. Weinberg, Director of the Oak Ridge National Laboratory, suggests in "The Axiology of Science" (November-December 1970 issue of *American Scientist*), ". . . the program of philosophy of science is to clarify questions that arise in, but transcend, science."[21]

This recognition of "beyond science" is also brought out by Allen L. Hammond, editorial staff member of AAAS *Research News* who wrote as follows in *Science* (May 1975) under the title, "Weisskopf on the Frontiers and Limits of Science" (V. F. Weisskopf is chairman of AAAS physics section):

> Weisskopf is hugely optimistic that the frontiers of scientific knowledge will continue to recede. He believes that "it is reasonable to predict that man will eventually understand all of nature scientifically"—all observable phenomena. But he qualifies this sweeping claim by asserting that scientific insights will not cover every aspect of human experience. For example "one can understand a sunset or the stars in the night sky in a scientific way, but there is something about experiencing these phenomena that lies outside science". Quoting Wittgenstein and the Swiss philosopher Fierz, Weisskopf goes on to develop the point that science does not always illuminate the most important aspects of human experience, that there are limits to the scientific world view.[22]

This observation I would note parallels that of Weinberg above and the comment by Stiernotte made earlier that the scientific picture is ghastly silent about all and sundry that is really near to our heart, that really matters to us.

It is, however, George Gaylord Simpson (Alexander Agassiz Professor of Vertebrate Paleontology) of Harvard University who personifies the quest regarding the "Beyond Science" aspect by saying, "The question 'What is man?' is probably the most profound that can be asked by man." He follows this by stating, "I do not mean to say that the biological study of man or even that the scientific study of man in terms broader than biological can here and now—if ever—provide a satisfactorily complete answer to the question 'What is man?' "[23]

Regarding this unique aspect of man, I note that in *Science*, November 15, 1968, T. M. Sonneborn draws attention to a comment that H. J. Muller made in his book "Out of the Night" stating:

> But man is the first being yet evolved on earth which has the power to note this changefulness, and, if he will, to turn it to his own advantage, to work out genetic methods, eugenic ideals, yes, to invent new characteristics, organs, and biological systems that will work out to further the interests, the happiness, the glory of the godlike beings whose meagre foreshadowings we present ailing creatures are.[24]

For a man who admits that he has been converted

to atheism[25] (as indicated in the article mentioned above) to refer to man as a potentially god-like being is very interesting. This accomplishment he of course sees as a possible attainment by man himself.

Frederick E. Smith, who in 1969 was chairman of the Department of Wildlife and Fisheries, School of Natural Resources, University of Michigan is not so optimistic. He writes in *BioScience* of that year, "In one area, however, man is virtually impotent. Although he shows tremendous ability to alter the environment, improvising, correcting mistakes, salvaging disasters, and taming new regions, he shows almost no ability to change himself."[25]

Before leaving the subject of man's superquality, yet recognizing his inadequacy, I refer to Edgar D. Mitchell who in February 1971 walked on the moon. He states in an article "Outer Space to Inner Space: An Astronaut's Odyssey" which appeared in the February 22, 1975 *Saturday Review*, "When I went to the moon, I was as pragmatic a scientist-engineer as any of my colleagues."[26] And further down in the same article he says,

> The contemporary scientific model of man as simply a complex organization of organic molecules is insufficient for explaining consciousness. Human beings are more than mere lumps of flesh. They have a dimension that transcends the entity of the person and takes them into the category of the trans-person.

He continues,

> That concept, of course, takes us right back into religion and philosophy. It presents a sound reason for religious beliefs—a rational basis for explaining why people throughout history have persisted in claiming that the physical world has a spiritual foundation. But it takes a change of consciousness if we are to 'see' that foundation.[26]

History and personal experience tell us that to change man positively is a phenomenal task; even the best education and access to the most pertinent information will not ensure such a change. Do we see in the above then an acknowledgment that if man is really going to change he cannot accomplish this on his own but needs help? Here the Word of God brings hope through Jesus Christ, the One Who changes lives. The psalmist in Psalm 51:10 calls for Divine help saying, "Create in me a clean heart, O God; and renew a right spirit within me."

Admittedly secular scientists have a wealth of factual information but how to infuse the facts with purpose in order to give meaning to life and the universe without introducing the metaphysical becomes a monumental struggle.

Bruce Wallace of Cornell University mentions in *Discussion Guide for Volumes I-III Essays in Social Biology*, "An early geneticist wrote: 'The real trouble is not with the facts. It is with the interpretation of these facts. Just at present we have more facts of a certain kind than we know what to do with. We need some one to put meaning into these facts.' "[27] It is admittedly true that the proper interpretation of facts gives ultimate meaning.

At the 1972 meeting of the Northwest Scientific Association Fred W. Fox of Oregon State University gave a presentation under the heading, "Beyond Concept and Process in Science and Education: An Ethic". He pointed out that scientific theories have ethical and philosophical implications, and that he thought man wants to know if there is purpose in the universe. He observed that process and concept have been driving us; should we not look beyond this to ethics? He drew attention to reverence for life and recognized the ethic of love as universal, and mentioned Oppenheimer in connection with the thought that we will not find the ultimate building block in "nature".

In spite of acknowledgment in the group during the lively and rather lengthy discussion which followed, that we were moving into theological and religious territory, one person spoke up saying that this indicates our need. Before his session was closed, Fox not only admitted that he was a humanist but also shared with us the problem facing him, namely, should we allow our students to ask the ultimate question?

To further acknowledge that science is inadequate in meeting man's great outreach and quest for answers, I refer to something Philip Handler said. As president of the National Academy of Sciences in 1970, he spoke on *Science's Continuing Role* at the dedication of the Loeb Building, Marine Biological Laboratory, Woods Hole, Massachusetts. In his speech he made a striking comment regarding science and faith. He said, "If our spiritual faith is somewhat shaken, whence do we turn? Science may be an inadequate substitute—but it is the substitute we have."[28]

What a challenge the above responses should present to the evangelical scientist! What can be learned from these observations? One thing I see in this is that the evangelical scientist should sense the urge and feel encouraged to present the philosophical answers in science that are needed to satisfy the outreach for meaning in this world and this universe.

Conclusion

In my concluding comments I draw attention to Clifford L. Burdick, Hugh L. Dryden and Irvine H. Page.

Burdick, a geologist, states in a book *Behind the Dim Unknown* edited by John Clover Monsma as follows: "In my own thoughts, I am close to Dr. A. Cressey Morrison, former president of the New York Academy of Sciences, who stated that the universe shows such definite design and purpose that it demands a Master Mind to account for its many perfections."[29]

Dryden of the National Advisory Committee for Aeronautics, Washington, D.C. in a talk given before the Cosmos Club, Washington, D.C. said, "Scientists, as well as others, have come to realize that atrophy of the moral and spiritual life is inconsistent with well-rounded development. Man's life at its fullest is a trinity of activity—physical, mental, and spiritual."[30]

And in an article, "Chemistry of the Brain" which is based on his vice-presidential address to Section N-Medical Sciences during the New York meeting of the AAAS in 1956, Irvine H. Page stated,

> I conclude with the hope that, for the small part we play in the shaping of things to come, the neurochemist will pursue his science to its utmost but will never forget that the problem of dualism of body and soul may not be solved in material terms only, and that on its solution hangs the fate of society. The problem must

be approached humbly and with care lest ineptitude lead us into the greatest of human tragedies—a philosophy of nothingness; a philosophy without beauty; a philosophy without God.[31]

Philosophical judgments that must be made in the field of science dealing with the origin of matter, the origin of life, the concept of causation, the meaning of man in the universe and the factor of belief associated with scientific pursuits call for a faith in a Person, One who transcends the facts of science. This Person if excluded from scientific endeavors makes inadequate hypotheses a necessity and calls for the deification of man. On the other hand if this Person, God, is included in scientific quests (as even some secular scientists find themselves pressed to allow), answers will develop that have a unifying thrust and bring clarity to deep questions such as whether there is purpose in the universe.

In the light of the reactions of scientists mentioned above and others that might be added, I submit that even though the secular scientist may not be aware of it, he is found many times to be a supporter of a Christian philosophy of science.

REFERENCES

[1]D. A. Hollinger, *The American Historical Review* 78, 386 & 381, April (1973).
[2]N. Wade, *Science* 188, 37 (April 4, 1975).
[3]S. W. Fox, *Science* 132, 200 (1960).
[4]J. P. Segrest, *Science* 182, 336 (October 1973).
[5]C. E. Nelson, G. G. Robinson, and R. A. Boolootian, *Fundamental Concepts of Biology* (John Wiley and Sons, Inc., New York, 1970) pp. 8 & 285.
[6]H. L. Carson, *BioScience* 22, 349 (June 1972).
[7]F. B. Salisbury, *The American Biology Teacher* 33:(6), 338 (September 1971).
[8]L. Bogorad, *Science* 188, 897 (May 30, 1975).
[9]J. A. Behnke, *BioScience* 24:(9), 526 (September 1974).
[10]P. Weiss, *Science* 136, 470 (May 11, 1962).
[11]H. J. Fuller and O. Tippo, *College Botany*, 25 (Holt, Rinehart and Winston, Copyright 1954, printed 1960).
[12]F. B. Salisbury, *The American Biology Teacher* 33:(6), 337 (September 1971).
[13]W. Weaver, *Science* 126:(3285), 1229 (December 13, 1957).
[14]A. P. Stiernotte, *American Scientist* 42:(4), 652 (October 1954).
[15]H. J. Muller, *AIBS Bulletin*, 22 & 23 (October 1961).
[16]A. Rosenfeld, *Saturday Review/World*, 59 (November 20, 1973).
[17]F. Hoyle, University of Washington *Alumnus* 55:(1), 32 (1964).
[18]R. L. Sinsheimer, *American Scientist* 59, 21 (January-February 1971).
[19]R. M. Jones, *The Radiant Life*, 135 (The Macmillan Co., New York, 1944).
[20]J. A. Wheeler, *American Scientist* 62, 686 (November-December 1974).
[21]A. M. Weinberg, *American Scientist* 58, 612 (November-December 1970).
[22]A. L. Hammond, *Science* 188, 721 (May 16, 1975).
[23]G. G. Simpson, *Science* 152, 472 & 473 (April 22, 1966).
[24]T. M. Sonneborn, *Science* 162, 774 & 772 (November 15, 1968).
[25]F. E. Smith, *BioScience* 19:(4), 320 (April 1969).
[26]E. D. Mitchell, *Saturday Review*, 20 & 21 (February 22, 1975).
[27]B. Wallace, *Discussion Guide for Volumes I-III Essays in Social Biology*, 6 (Prentice-Hall, Inc., Englewood Cliffs, N.J., 1972).
[28]P. Handler, *BioScience* 20:(20), 1103 (October 15, 1970).
[29]J. C. Monsma, *Behind The Dim Unknown*, 216 (G. P. Putman, N.Y. copyright 1966).
[30]H. L. Dryden, *Science* 120, 1054 (December 24, 1954).
[31] I. H. Page, *Science* 125, 727 (April 19, 1957).

The Christian in Science: An Aim-Oriented Approach

JOHN E. RICHARDS
University of California
Los Angeles, California

JOHN DRIVER
Driver Nurseries
Modesto, California

The aim-oriented empiricism of Nicholas Maxwell posits that a priori *metaphysical blueprints must be developed as aims for scientific activity before proceeding with empirical testing. An aim M_1 is proposed for Christians active in science. M_1 is the proposition that the knowledge domains of science and Christianity are integratable. After outlining methodological rules, R_n (consonant with M_1), by which to evaluate scientific theories, two examples are discussed which demonstrate how M_1 may help Christians to choose between rival integrative type theories. It is concluded that the aim articulation Maxwell posits as essential to science would be beneficial to Christians active in science.*

Aim-Oriented Empiricism

A recent interesting view in the philosophy of science is that presented by Nicholas Maxwell called "aim-oriented empiricism."[1] Aim-oriented empiricism (AOE) proposes that science be subject to empirical criticism but is itself not only empirical. AOE also allows the explicit usage of *a priori* propositions. These *a priori* propositions give direction or an "aim" to science. AOE is rational, empirical, and metaphysical.

Maxwell's 1974 article puts AOE in opposition to Standard Empiricism (SE). SE is that attitude in science that claims to reject the use of *a priori* propositions. Science should not make "permanent metaphysical assumptions about the world (or about the phenomena) upheld in an entirely *a priori* fashion . . ."[2] Ultimately all scientific knowledge must be subject to critique by empirical propositions.

Maxwell presents a number of severe criticisms of SE. First he attacks the consistency of the exclusion by scientists in the SE tradition of aberrant or *ad hoc* theories. Aberrant science does not allow falsification of theories by contradictory evidence.[3] When a prediction fails, *ad hoc* reasons for the failure are tacked on to save the central theory. Aberrant theories also often consist of respectable scientific theories which have irrelevant information added. Aberrant scientific theories are rejected by SE as being vague, imprecise, and containing irrelevant information. Often it is claimed that the basis for rejection of these theories is "Occam's razor" or "simplicity". Yet the proposition that the "simplest theory is the most acceptable" is nonempirical. This reference in SE is disallowed because all *a priori* propositions are rejected. Thus scientists in the tradition of SE are not acting consistently when rejecting aberrant theories.

Maxwell's second criticism revolves around the decision scientists make between equally respectable theories. Assume two well-developed theories are equal in respect to empirical success, nonaberrancy, acceptance by the scientific community, and other generally accepted norms. Scientists in the SE tradition must often choose between two such theories. But there is no rational criteria for choosing between the two competing theories. Any choice that is made must be made on grounds other than empirical. The fact that choices are made is evidence that again SE has to often act non-rationally.

Further presume that one of the theories in question has had more empirical success than the other, but is equal in other respects. SE would accept the most successful theory. Yet it was Hume's most devastating criticism that illustrated that present empirical success is no guarantee of future empirical success. Preference of the successful theory and rejection of the other implicitly assumes the metaphysical thesis that induction does give one the grounds for accepting universal formulations (the preferred theory) on the basis of particular evidence (the empirical success). Lakatos has amply demonstrated that acceptance of a successful empirical theory over an evident failure is not always a wise procedure, for the theory that is a failure may in the future be revived and receive much success.[4] Thus the central tenet of SE, empirical success, is not a proposition that can be followed in an entirely rational and consistent fashion.

Concepts in Christianity should be used to develop new models in science, and scientific models should be used to develop new models in Christianity.

Perhaps Maxwell's most important insight is with the treatment of germinal theories by SE. Assume that two theories are equal in respect to having no empirical success, are germinal, and are equal in all other respects. Even the SE guidelines have no direction to give here, for empirical testing has not yet occurred. This is the situation of scientific discovery when one is faced with an unexplained phenomena and can imagine many hypotheses to account for the data. But,

> . . . according to standard empiricism the only way in which we can, in the end, make a rational choice between conflicting ideas about the world is to compare these ideas with our experience. According to standard empiricism nonempirical or *a priori* considerations alone cannot provide a basis for choosing rationally between different ideas about the world. Thus standard empiricism rules out all hope of arriving at good new scientific hypotheses in a rational manner . . .[5]
>
> Standard empiricism excludes the possibility of rational discovery in science because it excludes the possibility of there being any *a priori* knowledge about the world (in terms of which rival ideas for future research may be assessed).[6]

It is precisely this problem in SE which provided the data for Kuhn to write about in *The Structure of Scientific Revolutions*. At a revolutionary point in science no rational choice can be made between competing scientific theories, given the theses of SE.

As a rational alternative to the nonrationality demanded in SE, Maxwell presents AOE. First the community of scientists must choose a metaphysical blueprint (M) to guide research, rejection decisions, and give direction to rational scientific discovery. The choice of M is "irredeemably speculative and conjectural,"[7] since it is a proposition of an *a priori* nature. But rational reasons demand such an M must be chosen. Science as practiced by those in the SE tradition also chooses metaphysical (nonempirical) assumptions (Occam's razor, simplicity, induction, etc.). But SE claims to reject such propositions and thus discourages open discussion and evaluation of those assumptions that guide and limit science. Recognizing one's assumptions and subjecting them to public criticism allows them to be useful rather than limiting in science.

The M to be chosen should correspond with some human value or desire. For example, modern science has a deeply ingrained desire to discover an intelligible, rational universe.

> We seek coherence, harmony, beauty, not because we have good reason to suppose these things really exist in the world, but because our passion to discover these things is so great, because the intrinsic *value* we place on the discovery of these things is so high, that we are prepared to devote ourselves to long and arduous labors merely on the offchance that what we hope to find really does exist.[8]

Scientists have thus over the years used Occam's razor to reject scientific theories which were not simple, ele-

gant, and intelligibly rational to man. Maxwell uses this fact to base his proposal that the aim, or M, for science should be the proposition that the world is intelligible.[9] But a different group of people, with different values, could just as well choose a different aim for their activity.[10]

The M that is chosen is tested against the empirical pole of science.[11] M must specify the direction in which science must proceed. M is used to decide between competing germinal theories. M is used to judge the quality and importance of empirical data and also is used as a standard to evaluate well-tested empirical formulations. If, however, after long periods of time there is a lack of empirical success within the logical realm of M, the community of scientists must look at M and refine it according to the empirical data available. But if theories within M's domain are extremely successful, M is strengthened, perhaps made more specific. Through this process of reciprocal feedback both M and empirical knowledge develop.

Aim articulation in a public, rational fashion is seen by Maxwell to be the chief distinctive of science. ". . . the heart of scientific method is concerned with rationally appraising and developing different possible aims or blueprints for science."[12] It is not searching after truth or trying to find immensely successful empirical theories or applying scientific knowledge to real-life situations. All of these are in some way contained in the aim-oriented method. Science should have as its main goal the articulation of M. In this way science is able to proceed rationally.

Finally Maxwell posits that a number of methodological rules(R) must be developed which "specify how scientific theories are to be chosen between, accepted and rejected, in the light of evidence."[13] Three levels of statements in science are distinguished.

> *Level* 1—Ordinary scientific theories.
> *Level* 2—Methodological rules which specify under what circumstances scientific statements (Level 1 statements) should be accepted and rejected (or how they should be graded).
> *Level* 3—Methodological rules which specify under what circumstances Level 2 rules should be accepted and rejected.[14]

Level 1 statements are the theories and observational data contained in the empirical pole of science. Level 2 statements are R which translate the aim of science, M, into concrete propositions by which to evaluate Level 1 statements. And Level 3 statements are a set of general rules by which to guide the total aim-oriented approach to science.[15]

An Aim for Christians in Science

Should Christians operating in science accept Maxwell's proposal of intelligibility as their aim? Certainly Christians have a much stronger reason for the belief that the universe is rational and intelligible. The non-Christian scientist bases his desire to find simplicity in a vague tenet of his value system. The Christian believes that a rational God created an orderly universe whose laws are discernible by the scientific process.[16] Thus the Christian, before starting science, would expect to discover the universe was orderly.

However this aim of simplicity may be "known in advance to be unrealizable,"[17] which would disallow its use as an aim for Christians. One implication of the idea of intelligibility is rationality and the possibility of an intelligent discovery of this rationality. Yet Paul the Apostle speaks of "mysteries" which could not be discovered except through a special revelation.[18] There are then certain aspects of the universe that cannot be discovered through reason, rationality, and scientific testing merely by man. Intelligibility cannot then fully be accepted by Christians as a realizable aim.

The idea of intelligibility also connotes simplicity. This means that acceptable scientific theories must have all loose ends tied into a theory. Such things as free will, personality (in a free sense), and indeterminacy have little place in intelligible theories. God's purposive action in history represents such a loose end, an uncertainty limit in any Christian theory about the world. Although God can be known to a degree, and thus his actions predicted, his infinite greatness is unintelligible to man's mind.[19] The hope of finding a totally intelligible universe is unrealizable to Christians who value their beliefs while operating as scientists.

One aim suggested by Christians as appropriate for Christians active in science is the development of a Christian science. Robert Vandervennen in this vein suggests that a "Christian mind" should be developed in science resulting in a "radical Christian approach to science."[20] Vandervennen appears to be influenced by the presuppositionalism movement in Europe begun by Abraham Kuiper, developed at the Free University of Amsterdam by Herman Dooyeweerd, and brought to America by Cornelius Van Til.[21] Vandervennen proposes a truly Christian science should be developed which would recognize its basic presuppositions as the tenets of Christianity. The aim or M would be the tenets of Christianity within which a comprehensive science could be constructed.

The aim suggested by Vandervennen has a number of deficits, which will be mentioned only briefly here. First the Christian actively involved in science must compete in a secular situation. Research journals, universities, research centers, and funding grants come from institutions which are unfavorable to Christian research. A Christian science would have to be developed at Christian universities and through Christian societies, a goal which is not practically feasible. Secondly the activity of science may be intrinsically incompatible with the activity of Christianity. Science is a rational activity of explanation, prediction, and discovery. Christianity is based on faith and is less a knowledge activity than science. The presuppositionalism outlined by both Reid[22] and Vandervennen[23] must have a thesis that science and Christianity are not different in this way, but both engage in similar activities. This must be seriously questioned. Though some aspects of Christianity can be scientifically investigated, most of them cannot. Thirdly, we cannot conceive of a "Christian science" that is radically different from non-Christian science. Is it "radically" different in methodology? Then it should not be called a "science". Is it different in that it investigates Christian ideas? Then it is merely using science to investigate Christianity. Neither of these differences have been adequately elucidated by the proponents of Christian science,

and thus the idea of how a Christian science would be is every vague. In any case these three reasons illustrate that it is a viable question whether or not the aim proposed by Vandervennen and others is realizable.

The Aim of Integration

The aim or M that we would like to propose is the integration of Christianity and science.

M_1—The knowledge domains of science and Christianity are to be integrated.

Christians working in science desire integration. Often the Christian must fragment his life into those areas that are Christian—his home, family life, church, social life—opposed to those areas that are nonChristian or secular—his job, his colleagues, his business. There is pressure from both sides to diminish the importance of the other. The Christian in this situation would profit from a substantial integration of his activities. It is also intellectually healthy to synthesize disparate cognitive values. Dissonance can be reduced by eliminating the importance of one of the disparate elements, but this distorts the realities that must be faced by the Christian in science. It would be more intellectually appealing to have a direction in which to proceed to give full credit to both elements in the cognitive conflict. Thus M_1 would be both intellectually and personally valuable to the Christian.

