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

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TENSION IN THEOLOGY:

CREATION vs REDEMPTION

Several years ago I considered the theme, "Optimism and Pessimism: Science and Eschatology," in several talks and in a publication.[1] The theme of that consideration was essentially this: How do we as Christians relate the pessimism about earthly affairs that is induced by the biblical revelation concerning unredeemed human nature and the future, with the optimism that is ours because we belong to God in Jesus Christ? I tried to show how the main outlines of the pre-, post-, and amillennial eschatological systems often correlated with specific emphases on this question. Here I take a somewhat different look at a closely related question. The subject does not seem to have lost relevance over the past decade; in fact it seems to be a crucial issue in Christian thought seeking to integrate science and Christian faith.

No Biblical Disjunction between Creation and Redemption

There is no biblical disjunction between Creation and Redemption, between the God who creates and the God who saves. It is toward this unity that I commend our thinking; it is this striving for unity in the midst of obvious difference that causes the tension in theology named in the title of this paper.

The Bible clearly answers the question: "Who is this God who saves?" with the answer, "The Father Almighty, Maker of Heaven and Earth." For reference I mention just a few of the passages that establish this perspective.

Thus says the Lord, your Redeemer,
who formed you from the womb:
I am the Lord, who made all things,
who stretched out the heavens alone,
who spread out the earth - Who was with me? (Isaiah 44:24)

The heavens are thine, the earth also is thine;
the world and all that is in it, thou hast founded them.
The north and the south, thou hast created them ..
Thou hast a mighty arm; strong is thy hand, high thy right hand.
Righteousness and justice are the foundation of thy throne;
Steadfast love and faithfulness go before thee.
Blessed are the people who know the festal shout,
who walk, O Lord, in the light of thy countenance. (Psalm 89:11-15)

.. all things were made through him, and without him was not anything made that was made. .. He was in the world, and the world was made through him, yet the world knew him not. He came to his own home, and his own people received him not. But to all who received him, who believed in his name, he gave power to become children of God. (John 1:1-12)

.. for in him all things were created, in heaven and on earth, visible and invisible .. all things were created through him and for him. ... He is the head of the body, the church .. For in him all the fulness of God was pleased to dwell, and through him to reconcile to himself all things, whether on earth or in heaven, making peace by the blood of his cross. (Colossians 1:16-20)

Given this biblical clarity, how could there be tension

This is one of three keynote addresses on the theme, "Choices We Face," presented at the 1979 Annual Meeting of the American Scientific Affiliation at Stanford University, Stanford, California.

in preserving the integration of Creation and Redemption? It is not the first case where the twists and turns of human philosophy have been discontent to accept a biblical synthesis and have sought instead either for various kinds of disjunctions, subjecting one of these great biblical doctrines to the other, or for false syntheses, blurring the distinctions between them.

Greek vs Hebrew Thought

Matthew Fox, for example, has argued[2] that Greek and Hebraic understandings of "creation" itself are quite different. The Greeks saw "creation" as concerned with the mechanisms of the origin of the world, with the type of concerns that characterize a scientific view. The Hebrews saw "creation" as the inauguration of salvation history—a mighty work of God inseparably tied to the more transcendent aspects of salvation and redemption.

Fox goes on to argue that Greek and Hebrew readings of the meaning of "salvation" also differ appreciably. The Greeks saw "salvation" as a journey out of this world, and "redemption" as perfection. The Hebrews, on the other hand, saw "salvation" as a re-creation of this world, and "redemption" as liberation for the oppressed.

Considering the strong philosophical blending of Greek with Hebraic thought that underlies our own theological understanding of these concepts, it is not surprising that room for extreme positions can easily develop, extremes that in effect break the biblical correlation of Creation and Redemption.

"Radical" vs "Compromise"

With his characteristic prophetic vision Dietrich Bonhoeffer also saw the full dimensions of this continuing tension. In his unfinished *Ethics*,[3] Bonhoeffer spelled out the tension in what he called the problem of "the ultimate and the penultimate." Here "the ultimate" is the justification of the sinner by the grace of God; it focuses on redemption. "The penultimate" is everything that occurs in time on the way to the ultimate; it focuses on creation. Bonhoeffer points out two typical errors that result from treating either the ultimate or the penultimate without the other.

The first he calls the "radical" solution; it corresponds to exclusive emphasis upon redemption: the penultimate is destroyed by the ultimate, God is seen as Judge and Redeemer, the end is rendered absolute, and ethics are based solely on the Cross or the Resurrection. There is an implicit rejection or downplaying of creation, time, patience, wisdom, moderation and reality. This is the solution of the hyperfundamentalist with insistence on the saving gospel only, and an exaltation of Redemption over Creation.

The second Bonhoeffer calls the "compromise" solution; it corresponds to exclusive emphasis on creation: the ultimate is excluded by the penultimate, God is seen as Creator and Preserver, things-as-they-are are rendered absolute, and ethics are based solely on the Incarnation. There is an implicit rejection of redemption, eternity, decision, simplicity, the immeasurable, and the Word. This is the solution of the liberal with insistence on the social gospel only, and an exaltation of Creation over Redemption.

Bonhoeffer makes clear to us that another facet of the Creation/Redemption tension is the Incarnation/Cross tension. To focus on the Incarnation is to emphasize the value of man and of this real world; for God became a man and lived in this world. To focus on the Cross is to emphasize the worthlessness of man ("Would He devote that sacred head for such a worm as I?") and this sinful world; for human sin caused God to give up his Son to death.

We see also that the Creation/Redemption, Incarnation/Cross tensions are paralleled by the Social Gospel/Personal Evangelism tension in Christianity. Bonhoeffer calls Christians to be neither "radical" nor "compromisers" in this sense, but instead to realize that it is only in Christ that the resolution of this tension lies: his Incarnation shows the love of God for his creation, his Crucifixion shows the judgment of God upon all flesh, and his Resurrection shows God's will for a new world. Since these three are revelations of one God, one cannot be emphasized at the expense of the others.

Elevating Creation over Redemption

In some ways the Creation/Redemption tension is simply a reflection of the traditional Science/Religion tension. To elevate Creation over Redemption often takes the form, therefore, of elevating science over religion—indeed of attempting to establish a scientific religion, which since it is *scientific*, is devoid of all revelational aspects.

Ralph Wendell Burhoe, for example, has sought to set forth what he calls a "scientific theology" of which he states,

> the religious reformation now .. will be a theological adaptation of traditional religious beliefs and rituals to the modern sciences. The new religious language will be as high above that of five centuries ago as contemporary cosmology is above the Ptolemaic. .. I prophesy human salvation through a reformation and revitalization of religion at a level superior to any reformation in earlier histories.[4]

The motivation for this reformation of theology is to allow the benefits of "religion" to become available to the modern mind, saturated with scientific and skeptical perspectives. Since the realm of the applicability of science is the natural world, it inevitably follows that biblical revelation is rejected and only a very naturalistic religion results from the elevation of science over religion, i.e., of Creation (in a general sense) over Redemption.

In this "scientific theology" a thorough transformation of terms takes place. The God of the Bible is replaced by "nature." The total ecosystem is the Kingdom of God. The supernatural is anything not covered by common sense. Science is truth. Evil means non-viable. Salvation is man's quest for survival. Individual survival of death is rejected. Since there is no personal God, there is no holy God, there is no sin against moral standards, no need for atonement from sin, no biblical remnant of the concept of Redemption left, and of course no need for a Savior. Jesus Christ is curiously absent from scientific theology.