M_1 is a realizable aim for Christians in science. There are enough testable elements in Christianity that can be synthesized with scientific investigation. A Christian science as proposed by Vandervennen demands that Christianity and science be similar activities. M_1 demands only that some elements in Christianity be commensurable with scientific activity, and *vice versa*. If it is impossible to follow this metaphysical blueprint, if future empirical testing within the domain of M_1 does not meet with success, it does not matter. If it is possible to integrate the two fields, only adopting M_1 would lead to success and adoption of any other M would doom our activities. Perhaps if M_1 is very successful it would reveal that a fully Christian science is possible, and M_1 could be refined to include Vandervennen's suggestions. But at this point we should accept M_1 and begin the process of aim articulation.

M_1 as proposed specifically is for theoretical concerns rather than applied values. Maxwell shows how often values in technology conflict with theoretical postures even though the theoretical postures are not inherently non-rational. Certain values in the Christian community on a practical or applied level would prohibit postulation of new models or paradigms by which to view biblical and theological concepts. We are open to any new model which is not in specific contradiction to our blueprint, M_1. With Maxwell it is asserted that "pure science has valuable practical applications."[24] If M_1 represents reasonably well the contingencies of reality, research guided by M_1 should meet with success. If it does not it can be revised on a pure level by those Christians practicing science for its own sake. Intervention by those on an applied level is unnecessary.

Proposed theories must do justice to both the tenets of Christianity and to those of science.

Methodological Rules for M_1

The following methodological rules (R_n) supplement the blueprint of integration, M_1. These R_n are Level 2 statements which specify how to evaluate scientific theories. They are dependent upon the acceptance of M_1, being logically related to M_1. The future refinement of M_1 resulting from aim articulation will be accompanied by similar refinement of R_n.

R_1—Via analogy, metaphor, transfer of ideas, and application of theories into many areas, concepts in Christianity should be used to develop new models in science, and scientific models should be used to develop new models in Christianity.

R_1 gives some substance to the authors' conception of integration. By integration is not meant the mere explanation of phenomena in one discipline by concepts in the other discipline. Rather each discipline should infuse new ideas into the other such that useful new concepts can be discovered.

R_2—In areas of controversy or conflict, and even in the normal application of integration, proposed theories must do justice to both the tenets of Christianity and to those of science.

R_2 is an important rule for the correction of current practice of many Christians attempting some integration. Integration demands that the activities of both science and Christianity be given equal importance. Many Christians attempt to explain the motives and results in science by Christian principles, resulting in a "biblicism". On the other hand, attempting to explain all the facts of Christianity by a secular science results in a "scientism". It is most important to recognize that Christianity and science are different activities and their separate integrity must be preserved. While "The Holy Scriptures are the inspired Word of God, the only unerring guide of faith and conduct . . . the scientific approach is capable of giving reliable information about the natural world."[25]

R_3—Empirical theories must admit the possibility of commensurability between Christianity and science.

R_3 is a necessary direction for the integration of two slightly different activities. Christianity and science are in many ways incompatible. However theories which wish to integrate the two cannot state that they are speaking in such different areas they are not relevant to each other. Perhaps at times, especially with the biblical witness, translation may be necessary to discern the author's intents and purposes.

R_4—Truly successful theories must not only explain phenomena in the other field, but must enhance predictions and discoveries in the other field.

R_4 attempts to guard against *ad hoc* or aberrant theories which are often found in integration attempts. Those that would violate R_2, resulting in a biblicism or

scientism, often make use of *ad hoc* and contrived explanations when difficulties arise. Integration demands a synthesis which leads to new discoveries in both fields.

The Christian Scientist's View of Biblical Inerrancy

Having adopted M_1 and developed appropriate Level 2 statements, R_n, two examples will be given. Assume for the following example a period of "revolutionary crisis" surrounds the doctrine of biblical inerrancy and authority. In fact the past 15 years have been accompanied by an increase in those questioning the exact meaning of this doctrine. Dewey M. Beegle's *The Inspiration of Scripture* (1963, revised as *Scripture, Tradition and Infallibility*, 1973) began the recent controversy in the area. Harold Lindsell's *Battle for the Bible* (1976) shows the question is still a viable issue among evangelicals. M_1 gives Christians active in science a rational tool by which to evaluate the problem with respect to its scientific implications.

The following views (V_n) are a number of positions that might be taken on the question of the Bible and science relationship. In this period of "discovery" it will be shown which empirical theories can be rejected through the use of M_1 and R_n and which are acceptable for further investigation.

V_1—The Bible, containing historical and scientific assertions, has "no final conflict" with science and speaks authoritatively in those areas it has in common with science.

V_1 can be recognized as the view proposed by Francis Schaeffer in such books as *Genesis in Space and Time*. The Bible does not contain exhaustively every possible scientific truth, but what is there is accurate and should be in no final conflict with the discoveries of science. V_1 is acceptable to pursue within the domain of M_1 and the rules R_n. It allows for the possibility of integration and especially is concerned with the importance of both Christianity and science. Christians in science can now proceed to test V_1, which is a Level 1 scientific statement.

V_2—The Bible is a collection of myths, folktales, and cultural stories, and speaks with little importance in matters of science.

V_3—Science has nothing to offer the Christian. All concepts of life, truth, and knowledge are to come from the Bible.

V_2 and V_3 are similar in that they both deny the respectability or importance of one of the disciplines. V_2 is the opinion of most persons in the secular field of science. V_3 is the view of many sectarian Christian organizations. Both V_2 and V_3 make no attempt to integrate and thus conflict with R_1. They do not do justice to the tenets of both fields and are contradicted by R_2. The Christian scientist valuing integration would not then consider empirically testing these views because they do not acceed to his aim, M_1.

V_4— The Bible should be given the ultimate say in every matter. Science does have some things to offer: improvement of life, design of technology, etc., but when it comes to conflicts the Bible must prevail.

V_5—The Bible certainly has some historical significance and may be historically accurate. It contains some good stories and good moral lessons. However most of the events listed therein, the interpretations of those events, and the importance placed upon them, especially "supernatural" ones, can be alternately explained using the principles of modern science.

V_4 and V_5 are modified positions of V_2 and V_3. They appear to be the most prevalent positions taken on this subject. The proponents of these views often engage in integration activities. However these views must be rejected because they conflict with certain R_n. They violate R_2 because they fall back on their Christian or secular precommitments when conflict arises rather than attempting a synthesis. Often persons with these views rely on *ad hoc* explanations of phenomena in the other field and do not attempt to generate successful new theories. In this they violate R_4. Both V_4 and V_5 violate M_1 and thus should not be investigated.

Empirical theories must admit the possibility of commensurability between Christianity and science.

V_6—Concepts in the Bible and the historical-scientific propositions of the Bible are encouched in the cultural paradigms of the time of the author. Translation is necessary to make the concepts of the Bible commensurable with current cultural paradigms.

V_6 is a current popular view, especially with those who call themselves the "new evangelicals". They wish to retain the authority of the Bible but do not like being restricted by cultural and paradigmatic differences. This view is acceptable to pursue by Christians active in science for it falls within the domain of M_1 and R_n. Note that to be in accord with R_3 great attention must be given to translation activities, preserving the integrity of the thoughts and intents of the original authors. But this view does give equal importance to both disciplines (R_2), can be used for integration purposes (R_1), and can be used to develop new models which could lead to new discoveries (R_4).

V_7—The Bible speaks in and of a world completely separate from that of science. The Bible speaks to man in a way that cannot be measured by scientific tools. It need not be accurate historically nor scientifically because it is incommensurable with science.

V_7 is the inspiration and authority position taken by the neo-orthodox movement led by Karl Barth. The matters spoken of in the Bible cannot be scientifically examined because they are of a different nature and meant for different purposes. V_7 conflicts with the commensurability rule, R_3. Integration is not possible if the two fields have no common subject-matter. Thus this position would have to be rejected as unsuitable for further research.

There may be other views of the inerrancy and authority doctrine. Before they are empirically tested, they should be evaluated as to their compatibility with M_1 and R_n. After they have passed this *a priori* test they can be subjected to empirical verification.

One final point should be clarified with respect to this example. No claim is made by the present authors about the existential status of the rejected theories The neo-orthodox view may be philosophically or biblically sound, but it is incompatible with the Christian scientist's desire to integrate science and Christianity. Christianity may be a hoax, a fraud, or worthless, as V_2 and V_5 might assert, but these must be rejected because Christians in science value integration. And perhaps scientific activity is a waste of time as V_3 and V_4 would entail. But Christians active in science obviously do not feel this way and thus would reject these as possibilities. ". . . theories that are incompatible with M will be quite rationally disregarded, however 'empirically successful' they may be, for the simple reason that considering such theories cannot help us to articulate more and more of M."[26]

The Question of Origins

As a second example, we show that adopting M_1 makes possible rational choices between rival theories which have already received much empirical attention. Is the earth "new" or "old"? Did life arise suddenly or evolve slowly over long periods of time? The actual practice of choice between these and other origin theories is at best haphazard, depending largely upon precommitments supplied by either the church or the secular scientific community. By accepting the proposed metaphysical blueprint M_1 and the rules R_n Christians would have a rational method of choice between rival theories concerned with the origin of the physical world.

The debate between those who espouse a young earth and those who hold origins to be extremely ancient would benefit from a mutually accepted aim. Science of course has dating methods by which relative dates can be affixed. Within the knowledge domains of Christianity (specifically the biblical witness) dates are vague and uncertain. The closest the Bible comes to dating are genealogies, which cannot be construed as time clocks.[27] Therefore R_2 would demand that science be given its proper importance and a date from science would have to be accepted.[28] Perhaps if science did demand an old earth the Genesis account could be understood in light of this and specific predictions of theological concepts would differ from the special creation accounts to date.

Truly successful theories must enhance predictions and discoveries in the other field.

The problem of the fixity and variability of species is another difficulty in the creation-evolution debate. Many special creationists argue that since God created each species there must be a fixed "type" which must be associated with each species and that evolution in any form is impossible. Typically the creationist of this persuasion might accept a variability within species but would deny the possibility of interspecies development. Richard Aulie successfully demonstrates that the concept of types comes from the writings of Plato, the "idea", rather than from Moses.[29] Again this is an instance where science must be given its full importance especially because the Bible is silent on any specific directions. At the very least modern biology demands intraspecies variation. It is certainly credible that the theory of interspecies development is an accurate theory. In any case science must be given the final say.

The preceding two paragraphs emphasize areas where scientific concepts must be brought into Christianity to develop new models in Christianity. However in the problem of origins there are a number of Christian considerations for which account must be given. The first few chapters of Genesis clearly indicate physical origins are divinely directed. Perhaps this fact can be brought into scientific activity. One might search for evidence of a "creative" or "directed" evolution. Because of theistic activity certain phenomena may contradict normal scientific "laws". Discovery of such phenomena would strengthen and broaden scientific investigation, the intent of R_4.

The Bible and Christianity also emphasize the importance of man in the universe. If one accepts evolution as the method used by God in creating the physical world, certain trends might be in evidence. The direction of evolution might culminate in the development of man. Teleological evidences may exist in early ancestors of man. One should be careful to stay away from anthropomorphisms and *ad hoc* explanations, but such care does not completely close such an investigation.

As well as expressly biblical themes, theological considerations could be integrated with scientific knowledge. An admirable attempt at this type of synthesis has been done by Richard Bube in his "Biblical Evolutionism?"[30] and "Original Sin as Natural Evil."[31] Without specifically agreeing with Bube's articles we assert they are an excellent demonstration of how one might take theological models and integrate them with scientific knowledge. The only missing emphasis in his work is the development of new hypotheses to be tested as demanded by R_4. This likely occurred since Bube does not have the same aim as proposed in this paper. An intensive effort by the Christian community within science at aim articulation would help solve this discrepancy such that commensurable dialogue is possible through attempts such as Bube's.

Christians attempting integration in the concept of physical origins should be extremely careful not to engage in aberrant science. Often scientific phenomena are difficult to accept because of other ingrained prejudicial commitments. Difficult areas are explained with *ad hoc* or contrived theories which attempt to account for the inconsistent data. An example is the catastrophism posited by the special creationists in the Creation Research Society.[32] Difficult phenomena for the special creationist approach are particular geological formations and radiometric techniques which suggest an old earth. Henry Morris and John Whitcomb in *The Genesis Flood* give very ingenious explanations of the data contrary to their own schema. However these are *ad hoc* explanations and must be rejected by R_4. They do nothing to encourage the development of Christian models or scientific theories. This type of "biblicism", or alternatively any "scientism", must

be seen as contrary to M_1 and rejected by scientists wishing to integrate Christianity and science.

Conclusion

In the present essay Maxwell's Aim-Oriented Empiricism was briefly outlined. Next an aim, M_1, was proposed for Christians active in science. After outlining a number of appropriate methodological rules, R_n, by which to evaluate scientific theories, illustrations were given which demonstrated how Maxwell's Aim-Oriented Empiricism might be applied by Christians with the aim M_1.

We advocate a public evaluation of M_1, and subsequent articulation or refinement of M_1. "We will need constantly to reassess the blueprint that we have chosen, in an attempt to pick the best possible blueprint for our science."[33] M_1 may be offensive to many Christians active in science: it should be refined. Empirical theories within the domain of M_1 may not be successful: it should be refined. On the other hand empirical theories commensurable with M_1 may be successful: it should be refined further. Aim articulation, development, and refining must be a constant activity of every scientist. It is especially incumbent that Christians acting in science develop and strengthen their metaphysical blueprint. ". . . *the single most important and most intractable problem that can face us is precisely the problem of discovering the best possible aim or metaphysical blueprint for our science.*"[34] It is our hope that both this article and M_1 will encourage Christian scientists to correct and improve their practices, bringing their presuppositions, aims, or metaphysical blueprints into open discussion. It will be through such aim articulation that Christians operating in secular science can best achieve professional and personal success.

REFERENCES

[1]Maxwell, Nicholas. "A Critique of Popper's Views on Scientific Method," *Phil. Sci.*, 1972(39), pps. 131-152; "The Rationality of Scientific Discovery," *Phil. Sci.*, 1974(41), pps. 123-163 and 247-295.

[2]Maxwell, Nicholas. 1974, pg. 131.

[3]It has been pointed out that while mainstream science also protects central theories from the contradiction of anomalies, aberrant science does so without specific, positive directions guiding such partice. See Lakatos, Imre, *Criticism and the Growth of Knowledge* (Cambridge Univ., 1970), pps. 91-195.

[4]Reference 3.

[5]Reference 2, pg. 127.

[6]Reference 2, pg. 148.

[7]Reference 2, pg. 251.

[8]Reference 2, pg. 249.

[9]"I use the terms simple, intelligible, non-*ad hoc*, coherent, harmonious, unified, explanatory, beautiful, more or less interchangeably, the core idea here being perhaps intelligibility." Reference 2, pg. 140, Note No. 3. See also Sections 12-15, Reference 2, pps. 264-288 for Maxwell's understanding of simplicity and intelligibility.

[10]It is uncertain from Maxwell's article whether intelligibility is only one of many possible aims that could be chosen, or *the* guiding aim or value behind scientific activity under which aims corresponding to this value should be chosen. We adopt the position that the metaphysical blueprint of intelligibility is only one of many aims and M_1 presented in the present essay is of equal importance. Even if this is not the case, our position with respect to a Christian aim-oriented approach would remain valid.

[11]By the empirical pole of science Maxwell refers to both observational data and the theories related to such data. The empirical pole of science is put in opposition to the *a priori* pole of science, the aim.

[12]Reference 2, pg. 247.

[13]Reference 2, pg. 139.

[14]Reference 2, pg. 260.

[15]Maxwell proposes a number of Level 3 rules, Reference 2, pg. 257-264.

[16]For example, see ASA statement of faith, No. 3.

[17]Reference 2, pg. 139.

[18]Romans 16:25-26; Galatians 1:12.

[19]Romans 11:33-34.

[20]Vandervennen, Robert. "Is Scientific Research Value-Free?" *JASA*, 1975(27, Sept.), pg. 111.

[21]See W. Stanford Reid, "The Historical Development of Christian Scientific Presuppositions," *JASA*, 1975(27, June), pps. 69-75. Reid gives a more accurate portrayal of presuppositionism. In general we are more sympathetic to Reid's article than to Vandervennen's, but still hold reservations concerning the presupposition approach.

[22]Reference 21.

[23]Reference 20.

[24]Reference 2, pg. 138.

[25]ASA statement of faith, No.'s 1 and 3.

[26]Reference 2, pg. 146.

[27]Kinder, Derek. *Genesis*, Intervarsity Press, 1967; Cassuto, U. *A Commentary on the Book of Genesis*, Jerusalem: The Magnes Press, 1944.

[28]It is not absolutely necessary even within science that an old earth be accepted. See, for example, Daniel Wonderly, "Non-Radiometric Data Relevant to the Question of Age," *JASA*, 1975(27, Dec.), pps. 145-152.

[29]Aulie, Richard. "The Doctrine of Special Creation, Part III. The Ideal Type," *JASA*, 1975(27, Sept.), pps. 126-129.

[30]Bube, Richard. "Biblical Evolutionism?" *JASA*, 1971(23, Dec.)., pps. 140+.

[31]Bube, Richard. "Original Sin as Natural Evil," *JASA*, 1975 (27, Dec.), pps. 171-180.

[32]For a comprehensive criticism of the special creationists' catastrophism, see Richard Aulie, "The Doctrine of Special Creation, Part II. Catastrophism," *JASA*, 1975(27, June), pps. 75-79.

[33]Reference 2, pg. 254.

[34]Reference 2, pg. 249.

Once the rise of technology meant an improvement in humanity's life. Now human lives are dedicated en masse to the advancement and improvement of the technological machinery of progress. Left unhindered in its development and unquestioned in its purpose, technology has flourished, while the importance of the person has declined proportionately. People have become cogs in the machine, investments in the future, commodities to be bought and sold in the burgeoning marketplace; they are the functionaries of progress, and the servants of technology, Abundance and the constant drive for success are blessed, while gentleness, compassion, and contemplation have been forgotten.

Mark O. Hatfield
Between a Rock and a Hard Place, Word, Waco, Texas (1976), p. 157

Notes on "Science and the Whole Person"—
A Personal Integration of Scientific and Biblical Perspectives

Part 6

Pseudo-Science and Pseudo-Theology: (C) Cosmic Consciousness

RICHARD H. BUBE

Department of Materials Science and Engineering

Stanford University
Stanford, California 94305

Disillusionment with the ability of science to solve all human problems and a growing awareness of the magnitude of the problems facing the human race in the near future have led in recent years to an outbreak of mysticism: a desperate attempt to find religious comfort in an impersonal world, to establish individual freedom in a world of increasing collective limitations, and to prepare the foundation for that great Utopia of man's making which is always around the corner and never at hand. Although this move toward mysticism can be viewed as a reaction against scientific rationalism, coming as it does in the age of science, it seeks in spite of itself to establish its validity on scientific grounds. In its various manifestations, therefore, it presents itself as a grand harmonization of science and religion, a final unification of the whole man. As such it has a unique appeal to scientists dissatisfied with the fruits of their labors, and to those who are seeking some objective evidence for the validity of their religious faith. This general movement toward mysticism may well present at one and the same time, therefore, a major move toward the breakdown of the dichotomy between science and Christianity which all Christians can applaud, and a major move toward the denigration of every basic Christian concept which Christians hold dear. It seems to offer "the answer;" in fact, it all too often is only once more "the problem," an ancient heresy with a modern veneer. It poses one of the major challenges to Christianity in the encounter for men's minds in the near future.

Getting Your Head Together

A quite useful summary of the variety of movements involved in cosmic consciousness is given in the September 1976 issue of *Newsweek*.[1] It is not possible to describe each of the many (possibly hundreds?) of groups, cults, movements and schools that have blossomed over the last 20 years. They include transactional analysis, transcendental meditation, primal scream, bioenergetics, yoga, guided fantasy, Arica, psychosynthesis, est, creative consciousness, biofeedback, rolfing, mind control, Esalen, the Feldenkrais Method, and humanistic psychology. What do they have in common?

> As a cultural phenomenon, the consciousness movement feeds on the romantic notion that inner experience alone can transform reality and that anyone can knead his life into a perfect work of art. As a religious movement, it signals a return to gnosticism, which always disparages common humanity in the name of higher truths. At its best, it offers an antidote to both false piety and complacent materialism. But at its worst, by ignoring the demonic side of man and smothering tragedy in a cloud of consciousness, it offers a sentimental journey for those who cannot stand too much reality.[1]

This is a harsh and amazingly perceptive assessment to be found in a modern secular magazine. Involved in the cosmic consciousness movement are, however, *bona fide* psychologists and scientists attempting to do good science, as well as other scientists who already have a faith commitment to the worldview of cosmic consciousness, and finally a whole host of entrepreneurs, quacks, and peddlers of sophisticated nonsense. Discrimination between the various branches of the move-

This continuing series of articles is based on courses given in the Undergraduate Special Seminar Program at Stanford University, at Fuller Theological Seminary, and at Regent College, Vancouver, B.C. Part 1, "Science Isn't Everything" appeared in March (1976), p. 33-37. Part 2, "Science Isn't Nothing" appeared in June (1976), p. 82-87. Part 3, "The Philosophy and Practice of Science" appeared in September (1976), p. 127-132. Part 4, "Pseudo-Science and Pseudo-Theology. (A) Cult and Occult" appeared in March (1977), p. 22-28. Part 5, "Pseudo-Science and Pseudo-Theology. (B) Scientific Theology" appeared in September (1977), p. 124-129.

ment is not always easy, but in this installment we try to limit ourselves primarily to what can be considered the more serious and authentic aspects, not wishing to judge any movement totally by the lunatic fringe.

With antecedents in such movements as Spiritualism, Theosophy, and Christian Science, the various aspects of cosmic consciousness emphasize the power of mind over matter, and most include the basic assumption that the world perceived in normal human fashion through the senses is much less real and certainly less significant than the world that can be perceived through arriving at altered states of consciousness. By combining modern psychotherapy with inputs from Eastern religions, the cosmic consciousness movement turns inward upon the individual in order to produce harmony between the individual and his own true self, nature around him, and finally the cosmic forces of the universe. Most forms of the movement assume "the innate goodness of man, the inevitability of human progress, and the inherent alterability of character."[1] Here finally is a way to change human nature, a way at the control of each individual and justified by its scientific validity, rather than a way based upon the authoritarian edict of an ancient religion.