Elevating Redemption over Creation

To elevate Redemption over Creation is to elevate religion over science—to attribute no value to the present world because it will pass away before the new creation of the world to come. This is the strong thrust of much that has been called fundamentalist, particularly of the

dispensational variety, in recent years, but it also has an historic root in Christian asceticism and monasticism.

It is indeed acknowledged that God did create—and in fact dogmatic insistence on anti-scientific views of the mechanism of that creation fairly generally characterize this position—but since the curses that followed the Fall were leveled against this creation, it is a dying and corrupted thing, suitable only to be set aside or tolerated for the present in view of the demands of eternity. Attempts to live responsibly in the real world by dealing with its real problems are commonly condemned as a waste of time: "When a great ship is sinking, one doesn't try to bale out the water or plug the holes; one tries to save the living." By which is meant the preaching of the Gospel to save souls.

Equating Creation with Redemption

Of the three distortions of the Creation/Redemption tension we have considered, this is perhaps the most difficult to evaluate. Since both Creation and Redemption in some sense are expounded as central concepts, the subtleties that lead to the confession, "Creation *is* Redemption," are more difficult to judge fairly and without error. If, in trying to give some examples, I misrepresent someone's overall position by trying to interpret what their written word intends, I apologize at the very outset.

One of the characteristic ways of maintaining that "Creation is Redemption" is to invoke the process of evolution as the means by which this works itself out in time. Teilhard de Chardin here seems to me to be an outstanding example; he saw the unfolding of the world under the power of the love of God, finally to be characterized by a period of convergence that would bring all into Christ.[5] He saw evolution shaping the universe in cosmogenesis, bringing forth life in biogenesis, giving rise to thought in noogenesis, and finally reversing this diverging trend to unite all in Christ in Christogenesis. In this framework, however, evil and sin are simply by-products of the process of evolution, and have nothing to do with the central issues of life. Either all mankind will arrive at Omega in Christ or none will. Although the name of Christ is named, it is not Jesus the Christ who lived, died and rose again, of whom he speaks—but rather a kind of universal "Christ symbol." If Creation is Redemption, then God redeems *through creative activity*, and not through the death of Jesus Christ on the cross. Mankind participates in the work of creation and hence of redemption: we become co-creators with God and high priests of God's creation.

The movement toward humanism is an everpresent danger: there is much talk about what mankind *must* do in the future to bring in this Kingdom of God. We must see the earth and all it holds as a whole. We must respond to the love of God which drives the evolutionary process. We must be caring, unselfish, open . . . indeed, we *must* be everything that *unredeemed human beings cannot be*!

The Allure of Space

Christians in science find this equating of Creation with Redemption particularly seductive. Sometimes it seems as if Christians have either crossed over into the "Creation is Redemption" camp, or at least write in such a way as to leave their position ambiguous. Without in any way wishing to offend, I would like to mention here two recent articles written by Christians of eminent standing that left me wondering if some violation of the Creation/Redemption tension were not involved at least in their style of presentation.

The first article was written by the distinguished President of Whitworth College, Edward B. Lindaman, who says in part,

> after centuries of maturation, the hour has come when we are seeing our own significance in the physical world. . . Today we look out of our suburban dens (which have replaced our prehistoric caves), and we blink our eyes with the sudden realization that, thanks to science, all the filters have been removed from between us and everything that happens anywhere in the world. *Responsibility has been handed back to us as individuals.* Standing at the threshold between the age of gravity and the infinity of space, we must now begin to evaluate our celestial purposes. To handle this new level of responsibility we can borrow from the growing school of futurists a variety of techniques and postures which equip us to think and act wisely and with dispatch. Perhaps the place to begin is in taking charge of one's own life and assuming responsibility for creating one's own future. . . . What we imagine of the future determines what will be.[6]

Now I am ardently in favor of our undertaking our responsibility as Christian stewards of God's earth—and even God's heavens. But I am troubled that there is no mention in this consideration of the future of an ongoing need for the change in human nature through faith in Jesus Christ and his work on Calvary. I am troubled that Christ is indeed not mentioned at all even though the title of the article is "Thinking in the Future Tense." Although a Christian commitment may well be assumed in view of both the author and the publication, the article itself is curiously non-theistic. I am troubled by what might be taken as an affirmation that Creation is Redemption, that what we might mean by "salvation" does not have all that much to do with what happened on Calvary or with what happens in human hearts today.

Higher Levels of Reality

The second article is the acceptance speech of Dr. Thomas F. Torrance, winner of the 1978 Templeton Prize.[7] Dr. Torrance is concerned with what he calls "theological science," and writes,

> The fact that the universe has expanded in such a way that the emergence of conscious mind in it is an essential property of the universe, must surely mean that we cannot give an adequate account of the universe in its astounding structure and harmony without taking conscious mind into account, that is, without *including conscious mind as an essential factor in our scientific equations*. . . If this is the case, as I believe it is, then natural science is on the verge of opening itself out toward higher levels of reality.

The fact that the structure of the universe appears to fall within that extremely narrow range required to allow the existence of human life on earth may well have profound theological and apologetic implications. But there is again no mention of Christ or of Redemption in this article to indicate the need for maintaining the crucial Creation/Redemption tension. Instead the article ends with a statement that could be construed as quite open-ended toward affirming that Creation is Redemption.

> It is more and more clear to me that, under the providence of God, owing to these changes in the very foundations of knowledge in which natural and theological science alike have been sharing, the damaging cultural splits between the sciences and the humani-

> ties and between both and theology are in process of being overcome, the destructive and divisive forces too long rampant in world-wide human life and thought are being undermined, and that a massive new synthesis will emerge in which man, humbled and awed by the mysterious intelligibility of the universe which reaches far beyond his power, will learn to fulfil his destined role as the servant of divine love and the priest of creation.

Frankly I am troubled by this reference to a "massive new synthesis" in which all distinctions between science and theology will disappear; there are some distinctions that must be preserved in keeping the Creation/Redemption tension biblically sound. I am troubled by the implication that mankind will "learn to fulfil his destined role" by his interaction with the universe—for that sounds very much to me like saying that mankind will be redeemed through creative and not redemptive acts.

I am troubled further that Dr. Torrance speaks about "science opening itself out toward higher levels of reality" and seems to be falling into a semantic pattern that opens other doors. My concern with "Cosmic Consciousness" and its blurring of vital distinctions between authentic science and authentic theology has already been set forth previously and there is not space here to repeat those arguments.[8] The key choice is the following: Shall we continue to view "science" as a valid endeavor within its historical limitations of knowledge obtained by the interpretation of sense data, or shall we opt for a revision of what it means to do science by seeing science inappropriately limited by its past methodology and needing to be broadened and freed to provide us with insights into wider realms?

A word of strong caution is in order. Authentic science as traditionally defined shares a worldview with biblical Christianity. Changes ought to be made only with great care and as absolutely needed. A premature giving up of authentic traditional science may well initiate a new Dark Age where no claim to truth is valid. Let us at least be enough followers of David Hume to recognize that authentic scientific descriptions of the natural world are in general far more reliable than human psychological impressions. Nor should we on the other hand easily suppose that current scientific descriptions have obvious spiritual and theological implications.