We have argued in a previous installment, however, that unjustified extrapolations from objective evidence should not lead the Christian to reject the evidence itself. We cannot appreciate the academic appeal of the cosmic consciousness movement without stepping back from the popular manifestations of it as various forms of mystic therapy, and considering the theoretical and experimental foundations of the movement. For example, internationally known spectroscopist Edward G. Grame reports that he has discovered to his satisfaction that lengthy group prayer over ordinary water breaks down the molecular bonds that hold a group of H_2O molecules together and produces a simpler kind of water composed of single molecules which, he believes, is healthier to drink.[2] (In addition to his scientific work as a chemist, Dr. Brame is also described as a "parapsychologist" after hours and on weekends, a type of life characterizing an increasing number of scientists in recent years.) In May 1977, the Maharishi European Research University announced that advanced practitioners of transcendental meditation had acquired the ability both to levitate themselves and to become invisible. These were presumably just the first steps in a grander program of acquiring mastery over the fundamental forces of nature. A graduate student from MERU reported,

> Scientific investigation is an important part of the world plan of Maharishi Mahesh Yogi. . . . Combining knowledge of ancient texts with modern ideas of physics, Maharishi announced in 1958 a plan "to spiritually regenerate mankind."[3]

In a paper entitled, "Enlightenment and *Siddhis*," (*siddhis* are supernormal phenomena) Maharishi wrote

> According to the laws of physics, the home of all the laws of nature is the superfluid vacuum, the physical state of least excitation. Here all the constituents and tendencies or laws of nature are found in an unmanifest yet infinitely correlated fashion; it is the source of all activity, the dynamic field of all possibilities.[3]

It is to physics, therefore, that a basic appeal is made for justification of cosmic consciousness movements. This is a point to which we shall return in several later sections.

An Evaluation by J. G. Sire

A very helpful evaluation of the cosmic consciousness movement has been made by James G. Sire in his book, *The Universe Next Door*.[4] Sire lists five basic tenets of what he calls "the New Consciousness." They are helpful in developing an integrated picture of the movement.

1. "*Whatever the nature of being (idea or matter, energy or particle) the self is the kingpin—the prime reality. As mankind grows in his awareness and grasp of this fact, he is on the verge of a radical change in human nature; even now we see harbingers of the new man and prototypes of the new age.*"[4] The God of the theist, and the physical world of the naturalist, is replaced by the Self. This self has the potentiality of being in control of all reality. It is both Creator and created. In such a situation, how is it possible to discriminate between self-deception and genuine perception?

2. "*The cosmos, while unified in the self, is manifested in two more dimensions: the visible universe, accessible through ordinary consciousness, and the invisible universe (or Mind at Large), accessible through altered states of consciousness.*"[4] The physical universe is only the most prosaic of the realms available to the self. The invisible universe, enterable through meditation, physical discipline or drugs, touches the essence of existence. Sire points out that the new consciousness is peculiarly Western amidst its Eastern forms because in general it does insist on the reality of the visible universe that obeys knowable physical laws. The invisible universe, however, the Mind at Large, does not obey the laws of the visible universe.

3. "*The core of the new consciousness is the experience of cosmic consciousness, in which ordinary categories of space, time and morality tend to disappear.*"[4] We can now answer the question raised at the end of statement 1, above: it is not necessary to be concerned about self-deception, for there is no such thing. Anything the self perceives, *is*, for the self is in control of everything. "Appearance is reality. There is no illusion."[4]

> The label *cosmic consciousness* comes bearing a metaphysical explanation of the experience, one widely accepted among proponents of the new consciousness world view. The point is this: when the self perceives itself to be at one with the cosmos, it is at one with it. Self-realization, then, is the realization that the self and the cosmos are not only of a piece but are the same piece.[4]

Eastern monism dominates cosmic consciousness movements.

4. "*Physical death is not the end of the self; under the experience of cosmic consciousness, the fear of death is removed.*"[4] This is a popular theme in a variety of modern explorations of occurrences "after death," as for example, R. A. Moody's *Life After Life*.[5]

5. *"Three distinct attitudes are taken to the metaphysical question of the nature of reality under the general framework of the new consciousness: (1) the occult version, (2) the psychedelic version, and (3) the conceptual relativist version."*[4] The three choices enumerated by Sire can be considered as alternative answers to the question, "Where is this separate reality?" The occult version replies that it is a reality with an existence independent of the viewer. The psychedelic version replies that it is a reality projected from the self. The conceptual relativist version replies that cosmic consciousness deals with the same reality as other modes of consciousness but using models of reality which are different, no particular model being any "truer" than any other.

Sire offers three principal critiques of this new consciousness worldview. (1) It shares with naturalism and pantheistic monism the concept of a closed universe. Ethical issues are therefore largely ignored. If the self is truly in control of the universe, why is anything required except the satisfaction of the self? (2) It reverses the process of desacralization of nature that Christianity accomplished, by once again calling into being the spirit inhabitants of the "inner spaces of the mind."[4]

> While spirit activity has been constant in areas where Christianity has barely penetrated, it has been little reported in the West from the time of Jesus. Christ is said to have driven the spirits from field and stream, and when Christianity permeates a society the spirit world seems to disappear or go into hiding. It is only in the last few decades that the spirits of the woods and rivers, the air and the darkness have been invited back by those who have rejected the claims of Christianity and the God of Abraham, Isaac and Jacob.[4]

(3) It has no inner test for truth, only for patterns of coherence. "Every system is equally valid; it must only pass the test of experience and experience is private. Taken to its logical conclusion this notion is a form of epistemological nihilism."[4]

An Incomplete Guide to the Future

Sire uses the writings of Carlos Castaneda[6] as a specific case of the new consciousness in action. A much less esoteric case, and hence perhaps an even more effective one, is provided by Willis W. Harman in his book, *An Incomplete Guide to the Future*.[7] Harman holds an MS in physics and a PhD in electrical engineering; starting in 1967 when he was a professor of engineering-economic systems at Stanford University, he began to become involved with futures research, which led to his book. Not insignificant, however, is the fact that since 1954 he has been interested in sensitivity training, the human-potential movement, and the study of consciousness through psychedelic chemicals and biofeedback. It is not surprising, therefore, that when Harman finds industrialized society deficient and constructs a new paradigm for a post-industrial society,[8] he also finds the development of human consciousness as a compelling force driving the new society into being.

Of direct interest to us here is his description of the new man and his reasons for believing that this new man is currently emerging. Harman rejects, as would the Christian, deficient models of man such as a physiologically motivated mechanism, a psychologically conditioned animal, and a free being. He also rejects the model of man as God's creation in favor of the model of man as a transcendental being, "who has 'the Divine within,' a 'true Self' or 'Atman' or 'Oversoul,' which the individual may come to experience as one with a 'Higher Spirit,' 'Brahman,' or the 'Divine Ground.'"[7] We may note in passing that Harman's rejection of the biblical model of man is primarily because he finds its context objectionably authoritarian, and because such traditional religious positions have lost their influence in the modern world.

This general movement toward mysticism seems to offer the answer; in fact it all too often is once more the problem, an ancient heresy with a modern veneer.

The attraction of Harman's thought for the Christian is illustrated by his statement,

> We are gradually coming to realize that such well-worn dichotomies as free will versus determinism, physical versus spiritual, and science versus religion are really only expressions of the tension between complementary and equally valid metaphors.[7]

In his effort to get free of the industrialized paradigm with its emphasis on science as the way to truth and on technology for materialistic ends, Harman faces the choice of seeing science as a valid endeavor within its historical limitations of knowledge obtained by the interpretation of sense data,[9] or of seeing science as inappropriately limited by its past methodology and needing to be broadened and freed to provide us with insights into wider realms. *As is characteristic of every choice made in the context of cosmic consciousness, Harman opts for the latter possibility.* He sees scientific orthodoxy as being challenged by a host of new phenomena including among others growing awareness of hypnosis, unconscious processes, psychosomatic illness and the power of self-suggestion, various states of consciousness and psychic research into telepathy, clairvoyance, faith healings, retrocognition, precognition, psychokinesis, unusual control of involuntary processes, thought photography, and unusual mental abilities.

Harman appears quite correct in arguing that it is possible to know through intuitive identification (as with persons) as well as through rational, empirical investigation (as with scientific facts). His desire to see scientific and religious descriptions combined to produce man's wholeness is also sound. But Harman uses this framework to launch into a set of faith presuppositions of his own about the nature of "the new man" who will revolutionize life on earth and make the post-industrial paradigm a reality. This "new man" is the man with cosmic consciousness, following quite closely to the description given by Sire.

In Harman's view the human race is approaching a new evolutionary stage of awareness with no counterpart in history. As in Clarke's *2001*[10] man's advent into space marked a new evolutionary breakthrough akin to the first time that pre-human creatures began to use tools, so Harman sees all of the above phenomena as marking a new period of man's internal and "spiritual"

development. Although he makes no reference to it, his vision is not greatly different from that of Teilhard de Chardin[11] who envisioned a major convergence in the evolutionary process to Omega after the stage of noogenesis (human thought) had been established.

Harman refers to a "perennial philosophy" which he sees as characterizing the hidden wisdom of all ages in a theme reminiscent of the "hidden key" motif of gnosticism. It has always been believed by the wisest of men that man can attain cosmic consciousness, a kind of immediate knowledge of the reality underlying the physical world. Normal life can be likened to going through life in a kind of hypnotic sleep, not really seeing; once he sees more clearly, he is able to become aware of the directions of his inner self. Driven by a profound motivation to participate fully with awareness in the evolutionary process, human potentiality is limitless; all knowledge and all power is ultimately accessible to the human mind looking within itself.

Unfortunately in his zeal to show that this hidden wisdom is typical not only of Eastern thought but also of Christian thought, Harman includes Luke 17:33, "Whoever seeks to gain his life will lose it, but whoever loses his life will preserve it." This he represents as being equivalent to the statement from the *Upanishads*, "Having realized his own self as the Self, a man becomes selfless; and in virtue of selflessness he is to be conceived as unconditioned." Only gross misunderstanding permits such an attempt to harmonize Eastern monism with Christianity.

Finally the Christian can also agree with Harman when he states,

> The concept of a transcendental, choosing, ultimately responsible self is central to the entire theory of democratic government. It underlies the assumption that the individual is finally responsible for a criminal act. It is basic to the assumption in the judicial process that the judge can make a meaningful judgment.[7]

But it is almost exactly this picture of the human being that is conveyed by the biblical representation of man as a creature made in the image of God. Harman seeks after symbols with the power to restore health to society; it is frustrating that his search takes him so far afield.

The Influence of Modern Physics

Scientists trained in modern physics often find in an interpretation of that discipline a clue to the world view that leads to cosmic consciousness. This aspect of the subject receives the least public exposure because it is so difficult to discuss on a popular level; on the other hand, it is this aspect of the subject that has considerable appeal for scientists with a bent toward believing in paranormal phenomena.

One starting point is a paper by the distinguished physicist Eugene P. Wigner, "Remarks on the Mind-Body Question," published in 1961.[12] Wigner addresses himself to a basic problem in the interpretation of quantum mechanics and concludes that not only does the body influence the mind, as is generally conceded, but also that the mind influences the body. In a day when psychosomatic illnesses are generally accepted, this statement is not very revolutionary, but it is coupled with another by Wigner, "The second argument supporting the existence of an influence of the consciousness on the physical world is based on the observation that we do not know of any phenomenon in which one object is influenced by another without exerting an influence thereon." Wigner therefore urges a search for instances in which it is observed that consciousness alters the laws of nature.

It is to physics that a basic appeal is made for justification of cosmic consciousness movements.

What lies behind Wigner's paper is a problem in the interpretation of the mathematical formalism of quantum mechanics. In conventional quantum mechanics the total state function of a system is represented as a combination of eigenstate (possible state) functions for the system. The *act* of measurement somehow selects one of these eigenstates as the result of the measurement. The question is: how does the act of measurement select one of the possible states and make it the observed state? In the "traditional" interpretation after von Neumann,[13] it is argued that the act of measurement causes the state function to collapse to a single eigenstate as given by the measurement; the state function itself does not represent reality but only provides a means of making statistical predictions about reality. Wigner, on the other hand, proposed that it is the entry of the measurement signal into the human consciousness of the observer that selects one of many possible outcomes. He argues that grossly nonlinear departures from the normal quantum mechanical equations occur when conscious beings are present. If this argument seems obscure, at least it illustrates concern with the role of human consciousness in the measurement procedures of modern physics.

Another effect of modern physics has been to demolish the classical separation between the observer and the observed. The well-known Heisenberg Uncertainty Principle is a general statement of the fact that a scientist trying to measure the position of an electron must interfere with the electron in making the measurement so that he cannot simultaneously determine the velocity of the electron; the very process of measurement destroys the availability of some information about the system. It is not always possible to view the scientist as an independent observer, whose observation of the system leaves it unaffected. Rather it has become necessary to incorporate the observation of the scientist into the total system being considered.

A simple but basic illustration may help at this point.[14] Consider a light source able to emit single photons, a polaroid filter that polarizes the light, and a second filter of the same type placed beyond the first filter. If the axis of the second filter is parallel to that of the first filter, all photons will get through both filters; if the axis of the second is at 90° to that of the first filter, none of the photons will get through. Now set the axis of the second at 45° from that of the first. Subsequently some of the photons will get through and some will not, so that if enough photons are observed, on the average one-half will get through. The

question is raised: "What causes some photons to get through and others not to?" The answer of traditional quantum mechanics is that *nothing* causes these events: they are totally describable by a statistical chance situation. But suppose someone does not wish to believe this. Following suggestions by Bohm[15] he may suppose that the photons are really different as they come from the light source, which imparts to a particular photon the property that makes it be transmitted or not, as the case may be. Then it is the light source that controls the behavior of the experiment and not the polaroid filters. Now add a third polaroid filter beyond the second one, at 45° with respect to the second filter. Observations will now show that some photons will get through both the second and the third filter, and some will not; if enough observations are made it will be observed that exactly 1/4 of the photons get through all three filters. At this point, *simply remove the second filter;* now *none* of the photons will get through (the first and third filters are oriented at 90° from one another). So removing a filter markedly changes whether or not a photon makes it through. This violates our previous notion that it was the light source that determined this effect. Instead we see that the whole system of light source and all filters must be considered together; it is one total system that cannot be meaningfully separated into independent parts. So the scientist becomes an integral part of the experiment which he is performing.

If this is true, then why is it that we have been able to live our lives so long without paying attention to it? The answer appears to be that the forces that control the physical world are so different in magnitude and range that there is very little overlap between the domain of one force and that of another. Davies in *The Scientific Approach*[16] separates forces into four major categories: (1) weak and long range gravitational and electrostatic forces, (2) inter-molecular attractive forces which are weak with a rather short range, (3) intra-molecular attractive forces (chemical bonds) which are strong but with very short range, and (4) forces within the nucleus which are extremely strong and of extremely short range. Selection of a particular physical phenomenon identifies which of these four force ranges dominates in the formulation of the relevant law of action, other forces being essentially irrelevant to this particular law. For the motion of the planets gravitational forces dominate, for the chemical behavior of atoms forces between atoms dominate, for the properties of the nucleus nuclear forces dominate. It is this separation of physical forces into bands of influence that permits formulation of physical laws in such simple form. Whereas it is true that a remote body in the universe *does* exert a finite gravitational attraction on my body, the magnitude of that attraction is so small that it is totally negligible compared to the effects of other forces.

Does a monistic view of the origin of natural forces really constitute support for a monistic religious view any more than it supports the biblical view of the one God who creates and sustains?

If a physicist formulates the major forces and their domains, he is likely to make a somewhat different set of choices from that suggested by chemical engineer Davies. Weinberg,[17] for example, describes the four forces in the natural world as the gravitational, the weak, the electromagnetic and the strong, in order of increasing strength. Both the gravitational force and the electromagnetic force are in principle of infinite range. Both the weak and the strong forces referred to arise from studies of the nucleus; the strong force has a range of 10^{-13} cm, and the weak force has an even shorter range by about a factor of 100! One of the challenges of modern physics has been to develop a unified theory that would encompass all four of these forces. Weinberg discusses a class of theories known as "gauge theories" in which "there is a principle of invariance which logically requires the existence of the forces themselves." What does all this have to do with cosmic consciousness? Simply this: physicists speculate that at a sufficiently small scale three of these forces may be the same.

> This suggests that in the early universe, when the temperature was extremely high, the forces of nature may not merely have been related by a hidden symmetry, but rather were actually all alike; the weak, the electromagnetic, and the strong interactions may all have been long-range, inverse-square forces with the same strength.[17]

When the universe is perceived as being describable by a series of different forces with different ranges, then separation between phenomena is a natural philosophical correlate. But when the universe is perceived as being describable by one basic set of forces, then support for philosophical monism can be claimed: at its most profound level, the universe is a unity of interactions occurring among all levels through a fundamental interrelatedness that our classical view of physics with its domains of different forces has obscured until the present time. Add to this the additional concept of "mind" as a kind of "cosmic force" operable at a fundamental level, and then it becomes "obvious" how mind can control matter by operating at this fundamental level to change gravitational, weak, electromagnetic and strong forces of "everyday" physics.

Another dimension of this approach is expounded by Capra in *The Tao of Physics.*[18] Whereas Weinberg was reluctant to draw philosophical conclusions from the apparent direction of modern physics, Capra's purpose is to show that it is possible to produce an integration of modern physics and the concepts of Eastern religions, in fact that it is only the Eastern religions that are adequate to such a task. Arguing from the unity and interrelatedness of all phenomena and the intrinsically dynamic nature of the universe, Capra suggests that "quantum theory forces us to see the universe not as a collection of physical objects, but rather as a complicated web of relations between various parts of a unified whole."[18] This monistic conclusion seems to Capra to fit beautifully with the views of Eastern philosophers. The concept of the universe as in ceaseless motion that comes out of modern physics Capra sees as similar to that symbolized by the dance of Shiva, revered by Hindus. Astronomer Mansfield says of the book,

> I strongly recommend the book to both layman and scientist. . . . The infusion of an Eastern view of nature into modern physics could provide the significant paradigm shift that many claim is needed in physics in the last quarter of the twentieth century[19]

Perhaps it is possible to see a parallel here between the historical development of the theory of evolution and this modern twist arising from physics. Evolutionary theory can also be interpreted as a striving toward "monism"—a common origin for all things, in contrast to a series of unrelated multiple origins. When a series of unrelated origins is considered philosophically essential for harmonization with the biblical account of creation, then evolution with its thrust toward monism becomes a threat to Christianity. So in this present development if a monistic view of the phenomena of the natural world is viewed as being intrinsically anti-biblical and anti-Christian, it will cause profound difficulties in attempts to treat scientific and biblical thought in an integrated manner. A fundamental question may be raised, however. Does a monistic view of the origin of natural forces really constitute support for a monistic religious view any more than it supports the biblical view of the one God who creates and sustains? That is, isn't the choice of religious implication derived from quite nonscientific inputs and not impelled by the scientific model at all? The answer must be affirmative unless there were some reason to believe that Christianity leads to the conclusion that all natural forces cannot by their very nature be scientifically describable in a single unified model; I know of no such reason. Nor do I know why the acceptance of the possibility for a common origin for all natural forces should lead one to believe that this violates the practical macroscopic observation of separation between force domains. It is common experience in modern physics that one can treat the radioactive decay of a large number of decaying atoms quite deterministically, even though the scientific description of the process for a particular atom is completely a chance description. The major question is not whether all forces can be described in a unified field theory, but whether or not there exists some hitherto unknown force of quite different nature from the four forces described by Weinberg. On the latter question there appears to be considerable difficulty in obtaining relevant specific evidence.

Psychoenergetics

In order to demonstrate the consequences of believing that we are at the edge of a major revolution in scientific understanding as we understand the connection between these philosophical implications of modern physics and the role of "mind" in the universe, we consider the position of William A. Tiller. Tiller is Professor of Materials Science and Engineering at Stanford University and a scientist with an established reputation in the theory of crystallization. He is also Director of the Academy of Parapsychology and Medicine, and former Director of the Institute of Noetic Sciences, as well as being Director of Health for the New Age Trust (England). In November 1976 he presented a lecture at Stanford University in a series on Psychic Phenomena, entitled, "Towards a Multidimensional Physics and its Relationship to Psi." He is quoted elsewhere as having made the following statement that summarizes his perspective,

> We are on the threshold of a revolution. A revolution so vast, much more vast than this world has ever seen, even in the days of the Greeks. We are talking about a revolution of scientific understanding, vast new technologies growing out of that understanding, knowledge of man's relationships within himself, between himself and his brothers. I think we're moving towards an 'energy medicine' where acupuncture is just the tip of the iceberg. I think we'll be leading ourselves toward vast new energy sources, new ways of influencing plant growth. As we learn the true meaning of mind and thought and put them to work we will grow to a potential far, far beyond what, presently, we manifest; and we can make of this earth a rather fantastic place.[20]

Tiller sets forth the outline of his position in six basic suggestions he believes indicated by developments in the field he calls "psychoenergetics."

Unfortunately Christians are often so eager for scientific support that they embrace pseudo-science without critical evaluation and sometimes play havoc with their basic position in the long run.

1. Energies exist in the universe different from any known to date.

2. The aspect of reality we perceive with our senses is quite limited. Man's view of reality is an effective jailer, limiting his perspective. Other dimensions of reality exist beyond those detectable by our five senses, but human beings have within themselves latent systems for contacting these other dimensions.

3. The universe can be likened to one great organism, just becoming aware of itself. At some level of reality, everything is interrelated. We are all part of that one organism.

4. Time, space and matter can all be changed by human beings. One can perceive events out of time and out of their locations in space, and matter can be de-materialized and re-materialized.

5. The world that we perceive is not an objective world with existence independent of us. Rather it is a world altered by our intentions. We cannot perceive reality.

6. Man is at the present time developing the final stages of a new sensory system which will enable him to couple into other dimensions of the universe.

It is evident that these beliefs are on the border line between science and pseudo-science, exactly where the boundary is not being clearly defined at the present. Tiller himself bases his belief on his personal experiences with Kirlian photography[21] and a visit he made to the Soviet Union in 1971 as a member of a seven-man team to investigate Russian activity in tbe field of psychoenergetics. There he saw psychokinesis experiments first hand from two demonstrators: two women who were able to move gold rings, plastic pen tops, and aluminum cigar cans presumably by concentration of

mental energy.

Tiller sees these as developments in a growing understanding of a new dimension of science. Just as classical medicine and agriculture depended on standard chemistry, and the new field of neuropsychiatry developed with the understanding of electromagnetic fields, so Tiller argues the activities of aikido, Zen, yoga and biofeedback are associated with the new emerging understanding of the powers of mind. He gives basic credence to a variety of phenomena reported around the world, including the change in the surface tension of water by a "healer" or by magnets, the change in the optical absorption and hydrogen bonding of water as affected by a "healer," the effect on a normal subject's physiological reactions by the concentration of a psychic, mental control of a magnetometer, of a falling die, and of matter a la Uri Geller, and a whole new phenomenon of organic gardening based on love, concern and positive thinking as these affect "the spiritual world of plant life."

Tiller himself does not stop with this borderline between science and pseudo-science, but pushes on into the realm of pseudo-religion as well. He includes the miracles of Jesus and other great teachers in the same category as the phenomena just described. He sees mind as the connecting link between positive and negative space-time fields and a level he calls "Spirit," which in turn is a link with the ultimate level of "Divine."

Of particular interest to Tiller is the influence of these new energy fields in the area of medicine. Traditional medicine is still bound to the level of positive space-time fields (electromagnetic fields). New medical breakthroughs (e.g., "healers," acupuncture) are beginning to make use of negative space-time fields. Tiller's goal is to develop a model of this multidimensional universe, establish the connection between positive and negative space-time fields, and determine the role of the human being as receiver, transducer and transmitter of this energy. In this model the human being is an array of antenna elements (the acupuncture points linked by the autonomous nervous system); evidence for this are the "auras" claimed to be seen by psychics around human beings, and the related phenomenon of "dowsing." The determination of the connection between body functions and the electrical properties of acupuncture points is a first step in this direction. Of course, participation in this higher level energy may require that an individual be in an altered state of consciousness.

There is no evidence of any kind for the powers of human "mind" without the presence of a living human "brain."

An interesting twist to this approach to the paranormal or supernormal is the turning of a standard argument from traditional science against these phenomena into an argument in favor of them. If traditional science were to check the reality of psychokinesis experiments, for example, it would demand that the experiments be possible and reproducible under a wide variety of extraneous conditions. Failure to perform under some fraction of these conditions would be interpreted as evidence against the new energy of the mind being advocated. Lack of control on a host of parapsychological experiments has plagued their investigation for years. Under this "new" view, however, the ability to demonstrate a particular parapsychological phenomenon depends upon the total physical and mental environment in which the experiment is carried out since the experimenter cannot be separated from the observers: they are all part of one system. It is therefore *to be expected* that a psychic will be successful before an audience of believers and not successful before an audience of doubters! If the mental attitude of the environment were irrelevant, the theory of parapsychological phenomena would be inconsistent. This aspect of the "new science" therefore makes a radical break with every aspect characteristic of traditional science in the past, one of the most prominent aspects of which was the insistence on publically reproducible data under controlled conditions. But *in the view of the "new science,"* this is no break at all, but simply the application of new understanding from the discipline of modern physics.

The Appeal to Christians

There is a strong strain in the Christian community which values scientific support for their religious convictions. While, on the one hand they denigrate scientific descriptions that appear to conflict with their theological descriptions, they are also so much a part of the scientific age that they value highly demonstrations by "true science" that their religious picture is true. Unfortunately they are often so eager for scientific support that they embrace pseudo-science without critical evaluation and sometimes play havoc with their basic position in the long run. This appeal of what is presently on the borderline of science and pseudo-science with strong leanings toward pseudo-religion, is one of the major dangers of these developments for the Christian.

One delight of Christians is to embrace the evidence that these phenomena testify against a materialistic interpretation of the universe. In the body of a cautious assessment by Stephen Board[22] he nevertheless gives voice to sentiments of this type.

> In addition to physiological explanations of some of these phenomena, there may easily be room for fresh thinking on psychic explanations. As Vernon Grounds of Conservative Baptist Seminary in Denver puts it, "Reality is much more porous than our scientific mind-set has been ready to view it." The edge of knowledge in telepathy, extrasensory perception and other psychic wonders may expand under the stimulation of people like Raymond Moody. This need not be rejected by Christians, for these areas may be neither divine or demonic but a neutral part of creation. . . . The crude materialism long associated with the world of science is today chastened and in retreat because of such mysteries as those reported by the thanatologists. Pure materialism has become an act of blind faith.

Here Board makes the important point that Christians need not (must not?) reject what is objectively true, even if these same phenomena are used by others to advance an anti-Christian theology. And it is true that he modifies materialism with the adjectives "crude"

and "pure". Still the implication is that we are through these phenomena getting evidence for non-materialistic manifestations. The conservative Christian quickly translates this into meaning we have scientific evidence for the existence of soul and spirit. This is not true. Whatever phenomena may or may not exist, whatever mystic energy fields may or may not be associated with human mind, one fact remains: none of these phenomena occurs without the participation of human beings and human beings are material creatures. One might as well argue that electromagnetic or gravitational fields are evidence of a spiritual realm. There is no evidence of any kind for the powers of human "mind" without the presence of a living human "brain." The *claims* of the parapsychologist who extrapolates into pseudo-religious interpretations are far more compatible with Christian Science than they are with biblical Christianity. An author supporting Christian Science writes, for example,

> The particles of the atom have no more solidity than a thought or feeling. Gradually, in this century, matter as a solid thing has been drained out of the universe. It has disappeared, replaced by a basic atomic unit composed of space and non-material charges of energy. This non-material nature of the atom is a most essential point in relating the physical universe to the spiritual dimension.[23]

An example of curiously ambiguous Christian response is found in a book review of *Parapsychology and the Nature of Life* by John L. Randall in *Faith and Thought*.[24] The reviewer starts with glowing praise,

> It would be difficult to imagine a better book than this one to put into the hands of a serious but materialistically minded sceptic. . . . Its conclusion is modest—science and religion can be reconciled but science does not at present favour one religion rather than another, though it points strongly to belief in autonomous mind as a creative principle and to the existence of God.

The author of the book is cited as arguing that the main findings of psychical research are now firmly established, that efforts to avoid a God-of-the-Gaps are misguided, and that the evidence against the mechanistic view of the world is overwhelmingly convincing. At the end of the review, the reviewer stops suddenly, however, and suggests why there may still be resistance in spite of the "masterpiece" he is reviewing. His comments are illuminating.

> Opposition to the new discoveries may stem in large measure, from the fear that if ESP and PK are accepted, superstitions of all kinds will be rationalized scientifically. If it becomes generally accepted in the world of science that the human mind can influence the fall of dice, manipulate the disintegration of atomic nuclei, influence the will of animals and even modify the movements of insects and plants, shall we not soon find ourselves back in the witchcraft days? The malicious old lady next door will perhaps impel me to act stupidly, or she will manipulate the internal organs of my body to make me sick, or torment me with ESP-induced cancer, or by PK remove bolts from my car and make me crash. . . . There is no end to it . . .

Can you imagine a more frightful world than one in which all the claims of paranormal phenomena are valid? What a nightmare existence that would be when every moment was involved in a conflict of mind power against mind power! Suddenly all the foreseeable evils awaiting the human race seem to pale by comparison. This does not, of course, mean that many of them may not come to pass if that is the way the world is really put together.

A more perceptive response is found in the editorial pages of *Christianity Today* in comments on Moody's *Life After Life*[5] and similar publications.

> Before Christians run to jump on the bandwagon or add these data to their apologetic arsenal, they should be aware that no essential difference is reported between the OBEs (out-of-body experiences) of believers and unbelievers! . . . Christians testify to seeing Christ while Hindus say they come face to face with Krishna. Cultists tend to have their worldview validated, and some nominal Christians adopt heterodox opinions. . . . Christians should encourage further serious research in the area while recognizing that faith cannot be "proved" by scientific research.[25]

Other Christians, however, tend to be much less cautious. Writing in the *Creation Research Society Quarterly*, Robert W. Bass[26] has an article entitled "Quantum Psycho-Physics." Bass supposes that the usual interpretation of quantum mechanics in terms of statistical processes means that "human beings are demonstrably *capricious robots.*" He is therefore receptive to a new theory that postulates that actually random events are "*controlled* by a non-physical entity, the brain's consciousness (or 'spirit' or 'soul')." Cited supporting evidence is a report of French physicists that school-children can telepathically alter the rate of radioactive decay. Bass' conclusion is

> In 1974 scientists have at last discovered hard evidence that human beings have real but non-physical "spirits" or "souls" which can control matter—rather than conversely—and can interact at a distance without physical media of transmission.

The accuracy of the claims aside, the conclusion simply does not follow from the data given.

Coming closer to home, we may include remarks on "Psychic Phenomena as Related to Science and Christian Experience,"[27] given in a commencement address at Trinity College in 1974 by Dr. Stanley E. Lindquist, Professor of Psychology at California State University at Fresno, who was being honored at Trinity for his work with the Link-Care Foundation. Lindquist starts with a strongly dichotomous view of man,

> The essence of our life—the spirit—is using these earth space suit bodies as the necessary form through which the spirit can have being on earth.

Continuing with an affirmation that "the spirit living within is eternal," Lindquist claims that "when Jesus said 'God is a spirit and they that worship Him must worship Him in spirit and truth,' He delineated the central core of psychic phenomena as it relates to Christian experience." Lindquist looks for a breakthrough: "If a non-material dimension were confirmed, scientific materialism, which places matter in first place, would be dealt a mortal blow." Lindquist believes that we may be on the crest of a wave of change that can totally transform science as we know it. After citing standard references to psychic phenomena, he goes on to state,

> . . . great men have postulated the intervening variables in their quest for answers. Einstein said $E = mc^2$ . . . Copernicus said the world is not the center of the universe . . . Jesus Christ, opening the way to God, is the supreme example of a person being the way, and today each of us here owes the life we live to the God who became *the way* for us. Today we can turn to a man such as Dr. Tiller, Chairman of the department of material sciences, Stanford University, who may be a pioneer like Einstein or Copernicus. He says in essence that today's psychic phenomena may be tomorrow's physics —that we cannot limit ourselves to the current time--space continuum any longer if we are to learn about new dimensions in life.

Lindquist continues his strong identification of the "new science" with the Christian faith,

> Psychic phenomena are part and parcel of the whole human, and especially of the Christian experience. If the principles of this new dimension could be demonstrated scientifically, new bridges could be built between science and our faith. Windows of understanding could be opened in the blank and resisting walls which now exist.

These quotations from Lindquist show how deeply the sincere Christian, seeking scientific support of his faith, may ally himself and call upon others to ally themselves with a movement which may not accomplish at all what they wish and which moves steadily in a direction contrary to what they would follow.

Unexpected Critics

A curious response to the cosmic consciousness movement is the establishment of the Committee for the Scientific Investigation of Claims of the Paranormal, with its publication *The Zetetic,* the name given to the followers of the Greek skeptic philosopher Pyrrho. Founders of this Committee are members of the humanist movement. As quoted in *Science*[28], Lee Nisbet, executive editor of the *Humanist* has said that "It's a very dangerous phenomenon, dangerous to science, dangerous to the basic fabric of our society. . . . We feel it is the duty of the scientific community to show that these beliefs are utterly screwball." Targets of the committee listed in the *Science* article include "astrology, parapsychology, faith healing, life after death, flying saucers, chariots of the gods, astral projection, Atlantis, kirlian photography, exorcism, pyramid power, poltergeists, psychic plants, sasquatches (a.k.a. Bigfeet) and of course the Bermuda triangle." It was the *Humanist* that in 1975 gathered the signatures of 186 scientists affirming that there was no scientific basis for astrology.

This social polarization places the Christian in a curious position. Should he side with the mystics of cosmic consciousness because they welcome his belief in the supernatural—along with many other beliefs that the Christian does not hold? Or should he side with the humanists who deny the existence of God and the supernatural, but seem to have a level head on their shoulders when it comes to being skeptical about mystical esoterica? Not surprisingly the Christian must do neither in spite of the strong pulls that he is going to experience.

Conclusions

With this discussion of cosmic consciousness and its many ramifications, we conclude this three-part installment on pseudo-science and pseudo-theology, to return in subsequent installments to the other aspects of integrating science and the whole person. The conclusions from our discussion, offered for your evaluation, may be briefly summarized as follows.

1. Christians must be careful not to deny the existence of objectively observable phenomena in the world, simply because the theological context in which such phenomena are advanced and interpreted is non- or anti-Christian.

2. Christians must be careful not to credit non- or anti-Christian perspectives as being valid or "intrinsically Christian" simply because they are the framework within which objectively observable phenomena in the world are advanced and interpreted.

3. To discriminate between authentic science and pseudo-science, and even sometimes between authentic theology and pseudo-theology, is not always a simple matter. Complexities should be expected, and care should be taken before arriving at conclusions.

4. To defend Christianity in a scientific day by attempting to transform biblical categories into scientific categories is an instance of philosophical reductionism and is bankrupt.

5. To defend Christianity in a scientific day by attempting to provide scientific descriptions for spiritual phenomena is a dangerous path to tread. It is dangerous because authentic science can easily be transformed into pseudo-science as the means to achieving theologically defensible ends. It is dangerous because revolutionary transformations of scientific methodology should be approached with great caution. It is dangerous because what may be scientifically describable (e.g., new energy fields or forces) cannot be identified with spiritual aspects (e.g., soul, spirit).

6. The extrapolation of scientific theories into theological analogies has always been and continues to be a totally questionable procedure.

ACKNOWLEDGMENT

In the course of this paper I have been critical of three of my colleagues: Willis W. Harman, William A. Tiller and Stanley E. Lindquist. It is evident that we disagree on many central issues related to the topic under discussion, but I would not wish to conclude this paper without clearly acknowledging that nothing I have written is intended to belittle these colleagues, or cast any discredit on their professional reputations. Preprints of tbis paper were sent to each of these colleagues with the invitation to correct any misrepresentations or inaccuracies and to submit comments of their own if they so desired.

REFERENCES

[1]K. L. Woodward, J. Huck, D. Gram, and I. Howard, "Getting Your Head Together," *Newsweek,* September 6, 1976, pp. 56-62.

[2]"Power of Prayer," *Dickinson Alumnus,* August 1976.

[3]Stephen Crolius, *The Stanford Daily,* May 25, 1977, pp. 1, 8.

[4]James W. Sire, *The Universe Next Door,* InterVarsity Press, Downers Grove, Illinois, 1976, pp. 150-203.

[5]Raymond A. Moody, Jr., *Life After Life,* Stackpole Books, Harrisburg, Pa., 1976.

[6]*The Teachings of Don Juan: A Yaqui Way of Knowledge* (1968); *A Separate Reality: Further Conversations with Don Juan* (1971); *Journey to Ixtlan: The Lessons of Don Juan* (1972); *Tales of Power* (1974).

[7]Willis W. Harman, *An Incomplete Guide to the Future*, Stanford Alumni Association, Stanford, CA 1976.
[8]Richard H. Bube, "The Biblical Basis for a New Social Paradigm," *The Reformed Journal*, April 1977, p. 19.
[9]Richard H. Bube, "Science Isn't Everything," *Journal ASA* 28, 33 (1976).
[10]Arthur C. Clarke, 2001: *A Space Odyssey*, Signet, N.Y. (1968).
[11]Pierre Teilhard de Chardin, *The Phenomenon of Man*, Harper, N.Y. (1959).
[12]Eugene P. Wigner, "Remarks on the Mind-Body Question," in *The Scientist Speculates*, William Heinemann, London (1961), p. 284.
[13]A. Petersen, *Quantum Physics and the Philosophical Tradition*, MIT Press, Cambridge (1968).
[14]For this illustration I am indebted to J. M. Jauch, *Are Quanta Real?* Indiana University Press, Bloomington (1973).
[15]David Bohm, *Physical Review* 85, 166 and 180 (1952); 87, 389 (1952); 89, 319 and 458 (1953); David Bohm and J. Bub, *Reviews of Modern Physics* 38, 453 and 470 (1966).
[16]J. T. Davies, *The Scientific Approach*, Academic, N.Y. (1973).
[17]Steven Weinberg, "The Forces of Nature," *American Scientist* 65, March-April (1977), p. 171.
[18]F. Capra, *The Tao of Physics*, Shambhala, Berkeley (1975).
[19]V. N. Mansfield, *Physics Today*, August (1976), p. 56.
[20]Robyn Williams, *Qantas Airways*, May/June (1976), p. 8.
[21]Kirlian photography is named after S. D. Kirlian and his wife, two Russian investigators. An image is formed on photographic film by initiating a high-frequency electric discharge between two plates between which is placed an object and the film. Alternatively a human finger can be pressed against the film plate and the discharge due to the electric field recorded. It is claimd that this is a way of making "aura" visible.
[22]Stephen Board, "Light at the End of the Tunnel," *Eternity*, July (1977), p. 13.
[23]Ann Beals, *The Spiritual Dimension*, Ann Beals, Sharon, MA (1977), p. 24.
[24]*Faith and Thought* 103, 16 (1976); review of John L. Randall, *Parapsychology and the Nature of Life*, Souvenir Press (1975).
[25]"Scientific Evidence for Life After Death " *Christianity Today*, August 27, 1976, p. 21.
[26]Robert W. Bass, "Quantum Psycho-Physics," *Creation Research Society Quarterly* 12, March (1976), p. 215.
[27]Stanley E. Lindquist, "Psychic Phenomena as Related to Science and Christian Experience," Leadership Development Program, Link-Care Foundation, Fresno, CA (1974).
[28]"A Pyrrhonian Sledgehammer," *Science* 197, 646, August 12, 1977.

Neither of Us is "Right"

Thank you for your courtesy in sending me a draft copy of your "Pseudo-Science and Pseudo-Theology" article.

I am sure we share the frustration of attempting to communicate with words, and then finding the words transmitted a different shade of meaning than was meant. Because this problem arises out of the divergence of our experiences, it is not very remediable. What I am attempting to say is that I don't feel you understand what I was really trying to express—but on the other hand, I can't take great issue with what you did with my words. So, since in the end each reader has to sort this out for himself anyway, let the debate go on.

I think that my observations already published, and your comments here, give the reader an opportunity to further clarify his own perceptions—and that's the real objective anyway. The limitations of language being what they are, we can be reasonably sure that neither one of us is "right."

Willis W. Harman
Associate Director
Center for the Study of Social Policy
Stanford Research Institute
Menlo Park, California

Inaccurate Reporting

I'm enclosing some comments concerning your article as you requested. Frankly, I'm disturbed that you would use a speech for such careful analysis and as a case history to prove your point. However, I also realize that anyone who does give talks on esoteric topics is also subject to such analysis.

I have moved away from the position in that speech by now so that it is not an adequate presentation of my present thoughts.

In general, I agree with the basic conclusions that Bube offers. It is important to maintain the independence of Christian faith from science. The two are on totally different levels and an attempt to base the one on the other would be foolhardy.

I am disturbed, however, at the method Bube has chosen to illustrate his points. From a speech which had as its total appeal, for Christians to recognize and amplify spiritual aspects of their faith, he has extracted statements for use in his own arguments. He has drawn conclusions which go far beyond my original purpose and intent. This may make for good journalism but is inaccurate reporting.

My original talk (1974) was to present Christians with another perspective on the interface between Christianity and science. It was not a scientific treatise that grasped eagerly at some seeming potential scientific buttress for Christian faith as Bube implies. Rather, it was a call to laymen to take a broader look at the spiritual, rather than being totally preoccupied with the scientific and material side of life. The burgeoning interest in psychic phenomena and the work of a few scientists who appeared to be changing from a former preoccupation with the material world to a concern for the immaterial were used as an example of a change in outlook.

Throughout, my use of the term "psychic" and "psychic phenomena," as it was briefly defined in the original talk, followed the dictionary definition of the term:

> pertaining to mental phenomena that cannot be explained otherwise than originating *outside* or *independent* of normal physiological processes—*'spiritual'* (underlining mine.)

In each instance, my illustrations were carefully couched in speculative terms, not as dogmatic fact, e.g., "*If* a non-material dimension were confirmed . . .," "Dr. Tiller . . . *may be* a pioneer . . .," "*If* the principles could be demonstrated scientifically . . ."

Bube has taken such conjectures as being representative of acknowledged fact and has disregarded their original import within a context that differed totally from that which Bube suggests.

In the case of my supposed, "strong identification of the 'new science' with the Christian faith," Bube has failed to recognize that my definition of psychic phenomena and "tomorrow's physics" are not the same thing. In this case a trend was noted. True science is as Christian as any other endeavor. To try to remove any aspect of the realities of life as non-Christian is as dangerous as attempting to make Christian faith dependent upon science.

While I commend Bube for taking on "the enormous task of trying to clarify some of the ideas about psychic phenomena," I wish that he had been more careful in his methods of illustrating his points. For a personal analysis of my remarks, I can only suggest, for those who are interested, that they draw their conclusions from my total speech rather than from selected parts, taken out of context, and interpreted differently from their original intention.

Stanley E. Lindquist
Professor of Psychology
California State University, Fresno
President, Link Care
Fresno, California 93711

Author's Note: *I certainly apologize if I have misunderstood or misinterpreted Dr. Lindquist. I have no desire whatsoever to exploit a Christian brother for journalistic purposes. It may well be that Dr. Lindquist did not intend the implications of his talk that become clear in the larger context of current thought. I do not imply that he does or ever did espouse the view of "cosmic consciousness" but have cited his remarks as an example of the way in which Christians can easily lend themselves to supporting a movement they would not consciously approve. Although it may well be that Dr. Lindquist did not intend his remarks to be taken in the way I have taken them, I am confident that any reader of his remarks will agree that I have not quoted out of context in order to prove a point; I am happy to join with Dr. Lindquist in inviting readers to obtain a copy of his remarks by writing to him at Link Care Foundation, 1734 W. Shaw, Fresno, CA 93711. Finally I note with some reassurance that Dr. Lindquist has moved away from these ideas and that they no longer adequately represent his present position.*

Reserve Judgment

The theoretical work of Einstein showed that time and the three dimensions of space are intimately connected, such that they form a space-time manifold in our experiential frame of reference. He showed that, in certain domains of our experiential variables such as very high velocities, very large energy densities and very large mass densities, the observable behavior of nature meaningfully departs from expectations based upon a linear extrapolation of our more common experience; i.e., clocks slow down, measuring sticks shorten, everything becomes heavier, etc. Experiments of the past two decades have confirmed that these very nonlinear and totally unexpected phenomena do, in fact, occur.

Today, a number of investigators are considering the consequences of a multidimensional universe of the space-time-X, space-time-X-Y and space-time-X-Y-Z type where the variables X, Y, and Z are other significant qualities of the human experience on a parallel footing with space and time. It is being postulated that, as a consequence of self-integration of various types, individuals may manipulate the X-quality to such a degree that the space-time-X manifold behaves in a strongly coupled fashion so that essentially nonlinear effects appear in the common space-time perception domain of this manifold.