Maintaining the Creation/Redemption Tension

As Christian men and women of science we have a particular calling to maintain the biblical tension, both integrative and distinctive, of Creation and Redemption. We live in God's world as God's stewards, called by him to care for the creation he has entrusted to us for a time. We are responsible before him to work out this stewardship responsibility faithfully, taking advantage of all the possible talents, techniques and opportunities that God has made available to us.

We also live in a world in need of Redemption, a world in which men and women will not live as stewards and caretakers for God unless they truly know God through faith in Jesus Christ. The application of human creativity without a change in human nature through the divine creativity of God in Jesus Christ will ultimately benefit nothing. To plan for the solution of mankind's problems by ignoring the orientation of the human heart outside of Christ, in rebellion against God and his fellow man, is to neglect reality and to court delusion, unbelief and frustration.

The proper Creation/Redemption tension is so fragile, so easily lost with slippage to one extreme or the other, that we must exercise extreme care in discussing such issues so as not to mislead or lead into error. For that which God has created, he has provided the means of Redemption; for that which God has redeemed, he has provided a new creation.

> *All things were created through him and for him. . . . through him to reconcile to himself all things, whether on earth or in heaven, making peace by the blood of his cross.*

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Philosophical and Scientific Pointers to *Creatio ex Nihilo*

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To answer Leibniz's question of why something exists rather than nothing, we must posit three alternatives: the universe either had a beginning or had no beginning; if it had a beginning, this was either caused or uncaused; if caused, the cause was either personal or not personal. Four lines of evidence, two philosophical and two scientific, point to a beginning of the universe. If the universe had a beginning, it is inconceivable that it could have sprung uncaused out of absolute nothingness. Finally, the cause of the universe must be personal in order to have a temporal effect produced by an eternal cause. This confirms the biblical doctrine of **creatio ex nihilo**.

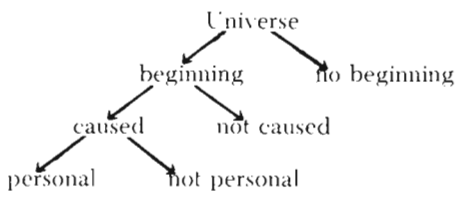
". . . The first question which should rightly be asked," wrote Gottfried Wilhelm Leibniz, is "Why is there something rather than nothing?"[1] I want you to think about that for a moment. Why *does* anything exist at all, rather than nothing? Why does the universe, or matter, or anything at all exist, instead of just nothing, instead of just empty space?

Many great minds have been puzzled by this problem. For example, in his biography of the renowned philosopher Ludwig Wittgenstein, Norman Malcolm reports,

> . . . he said that he sometimes had a certain experience which could best be described by saying that 'when I have it, *I wonder at the existence of the world*. I am then inclined to use such phrases as "How extraordinary that anything should exist!" or "How extraordinary that the world should exist!" '[2]

Similarly, the English philosopher J. J. C. Smart has said, ". . . my mind often seems to reel under the immense significance this question has for me. That anything exists at all does seem to me a matter for the deepest awe."[3]

Why *does* something exist instead of nothing? Unless we are prepared to believe that the universe simply popped into existence uncaused out of nothing, then the answer must be: something exists because there is an eternal, uncaused being for which no further explanation is possible. But who or what is this eternal, uncaused being? Leibniz identified it with God. But many modern philosophers have identified it with the universe itself. Now this is exactly the position of the atheist: the universe itself is uncaused and eternal; as Russell remarks, ". . . the universe is just there, and that's all."[4] But this means, of course, that all we are left with is futility and despair, for man's life would then be without ultimate significance, value, or purpose. Indeed, Russell himself acknowledges that it is only upon the "firm foundation of unyielding despair" that life can be faced.[5] But are there reasons to think that the universe is not eternal and uncaused, that there is something more? I think that there are. For we can consider the universe by means of a series of logical alternatives:



By proceeding through these alternatives, I think we can demonstrate that it is reasonable to believe that the universe is not eternal, but that it had a beginning and was caused by a personal being, and that therefore a personal Creator of the universe exists.

Did the Universe Begin?

The first and most crucial step to be considered in this argument is the first: that the universe began to exist. There are four reasons why I think it is more reasonable to believe that the universe had a beginning. First, I shall expound two philosophical arguments and, second, two scientific confirmations.

The first philosophical argument:

1. *An actual infinite cannot exist.*
2. *A beginningless series of events in time is an actual infinite.*
3. *Therefore, a beginningless series of events in time cannot exist.*

A collection of things is said to be actually infinite only if a part of it is equal to the whole of it. For example, which is greater? 1, 2, 3, . . . or 0, 1, 2, 3, ... According to prevailing mathematical thought, the answer is that they are equivalent because they are both actually infinite. This seems strange because there is an extra number in one series that cannot be found in the other. But this only goes to show that in an actually infinite collection, a part of the collection is equal to the whole of the collection. For the same reason, mathematicians state that the series of even numbers is the same size as the series of all natural numbers, even though the series of all natural numbers contains all the even numbers plus an infinite number of odd numbers as well. So a collection is actually infinite if a part of it is equal to the whole of it.

Now the concept of an *actual* infinite needs to be sharply distinguished from the concept of a *potential* infinite. A potential infinite is a collection that is increasing without limit but is at all times finite. The concept of potential infinity usually comes into play when we add to or subtract from something without stopping. Thus, a finite distance may be said to contain a potentially infinite number of smaller finite distances. This does not mean that there actually are an infinite number of parts in a finite distance, but rather it means that one can keep on dividing endlessly. But one will never reach an "infinitieth" division. Infinity merely serves as the limit to which the process approaches. Thus, a potential infinite is not truly infinite—it is simply indefinite. It is at all points finite but always increasing.

To sharpen the distinction between an actual and a potential infinite, we can draw some comparisons between them. The concept of actual infinity is used in set theory to designate a set which has an actually infinite number of members in it. But the concept of potential infinity finds no place in set theory. This is because the members of a set must be definite, whereas a potential infinite is indefinite—it acquires new members as it grows. Thus, set theory has only either finite or actually infinite sets. The proper place for the concept of the potential infinite is found in mathematical analysis, as in infinitesimal calculus. There a process may be said to increase or diminish to infinity, in the sense that the process can be continued endlessly with infinity as its terminus.[6] The concept of actual infinity does not pertain in these operations because an infinite number of operations is never actually made. According to the great German mathematician David Hilbert, the chief difference between an actual and a potential infinite is that a potential infinite is always something growing toward a limit of infinity, while an actual infinite is a completed totality with an actually infinite number of things.[7] A good example contrasting these two types of infinity is the series of past, present, and future events. For if the universe is eternal, as the atheist claims, then there have occurred in the past an actually infinite number of events. But from any point in the series of events, the number of future events is potentially infinite. Thus, if we pick 1845, the birthyear of Georg Cantor, who discovered infinite sets, as our point of departure, we can see that past events constitute an actual infinity while future events constitute a potential infinity. This is because the past is realized and complete, whereas the future is never fully actualized, but is always finite and always increasing. In the following discussion, it is exceedingly important to keep the concepts of actual infinity and potential infinity distinct and not to confuse them.