It may appear as if the scientific laws of our universe are being contravened by many of the psychoenergetic phenomena and that they therefore are really fraudulent. However, a more open-minded conclusion would be that the appearance of such phenomena seems to indicate that a purely 4-dimensional space-time continuum description of the universe is naive and that a higher dimensional description is probably needed to satisfactorily draw the new phenomena into our "World View" paradigm. Further, reproduction of such phenomena by other investigators would require that they have access to this X-quality of sufficient degree as to be located in that same domain of perception space wherein the phenomena are lawfully manifest. Obviously, this X-quality requires the development of reliable measurement techniques for its quantitative discrimination before such reproduction can be meaningfully assessed. The development of such measurement systems is being pursued in a number of quarters.

A common misconception is that the "scientific method" requires the experimenter to be coldly and distantly objective during the conduct of the experiment. Instead it really requires a complete description of the necessary and sufficient conditions or protocol for anyone to reproduce the experimental result at any physical location. If this requires setting a mental and an emotional field at certain strengths—so be it. If these are to provide a positive, negative, or neutral bias—so be it. However, we must find the measuring instruments with which to set the field strengths. That is our problem today—we don't yet know enough to design the correct instruments, we know only enough to recognize a significant influence and to realize that it is not easily controlled.

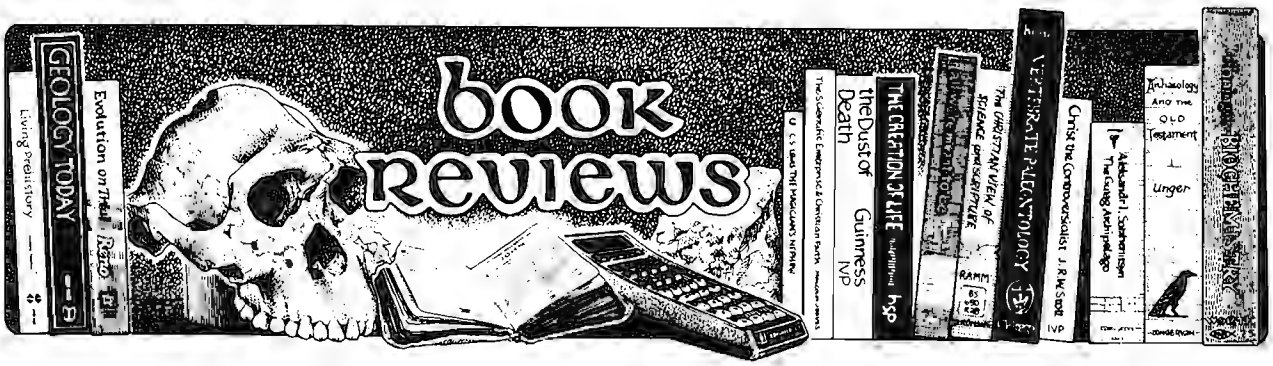
We generally tend to think that our science makes definitive and absolute statements about nature whereas, in fact, it provides us with only a set of consistency relationships about our experience of nature. It is internally self-consistent but that doesn't mean that it describes the Absolute. The common pillars of this edifice of relationships, symbolized in the form of beautiful equations, are mass, charge, space, time, etc. These qualities are not deeply understood by our science but they provide a good support structure for the edifice provided they are unchanging or unalterable

by other qualities of man or nature. The X-quality of certain humans appears to be manifest in them to a sufficient degree that these key pillars can be locally perturbed for a brief duration, which upsets our nice set of consistency relationships. Many tend to respond by stating that since such phenomena violate Reality, fraud is involved. Others recognize, more correctly, that it puts into serious question our present "View of Reality" and suggests that we are limiting ourselves by rigidly embracing the present "World View."

The body of evidence supporting the need for a new "World Picture" is growing each day by leaps and bounds. I would strongly recommend that we not develop a fixed position against it but that we reserve judgment until researchers have developed the skills and abilities to meaningfully test the new ideas. In this regard, if more capable scientists would seriously and open-mindedly study these phenomena, then we would soon know what limits to place upon them and upon ourselves. Perhaps, as Jesus said, we will come to perform all the miracles he conducted and even more, and we may find they belong in the domain of "tomorrow's physics" as a higher dimensional expression of man and nature.

William A. Tiller
Professor of Materials Science and Engineering
Stanford University
Stanford, California 94305

Author's Note: *I can certainly agree with most of this generally conservative statement by Prof. Tiller if I interpret it as being equivalent to points* (1) *and* (3) *of my Conclusions. I have no reluctance to view physical reality as far more complex than described by modern science, but the Christian must respond with extreme caution to all attempts to derive spiritual or religious significance from scientific descriptions.*



MEANING by Michael Polanyi and Harry Prosch, Chicago: University of Chicago Press, 1975. 246 pp. $12.50.

This is the last work by Polanyi to be published during his lifetime. And in many respects it is a fitting capstone to his varied career. Not only does it sum up his past contributions to epistemology and philosophy of science but it captures something of the spirit of the man as well. We see Polanyi as the social critic and defender of freedom (one of the earliest themes in his writings) and we see him exploring the implications of his thought for new areas—metaphor, art, myth and religion.

Although *Meaning* is co-authored with Harry Prosch, the ideas it contains belong to Polanyi. Prosch, as he explains in the Preface, is responsible for the continuity of the book, footnotes and the adaption of Polanyi's previous work for use here. The core of the book is based upon lectures given at Oxford, The University of Chicago, and The University of Texas during 1968-71. It is in these lectures that Polanyi developed and articulated his views on how meaning is achieved by metaphor, poetry, art, myth, ritual, and religion. The book is truly Polanyi's but since it covers such a wide range of topics and nevertheless remains a single and progressive argument, Prosch merits our appreciation.

The argument of *Meaning* begins with an historical analysis of how the scientific world view led to anti-authoritarianism and philosophic doubt, which, in turn, led to nihilism, totalitarianism and the phenomenon of "moral inversion". Polanyi approvingly cites C. S. Lewis' observation that science is the greatest source of dangerous fallacies today. The mechanistic view of the

universe has led to the "absurd" results that scientists deny human consciousness and social scientists have been led to ethical relativism, or to delete moral judgments altogether, in order to satisfy some ideal of scientific objectivity. The corrective for all this, Polanyi maintains, is, "A theory of knowledge which shows up the fallacy of positivistic skepticism and supports the possibility of a knowledge of entities governed by higher principles" (p. 24). Since at least 1946 Polanyi has been criticizing these false and nonsensical ideals of science and developing an alternative theory of knowledge that acknowledges the personal and essential contribution of the knower in the act of knowing. One of the valuable features of *Meaning* is that it contains a concise presentation of Polanyi's alternative epistemology and a short discussion of a host of problems in philosophy of science, epistemology and philosophy of mind that he believes it resolves.

This historical analysis and Polanyi's epistemology is not new but a necessary introduction to what is new—the extension of his thought into the areas of aesthetics, mythology and religion. Polanyi employs his observations about tacit knowledge and tacit inference to illuminate these subjects. Polanyi continually draws comparisons and contrasts between aesthetic topics and certain aspects of science. It is this last point that will make his account of metaphors, symbols and works of art of interest to those who otherwise have no affection for aesthetics.

What is sure to be of interest to readers of this journal, however, is his treatment of how meaning is achieved by myth and religion. The paradigm sense of meaning, for Polanyi, is the perceptual experience of integrating disparate data into a meaningful or coherent whole. This is the sort of thing that takes place when you "look for the hidden faces" in those drawings used to amuse children. A more striking example of this phenomenon is those pictures of Jesus consisting of black and white blotches. The novelty of them is that at first they appear to be meaningless blotches and then suddenly you see it as a picture of Jesus. The meanings achieved by myth and religion are like this but with one difference. As is the case with certain works of art which employ an "artificial" framework (e.g., a play) we must accept the framework and allow it to detach us from everyday experience and carry us into its own sphere. Polanyi believes that myths can be true in the sense that "they evoke in us an experience which we hold to be genuine" (p. 146). An example of this is the experience that comes from accepting creation myths. Polanyi believes that it opens a view of the universe that allows man to feel at home in it and that they portray an image of man's destiny which,

> . . . is much nearer to our own experience of greatness, to our perception of the course of history since history began, and to our experience of the shattering forces of our utopias than is the image of the barren atomic topography to which the ideal of detached observation seeks to reduce these matters (p. 147).

The most sweeping and complex integrative act of the human mind is the religious act of seeing meaning and significance in the world. What bars the acceptance of religion for many modern minds is that it lacks initial plausibility. So steeped are we in "naturalistic and scientistic commitments" it is nearly impossible to imagine a place for values and meaning. The chief stumbling block is that we are taught to believe that everything is explainable in terms of chemistry and physics, forbidding from the outset any form of teleological explanation.

Polanyi attacks this reductionistic notion directly and indirectly. First Polanyi adduces a number of problems about DNA that must be resolved before we can say that life can be completely explained in terms of it. Then he argues that one cannot, logically cannot, make the requisite explanatory reduction. The problem arises when the notion of mechanism is not taken seriously enough, for not even a simple tool such as a spoon or screwdriver can be explained solely in chemical and physical terms. One can never deduce from a mere description of its physical and chemical properties that it is a tool. Thus, even for explaining a simple mechanism two explanatory principles must be invoked—physiochemical principles and boundary type principles which inform one of what the machine is supposed to accomplish.

The indirect attack on reductionism is Polanyi's attempt to argue for the plausibility of supposing that there is a "directional gradient" in evolution. That is:

> Some sort of gradient of meaning is operative in evolution in addition to purely accidental mutation and plain natural selection and this gradient somehow evokes evermore meaningful organizations (i.e., boundary conditions) of matter (p. 173).

An analogous principle, Polanyi argues, is already operative in quantum mechanics and problem-solving. The "cash value" of such a theory has a two-fold import. Scientifically, it reinforces the felt absurdity of attempting to deduce the characteristics of human sentience from chemical and physical laws. This is as silly as trying to deduce the rules of grammar from the principles governing words. The point is that there is a *hierarchy* of principles here. Although, for example, sentience depends upon the chemical and physical level, it is this level which is structured and operated by higher principles which are added to, and not de-

Books Received and Available for Review

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

Boyle, J. P., *The Sterilization Controversy: A New Crisis for the Catholic Hospital?*, Paulist Press, 1977.
Eichbaum, B. R., *Awake, America!*, Carlton Press, 1977.
Fahey, S. M., *Charismatic Social Action: Reflection/Resource Manual*, Paulist Press, 1977.
Hebblethwaite, P., *The Christian-Marxist Dialogue: Beginnings, Present Status, and Beyond, Paulist Press*, 1977.
Holmes, A. F., *All Truth is God's Truth*, Eerdman's, 1977.
Kosnik, A. (ed.), *Human Sexuality: New Directions in American Catholic Thought*, Paulist Press, 1977.
Miller, A. O. (ed.), *A Christian Declaration on Human Rights*, Eerdmans, 1977.
Osseo-Asare, F., *A New Land to Live In: The Odyssey of an African and an American Seeking God's Guidance on Marriage*, IVP, 1977.
Weiss, R. A., *Relativistic Thermodynamics: A Theory of the Interaction of Space and Time with Matter*, Exposition Press, 1976.
Young, D. A., *Creation and the Flood: An Alternative to Flood Geology and Theistic Evolution*, Baker, 1977.

ducible from it. The religious import is that we can see that all of mankind's cultural frameworks have been attempts to achieve every kind of meaning. Everything we know is full of meaning but it is also true that sometimes we miss or fail to grasp meanings and fall into absurdities. And Polanyi asserts:

> . . . we can claim all this with an open and clear scientific conscience. The religious hypothesis if it does indeed hold that the world is meaningful rather than absurd, *is* therefore a viable hypothesis for us. There is no scientific reason why we cannot believe it (p. 179).

This is so because the major obstacle was the belief that science could tell us what the world is like and this only in reductionistic terms that made the world valueless, pointless, and absurd. This, Polanyi has tried to show both here and elsewhere, is a modern myth,

> . . . produced by a profound misunderstanding of what science and knowledge are and what they require, a misunderstanding spawned by positivistic leftovers in our thinking and by allegiance to [a] false ideal of objectivity (p. 181).

Once this is seen we are once again in the position to "experience the full range of meanings possible to man."

The final chapters are devoted to discovering what principles must structure a society if it is to be open to the achievement of all sorts of meaning. The argument is to establish a midway position between totalitarianism and the type of "open society" sketched by Karl Popper. The problem with the former is that ideology subverts the higher realities of morality and truth to serve its ends. The latter believes that every idea and position has a right to a booth in the market place in either the naive belief that truth will emerge victorious or that such freedom is a good in itself. Sometimes science is cited as the paradigm example of how successful such a system might be. This however is a mistake. Polanyi argues that science cannot reject authority and tradition and neither can a free society. The argument is not that science is not a paradigm of a free association but that it is misunderstood if it is thought to exclude traditional frameworks.

Due to the breadth of this work, if nothing else, there is very likely much that could bear a closer examination by those more intimate with the fields he discusses. For example, a biologist and/or physicist would be in a better position to assess his direct and indirect arguments against reductionism. Philosophically, there is unclarity about whether levels of explanation generate or imply different ontological levels. He seems to speak as if they do but I am not convinced this is so. And he sometimes talks as if chance and boundary conditions were causal agents. These things, however, do not diminish the significance of the work. Readers of this *Journal* will find much here that is of surprisingly kindred spirit coming from an unexpected quarter.

HOW TO LIVE WITH YOUR FEELINGS by Phillip J. Swihart, Downers Grove, Illinois: Inter Varsity Press, 1976. 60 pp., $1.25.

This is a practical booklet on the self-management of negative emotions and their relation to honesty and self-deception. The central advice about these negative emotions is that rather than to allow them to "roost" we should confess them instead of repressing or expressing them. Swihart shows how the Christian is at a unique advantage over a non-Christian in becoming honest about his or her feelings. This is because God enables the Christian through prayer, Scripture and fellowship to discover the truth about himself and also provides the forgiveness and acceptance needed to face these truths.

In a broad way, this is probably sound advice and certainly contains an edifying observation about a Christian's capacity for self-honesty. But on closer inspection there are things said which are misleading and sometimes mistaken.

The very title of the book conveys an impression that there is not much to be done about emotions except learn to live with them. Swihart does not believe this but his approach to changing our emotional liabilities is mainly restricted to confession and facing up to them. He never adequately stresses the cognitive basis of our emotional reactions. Emotional reform, on Swihart's view, is almost entirely a matter of divine grace; our thought and beliefs are not given much of a role in this process.

Swihart claims that what he says can be "widely applied to all feelings" (p. 16) but this is not so. Consider love, joy, serenity, peace, wonder, awe, delight, and the various aesthetic and religious emotions. Would we not want some of these to roost? Or what is there about these emotions that needs to be confessed or faced up to? What would be wrong with expressing these feelings? The point is that Swihart's view is really applicable only to the class of negative emotions such as jealousy, hate, disappointment, anger and resentment. Perhaps these emotions need to be dealt with constructively but it is wrong to think that all emotions are like this.

Guilt and shame are among the most significant of the negative emotions. They are distinct from one another and so is their psychological resolution. [For a full differention of these two emotions see Helen Lynd, *On Shame and the Search for Identity* (New York: Harcourt, Brace and World, 1958) or Helen Lewis, *Guilt and Shame in Neurosis* (New York: International Universities Press, 1971).] One would expect a psychotherapist to know this but Swihart continually confuses them. And his confusion extends to his biblical exegesis. He ascribes guilt feelings to Adam, Eve, David and Peter, but nowhere in the Bible are guilt feelings ever mentioned.

This book is meant to be practical and perhaps these flaws do not detract from the soundness of its practical advice, but I cannot help but think it would have been even better without them.

Reviewed by Terry Pence, Department of Philosophy, Purdue University, West Lafayette, Indiana 47906.

A Second Review of *How To Live with Your Feelings . . .*

In this booklet, *How to Live with Your Feelings,* Swihart discusses in six chapters such emotions as anger, jealousy and anxiety. For those who are versed in this area of psychology, Swihart offers no new insights. It

is a rehash of more substantive writers such as Paul Tournier, Norman Wright, and Ken Olson.

Swihart stops short of suggesting ways that destructive and negative emotions can be prevented from even occurring. It is a positive step to openly own feelings as one's own. However, negative emotions can be controlled and to a degree prevented via applying the scientific laws of learning. Swihart never discusses these. For a more useful scientific analysis of emotions and their parameters, an excellent book by David Watson and Roland Thorp entitled *Self-Directed Behavior* is available from Brooks/Cole Publishers. It deals in a very helpful way with emotional problems and self-modification. The procedures suggested in *Self-Directed Behavior* are compatible with the Bible and may be supplemented by its insights.

Reviewed by Richard Ruble, Professor of Psychology, John Brown University, Siloam Springs, Arkansas 72761.

CHRISTIAN ANTHROPOLOGY: A MEANING FOR HUMAN LIFE by John F. O'Grady, Paulist Press, New York 10023. Paperback, 231 pages, (1976) $4.95

This book promises to provide a "mutual interaction between anthropologists, psychologists, and theologians" so as to found "a truly integrated Christian anthropology." Such a book is keenly needed. Unfortunately, the fulfillment of that promise awaits a different book.

John F. O'Grady is Director of Continuing Education for Clergy in the Diocese of Albany. He paints a Catholic portrait of humanity which moves largely within the theological realm. The names that pepper the text are Aquinas, Rahner, Brunner, Tillich, Berdyaev and Barth. The other side of the interaction—Freud, Marx, Levy-Strauss, Durkheim, Weber, etc.—are notable by their absence. What interaction occurs with the behavioral sciences takes place third hand: as they are reflected in the works of major theologians and philosophers.

The most interesting part of the book is the attempt to develop theology within an evolutionary point of view. Genesis is seen as not interested in presenting a theory opposed to, or in favor of, evolution. Scientific affirmations about the origin of the world or of the human race are matters for science and not for faith. Mankind develops through a process of becoming, which involves an extension of the being, a growth and development that significantly alters the being through the addition of that which is new. The transcending of these threshholds to greater levels of development are the result of qualities intrinsic to human life whose development is related to the transcendent cause of God who gives to his creation the power to become and supports it in its ever-developing journey to perfection. "God gives to his creation the power and possibility of becoming more than it is and makes this possible because he is present to this creation, not as efficient cause intervening but as transcending cause supporting, sustaining, and encouraging." (p. 102)

While rejecting elements of traditional Catholic theology such as the Thomist and Augustinian understanding of original sin and the *imago dei*, O'Grady nonetheless retains a basic natural theology point of view. The fall is less than complete. Evil is significantly qualified by the fact that man was created good and has a destiny which is God himself. All are predestined to share in God's glory. Every person already has a positive orientation toward God. Grace builds upon this preestablished orientation of man while at the same time taking man beyond his own possibilities toward the perfection and transcendance which he inwardly seeks.

For those who seek a clearly written, brief presentation of a non-traditional Catholic approach to the doctrine of man, O'Grady will serve their purposes well. Because it does not interact with the behavioral sciences on a serious level, it is not the work to be read in order to get a well balanced perspective on man from both a theological and scientific point of view.

Reviewed by David A. Fraser, Research Associate, MARC, Monrovia, California.

GENESIS AND EARLY MAN by Arthur Custance, Doorway Papers

This book is a collection of seven separate papers relating anthropology to the Bible. All of them assume and/or attempt to prove that a literal interpretation of Genesis 2-9 (including dating the Flood c. 2500-3000 B.C.) can be honestly harmonized with the scientific data of anthropology.

Two of the papers, one dealing with the intelligence of paleolithic men, the other dealing with the evolution of the human skull, are enlightening even though—or maybe because—they cut against the grain of much that is commonly thought about paleolithic men. Their substance does not necessarily support the author's thesis, however, since the data presented also cohere with the Presapiens school of thought and the position that Wilbert Rusch espoused in *Rock Strata and the Bible Record.*

The paper on Primitive Cultures as being possibly degenerated cultures rather than earlier ones, and the paper on the difficulty of accurately reconstructing facial characteristics from skulls were thought provoking in spite of being one-sided.

On the other hand, if the thesis of the paper on the origin of language is correct, it will be very difficult logically to avoid granting the status of *Homo Sapiens* to the many chimpanzees currently carrying on conversations in American Sign Language.

Equally unconvincing to this reviewer is the paper reinterpreting the fossil remains of all early men as descendants of Noah. Custance admits that "it is perfectly true that the thesis we are presenting has against it in the matter of chronology the whole weight of scientific opinion . . ."

The final paper, attempting to throw light on the Bible through a Frazerian appeal to Primitive cultures is very weak both in its methodology and its results.

The methodology of the book is common to the "scientific creationists" in that the following assumptions are made. (1) Genesis 2-9 ought to be interpreted very literally, just as if one were reading a scientific or photographic description of history. (2) Showing anomalies or difficulties in a scientific theory allows one to disregard it. (3) If the probability of one scien-

tific theory can be weakened, then any other theory even if much weaker in probability, even if only plausible, even if barely possible, can legitimately be substituted for the more probable theory . . . and ought to be so substituted if it supports the literal interpretation of Gen. 2-9. (4) Data contrary to the supposedly more biblical theory should be ignored or discounted. (Even apart from his nearly arbitrary rejection of radioactive data, Custance ignores many instances of cultural sequences as well as the overall historical gestalt derived from them because in the long run, as science perfects its understanding of these contrary points, a literal interpretation of Gen. 2-9 "will prove to be precisely correct.") (5) Supporting arguments by appeal to authors out of context, out of date, or out of their fields of specialization, is as valid as appeal to the majority of up-to-date specialists in a particular field of knowledge.

Because theories with these assumptions can be held intact only in isolation from professional scientific discussion, they can never be acclaimed as scientific. Because they represent only a possible interpretation of the Bible, they can never be insisted upon as biblical. But for those who share the underlying presuppositions, such theories will be emotionally satisfying.

Reviewed by Paul H. Seely, President, Christian Promotions, Portland, Oregon 97214.

PHILOSOPHY, SCIENCE, AND THE SOVEREIGNTY OF GOD by Vern S. Poythress, Philadelphia: Presbyterian and Reformed, 1976

In this highly unusual book, Dr. Poythress' first major work (though he has published many articles, including one on mathematics in Gary North's *Foundations of Christian Scholarship*), the author presents a synthesis of his background in mathematics, philosophy, linguistics, and theology. Though Poythress' intention is to lay the groundwork for an evangelical philosophy of science, the book could have been given one of any number of titles, for it seems hardly less than a brief categorization of all of reality in an imaginative way with the use of technical terms (many coined by Poythress himself) which nevertheless are not claimed to be normative. The work is a linguistic one because of the abundance of terms which Poythress employs to describe special aspects of the created world (and thereafter captitalizes them to denote his special usage); it is mathematical in that he explores the permutations of these terms in order to describe the various relationships in the universe; it is philosophical in that he is deliberately speculative about the inner workings of the universe and its relationship with the Creator; and it is theological because he attempts firmly to root his thinking in the Bible, and in fact to build upon the Bible alone as his epistemological base.