A second clarification that I must make concerns the word "exist." When I say that an actual infinite cannot exist, I mean "exist in the real world" or "exist outside the mind." I am not in any way questioning the legitimacy of using the concept of actual infinity in the realm of mathematics, for this is a realm of thought only. What I am arguing is that an actual infinite cannot exist in the real world of stars and planets and rocks and men. What I will argue in no way threatens the use of the actual infinite as a concept in mathematics. But I do think it is absurd that an actual infinite could exist in the real world.

I think that probably the best way to show this is to use examples to illustrate the absurdities that would result if an actual infinite could exist in reality. For suppose we have a library that has an actually infinite number of books on its shelves. Imagine furthermore that there are only two colors, black and red, and these are placed on the shelves alternately: black, red, black, red, and so forth. Now if somebody told us that the number of black books and the number of red books is the same, we would probably not be too surprised. But would we believe someone who told us that the number of black books is the same as the number of black books *plus* red books? For in this latter collection there are all the black books plus an infinite number of red books as well. Or imagine there are three colors of books or four or five or a hundred. Would you believe someone if he told you that there are as many books in a single color as there are in the whole collection? Or imagine that there are an infinite number of colors of books. I'll bet you would think that there would be one book per color in the infinite collection. You would be wrong. If the collection is actually infinite then, according to mathematicians, there could be for each of the infinite colors an infinite number of books. So you would have an infinity of infinities. And yet it would still be true that if you took all the books of all the colors and

added them together, you wouldn't have any more books than if you had taken just the books of a single color.

Suppose each book had a number printed on its spine. Because the collection is actually infinite, that means that *every possible number* is printed on some book. Now this means that we could not add another book to the library. For what number would we give to it? All the numbers have been used up! Thus, the new book could not have a number. But this is absurd, since objects in reality can be numbered. So *if* an infinite library could exist, it would be impossible to add another book to it. But this conclusion is obviously false, for all we have to do is tear out a page from each of the first hundred books, add a title page, stick them together, and put this new book on the shelf. It would be easy to add to the library. So the only answer must be that an actually infinite library could not exist.

But suppose we *could* add to the library. Suppose I put a book on the shelf. According to the mathematicians, the number of books in the whole collection is the same as before. But how can this be? If I put the book on the shelf, there is one more book in the collection. If I take it off the shelf, there is one less book. I can see myself add and remove the book. Am I really to believe that when I add the book there are no more books in the collection and when I remove it there are no less books? Suppose I add an infinity of books to the collection. Am I seriously to believe there are no more books in the collection than before? Suppose I add an infinity of infinities of books to the collection. Is there not now one single book more in the collection than before? I find this hard to believe.

But now let's reverse the process. Suppose we decide to loan out some of the books. Suppose we loan out book number 1. Isn't there now one less book in the collection? Suppose we loan out all the odd-numbered books. We have loaned out an infinite number of books, and yet mathematicians would say there are no less books in the collection. Now when we loaned out all these books, that left an awful lot of gaps on the shelves. Suppose we push all the books together again and close the gaps. All these gaps added together would add up to an infinite distance. But, according to mathematicians, after you pushed the books together, the shelves will still be full, the same as before you loaned any out! Now suppose once more we loaned out every other book. There would still be no less books in the collection than before. And if we pushed all the books together again, the shelves would still be full. In fact, we could do this an infinite number of times, and there would never be one less book in the collection and the shelves would always remain full. But suppose we loaned out book numbers 4, 5, 6, . . . out to infinity. At a single stroke, the collection would be virtually wiped out, the shelves emptied, and the infinite library reduced to finitude. And yet, we have removed exactly the same number of books this time as when we first loaned out all the odd numbered books! Can anybody believe such a library could exist in reality?

These examples serve to illustrate that *an actual infinate cannot exist* in the real world. Again I want to underline the fact that what I have argued in no way attempts to undermine the theoretical system bequeathed by Cantor to modern mathematics. Indeed, some of the most eager enthusiasts of trans-finite mathematics, such as David Hilbert, are only too ready to agree that the concept of actual infinite is an idea only and has no relation to the real world.[8] So we can conclude the first step: an actual infinite cannot exist.

The second step is: *a beginningless series of events in time is an actual infinite.* By "event" I mean something that happens. Thus, this step is concerned with change, and it holds that if the series of past events or changes just goes back and back and never had a beginning, then, considered all together, these events constitute an actually infinite collection. Let me provide an example. Suppose we ask someone where a certain star came from. He replies that it came from an explosion in a star that existed before it. Suppose we ask again, where did that star come from? Well, it came from another star before it. And where did that star come from?—from another star before it; and so on and so on. This series of stars would be an example of a beginningless series of events in time. Now if the universe has existed forever, then the series of all past events taken together constitutes an actual infinite. This is because for every event in the past, there was an event before it. Thus, the series of past events would be infinite. Nor could it be potentially infinite only, for we have seen that the past is completed and actual; only the future can be described as a potential infinite. Therefore, it seems pretty obvious that a beginningless series of events in time is an actual infinite.

But that leads us to our conclusion: *therefore, a beginningless series of events in time cannot exist.* We have seen that an actual infinite cannot exist in reality. Since a beginningless series of events in time is an actual infinite, such a series cannot exist. That means the series of all past events must be finite and have a beginning. But because the universe *is* the series of all events, this means that the universe must have had a beginning.

Let me give a few examples to make the point clear. We have seen that if an actual infinite could exist in reality, it would be impossible to add to it. But the series of events in time is being added to every day. Or at least so it appears. If the series were actually infinite, then the number of events that have occurred up to the present moment is no greater than the number of events up to, say, 1789. In fact, you can pick any point in the past. The number of events that have occurred up to the present moment would be no greater than the number of events up to that point, no matter how long ago it might be.

Or take another example. Suppose Earth and Jupiter have been orbiting the sun from eternity. Suppose that it takes the Earth one year to complete one orbit, and that it takes Jupiter three years to complete one orbit. Thus for every one orbit Jupiter completes, Earth completes three. Now here is the question: if they have been orbiting from eternity, which has completed more orbits? The answer is: they are equal. But this seems absurd, since the longer they went, the farther and farther Jupiter got behind, since every time Jupiter went around the sun once, Earth went around three times. How then could they possibly be equal?

Or, finally, suppose we meet a man who claims to have been counting from eternity, and now he is finishing: -5, -4, -3, -2, -1, 0. Now this is impossible. For, we may ask, why didn't he finish counting yesterday or the day before or the year before? By then an infinity of time had already elapsed, so that he should have finished. The fact is we could never find anyone completing such a task because at any previous point he would have already finished. But what this means is that there could never be a point in the past at which he finished counting. In fact we could never find him counting at all. For he would have already finished. But if no matter how far back in time we go, we never find him counting, then it cannot be true that he has been counting from eternity. This shows once more that the series of past events cannot be beginningless. For if you could not count numbers from eternity, neither could you have events from eternity.

These examples underline the absurdity of a beginningless series of events in time. Because such a series is an actual infinite, and an actual infinite cannot exist, a beginningless series of events in time cannot exist. This means that the universe began to exist, which is the point that we set out to prove.