Poythress writes within the Reformed tradition of theology and the Van Tilian tradition of philosophy (he received hs theological degrees from Westminster Theological Seminary and now teaches New Testament there), and thus considers it important to let his orientation be known at the outset. He states, "I simply want to be frank about my own biases", and says "my own interpretation of the Bible is . . . like that of the Westminster Confession of Faith" (p. 4).

Poythress takes a systematic approach to what he considers to be necessary elements in a very basic philosophy of science: ontology ("what is there"?), methodology ("how does everything function?"), axiology ("why is it there?"), and epistemology ("what is knowledge?"). Then, in a chapter entitled "Study and Its Ethics" he discusses the value of study and the role of various kinds of study, e.g., science, philosophy, and theology. All of these topics are discussed in such a general manner that the book is hardly recognizable as a philosophy of *science* as we normally think of it. But Poythress seems to consider "science" as the systematic study of all reality and its interrelationships in the broadest possible sense (pp. 7, 136f), and seeks to explore what should be the most basic foundations for this endeavor in order to make it thoroughly Christian.

Poythress' approach to ontology involves a discussion first of the Creator, the Mediator (Christ), and the Creation. He then subdivides the Creation into Heaven, Men, and the Subhuman kingdom, the latter being further subdivided into the animal, plant, and inorganic kingdoms. He gives descriptions and charts to map the interrelations of these various subdivisions.

The chapter on methodology then singles out the physical universe (excluding heaven) to describe the functional characteristics of his ontological categories. He does this in terms of "Modes"—"A *Mode* is the bundle of characteristics that a Kingdom has in addition to those of lower Kingdoms. The *Personal* Mode, the *Behavorial* Mode, the *Biotic* Mode, and the *Physical* Mode are the names of Modes of the Human, Animal, Plant, and Inorganic Kingdoms respectively" (p. 29). Within these Modes are various Functions—for example, man has "ordinantial functions" arising from the biblical commands given him when he was created. These ordinantial functions include the sabbatical (man's relationship to God), the social (man's relationship to man), and the laboratorial (his relationship to subhuman creation) (p. 33). Furthermore, man has "official functions", or those functions he performs in his three offices of prophet (emphasizing meaning, communication, wisdom, and information), priest (emphasizing communion), and king (emphasizing rule, power, and majesty) (p. 35). Lastly, Poythress likes to think of man in terms of "actional functions"—active, middle, and passive (p. 40).

This sort of categorization continues in Poythress' discussion of biblical history, the relationship of God to men, and many other topics, all of which are quite unusual and provocative. Throughout the book the author emphasizes that there are not sharp distinctions among his terms and categories, which distinguishes him from Dooyeweerd; rather, he illustrates a great deal of overlapping or "interlocking" among them. In addition, he seems constantly to be guarding himself against any reductionistic claims for his terms— he insists that his particular categories are not the only or even the best way of seeing things. Rather, "they are *one* way, and I think a useful way. What is 'best' depends on what one is trying to accomplish" (p. 39).

In fact, perhaps the greatest value of Poythress' book to this reviewer is that it is a *tour-de-force* against reductionism. As a whole, the author's treatment of the

diverse interrelationships among the elements of reality, and the different perspectives or "Views" from which things can be seen indirectly produces the impression that a reductionist treatment of any aspect of the created world, particularly man, is quite paltry. Even the fact that most of his distinctions are in groups of three rather than two exhibits a non-reductionistic tendency. And this grouping is intentional, for he "wanted to avoid at all costs the impression of dialecticism that is so fond of dual categories: nature grace, revelation/reason, matter/form. . . . Dialectic has less surface plausibility if a third element can be introduced" (pp. 103-4).

Yet even beyond this, Poythress treats reductionism directly at several points in the book, and subdivides *it* into three different types, which alone is subtly devastating! Of these three, only two are definitely to be avoided: "Exclusive Reductionism", which is the insistence on the exclusive correctness of one's way of seeing things (p. 49), and "Slippery Reductionism", which is "the ambiguous use of key terms in a broad sense and in a narrow sense, in order to construct a non-Christian 'ultimate explanation' of the Cosmos" (p. 50). As an example of Slippery Reductionism, Poythress cites the logical positivists' use of the word "meaningful" in its broad connotative sense while actually defining it in a very narrow sense (p. 53).

In contrast to the reductionists, Poythress presents his material in such a way that he appears to have a firm grasp on his own limitations. This is evidenced by the open way in which he proclaims his presuppositions at the outset of the work.

Another of the book's strengths is that it is biblically based speculative philosophy. It is perhaps close to what the rationalistic minds of the pre-empiricist 17th century could have accomplished had they committed themselves to being consistently biblical, for it is intriguingly "rationalistic" in the sense of valuing the speculative mind as a possible avenue to truth. Yet it is rooted both in the particulars of the biblical revelation and in the reality of the world around us.

The book is concluded with several appendices giving Poythress' opinion of other Reformed philosophers, especially Herman Dooyeweerd and Gordon Clark. His extensive criticisms of Dooyeweerd will be of value only to those who are quite familiar with Dooyeweerd; his views on Clark's apologetic parallel those of Cornelius Van Til, i.e., he claims that Clark's use of the law of contradiction is a presupposition which is not accounted for, and must not be made more basic than the presupposition of the existence of God himself.

One definite weakness especially to those of us unschooled in linguistics is Poythress' use of specialized terms. Though the extensive glossary helps one to understand what he means by his terms, many of them are simply unfit for use as ordinary language.

Regarding the author's aim to lay the philosophical groundwork for a thoroughly theistic approach to science, he has probably realized his own special purpose, but one might wish that that purpose had been carried further. He has done very well in taking a rather comprehensive and definitely fresh gaze at what science could be without the fetters of what it *is* in the 20th century, but has not filled in any details as to how we can make it what it should be, *given* what it is. In that sense it is perhaps too theoretical for the program-oriented mind of today. But one gets the impression that Poythress is vitally interested in challenging us to *think*, leaving the details of the program up to us. If the reader can shake off the pragmatic insistence that in order to be worthwhile an idea must be concretely applicable to his life *today*, he will find Poythress' work quite valuable. He does indeed lay a groundwork of sorts for science as it could be, and perhaps we can look forward to future publications to fill in some more details of his highly creative thinking.

Reviewed by Douglas C. Heimburger II, Student, Vanderbilt University Medical School, Nashville, Tennessee.

PSYCHOLOGY AND CHRISTIANITY: THE VIEW BOTH WAYS by Malcolm A. Jeeves. Downers Grove, Ill.: Inter Varsity Press, pp. 177, 1976. $3.95 paper.

Inter Varsity Press has done it again! A scholarly and readable little book geared directly to the college student. And at a modest price.

The purpose of the book is to examine "the relationship between what psychologists have discovered and what Christians believe." The author asserts that psychology and true religion "are completely misinterpreted when cast in the roles of enemies rather than allies." Thereby the author sets an irenic tone of reconciliation between faith and science.

First, the author takes up psychology as a model-building discipline in which he presents the different functions of theory, research, modeling, and explana-

tion in science, with a special focus on psychology as science. Next comes a brief review of psychoanalytic, information processing, ethological, and behavioral theories. A Christian view of man as a model of human existence follows. The fallacy of psychological reductionism is the main focus of rapprochement here. Then the author takes on a few caveats about extrapolation from animal studies to human behavior, the use of machine models to account for determinancy-indeterminancy, and psychophysiological explanations of spiritual experience. He touches briefly on morality and guilt, and concludes with a reasoned critique of both Freud and Skinner who dismiss God as an illusion.

As can be seen, the author has covered a wide territory of very complex material, and the traditional knotty problems of the subject area. Overall I find the author to be fair, circumspect, and respectful of both his discipline of psychology and his faith as a Christian. He cites some of the major theorists in psychology as well as a pertinent index of biblical references.

My caveats are small ones, for no introductory book like this could do justice to major issues. He treats the scientific method best of all, and is weakest in areas of philosophy and human behavior. He deals with the mind-body problem as a dualist, tends to resort to epiphenomenalism in interpretating conversion, and rather misapprehends the issues in morality and guilt.

Some typical college students found the book very readable, understandable, relevant to the big questions, and in general just a very useful think-piece for beginning undergraduates. I suspect that the more advanced and sophisticated undergraduate might want a more detailed examination of issues that are not easily resolvable.

The author is Professor of Psychology at St. Andrews University in Scotland. His Brittanic empire tradition shows in his careful erudition and polished use of English. He is an experimentalist and that orientation gives the book a more scholarly thrust than similar books written from the more casual approach of many clinicians.

In sum, a really neat book that you can recommend highly to your students, as well as to your colleagues. And a kudo to IV Press.

Reviewed by E. Mansell Pattison, Department of Psychiatry and Human Behavior, University of California, Irvine.

A Second Review of *Psychology and Christianity: The View Both Ways* . . . .

In writing this book, Malcolm A. Jeeves, a British experimental psychologist, has rendered a service to all psychologists who call themselves Christians and who often find themselves misunderstood by both their psychological colleagues who do not call themselves Christians and their Christian brethren who do not call themselves psychologists. Truly, a great gulf seems to be permanently fixed between these two groups, but Jeeves' aim, according to his introduction, is "to change attitudes of suspicion and, at times, of scarcely concealed hostility into ones of mutual respect." As many a beleaguered Christian psychologist will agree, if this aim could be realized on even a modest scale, the book would have more than justified itself.

In certain respects, Jeeves can hardly fail to increase understanding of and respect for psychology on the part of fair-minded Christian readers who want a closer look at what psychologists actually do. Several misconceptions of psychology and psychologists are quickly corrected by a concise statement of what goes on today in professional psychology. Jeeves succeeds very well, in my opinion, at conveying both the diversity of specialties within psychology and their common goal of isolating the causes of behavior. Such is the amazing complexity of behavior, as he suggests, that none of these specialties need be in conflict but may produce complementary accounts of the same events, ranging in focus from the biochemical to the social.

In methodology, too, there is a common denominator which Jeeves takes care to explain since it is important to the development of his argument. This is the so-called *hypothetico-deductive* method. Psychological inquiry as Jeeves explains it cannot proceed except on the basis of theoretical constructs or models, such as that man is like an animal or that man is like a computer, and then testing whether predictions deduced from these models are verified by empirical data. When the logic of psychological inquiry is thus laid bare, the reader can appreciate that the assumptions are perfectly justified as tools of inquiry. To the extent that they give rise to valid predictions, they are useful. Trouble arises only when psychologists make unjustified extrapolations beyond their evidence to conclusions such as that man is "nothing but" an animal or an information processor. I certainly agree with Jeeves' contention that many pseudo-conflicts can be avoided when the Christian reader recognizes that there is nothing wrong with making these working assumptions even when they would conflict with Christian premises if embraced without qualification. Certainly nothing is to be gained by denying that human behavior is similar in many respects to animal behavior. However, I also believe that psychologists are wont to make unwarranted extrapolations beyond their evidence somewhat more often than Jeeves suggests, and this should be a source of concern to Christians.

Jeeves' discussion of the logical fallacy of "nothing-buttery" and his explication of Donald McKay's position on the status of moral choices within a deterministic framework were for me the key parts of the book, and should not be skipped by the nonprofessional reader notwithstanding Jeeves' invitation to do so. The points made are not difficult, and much is at stake. "Nothing-buttery" is attacked with arguments that are not entirely new or unique to a Christian viewpoint, as Christians find allies on this issue within humanistic, phenomenological and general systems approaches. McKay's argument is critical because it attempts nothing less that a reconciliation of moral responsibility with a deterministic view of brain mechanisms and behavior. Of course, other solutions of this philosophical dilemma are possible. The point is that nothing is to be gained by a Christian's denying that much of behavior is subject to causal explanation, and here is an argument which should allow Christians to tolerate cheerfully and without fear the deterministic working assumptions of behavioral scientists.

The intended effect of much of the author's line of argument is to allow Christians to stay unintimidated by psychological inquiry. The "something more" of Christianity cannot be threatened provided psychologists stay within the legitimate bounds of the discipline. Personally, I do not believe psychologists can avoid embracing philosophical assumptions which inform their thought even if they do not intrude explicitly into their scientific writings. These assumptions usually include a bias toward philosophical materialism which is the historical legacy of modern psychology. I do not believe, therefore, that Jeeves' main arguments will arouse much attention or respect of non-Christian psychologists toward Christian views. In fairness to Jeeves, I do not know whether it is possible to accomplish this goal to any great extent. Nevertheless it seems to me that there is good precedent in Christian thought for attempts to show the reasonableness of Christian views in the best intellectual currency of the times including its scientific conclusions. While avoiding easy "integrations" based on an inadequate understanding of psychology and a distorted view of Christian beliefs, surely we can attempt to show in substantive ways the compatibility of psychological and Biblical perspectives. None of this is meant to take anything away from what Jeeves has accomplished in his fine book. But to accomplish more than half of his goal of fostering "mutual respect" between Christians and psychologists, I believe a less conciliatory posture toward the latter is required.

Reviewed by Dennis R. Ridley, State University of New York at Geneseo

---

SELF-DIRECTED BEHAVIOR by David Watson and Roland Thorp. Monterey, California: Brooks-Cole Publishing Company, 1972. 264 pages.

This book tells you how to change yourself. It's about self-modification for personal adjustment. In some colleges it is used as a text in the psychology of adjustment course. It is an excellent source to show students how learning principles can be used for self improvement.

This is a useful book. It is simply and logically written and moves through the principles of behavior in small increments with lucid illustrations. Courses in adjustment, personality, mental hygiene or learning could use it as a text. It is fun and profitable reading for the sophisticate as well as the neophyte. One college instructor has his students identify a personal trait or habit which is annoying and then seek to modify it following the procedures suggested in this book.

There might be some Christians who would criticize this book for putting all the emphasis upon human maneuvers apart from divine aid. However, the authors are merely seeking to identify the principles of behavior which God has ordered and enlisting them as tools of betterment. They do not rule out religious contingencies of reinforcement. That decision is left up to the individual.

The authors recognize the limits of self modification and recommend seeking professional help under certain circumstances. However, the beauty of this book is that it's a "how-to" book based on empirical principles of behavior. The techniques of behavior modification are systematically analyzed and applied to human problems for the purpose of changing behavior.

Shelves are filled with books about how to have a better life. This book fills a unique niche in applying the science of psychology to problems people face. It make psychology relevant to individual needs. Essential reading for those who have always wondered how classical and operant conditioning relate to anything besides salivating dogs and pecking pigeons.

Reviewed by Richard Ruble, Professor of Psychology, John Brown University, Siloam Springs, Arkansas 72761.

EVANGELICALS IN SEARCH OF IDENTITY by Carl F. H. Henry, Waco, Texas: Word Books, 1976, 96 pp., $3.95

In *Evangelicals at the Brink of Crisis* (1967) Dr. Henry predicted that the next decade would see critical directions taken by evangelicalism, particularly in the face of the ecumenical movement. At the end of this decade Dr. Henry now assesses these directions in *Evangelicals in Search of Identity,* and concludes that evangelicals must transcend divisions that have arisen among them and renew a spirit of unity and cooperation, or else forfeit their witness to a troubled and confused society.

Twenty-five years ago evangelicalism in America experienced a renaissance. Fundamentalists labeled the movement as non-fundamentalist and neo-evangelical, while liberals put it down as a post-war phenomenon or a Billy Graham personality cult. Hence, evangelicals looked beyond the contemporary scene into the past to find roots. Departing from fundamentalism's anti-intellectualism and social withdrawal, evangelicals took their intellectual and social responsibilities more seriously. Differing streams of thought flowed into evangelicalism, and the term became less well defined. These differences within the ranks of evangelicalism were to later harden into sharp conflict.

The decade of the late sixties and early seventies saw notable gains for evangelicalism. But many evangelicals voiced their disbelief in biblical inerrancy and condemned the evangelical establishment's lack of socio-political involvement. Rather than giving definitive direction to realign evangelicals into a more comprehensive organization, the leadership lashed back with reactionary criticism. Disunity now centers around these issues of scriptural inerrancy and social action.

Conservative Christianity in America has been characterized by the viewpoint that the Scriptures are literally inspired and are to be read literally. Since the 1966 Wenham (Gordon) Conference on Scripture it has become apparent that an ever growing number of conservative scholars no longer hold this view. Many evangelical leaders believe that to surrender this doctrine is to undermine the foundations of Christianity and propose making "inerrancy" the evangelical password.

There is a renewed awareness of the social responsibility of Christianity on all sides, but the division

arises over the priority between evangelism and social action, and what program to take. Many young evangelicals, after the turmoil of the sixties, deplore the evangelical establishment's cultural conformity to capitalism, and join with many Third-World spokesmen in calling for immediate social justice and indictment of oppressive politico-economic forces.

Nineteenth century evangelicals reacted to ecumenism and "social gospel-ism" by withdrawing into their isolated sect. Had they followed more biblical principles of Christian unity and social concern, churches in the twentieth century might have pursued a sounder course. Dr. Henry warns evangelicals not to repeat the mistakes of history. Evangelicals do not need a new organization but a renewed sense of the evangelical family; they need serious apologetics to combat the anti-intellectualism of modern theology; and they need to exploit the mass media to present Christ's gospel more effectively. Dr. Henry sounds the clarion call for unity among evangelicals of diverse opinions in an irrational and confused age when the primary enemy of revelational theism is internal conflict.

A noted authority like Dr. Henry deserves serious consideration by all factions. Besides promoting his main thesis, the book is valuable as a brief history of the last twenty years of evangelicalism. It should be pointed out, though, that the value judgment made by Dr. Henry is not shared by all evangelical scholars, viz., that a broader Christian witness to secular society is worth sacrificing the integrity of evangelicalism's historical position on inerrancy.

Reviewed by Bruce Hedman, Assistant Instructor, Department of Mathematics, Princeton University, Princeton, New Jersey.

POVERTY PROFILE USA by Mariellen Procopio and Frederick J. Perella, Jr., New York: Paulist Press, 1976, 88 pp., $1.65.

This book succeeds in showing the affluent something of what poverty in the United States is. The task is not simple. Census Bureau Statistics for 1974 name only 24.3 million Americans poor, down from 39 million in 1959. However, in 1959 the poverty index ($2,943) for an urban family of four represented 54% of the median family income ($5,417). In 1974, the poverty index ($5,038) represented only 40% of the median family income ($12,480). Maintaining the larger percentage would have made 46 million Americans poor; using another standard ($9,198), suggested by the Bureau of Labor Statistics, would have raised the number to 65.5 million. Clearly Lazarus is sitting outside quite a few American homes.

No matter how numerous the poor may be, one generic definition identifies them all as "unproductive elements in our society". Some of them cannot work because of full-time responsibilities for children or retired persons. Some who do work full time at the minimum wage still do not earn enough to escape poverty. Between 16% and 23% of the nation's elderly are considered poor. At least one-third of the nation's poor population is under eighteen. The statistics are chilling. Knowing them convinces one of the futility of categorizing the poor.

No ethnic group escapes poverty. 56% of all poor are White; 30% are Black. 90% of all reservation-dwelling American Indians are poor by government statistics and almost 50% of all American Indians live on reservations.

The reader may be tempted to say, "There but for the grace of God go I." But clearly, the grace of God is no explanation for the misery and oppression shrouded by these statistics.

If poverty is not laid at God's door, the blame for it must be placed somewhere. Unfortunately the authors revert to the minimal poverty population (24 million) when they too briefly discuss the causes of poverty. A problem that concerns one-fifth of the population does not have the numerical urgency of one that concerns one-third of us. They do point out that 5% of the nation's populace controls 50% of its wealth.

Because the distribution is so lopsided, the solutions will not be simple. This book, prepared for the U.S. Catholic Conference Campaign for Human Development, was intended only to introduce the facts, not to solve the problem.

But in one sense the facts are the problem. Even on conservative governmental statistics, 24.3 million Americans have less than $1.15 a day for food. Matthew never bothered to tell how many Israelites were poor, naked, sick, and imprisoned in the time of Jesus. He did tell us that to care for them was to care for Jesus.

No matter how well we count nor explain the numbers of poor people, statistics do not tell the whole story. Only the poor understand what it means to need desperately what others possess indifferently and in abundance. To understand poverty, one must investigate wealth. The terms are correlative. Hence this reviewer hopes the authors will soon attempt a sequel: *Wealth Profile USA*.

Reviewed by William J. Sullivan, S.T.D., Associate Professor, Religious Studies, St. John Fisher College, Rochester, New York.

THE ETHICS OF FETAL RESEARCH by Paul Ramsey, Yale University Press: New Haven and London, 1975, xxii + 104 pp. $2.95.

Paul Ramsey has written a somewhat confusing book. His prose is sometimes tortured, his topic is sometimes too confined to the period of writing, and his conclusions are not spelled out clearly. Nonetheless, his stature as a medical ethicist who things that "the moral history of mankind is more important than its medical history" (p. xv), who is "an ethicist of principles (not of consequences only)" (p. 13), and who remarks that "God so loved the world that he did not send a committee" (p. 1) deserves a reading. The subject, too, beset by controversy and lack of definitions, is also an important one. All of us were fetuses once.

Ramsey spends most of the book wrestling not with fetal research, but with the reason fetal research has become an important subject: abortion for non-medical reasons. Yet he correctly points out that the two subjects are not necessarily the same.

Society, says Ramsey, bears a load of guilt over the massive numbers of those aborted for non-medical reasons. Shouldn't some good be obtained from their

termination? Many also feel that since these fetuses are not going to live anyway, why not perform research on them? Ramsey points out that two wrongs do not make a right, that guilt is a poor motivation for anything, and that the latter question "justified" the "research" undertaken by the Nazis.

Ramsey also states that a woman (or parents) who has consigned her unborn offspring to termination is not a rational person from whom informed consent regarding the disposal of that offspring can be obtained.

Ramsey deals with the tendency of physicians and researchers to set medical policy in private, while many of them deplore the establishment of military policy without public debate. He mentions several classes of fetal research, and divides the issues based on several criteria, such as whether the research is designed to benefit the fetus itself. Types of fetal research that might prove beneficial to many fetuses, and that probably cannot well be undertaken on any other type of material, are mentioned. The crucial issue of whether unborn fetuses are analagous to tissue, to animals, to babies, to unconscious, dying or condemned persons is considered in detail.

All in all, an important book, on the cutting edge of ethical practice.

Reviewed by Martin LeBar, Central Wesleyan College, Central, South Carolina 29630.

HOW SHOULD WE THEN LIVE? by Francis A. Schaeffer, Fleming H. Revell Company, Old Tappan, New Jersey, 1976, 288 pp., $12.95.

In this book, Schaeffer has attempted to identify those ideas, events, and people in history, who have shaped our present culture. His basic position is that the philosophical presuppositions and world view of a society determines the direction that it takes. History and culture are rooted in the thoughts of men. He begins with an analysis of Roman civilization, and proceeds through the Middle Ages, Renaissance, Reformation, Enlightenment, Scientific Age, and concludes with an analysis of modern Western society. At each step in the flow of Western civilization, he points out the philosophical basis for that civilization, and shows how the thinking of men gave rise to the cultural and political characteristics of the time.

Schaeffer's main thrust, however, is not historical analysis, but to show that the weaknesses of our own culture are a result of the loss of the biblical Christian world view. During the Reformation in Northern Europe, there was an attempt made to bring all aspects of life under the authority of God and the Scriptures. This was not always successful, as in the defence of racism and slavery, or the non-compassionate use of wealth. But, on the whole, the outcome of the Reformation was personal and political freedom, and economic stability. The idea that the Law is King, and the development of various checks and balances in government, nourished the growth of Western democracies. There was, also, a blossoming in art, music, and culture. Since modern men have given up the biblical Christian base, they are now also losing the spin-offs of that base in the areas of politics and general culture. Hence, with no adequate base, Western civilization is, like Roman civilization, decaying from within.

Having analysed the situation, Schaeffer suggests that if we wish to avoid the continued breakdown of our own society, there are only two alternatives: i) arbitrary authority imposed by a totalitarian government, or ii) a reaffirmation by our society of the biblical Christian base for our culture. Schaeffer's purpose in writing the book was to encourage the adoption of the second alternative, that "this generation may turn from that greatest of wickedness, the placing of any created thing in the place of the Creator, and that this generation may get its feet out of the paths of death and may live".

This is a very valuable book, in that it exposes the reasons for the breakdown of Western society. However, it appears to me to have two weaknesses. The first, is the over-simplification of complex issues. This is particularly noticeable in the first half of the book, where Schaeffer deals with history. He frequently makes summary statements about historical periods, without providing adequate evidence for them. For example, Schaeffer concludes that the reason that Rome fell was that it lacked an adequate philosophical base. Evidence to support that conclusion is not presented.

The second weakness derives from the fact that the same basic text has been used for this book and also as a script for a film series (10-30 minute films which cover the same material as the book). Hence, the film series presents many visual illustrations of points made in the text which the book, despite numerous photographs, is unable to do. Many points in the book are difficult to follow, if one is not already familiar with many details of art, architecture, music, cultural history, etc. Generally, the film series makes a better presentation of Schaeffer's arguments than the book.

Overall, however, "How Should We Then Live?" is well worth reading, since it gives a broad picture of the trends in Western civilization, which have led up to our present situation. Schaeffer has carefully laid out the reasons for the present direction of contemporary society and is like the watchman of Ezekiel 33, shouting a warning to the people, that we should turn from our wickedness and live.

Reviewed by Steve Scadding, College of Biological Science, University of Guelph, Guelph, Ontario, Canada.

A Second Review of *How Should We Then Live?...*

Francis Schaeffer and his writings have become an evangelical phenomenon. Since *Escape from Reason* and *The God Who Is There* appeared in print in 1968, no single philosophically and theologically oriented Christian author has had as much impact and as much exposure to the Christian community. He has summed up the apparent content of history, culture and art in bold strokes that in most part ring so true to the Christian reader that he is captured by the vision that Schaeffer provides. He has been the springboard for discussions among Christians and considerations of

topics that, except for him and his influence, might never have been brought to the fore at this time.

Unfortunately it is not possible to describe the great flow of historical thinking from the days of ancient Rome to the present—the task undertaken in *How Should We Then Live?*, a kind of compendium of all of Schaeffer's writings—without leaving oneself open to the charge of superficiality and inaccuracy in any one of a dozen or more specific disciplines. Each specialist feels that Schaeffer has been overly simplistic in dealing with his area of speciality, whether that area be philosophy, history, theology, art or science. This is no less true in the area of science, the area of specific concern to readers of this *Journal*. A reviewer might just note the inevitability of these shortcomings and pass on to the truly positive and monumental contributions of Schaeffer's writings to Christian understanding and integration, or he might stop and point out where Schaeffer has drawn the proper conclusions from the wrong data. In the former case, the reviewer might be charged irresponsible; in the latter case, picayune.

The difficulty is that the overly-simplistic particulars cited tend to detract from the validity of Schaeffer's general conclusions. In the area of science, as probably also in the others, Schaeffer would benefit from intimate interaction with scientists, i.e., with people who are actually *doing* science, not just philosophers, theologians or educators who talk *about* science.

To illustrate such scientific problems in *How Should We Then Live?* I cite simply two instances from Chapter 7, "The Rise of Modern Science." The quotation taken from Einstein, "I cannot believe that God plays dice with the cosmos," has nothing to do with the theory of relativity as indicated by Schaeffer. It is Einstein's reason for rejecting the quantum mechanical view with its explicit assumption of a chance basis for physical phenomena. Although he provided the experimental basis for much of the quantum theory in his work on the photoelectric effect, Einstein refused for philosophical reasons to embrace its chance-emphasizing conclusions, and so cut himself off for the rest of his life from the major developments in modern science outside his own relativity work.

Schaeffer's description of Heisenberg's Uncertainty Principle on p. 140 has a number of problems. First of all, there is no need for *two* atomic particles to be involved; the Principle says that we cannot measure exactly simultaneously both the position and velocity of a particle. Although the emphasis here may appear to be on "measure," still the theoretical structure of the quantum theory leads to the same conclusions without reference to experimental limitations.

The quantum theory according to the prevailing Bohr interpretation *does* lead to the concept of chance as the basic phenomenon *in a scientific description*. The description of single photons and single atomic particles *is* a chance one. A single photon approaching a sheet with two slits in it will go through one or the other on a purely chance basis. A radioactive atom will decay at a particular time on a purely chance basis. The apparent lack of chance in the macroscopic world, to which Schaeffer appeals, is the consequence of the fact that a deterministic description can be given of a group of particles, each individually described by a chance description, if the number of particles is large enough. For example, although the radioactive decay of a particular atom is un-caused, i.e., it is wholly a chance phenomenon according to present-day quantum theory, the average lifetime of a large number of such atoms can be predicted very accurately.

All scientific descriptions must be either deterministic or chance in character. Neither of these kinds of description is better suited than the other to correlate with Christianity. If a thoroughly deterministic description were adequate, then where would be the place for Providence, will, and responsible choice? If a thoroughly chance description were adequate, then where would be the place for Election, order, and again responsible choice? Since neither type of description is more appropriate than the other for Christian thought, it also follows that neither type of description is more inimical to Christian thought than the other. A process described scientifically as "chance" is as suitable a vehicle for God's creative activity as a process described scientifically as "deterministic."

If the reader has not encountered Francis Schaeffer before, *How Should We Then Live?* may well be too concentrated a dosage to be fully effective. On the other hand, if one doesn't have the time or inclination to read the other 20 books by Schaeffer or such related books as Rookmaaker's *Modern Art and the Death of a Culture*, this book will serve as a good overview of Schaeffer's positive contributions as well as of his inevitable shortcomings.

CREATION BY NATURAL LAW: Laplace's Nebular Hypothesis in American Thought by Ronald L. Numbers, University of Washington Press, Seattle (1977). 184 pp. $15.00.

This is the PhD dissertation of the author, who is Associate Professor of History of Medicine and the History of Science at the University of Wisconsin. Although the controversy over the theory of evolution is well aired because of that theory's apparent description of "creation by natural law," not so well known is the antecedent debate over another apparent description of "creation by natural law": the nebular hypothesis for the origin of the solar system advanced by Laplace in 1796, over 60 years before Darwin's *Origin of Species*. Numbers traces the rise and fall of this hypothesis as an aspect of cosmogony from its inception in 1796 to its demise in about 1900, and relates its effect on human thought about the possibility of scientific descriptions of the origin of the solar system. The parallel that Numbers draws between the nebular hypothesis and the theory of evolution is a fascinating one. He points out that even after the nebular hypothesis was no longer scientifically acceptable, its influence in turning human thought toward "natural law in the heavens" persisted. Unlike the theory of evolution, the nebular hypothesis generated no conflict between science and theology in the United States, yet its influence played a large role in preparing the way for evolutionary thinking.

Unlike many PhD dissertations, this one is fairly easy reading. Like other dissertations, the text which ends

on p. 118 is followed by two appendices, 37 pages of Notes, a 7 page Bibliography, and a 5 page Index. Recommended reading in the effort to understand present day controversies in historical perspective, an effort that often demonstrates that history does repeat itself.

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

CHRISTIANS AND SOCIOLOGY by David Lyon, Intervarsity Press, Downers Grove, Illinois. Paperback, 93 pages, (1976), $1.95.

This disappointingly brief book, written by a British sociologist at Bingley College of Education, emphasizes the tragic lack of works dealing with the relationship between sociology and Christian faith. Lyon's thesis is that there can and must be a distinctively Christian approach to sociology. This is due to the presuppositional variance that exists between sociology and a Christian view of society. That variance is rooted in the origins of sociology in 19th century humanism and skepticism. Its categories are "inherently and inescapably 'value-loaded' (p. 28)." It tends to act as a false form of consciousness, an encompassing ideology that excludes Christian faith and is characterized by scientism, empiricism, positivism, determinism, and relativism. As such it exerts a "subtle and persistent tendency . . . to erode faith and raise doubts (p. 7)."

This tendency is portrayed in three areas of sociological analysis. The sociology of knowledge traces all world-views and belief systems to the social context and status location of the people who originated that knowledge. It asserts an approach that potentially explains away Christian revelation and conversion.

Sociological views of the nature of humans also run counter to basic Christian affirmations. Those views (behaviorism, functionalism, voluntarism) which see people as malleable, the deterministic product of socialization within a given social system, lead to a denial of individual responsibility. If society creates human nature and is responsibile for everything, it is responsible for the socially unacceptable as well as the desirable. Those views which stress people as mastering their lives and transcending the social world, as active, self-determining, value-realizing creatures, tend to make humans autonomous arbiters of right and wrong. In either case people are not seen as intrinsically religious, to be viewed and defined primarily in terms of relationship to God.

The sociology of religion creates problems even at the point of definition. "No sociological definition of religion . . . can fail to contain implications as to the truth of religion (p. 73)." The study of religious behavior and its class determinants, religious belief systems and their functions for life-crises, and religion as a reification of security needs or compensation for alienating circumstances, gives valuable insight. But such analysis often threatens faith by assuming that it can completely explain the presence and function of religion.

In response the Christian sociologist affirms recent trends in the field which reject the notion that sociological information is neutral and argue for "a self-consciously moral sociology which aims to change society in accordance with its explicit value-system (p. 84)." Christian sociology uses non-Christian sociology but criticizes and modifies it by its own distinctive Christian presuppositions. Sociology is read with a mind that is open to the Word of God.

Several weaknesses mar Lyon's attempt to steady Christian students for a first encounter with sociology. The book is too negative and defensive to do justice to the relationship. One feels more warned about sociology than invited to bring it into captivity to the mind of Christ.

Lyon does little to explain what a Christian sociology might mean. He does not spell out a Christian view of society nor indicate what presuppositions are necessary to criticize and correct non-Christian sociology. Part of the problem appears to be the elementary level at which theological resources are utilized as compared with the broad knowledge of the sociological material. If an integration is to take place, it cannot be done with doctoral level sociology and freshman level theology.

Where Lyon suggests elements in an integration, he leaves large questions unanswered. For example, he does not discuss whether the focus (or scopus) of Scripture is such that it can provide statements that fall within the domain of interest of the sociologist (p. 45). We may agree that "there is knowledge which is undetermined by any social context." This certainly refers to knowledge about God and His salvation for sinful humans. But it certainly is more debatable when it comes to sociological knowledge. When Scripture touches on matters of social structure (e.g. monarchy, patriarchal family hierarchy, etc.), is it merely regulating a preexisting social custom among the people to whom God is revealing Himself or is it indicating that God intends this economic order or social system to be normative for His people?

He also leaves unresolved the matter of the culturally relative form in which revelation itself is given and thus does not clarify the method necessary to induce Christian sociological presuppositions. Surely it is too sweeping to say of the Old Testament laws: "the commands given were not socially determined: but rather spoken into the situation by an absolutely free God . . . (p. 46-47)." God is indeed free but He chose to work through and in terms of the culture of the Hebrew people. How else are we to understand laws about slavery or the ordeal prescribed for a wife suspected of adultery by her husband, etc?

One glaring omission is the failure to mention any Christian sociologists who have attempted to relate sociology and Christian faith. The great French sociologist and theologian, Jacques Ellul, comes to mind as the outstanding contemporary example. At least 17 of his books are now in English and present the largest and finest Christian sociological understanding of contemporary technological society. Some of the very elements Lyon sees as incompatible with a Christian view of society (e.g. determinism), Ellul makes central to his sociological and theological understanding. His latest work, *The Ethics of Freedom*, presents a powerful case for the deterministic conclusions of sociology

and psychology as the context for a Christian view of sin's alienating power and Christian understanding of the meaning of redemption and freedom. What Lyon argues is a possibility, Ellul gives us as a full developed reality.

Reviewed by David A. Fraser, Research Associate, MARC, Monrovia, California.

GOD, REVELATION AND AUTHORITY: VOL. 1, *God Who Speaks and Shows* by Carl F. H. Henry, Word Books; Waco, Texas, 1976, 421 pp., $12.95.

Dr. Carl F. H. Henry has spent most of his life lecturing, debating, and writing in defense of historic Christianity. He has written about most of the scientific, social, philosophical and theological issues that have faced the church during his lifetime. His breadth of interest and scholarship is almost unheard of in this age of specialization.

This book is the first volume of a projected four volume series in which Dr. Henry puts together the results of "twenty-five years of teaching, researching and lecturing". (p. 11) It is concerned with an introduction to the topic of theology. Volumes II and III deal with the doctrine of revelation and Volume IV will deal with the doctrine of God. (Volumes I and II are now available, Volume III will be available by the end of 1978, and Volume IV by the end of 1980.)

Dr. Henry believes that the timeless message of Christianity must be presented to the world in a meaningful manner. The message must not be changed to make it relevant, (as liberalism so often does) nor should the message be spoken in a language no longer used (as fundamentalism often does). For this reason, the introductory volume deals with an up-to-date discussion of the problem of knowledge.

The reader is taken on a detailed tour of various theories of epistemology. The writing is clear, but the subject matter is not easy. It is a very good introduction to the historical and philosophical aspects of the problem of knowledge. Throughout the entire survey, a basis is being laid for his later conclusion that revelation from God is essential for the construction of a proper philosophy and theology.

The core of Henry's thought is summed up in the following quotation:

> Divine revelation is the source of all truth, the truth of Christianity included; reason is the instrument for recognizing it; Scripture is its verifying principle; logical consistency is a negative test for truth and coherence a subordinate test. The task of Christian theology is to exhibit the content of biblical revelation as an orderly whole. (p. 215)

The next thirty pages are spent explaining this summation.

It is clear from the above quotation and Henry's explanation of it that he sides with the "presuppositionists" rather than the "evidentialists" in the field of Christian apologetics. His starting point, or axiom, is the word of God, not an historical event such as the resurrection of Jesus Christ. Indeed, it is argued, we would not know of the resurrection of Christ without the Holy Scriptures. Yet, he is no fideist like Barth, or for that matter Barth's counservative counterpart, Van Til. He says that it is "suicide" to renounce the importance of the laws of noncontradiction and logical consistency as Barth (p. 233) and Van Til (p. 236) do. Val Til's rejoinder to Carnell (a student of G. H. Clark with similar views as Henry) that "rational tests" imply that man is autonomous, itself implies either that the "unbeliever thinks with another system of logic or it confuses formal logic with a determinate sphere of thought" (p. 236). Dr. Henry is seen to follow his former mentor, Dr. G. H. Clark in this respect. (cf. p. 10).

Consistent with these views are Henry's views on "natural theology". He rejects Anselms' attempts to have all of theology based in nature. Yet, he also strenuously opposes Barth's denial of any point of contact between God and fallen man. He is careful to state that any "direct knowledge of God not inferred from experience . . . finds its explanation in and through the scripturally attested *imago Dei* alone." (p. 394) This conclusion comes after about one hundred pages of very good discussion on the various a priori schools of philosophical thought.

Dr. Henry states that the Christian religion "is a rational faith that rests on revelational fact and truth, a faith grounded in the self-disclosure of God in Christ as the ultimate reality and the ultimate reason. It calls, therefore, for reasonable reflection, reasonable decision, and reasonable service" (p. 272). That Dr. Henry has lived up to these high standards is evident from his life and from his writings.

At a time when much of Protestant Christianity is entrenched in neo-orthodox or conservative fideism, it is refreshing that a volume such as this be published. May it be used to bring about a return to a rational defense of our most reasonable faith.

Reviewed by David E. Laughlin, Department of Metallurgy and Materials Science, Carnegie-Mellon University, Pittsburgh, Pennsylvania

---

LIFE AFTER LIFE by Raymond A. Moody, Jr., Stackpole Books, Harrisburg, Pennsylvania, 1976. 125 pp. $5.95.

Is *Life After Life* a real breakthrough for the Christian, giving as it does numerous accounts of near-death experiences? I think not.

Dr. Moody holds a Doctor of Philosophy degree from the University of Virginia. His interest in the subject of *Life After Life* came about accidentally after he became a medical student intending to specialize in the philosophy of medicine. Dr. Moody's religious background includes early family connections with the Presbyterian Church, although his parents never tried to impose their religious beliefs upon their children. He grew up "having a 'religion' not as a set of fixed doctrines, but rather as a concern with spiritual and religious doctrines, teachings, and questions . . . all the great religions of man have many truths . . . In

organizational terms, I am a member of the Methodist Church."

In this book he poses the time-honored question: what is it like to die? His approach is to relate

> (1) The experiences of persons who were resuscitated after having been thought, adjudged, or pronounced clinically dead by their doctors.
> (2) The experiences of persons who, in the course of accidents or severe injury or illness, came very close to physical death.
> (3) The experiences of persons who, as they died, told them to people who were present. Later, these other people reported the content of the death experience to me.

Some fifteen separate elements recur again and again in the experiences researched, although not all elements are present in any one case. Dr. Moody specifies these: ineffability, hearing the news, feelings of peace and quiet, the noise, the dark tunnel, out of the body, meeting others, the being of light, the review, the border or limit, coming back, telling others, effects on lives, new views of death, and corroboration.

Dr. Moody very carefully insists throughout the book that he is not trying to prove that there is life after death. Rather he hopes his volume may encourage others who have had similar experiences to speak a little more freely, "so that a most intriguing facet of the human soul may be more clearly elucidated." He parallels quotations and summations on the subject from the Bible, Plato, *The Tibetan Book of the Dead*, and Emanuel Swedenborg, and then ends his book with questions, explanations and impressions.

Dr. Elisabeth Kübler-Ross, in her Foreword to this volume, indicates that this account of Dr. Moody's findings is true . . . also corroborated by her own research and by those of others "who have had the courage to investigate in this new field of research in the hope of helping those who need *to know*, rather than *to believe*." (italics mine)

Dr. Moody concludes his chapter on Questions with a fair-minded statement,

> Let us at least leave open the possibility that near-death experiences represent a novel phenomenon for which we may have to devise new modes of explanation and interpretation.

Speaking as a Christian, however, I must confess to a certain uneasiness with respect to the so-called glimpse into the process of "dying" as recorded in these cases. Rather than substantiating what the Bible clearly teaches concerning Jesus Christ as Savior and Judge, those who survived this "death" experience indicated no problem concerning sin.

> When he (the light) came across times when I had been selfish, his attitude was only that I had been learning from them, too.
>
> And it was not anything bad at all; I went through it with no regrets, no derogatory feelings about myself at all.

The Christian may well experience this blessed relief from the guilt of sin, based only upon Christ's substitutionary work for him—but this experience apparently was not reserved only for those who were committed to Christ.

> . . it is appointed for men to die once, and after that comes judgment. (Hebrews 9:27)
>
> For we must all appear before the judgment seat of Christ, so that each one may receive good or evil, according to what he has done in the body. (II Corinthians 5:10)

Although Dr. Moody tries to refrain from drawing conclusions, he does make this statement on pages 107 and 108,

> It seems to me that the best way of distinguishing between God-directed and Satan-directed experiences would be to see what the person involved does and says after his experience. God, I suppose, would try to get those to whom he appears to be loving and forgiving. Satan would presumably tell his servants to follow a course of hate and destruction.

This, indeed, sounds most reasonable. However, since one of Satan's most powerful weapons is deception (see II Corinthians 11:14, "And no wonder, for even Satan disguises himself as an angel of light"), he would be most happy to deceive people into thinking that God's Word concerning judgment is simply a lie. Genesis 3:1 . . "Did God say . . .?" Genesis 3:4 . . "You will not die." The fact that many people who returned from the "dead" are motivated to better and more loving patterns of living, while rejecting or neglecting God's means of acquiring a right relationship with Him through Christ, does *not* substantiate the assumption that God has somehow come through with a new revelation.

If one reads the book as an interesting account of experiences a number of people have shared in their close brush with death, without consciously or unconsciously feeling that the Bible somehow falls short or may even be in error concerning what follows death, then by all means read and enjoy it. Since *not one of these people has really died* and returned, the curtain between life and death remains closed to us. I much prefer to place my confidence in the One "Who died and rose again" . . . even Jesus Christ.

Reviewed by Betty J. M. Bube, Stanford, California 94305.

The Person and Sociology

Jack Balswick and Dawn Ward (Journal ASA 28, 181, 1976) are engaged in a crucially important discussion between sociology and social theology (Mouw, 1976). This is not meant as a critique of their article, but rather some reflections which might contribute constructively to that discussion. Nevertheless, in responding to their work, I do wish to question some of their categories from the viewpoint of both social theology and sociology, and thus throw a slightly different light on the issues.

A technical point first of all. I wonder why, having opposed positivistic and phenomenological outlooks, "conflict" and "symbolic interactionism" are singled out for special attention? While I largely agree with their (albeit brief) comments on those perspectives, their separate treatment is not adequately explained. However, it is common knowledge that there are almost endless variations on how to cut the paradigm cake. Denzin (1969), for example, tries to unite symbolic interactionism with phenomenology and Ritzer (1975) puts conflict sociology in the positivist camp. So this is not a complaint, so much as a question: why?