The second philosophical argument:

1. *The series of events in time is a collection formed by adding one member after another.*
2. *A collection formed by adding one member after another cannot be actually infinite.*
3. *Therefore, the series of events in time cannot be actually infinite.*

This argument does not argue that an actual infinite cannot exist. But it does argue that an actual infinite cannot come to exist by the members of a collection being added one after the other.

The series of events in time is a collection formed by adding one member after another. This point is pretty obvious. When we consider the collection of all past events, it is obvious that those events did not exist simultaneously—all at once—but they existed one after another in time: we have one event, then another after that, then another, then another, and so on. So when we talk about the collection of "all past events," we are talking about a collection that has been formed by adding one member after another.

The second step is the crucial one: *a collection formed by adding one member after another cannot be actually infinite.* Why?—because no matter how many members a person added to the collection, he could always add one more. Therefore, he would never arrive at infinity. Sometimes this is called the impossibility of counting to infinity. For no matter how many numbers you had counted, you could always count one more. You would never arrive at infinity. Or sometimes this is called the impossibility of traversing the infinite. For you could never cross an infinite distance. Imagine a man running up a flight of stairs. Suppose everytime his foot strikes the top step, another step appears above it. It is clear that the man could run forever, but he would never cross all the steps because you could always add one more step.

Now notice that this impossibility has nothing to do with the amount of time available. It is of the very nature of the infinite that it cannot be formed by adding one member after another, regardless of the amount of time available. Thus, the only way an infinite collection could come to exist in the real world would be by having all the members created simultaneously. For example, if our library of infinite books were to exist in the real world, it would have to be created instantaneously by God. God would say, "Let there be. . . !" and the library would come into existence all at once. But it would be impossible to form the library by adding one book at a time, for you would never arrive at infinity.

Therefore, our conclusion must be: *the series of events in time cannot be actually infinite.* Suppose there were, for example, an infinite number of days prior to today. Then today would never arrive. For it is impossible to cross an infinite number of days to reach today. But obviously, today has arrived. Therefore, we know that prior to today, there cannot have been an infinite number of days. That means that the number of days is finite and therefore the universe had a beginning. Contemporary philosophers have shown themselves to be impotent to refute this reasoning.[9] Thus, one of them asks,

> If an infinite series of events has preceded the present moment, how did we get to the present moment? How could we get to the present moment—where we obviously are now—if the present moment was preceded by an infinite series of events?[10]

Concluding that this difficulty has not been overcome and that the issue is still in dispute, Hospers passes on to another subject, leaving the argument unrefuted. Similarly, another philosopher comments rather weakly, "It is difficult to show exactly what is wrong with this argument," and with that remark moves on without further ado.[11]

Therefore, since the series of events in time is a collection formed by adding one member after another, and since such a collection cannot be actually infinite, the series of events in time cannot be actually infinite. And once more, since the universe is nothing else than the series of events, the universe must have had a beginning, which is precisely the point we wanted to prove.

The first scientific confirmation: the evidence from the expansion of the universe. Prior to the 1920's, scientists assumed that the universe as a whole was a stationary object—it was not going anywhere. But in 1929 an astronomer named Edwin Hubble contended that this was not true. Hubble observed that the light from distant galaxies appeared to be redder than it should be. He explained this by proposing that the universe is expanding. Therefore, the light from the stars is affected since they are moving away from us. But this is the interesting part: Hubble not only showed that the universe is expanding, but that *it is expanding the same in all directions.* To get a picture of this, imagine a balloon with dots painted on it. As you blow up the balloon, the dots get further and further apart. Now those dots are just like the galaxies in space. Everything in the universe is expanding outward. Thus, the relations in the universe do not change, only the distances.

Now the staggering implication of this is that this means that at some point in the past, *the entire known universe*

was contracted down to a single point, from which it has been expanding ever since. The farther back one goes in the past, the smaller the universe becomes, so that one finally reaches a point of *infinite density* from which the universe began to expand. That initial event has come to be known as the "big bang."

How long ago did the big bang occur? Only during the 1970's have accurate estimates become available. In a very important series of six articles published in 1974 and 1975, Allan Sandage and G. A. Tammann estimate that the big bang occurred about 15 billion years ago.[12] Therefore, according to the big bang model, the universe began to exist with a great explosion from a state of infinite density about 15 billion years ago. Four of the world's most prominent astronomers describe that event in these words:

> The universe began from a state of infinite density. Space and time were created in that event and so was all the matter in the universe. It is not meaningful to ask what happened before the big bang; it is somewhat like asking what is north of the north pole. Similarly, it is not sensible to ask where the big bang took place. The point-universe was not an object isolated in space; it was the entire universe, and so the only answer can be that the big bang happened everywhere.[13]

This event that marked the beginning of the universe becomes all the more amazing when one reflects on the fact that a state of "infinite density" is synonymous to "nothing." There can be no object that possesses infinite density, for if it had any mass at all, it would not be *infinitely* dense. Therefore, as astronomer Fred Hoyle points out, the big bang theory requires the creation of matter from nothing. This is because as one goes back in time, he reaches a point at which, in Hoyle's words, the universe was "shrunk down to nothing at all."[14] Thus, what the big bang model requires is that the universe had a beginning and was created out of nothing.

Now some people are bothered with the idea that the universe began from nothing. This is too close to the Christian doctrine of creation to allow atheistic minds to be comfortable. But if one rejects the big bang model, he has apparently only two alternatives: the steady state model or the oscillating model. Let's examine each of these.

The steady state model holds that the universe never had a beginning but has always existed in the same state. Ever since this model was first proposed in 1948, it has never been very convincing. According to S. L. Jaki, this theory never secured "a single piece of experimental verification."[15] It always seemed to be trying to explain away the facts rather than explain them. According to Jaki, the proponents of this model were actually motivated by "openly anti-theological, or rather anti-Christian motivations."[16] A second strike against this theory is the fact that a count of galaxies emitting radio waves indicates that there were once more radio sources in the past than there are today. Therefore, the universe is not in a steady state after all. But the real nails in the coffin for the steady state theory came in 1965, when A. A. Penzias and R. W. Wilson discovered that the entire universe is bathed with a background of microwave radiation. This radiation background indicates that the universe was once in a very hot and very dense state. In the steady state model no such state could have existed, since the universe was supposed to be the same from eternity. Therefore, the steady state model has been abandoned by virtually everyone. According to Ivan King, "The steady-state theory has now been laid to rest, as a result of clear-cut observations of how things have changed with time."[17]

But what of the oscillating model of the universe? John Gribbin describes this model,

> The biggest problem with the big bang theory of the origin of the universe is philosophical—perhaps even theological—what was there before the bang? This problem alone was sufficient to give a great initial impetus to the steady state theory, but with that theory now sadly in conflict with the observations, the best way round this initial difficulty is provided by a model in which the universe expands, collapses back again, and repeats the cycle indefinitely.[18]

According to this model, the universe is sort of like a spring, expanding and contracting from eternity. It is only in the last three or four years that this model has been discredited. The key question here is whether the universe is "open" or "closed." If it is "closed," then the expansion will reach a certain point, and then the force of gravity will pull everything together again. But if the universe is "open," then the expansion will never stop, but will just go on and on forever. Now clearly, if the universe is open, then the oscillating model is false. For if the universe is open, it will never contract again.