This relates to the central problem of the paper, though, which is a Christian evaluation of sociological models, from the point of view of justice done to the "person." And at one point the word "dialectic" is used, to describe the relationship "where society is a human product, but nevertheless an objective reality, and man is a social product, but not only social" (p182). While I agree, basically, with this sentiment, I wonder if it does not point, rather, *beyond* the "dialectic" to a kind of "trialectic." For in the Christian perspective, human sociality is also *Godward*, and human social-structures are also *God-ordained*.

May I suggest that it is possible to think of three sociological models, and to subsume Balswick and Ward's categories in them. For the sake of argument, we shall call them (a) "conformism," (b) "conflict," and (c) "action." They overlap considerably, but this does not preclude their use in this context. I would then put Parsons and Mead in (a), Marx and Simmel in (b), and Schutz in (c). Theorists like Weber, and movements like symbolic interactionism, might have feet in (b) and (c), and so on. At first sight, one might conclude that I am substituting one set of arbitrary categories for another. In fact, my tentative idea is that the three models could be seen as *complementary*, in terms of a Christian view of the person. Thus, some of the inadequacies of each perspective might be counteracted if the modes are considered to be aspects of a more complete picture. This does not, of course, rule out the possibility that other inadequacies might make one or other perspective irredeemably misleading, but it does point the way to a positive *use* of what may initially seem to be unhelpful perspectives.

So how do these categories relate to a Christian view of persons? To answer this question, we must first consider some aspects of Balswick and Ward's understanding of the person. Again, I concur with the view that constructing a Christian model of society is a dubious pastime—if by that they mean a kind of "grand theory." (I do think that a task of social theology is to try to generalise, from the biblical data, some components of Christian social perspectives.) And in principle, I like their five-fold proposal concerning an adequate model. Still, I would question the notion that we "create" symbolic meaning (No. 1), as things only *have* meaning in relation to Christ (Olthuis n.d.). We may misunderstand the meaning, or distort the meaning, but can we "create" meaning? There are also *potential* difficulties with the idea of "selfish interests" (No. 4). We know what Balswick and Ward mean—that selfish interests are sinful, and as such, may motivate persons to sinful action. Without intending to carp, it *could* be thought that *all* self-directed interests were sinful, which is not, of course, the case. Christ said that our self-love should be the very measure of our neighbor-love. (Matthew 22:39) And this distinction does, I believe, have sociological implications, but they are outside the scope of this communication.

There are two issues to which I think the "trialectic" speaks: the "ahistorical human nature," and the non-appearance of a sociology which "takes into account the fact that man can be motivated by intrinsic selfish interests." Firstly, the ahistorical nature, which Balswick and Ward seem to suggest is implied when we refer to "the image of God." I question whether Scripture *does* provide a view of man's nature as "ahistorical." For we are creatures subject to time, and even have "eternity in our hearts" (Ecclesiastes 3:11). I wonder whether persons, as images of God, are not answerers (respons-ible) to God, in an ongoing context which is at once social and historical. If so, then the trialectic would relate to three aspects of life: law (a) to which it is difficult to respond because of the (b) tensions and contradictions of life, and yet which must somehow be responded to in the form of (c) actions.

But, it may be objected, does this not do away with the "absolute" character of God's demands? Leaving aside the question of what is *meant* by "absolutes" (they are unbiblical abstractions, not dissimilar, in my opinion, from the one of an "ahistorical human nature") I would argue that nothing biblical is jeopardised by thinking of persons as being intrinsically "historical." People are no less subject to God's requirements, in this view, and no less unable to attain salvation through personal merit, because of it. Rather, this view puts the burden of judgment of human activity where it should be, with God. For I doubt whether a sociology ever will be found which copes with evil in the way that I feel Balswick and Ward mean.

But *discernment*, between rightful and wrongful responses to God's directives, is quite possible via the trialectic. The non-Christian it seems to me, will tend to polarise towards one or two aspects of the trialectic (giving us "oversocialised concepts of man" and so on), or else, even if all three aspects are recognised in some form, will not be able to live authentically in the light of them. Only the person who is "in Christ" can see not only (God's) law, and the tensions of a fallen world which necessitate a choice of ways of responding to that law, but also act in such situations with a clear conscience. And as far as sociology is concerned, I think this means that the whole *perspective*, rather than judgments about individual evils, will be that which is faithful to the biblical view of the person as image of God and yet a fallen creature. Balswick himself illustrates what I mean in his own (1971) work, when he *discerns* not the "fact," but the "tragedy" of the inexpressive American male.

I am working these ideas out further in a paper entitled "Images of the person in theology and sociology."

Balswick, J., 1971 "The Inexpressive Male: A Tragedy of American Society," *The Family Co-ordinator,* 20.

Deszin N. 1969 "Symbolic Interactionism and Ethnomethodology: A Proposed Synthesis," *American Sociological Review,* 34, 922-934

Mouw R. 1976 *Politics and the Biblical Drama,* Grand Rapids Erdmans

Olthuis, J., n.d. "The Reality of Societal Structures," Toronto, Institute for Christian Studies, (mimeo).

Ritzer, G., 1975 "Sociology: A Multiple Paradigm Science," *American Sociologist,* 10, 156-167

David Lyon
123 Newton St.
Bradford, West Yorks
BD5 7BH England

Creativity

Creativity is an arbitrary synthetic process. On the human scale it is responsible for the establishment of modes of communication, modification of the physical environment, and social institutions;

on the cosmic scale it is responsible for the countless forms of the material universe. To see man in a creative universe makes possible the change in human consciousness needed for a fresh approach to the problems of our time.

The great progress made by scientists in analytical studies of the material universe cannot conceal from them their inability to comprehend it. How can elemental order arise from subatomic disorder, or living organisms from varying arrays of nucleic acid and protein molecules? The term "creation" is used loosely to describe, but it does not solve the puzzle of organization. There appears to be a need to clarify the concept, and this can best be accomplished by reference to the human experience.

Human Creativity

In order for man to create he must be able to reason. Reasoning involves sensing, perceiving and conceiving. Formation of a concept depends on repeated perception of like events; it may be said to be the ability to simplify the multiple. The growing infant learns to discern a ball regardless of size and color, table and chairs irrespective of texture and appearance. The recognition of qualities, shape, size, and color is apparently not unique to man. Anthropoid apes can be trained to recognize symbols. They can learn to look for food behind doors which are, say, painted blue or marked with a square. There is no further progress. Man's mental development proceeds to another stage when he acquires the ability to utilize the qualities he has learned to recognize. This may be described as multiplication of the simple, active mentality, creativity. Thus, the normal child is not only expected to recognize a house or a tree or a man but also to name, describe, draw, and make models of them, expressing something personal, something creative in so doing.

Rationality at the highest level thus becomes creativity, making something of one's own, but something that can also be recognized and appreciated by others. Others are important, for if they cannot grasp what the individual has created, like nonsense words or misrepresented objects, they cannot communicate with him, hence would be bound to consider him non-rational. A man living by himself, separated from all human contacts since infancy, would have such a limited range of understanding as to appear merely a clever animal.

Man's achievements are indeed the results of group living. They are of three kinds: modes of communication, modification of the physical environment, social institutions. Language and mathematics are our modes of communication, for which we are indebted to remote ancestors. To create a system of sounds in order to express ideas, to translate it into written symbols, and to conceive of numbers and their relationships must all have been extremely difficult undertakings. As there were no models, men had to make it all out of nothing, synthesize it according to arbitrary rules. The modification of man's physical environment began with the invention of tools, cultivation of the land, and domestication of animals, but has undoubtedly reached its peak only in recent times. Indeed, it has now proceeded so far as to arouse serious concern about the exhaustion of our energy and mineral resources, the pollution of our environment, the reproduction of our own numbers beyond what this planet can sustain. The establishment of social institutions remains the major problem today. Rules of group living, for young and old, parents and children, men and women, those of greater and lesser ability, form the basis of morality and culture of societies. They show a wide range of variation, dependent on the physical environment and the historical experiences of the group. In most parts of the world there has always been conflict between groups. Wars have been fought by some to acquire the wealth and labor of their neighbors and by others to defend the integrity of their own group. The threat of mutual annihilation through thermonuclear weapons has made wars obsolete and demands, instead, steps toward establishing a peaceful world community.

Whatever our present problems may be, we have undoubtedly created here on earth a system of order in accordance with our endowments and purposes. Now creating is a process like seeing, hearing, and feeling. And just as what is seen, heard, and felt depends on who does the sensing; what is created depends on who creates. From the analysis of animal sense organs we have learned a great deal about what animals can sense and how, consequently, the world appears to them. Some animals react only to direct physical stimuli, others rely primarily on their sense of smell, others have very acute vision or hearing. We are aware of the limitation of our senses. The light and sound waves we are able to perceive form only a small portion of the entire spectrum of waves. The world would appear different to us if we had X-ray eyes or if our ears were attuned to supersonic waves. The structure of our bodies determines our experience of the outside world; it must also determine what we create. If we had no vocal chords, we could not speak; if our eyes could not be accommodated to near vision, we could not write or read. All this seems obvious, yet it cannot be over-emphasized that what we have learned and what we have created is the result of the application of the reasoning process to a specific situation: man and his environment. Our knowledge is derived from the human way of understanding; our language, mathematics, and art from the human way of communicating; our morality, laws, and institutions from the human way of behaving. It is possible that there may be other beings endowed with the reasoning faculty which would look at the world - or their corner of the universe - quite differently from ourselves. They might not even look at all but apprehend their environment with the aid of other senses. But one condition would have to be fulfilled: intelligent beings, to deserve this rating, must have created a system of order. Or, to put it conversely: a system of order perceivable by us would be evidence of the work of intelligent beings.

Cosmic Creativity

We live in a system of order, the cosmos, made up of a vast variety of material forms, from tiniest energy quanta to large living organisms, but essentially of only two basic constituents: material energy and its ordering element. It extends from maximum entropy, the speed of light, to minimum entropy, approaching absolute zero. At the one extreme of the scale, only quanta, the smallest bits of matter, can exist, whereas at the other extreme there is a frozen state of matter with ever increasing order. What is beyond those limits, material energy without imposed order or perfect order without material energy, is no more perceivable. It would seem reasonable then to view material evolution from quanta through subatomic particles, atoms, molecules, cells, all the way up to man as the result of increasing organization of the underlying material energy.

To attribute this evolutionary process to the workings of chance completely misses the point. It is the same kind of fallacious reasoning illustrated by the often quoted example of Huxley's typing monkeys. By furiously pounding their typewriters for years on end they might, by an exceedingly remote chance, succeed in reproducing Shakespeare's sonnets, but these would just be jumbles of lines to any being but a man. Only he could recognize the symbols and the qualities they were meant to express, because he had been taught by his ancestors, who created them. Just as random juxtapositions of letters or sounds resulting in words such as table, chair, love, and hate would be completely meaningless if not endowed with definite conceptual qualities by human minds, no arrangement of elementary particles, atoms, molecules, or cells could ever be more than that unless a creative mind superimposed upon it a new material quality, submerging thereby individual components into a larger whole. This arbitrary synthetic process must remain beyond the grasp of man's reason because it operates on a plane inaccessible to his experience. Human creativity is unable to cope with material energy, the stuff of the physical world. It requires a mental activity other than ours to mold it into forms endowed with qualities which we are able to perceive, directly or by means of ingenious instruments, hence constitute what we call existing or real.

To conceive of a mentally directed universe presents of course great psychological difficulties. We are persons, yet the universe is impersonal. It is passive, unemotional and indifferent to man. Now the literal meaning of person is mask. We are all wearing masks imposed upon us by the needs of our bodies. The universe obviously does not wear a human mask, hence must appear impersonal to us. To carry the analogy a bit further, let us assume for a moment the human race had been wiped out in some kind of natural catastrophe but its creations were left undisturbed. Let us assume further that a new form of intelligent being, say an insect, were to inherit the earth. How would such reasoning insects look at the products of human creativity, houses, automobiles, tools, anything made by us? It seems rather obvious that they would regard them in much the same way as we regard the creations of the cosmos, something to be analyzed and possibly utilized, but certainly not the result of mental activity because, from their point of view, mental activity would produce only things of personal usefulness to insects. Actually, the analogy is not quite correct since our universe, in both its inorganic and organic aspects, is still evolving, but it illustrates, I believe, the overriding importance of a proper perspective. Insects would embrace entomocentrism as naturally as we do anthropocentrism.

Man in the Creative Universe

Man's history is to a large extent the record of the conquest of a passive or hostile environment by human ingenuity. Such experience has made virtually inevitable man's belief in the uniqueness of his intelligence and with it in his natural right to dominance, as so well expressed in the Darwinian idea of the preservation of favored races (or survival of the fittest) in the struggle for life.

We know now that the life-and death struggle of evolutionary theory does not take place in nature. In fact, nature offers no parallel for the concept of fitness as superiority. The fittest in nature survive through adaptation, that is, through fitting their requirements to available resources. Atoms, molecules, and bacteria are not inferior to elephants and redwood trees because they are smaller and can do less than the latter. By the same token, it may be said that if an individual is endowed with certain mental capabilities, which, under the circumstances prevailing in his society, secure him a directing influence, this is no proof of his superiority but merely places on him an obligation to serve others in accordance with his ability and opportunity. This seems an obvious proposition since nobody is given a choice in selecting his parents, i.e., his physical and mental inheritance, his environment, his family, the neighborhood in which to grow up, or the country of his birth.

Superiority over the rest of nature is an incredibly arrogant notion, as it implies power which it would be absurd for man to claim. The exploration of nature can give us only knowledge comparable to that we acquire in learning a language, native or foreign. The more intensive our study, the more we become aware of grammatical and idiomatic intricacies. Our command of the language steadily improves; it will never reach perfection. Obviously, a more intricate knowledge of the laws of nature could be only beneficial to man and should be sought by all means. What we face today is that knowing nature can give us power in the meaning of arbitrary decision, not over nature, but over other men. Our understanding and subsequent application of thermonuclear reactions has certainly not had the slightest effect on the laws governing them, but the power it has given us over other men is truly terrifying.

In the Middle Ages, men naively believed that the central position of a static earth in the created universe was a reflection of their superiority in the eyes of God. We have just as naively proclaimed our superiority through the uniqueness of our reason, dismissing the countless structures of the material universe as chance products of evolution, conceiving all creative beings to be essentially like humans, even though science fiction artists usually make the concession of depicting them with pointed heads and protruding antennae. By freeing ourselves from anthropocentrism we shall be able to gain new insights into the workings of the rational universe of which we are a part. Moreover, it will make possible the change in human consciousness needed for a fresh approach to the problems of our time.

Paul H. Kopper
Department of Biology
Washburn University of Topeka
Topeka, Kansas 66621

More Important Questions than Evolution and Creation?

About a month ago, I received my first issue of the *Journal ASA*. I was disappointed to see that almost the entire issue was devoted to Evolution and Creation. *The Origin of Species* is almost 120 years old. Surely the problem of Evolution vs. Creation has been talked to death in that time. If not to death, then so nearly that little will be gained by hashing it out again and again. And besides, there are other problems in the integration of scientific learning and Christian faith, which are ignored when Evolution is treated as *the* problem.

One such problem is the relation between Time and Eternity. I think that it is best expressed as a thought-experiment. Suppose that two born-again Christians are living on planets 100 light-years apart (as measured in their reference frames). They are, to an excellent approximation, at rest relative to one another. If they die on the same night—as seen in their common frame—which one gets to Heaven first? To an observer going toward man A's planet, man A will die before B. Possibly a long time before, depending on the observer's speed. The opposite will be true for an observer moving toward B's planet.

The second problem is: How is a belief in God's omniscience reconcilable with the facts of quantum mechanics? Most readers of the *Journal* are probably familiar with the *Feynman Lectures on Physics*. In Chapter 37 of Volume I, Feynman describes an experiment with electrons.

As electrons leave a gun, they pass (we suppose) through holes 1 and 2 in plate A, to be detected on a wall B behind plate A. If hole 2 is closed, then the distribution of electrons on B has a single maximum behind hole 1. If hole 1 is closed, the distribution has a single maximum behind hole 2. But if both holes are open, multiple maxima and minima occur as the electron's probability amplitudes interfere. The interference happens when we don't know which hole each electron goes through to get to the wall. If measuring devices are set next to the holes, to see the electrons as they go through, then the interference disappears as the certainty of the devices' measurements goes up. There is no interference when one hole is stopped, because then we know that the electron went through the other hole.

This is a general rule: knowledge, or possibility of knowledge, of particle paths destroys interference. When two electron beams intersect, the scattered particles exhibit interference; but when one of the beams is a proton beam, they don't. Here the cause of this "smearing" of the interference does not seem to be physical disturbance of the system, but merely the possibility of knowledge about it. In the electron experiment, how could the stopping up of hole 1 "disturb" an electron as it goes through hole 2?

If this is true, then in what sense is God's knowledge knowledge? What does it mean to say "God knows. . ."? It can't mean the same as "Mr. Jones knows. . .," because Mr. Jones' knowledge destroys interference, but God's does not. If I were doing the electron experiment with both holes open, and God Himself were to tell me—as each electron clicked in my counter—"That one went through hole 2," etc., then would I *know* which hole each electron went through? If so, in what sense? If not, then what does that say about revelation in general?

My last problem is: Who was the man that fell? Was it Neanderthal? Cro-Magnon? Java? I am not an anthropologist, but I have read that, long before Modern man, men—or pre-men—were making weapons, and splitting open each other's bones to eat the marrow. Presumably, these things did not happen before man's Fall: no need for weapons (or cannibalism) when every man and animal is a vegetarian (Genesis 1:28-30), and there is plenty to eat. If these weapons and split bones are Post-Fall, then the Fall occurred a *long* time ago; and Adam wasn't a Modern man. If Adam was Modern, why so much violence before his time?

I have presented these problems in order of increasing seriousness. I would like to help toward some answers, from other scientists who know Christ. Maybe (I hope) this letter will stir up some discussion.

J. Michael Wilson
795 South Lake Avenue
Pasadena, California 91106

Editor's Comment: If neophyte ASA member Wilson had been around longer he would realize that your editor has advocated a moratorium on the discussion of creation and evolution for many years. Still the *Journal* carries lengthy discussions and devotes entire issues to the subject—Why? Only because you our readers demand that we offer continuing insights on this subject. No matter how much we may wish it otherwise, the subject of creation and evolution continues to be a vital one for many Christians, particularly new Christians. I never give a talk on science and Christian faith anywhere without a major portion of the discussion section being devoted to questions on evolution. As long as this is the case, it would be irresponsible of the *Journal* to ignore this issue completely.

Answers to reader Wilson's more profound questions may be hazarded. (1) The first problem founders on the assumption that "getting to Heaven" is a matter that should be discussed within a space-time framework. The relation between Time and Eternity is a thorny one, but this thought-experiment does not seem to illuminate it. (2) The phenomena of interference do not depend upon our lack of *knowledge*; they are a consequence of

Founded in 1941 out of a concern for the relationship between science and Christian faith, the **American Scientific Affiliation** is an association of men and women who have made a personal commitment of themselves and their lives to Jesus Christ as Lord and Savior, and who have made a personal commitment of themselves and their lives to a scientific description of the world. The purpose of the Affiliation is to explore any and every area relating Christian faith and science. The *Journal ASA* is one of the means by which the results of such exploration are made known for the benefit and criticism of the Christian community and of the scientific community.

Members of the **American Scientific Affiliation** endorse the following statement of faith: (1) *The Holy Scriptures are the inspired Word of God, the only unerring guide of faith and conduct.* (2) *Jesus Christ is the Son of God and through His Atonement is the one and only Mediator between God and man.* (3) *God is the Creator of the physical universe. Certain laws are discernible in the manner in which God upholds the universe. The scientific approach is capable of giving reliable information about the natural world.*

Associate Membership is open to anyone with an active interest in the purpose of the ASA. *Members* hold a degree from a university or college in one of the natural or social sciences, and are currently engaged in scientific work. *Fellows* have a doctoral degree in one of the natural or social sciences, are currently engaged in scientific work, and are elected by the membership. *Dues*: Associate $14.00, Member $19.00, and Fellow $26.00 per year. A member in any of these three categories can take the *special student rate* of $5.00 per year as long as he is a full time student.

PUBLICATIONS include the *ASA News* (sent to all members four to six times each year); four symposia: *Modern Science and Christian Faith*, F. Alton Everest, Editor, Van Kampen, Wheaton, Illinois (1950) (out of print), *Evolution and Christian Thought Today*, Russell L. Mixter, Editor, Eerdmans, Grand Rapids, Michigan (1960), *Our Society in Turmoil*, G. Collins, Editor, Creation House, Carol Stream, Illinois (1970), and *People, Power and Protein, Journal ASA Supplement* 1 (1976). Individual authors are also encouraged to publish independently.

LOCAL SECTIONS of the American Scientific Affiliation have been organized to hold meetings and provide an interchange of ideas at the regional level. Membership application forms, ASA publications and other information may be obtained by writing to: AMERICAN SCIENTIFIC AFFILIATION, Suite 450, 5 Douglas Ave., Elgin, Illinois 60120.

CENTRAL CALIFORNIA

CHICAGO

DELAWARE VALLEY

GULF-SOUTHWEST

INDIANA

NEW ENGLAND

NEW YORK CITY AREA

NORTH CENTRAL (Minnesota)

ONTARIO

OREGON

RESEARCH TRIANGLE (North Carolina)

SAN DIEGO

SAN FRANCISCO BAY

SOUTHERN CALIFORNIA

WASHINGTON-BALTIMORE

WESTERN MICHIGAN

WESTERN NEW YORK

---

considering the *whole system*. Problems with respect to knowledge are interjected if we persist in treating the problem without considering it as a whole system. God's knowledge apprehends the whole system. (3) The third problem sounds very much like a problem that arises from considering creation vs evolution! Some publications in past issues of the *Journal* that may be of some help, at least in defining the problem are:

P.H. Seely, "Adam and Anthropology: a Proposed Solution," 22, 3, S, 88 (1970

E.K. Victor Pearce, "Proto-neolithic Adam and Recent Anthropology," 23, 4, D, 130 (1971)

R.H. Bube, "Original Sin as Natural Evil," 27, 4, D, 171 (1975)

It seems there are a few problems that must be tackled first—including evolution—before this problem can be taken on.

"Upholding the Universe by His Word of Power." Hebrews 1:3

VOLUME 29, NUMBER 4 DECEMBER 1977