Scientific evidence seems to indicate that the universe is open. The crucial factor here is the density of the universe. Scientists have estimated that if there are more than about three hydrogen atoms per cubic meter on the average throughout the universe, then the universe would be closed. That may not sound like very much, but remember that most of the universe is just empty space. I shall not go into all the technicalities of how scientists measure the density of the universe,[19] but let me simply report their conclusions. According to the evidence, the universe would have to be at least ten times denser than it is for the universe to be closed.[20] Therefore, the universe is open by a wide margin. Let me share with you the conclusion of Alan Sandage: (1) the universe is open, (2) the expansion will not reverse, and (3) *the universe has happened only once* and the expansion will never stop.[21]

The evidence therefore appears to rule out the oscillating model, since it requires a closed universe. But just to drive the point home, let me add that the oscillating model of the universe is only a *theoretical* possibility, not a *real* possibility. As Dr. Tinsley of Yale observes, in oscillating models

> . . . even though the mathematics *says* that the universe oscillates, there is no known physics to reverse the collapse and bounce back to a new expansion. The physics seems to say that those models start from the big bang, expand, collapse, then end.[22]

Hence, it would be impossible for the universe to be oscillating from eternity. Therefore, this model is doubly impossible.

The second scientific confirmation: the evidence from thermodynamics. According to the second law of thermodynamics, processes taking place in a closed system always tend toward a state of equilibrium. In other words,

unless energy is constantly being fed into a system, the processes in the system will tend to run down and quit. For example, if I had a bottle that was a sealed vacuum inside, and I introduced into it some molecules of gas, the gas would spread itself out evenly inside the bottle. It is virtually impossible for the molecules to retreat, for example, into one corner of the bottle and remain. This is why when you walk into a room, the air in the room never separates suddenly into oxygen at one end and nitrogen at the other. It is also why when you step into your bath you may be confident that it will be pleasantly warm instead of frozen solid at one end and boiling at the other. It is clear that life would not be possible in a world in which the second law of thermodynamics did not operate.

Now our interest in the law is what happens when it is applied to the universe as a whole. The universe is a gigantic closed system, since it is everything there is and there is nothing outside it.[23] What this seems to imply then is that, given enough time, the universe and all its processes will run down and the entire universe will slowly grind to a halt. This is known as the heat death of the universe. Once the universe reaches this state, no further change is possible. The universe is dead.

There are two possible types of heat death for the universe. If the universe is "closed," then it will die a hot death. Tinsley describes such a state:

> If the average density of matter in the universe is great enough, the mutual gravitational attraction between bodies will eventually slow the expansion to a halt. The universe will then contract and collapse into a hot fireball. There is no known physical mechanism that could reverse a catastrophic big crunch. Apparently, if the universe becomes dense enough, it is in for a hot death.[24]

If the universe is closed, it is in for a fiery death from which it will never re-emerge. But suppose, as is more likely, the universe is "open." Tinsley describes the final state of this universe:

> If the universe has a low density, its death will be cold. It will expand forever, at a slower and slower rate. Galaxies will turn all of their gas into stars, and the stars will burn out. Our own sun will become a cold, dead remnant, floating among the corpses of other stars in an increasingly isolated milky way.[25]

Eventually, equilibrium will prevail throughout, and the entire universe will reach its final state from which no change will occur.

Now the question that needs to be asked is this: If given enough time, the universe will reach heat death, then why is it not in a state of heat death now if it has existed forever, from eternity? If the universe did not begin to exist, then it should now be in a state of equilibrium. Its energy should be all used up. For example, I have a very loud wind-up alarm clock. If I hear that the clock is ticking —which is no problem, believe me—then I know that at some point in the recent past, it was wound up and has been running down since then. It is the same with the universe. Since it has not yet run down, this means, in the words of one baffled scientist, "In some way the universe must have been wound up."[26]

Some scientists have tried to escape this conclusion by arguing that the universe oscillates back and forth from eternity and so never reaches a final state of equilibrium. I have already observed that such a model of the universe is a physical impossibility. But suppose it were possible. The fact is that the thermodynamic properties of this model imply the very beginning of the universe that its proponents seek to avoid. For as several scientists have pointed out, each time the model universe expands it would expand a little further than before. Therefore, if you traced the expansions back in time they would get smaller and smaller and smaller. Therefore, in the words of one scientific team, "The multicycle model has an infinite future, but only a finite past."[27] As yet another writer points out, this implies that the oscillating model of the universe still requires an origin of the universe prior to the smallest cycle.[28]

Traditionally, two objections have been urged against the thermodynamic argument.[29] First, the argument does not work if the universe is infinite. I have two replies to this. (a) The universe is not, in fact, infinite. An actually spatially infinite universe would involve all the absurdities entailed in the existence of an actual infinite. But if the universe is torus-shaped, then it may be both open and finite. The objection is therefore irrelevant. (b) Even if the universe were infinite, it would still come to equilibrium. As one scientist explained in a letter to me, if every finite region of the universe came to equilibrium, then the whole universe would come to equilibrium.[30] This would be true even if it had an infinite number of finite regions. This is like saying that if every part of a fence is green, then the whole fence is green, even if there are an infinite number of pickets in the fence. Since every single finite region of the universe would suffer heat death, so would the whole universe. Therefore, the objection is invalid.

The second objection is that maybe the present state of the universe is just a fluctuation in an overall state of equilibrium. In other words, the present energy is sort of like just the ripple on the surface of a still pond. But this objection loses all sense of proportion. Fluctuations are so tiny, they are important only in systems where you have a few atoms. In a universe at equilibrium, fluctuations would be imperceptible.[31] A chart showing fluctuations in such a universe would be simply a straight line. Therefore, since the present universe is in *dis*equilibrium, what are we to conclude? According to the English scientist P. C. W. Davies, the universe must have been created a finite time ago and is in the process of winding down.[32] He says the present disequilibrium cannot be a fluctuation from a prior state of equilibrium, because prior to this creation event the universe simply did not exist. Thus, Davies concludes, even though we may not like it, we must conclude that the universe's energy "was simply 'put in' at the creation as an initial condition."[33]

Thus, we have two philosophical arguments and two scientific confirmations of the point we set out to defend: the universe began to exist. In light of these four reasons, I think we are amply justified in affirming the first alternative of our first disjunction: *the universe had a beginning.*

Was the Beginning Caused?

Having concluded that the evidence points to a beginning of the universe, let's now turn to our second set

of alternatives: the beginning of the universe was either caused or not caused. I am not going to give a lengthy defense of the point that the beginning of the universe must have been caused. I do not think I need to. For probably no one in his right mind *sincerely* believes that the universe could pop into existence uncaused out of nothing. Even the famous sceptic David Hume admitted that it is preposterous to think anything could come into existence without a cause.[34] This is doubly true with regard to the entire universe. As the English philosopher C. D. Broad confessed, "I cannot really *believe in* anything beginning to exist without being caused by something else which existed before and up to the moment when the thing in question began to exist."[35] As still another philosopher has said, "It seems quite inconceivable that our universe could have sprung from an absolute void. If there is anything we find inconceivable it is that something could arise from nothing."[36] The old principle that "out of nothing nothing comes" is so manifestly true that a sincere denial of this point is practically impossible.

This puts the atheist on the spot. For as Anthony Kenny explains, "A proponent of (the big bang) theory, at least if he is an atheist, must believe that the matter of the universe came from nothing and by nothing."[37] That is a pretty hard pill to swallow. In terms of sheer "believability," I find it intellectually easier to believe in a God who is the cause of the universe than in the universe's popping into existence uncaused out of nothing or in the universe's having existed for infinite time without a beginning. For me these last two positions are intellectually inconceivable, and it would take *more* faith for me to believe in them than to believe that God exists. But at any rate, we are not dependent upon just "believability," for we have already seen that both philosophical and empirical reasoning points to a beginning for the universe. So the alternatives are only two: either the universe was caused to exist or it sprang into existence wholly uncaused out of nothing about fifteen billion years ago. The first alternative is eminently more plausible.

It is interesting to examine the attitude of scientists toward the philosophical and theological implications of their own big bang model. It is evident that there are such implications, for as one scientist remarks, "The problem of the origin (of the universe) involves a certain metaphysical aspect which may be either appealing or revolting."[38] Unfortunately, the man of science is, as Albert Einstein once observed, "a poor philosopher."[39] For these implications seem either to escape or not to interest most scientists. Since no empirical information is available about what preceded the big bang, scientists simply ignore the issue. Thus, Hoyle, after explaining that the big bang model cannot inform us as to where the matter came from or why the big bang occurred, comments, "It is not usual in present day cosmological discussions to seek an answer to this question; the question and its answer are taken to be outside the range of scientific discussion."[40] But while this attitude may satisfy the scientist, it can never satisfy the philosopher. For as one scientist admits, the big bang model only *describes* the initial conditions of the universe, but it cannot *explain* them.[41] As yet another astronomer concludes, "So the question 'How was the matter created in the first place?' is left unanswered."[42] Thus, science begs off answering the really ultimate question of where the universe came from. Scientific evidence points to a beginning of the universe; as rigorous scientists we may stop there and bar further inquiry, but as thinking men must we not inquire further until we come to the cause of the beginning of the universe?

Either the universe was caused to exist or it just came into existence out of nothing by nothing. Scientists refuse to discuss the question; but philosophers admit that it is impossible to believe in something's coming to exist uncaused out of nothing. Therefore, I think that an unprejudiced inquirer will have to agree that the beginning of the universe was caused, which is the second point we set out to prove: *the universe was caused to exist.*

Now this is a truly remarkable conclusion. For this means that the universe was caused to exist by something beyond it and greater than it. Think of what that means! This ought to fill us with awe, for it is no secret that the Bible begins with these words, "In the beginning God created the heavens and the earth."

Personal or Impersonal Creator?

I think there is good reason to believe that the cause of the universe is a personal creator. This is our third set of alternatives: *personal or not personal.*

The first event in the series of past events was, as we have seen, the beginning of the universe. Furthermore, we have argued that the event was caused. Now the question is: If the cause of the universe is eternal, then why isn't the universe also eternal, since it is the effect of the cause? Let me illustrate what I mean. Suppose we say the cause of water's freezing is the temperature's falling below 0 degrees. Whenever the temperature is below 0 degrees, the water is frozen. Therefore, if the temperature is always below 0 degrees, the water is always frozen. Once the cause is given, the effect must follow. So if the cause were there from eternity, the effect would also be there from eternity. If the temperature were below 0 degrees from eternity, then any water around would be frozen from eternity. But this seems to imply that if the cause of the universe existed from eternity then the universe would have to exist from eternity. And this we have seen to be false.

One might say that the cause came to exist just before the first event. But this will not work, for then the cause's coming into existence would be the first event, and we must ask all over again for its cause. But this cannot go on forever, for we have seen that a beginningless series of events cannot exist. So there must be an absolutely first event, before which there was no change, no previous event. We have seen that this first event was caused. But the question then is: how can a first event come to exist if the cause of that event is always there? Why isn't the effect as eternal as the cause? It seems to me that there is only one way out of this dilemma. That is to say that the cause of the universe is personal and chooses to create the universe in time. In this way God could exist changelessly from eternity, but choose to create the world in time. By "choose" I do not mean God changes his mind. I mean God intends from eternity to create a world in time. Thus, the cause is eternal, but the effect is not. God chooses from eternity to create a world with a beginning;

therefore, a world with a beginning comes to exist. Hence, it seems to me that the only way a universe can come to exist is if a Personal Creator of the universe exists. And I think we are justified in calling a personal creator of the universe by the name "God."

I would just like to make a few concluding remarks on God's relationship to time. Many people say God is outside time. But this is not what the Bible says. According to James Barr in his book *Biblical Words for Time*, the Bible does not make it clear whether God is eternal in the sense that he is outside time or whether he is eternal in the sense of being everlasting throughout all time.[43] Thus, the issue must be decided philosophically. It seems to me that prior to creation God is outside time, or rather there is no time at all. For time cannot exist unless there is change. And prior to creation God would have to be changeless. Otherwise, you would get an infinite series of past events in God's life, and we have seen such an infinite series is impossible. So God would be changeless and, hence, timeless prior to creation. I think that the doctrine of the Trinity can help us to understand this. Before creation, the Father, Son, and Holy Spirit existed in a perfect and changeless love relationship. God was not lonely before creation. In the tri-unity of his own being, he had full and perfect personal relationships. So what was God doing before creation? Someone has said, "He was preparing hell for those who pry into mysteries." Not at all! He was enjoying the fullness of divine personal relationships with an eternal plan for the creation and salvation of human persons. The Bible says Christ "had been chosen by God before the creation of the world, and was revealed in these last days for your sake."[44] Nor was this plan decided on several eons ago. It is an eternal plan: The Bible says, "God did this according to his eternal purpose which he achieved through Christ Jesus our Lord."[45] Why did God do this? Not because he needed us, but simply out of his grace and love.

So in my opinion, God was timeless prior to creation, and He created time along with the world. From that point on God places Himself within time so that He can interact with the world He has created. And someday God will be done with this creation. The universe will not, in fact, suffer cold death, for God will have done with it by then. The Bible says,

> You, Lord, in the beginning created the earth,
> and with your own hands you made the heavens.
> They will all disappear, but you will remain;
> they will all grow old like clothes.
> You will fold them up like a coat,
> and they will be changed like clothes.
> But you are always the same,
> and you will never grow old.[46]

We have thus concluded to a personal Creator of the universe who exists changelessly and independently prior to creation and in time subsequent to creation. This is the central idea of what theists mean by "God."

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Explanation, Testability, and the Theory of Evolution Part I

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Introduction

Among scientists and analysts of science there is an almost-universal acceptance of the thesis that life has evolved over a lengthy span of geological time and that it continues to do so. A few heretics question this interpretation, arguing that the evidence supports at most intraspecies or intragenus development with the fossil record being best interpreted in non-evolutionary terms. Others, though they operate within the usual consensus, differ on the evolutionary sequences suggested by paleontological and contemporary laboratory or field information. This paper refers to each of these ideas only obliquely.

Our attention is turned instead toward a quite different sort of criticism, the sort that takes exception to the way evolution has often been explained and defended. Such censures exhibit considerable variety. Some question the propriety of treating Darwin's own explanatory scheme as scientific during the half-century immediately following its appearance; others find later, and even current, theory equally unscientific by various standards. Some believe that understanding in biology, and particularly in the interpretation of its historical data, is different from the ways by which we comprehend the physical world and that it is wrong-headed to attempt to fit evolutionary explanations to forms appropriate only in the physical sciences. Others accept current theory as at least a fair sketch for explaining the factual material but deny that the theory provides, or at least intends to provide predictions by which it can be tested.

This paper serves primarily as an examination of the explanatory structures employed by evolutionary theorists and as a general evaluation of the testability of their schemes. The limits of space place constraints on the breadth and depth of my inquiry, but sufficient analysis should be provided to give reasonable warrant for my general conclusions. If they clarify the similarities and contrasts of theorizing in evolutionary work and in the physical sciences, and of the kinds of things which count as their evidential support, I will be satisfied. After all, most readers are not specialists when it comes to evolu-

This is part one of a three-part paper.

tionary technicalities and non-specialists commonly have qualms about evolution, if they have qualms at all, not because they can question descriptions of (say) evolutionary sequences with any competence, but because they find inadequacies in the evolutionary explanations and in the standards of evidence employed by advocates of the theory. Let me begin then by looking at explanation as understood among physical scientists both because it is widely considered the ideal and because it will provide a context for my later comparisons with biology and evolution.

Explanation in Physical Science

In the physical sciences we explain experience when whatever we wish to understand is derived from *laws* and *theories*. These are themselves testable within experience. It is this testability throughout which separates physical science, and anything emulating it, from other attempts at explanation.

In one form, scientific explanation in physical science uses statements described as *universal* because they are corroborated by experiences which appear to indicate that conditions of a certain sort, whenever they occur, are invariably accompanied by conditions of another sort. One or more of such laws, together with a set of circumstances found to be present, are used in practice to deduce the presence of conditions which we wish to explain. Thus, from the gas law for example, together with a particular pressure which we know obtains, we may explain an observed volume. Similarly, from the laws of gravity and motion as well as from information about the planets we may deduce the law of planetary motion; here a more general law is used to explain one of more restricted application.

Sometimes, however, the covering laws or law won't be universal in form but instead express *probabilities* found by experience as when we state that p/q cases of A are cases of B. If we know that something y is a case of A we may then conclude that, with a probability p/q, y is a case of B.

Physical science employs, as well, what we may call theoretical explanations. Here a theory is proposed as an aid in understanding a set of laws found by careful observation or experiment. The theory explains the phenomena which exhibit these regularities in terms of assumed laws governing the behavior of imagined entities and their activity and, by the use of interpretations of these, indicates how they are to be related to the phenomena. The theory is therefore used to give a coherent and systematic account of a variety of different phenomena or empirical laws while explaining why these apply only within certain limits.

Sometimes this may be done by treating the theory as a set of axioms, and theorems derived from these, together with interpretive rules by which the theorems are identified with empirical data. However, this technique often proves to be exceedingly difficult so that some *model* is employed to give an intelligible interpretation of the theory. For example a familiar physical system, having elements with familiar properties which in turn exhibit relationships expressed in familiar empirical laws, may be used to give a suggested meaning to the entities of the theory and their activity. We must, of course, always be aware that these theoretical entities and processes actually involve ideas lying beyond the familiar, ideas often quite strange to the earlier modes of thought found in the model, but which gain credibility by their employment in predicting empirical laws previously undiscovered.

The essence of all this is that, though laws perform a sort of explanatory function of their own, so that they are useful standing alone, scientists seek greater understanding through explaining the laws in terms of more general laws or theories. Here there is a binding requirement. As the strength of our purported explanation depends upon the confidence which we can place in the covering laws or theory, and as that is a function of the degree of corroboration which they have achieved in the face of severe testing, we must take pains to keep our covering laws or theory both testable and tested.

It is here that many explanations which are unlike those of physical science fail grandly, for, when we turn from explanation to prediction, the laws or theories which they employ, not being falsifiable by experiment or observation, predict everything and nothing. This is because they cannot indicate what it is in experience that would be different were they untrue. Thus, for example, an explanation of the events of the world as due to the will of God will ordinarily have no prognostic utility; as a consequence the explanation is untestable and on that account would appear to many to be unworthy of rational belief. This result may be avoided if we somehow had a prior knowledge of God's will or if we believe the explanation because it follows from a broader set of beliefs which have their own justification. In the former case fulfilled prediction would provide the vehicle by which the explanation gains credibility while, in the latter, the explanation gains support in spite of its inability to anticipate events.

Is Explanation in Evolution Different?

It has been argued that evolutionary explications are rather like this second example; they are neither explanatory nor corroborable in the style of the physical sciences, yet they are supported sufficiently well to command widespread acceptance. Later I examine the part of this thesis which claims that evolutionary theorizing lacks the ability to predict, but here it is the different structure of explanation and mode of evidential undergirding which are purportedly characteristic of this theorizing which calls for comment.

(a) *The Use of Narrative*

Several decades ago Beckner[1] described a characteristic of evolutionary interpretations of the history of life which, in his opinion, inevitably marked much of the writing of paleontologists and historical geologists. It was a description which others have found to be fitting. For Beckner and his fellows the past is made intelligible largely through the use of narrative passages, together with loose argument, connecting occasional and brief attempts at deductive argument in the style of the physical

scientist.[2] This emphasis upon narrative explanation is apparently made necessary by the uniqueness of the events which comprise the evolutionary history of living things; because events differ from one another in significant ways they cannot be instances of laws and must then be explained by pointing out and describing the sequence of circumstances which seem to have preceded or accompanied them.

It is worth noticing in passing, however, that narration might be widely employed in evolutionary interpretation for reasons other than the nature of the events being discussed. For one thing, the narrative may, on inspection, prove to be more a description of the scheme which unraveled a puzzle than an argument supporting the interpretation. The process of decipherment, unfolding "the context of discovery" as analysts of science would call it, may be mistaken for the "context of justification." This is particularly likely if one's writings are intended to instruct and to convince the reader by leading him or her along the sort of path which the writer found useful in arriving at some particular insight. As another example, the complexity of the occasions being dealt with and the lack of so much desirable information in the fossil record might make the use of a highly-descriptive account convenient as an explanation sketch. It would appear then that the narrative form is sure to be a familiar one in the literature of evolution, as Beckner and those like him have claimed. The question remains whether the form is *unavoidable* whenever an understanding of evolution is attempted.

Let us first look briefly at the idea that evolutionary events are unique for this, we saw, was used as a constraint by some which they claimed prevented the use of explanatory schemes used in physical science. The difficulty which at once comes to mind is that "unique" must be defined by including the specifications under which the term is to apply. Buddy Rich, for example, is unique in drumming skills but not in being American, male, or over 50 years of age. Likewise, the disappearance of the last saber-toothed tiger is unique in that it occurs only once but it is not unique if treated as an example of the disappearance of a life form by the processes of natural selection. An event's character then depends upon the scheme under which it is described.

If this is so, it is far from obvious that evolutionary explanations cannot be arrived at within which any historical event can be employed without the question of the event's uniqueness ever arising. In a similar way, whether an event is an instance of a law depends upon how specifically we describe it. Any event may be specified in such a way as to be non-recurring and thus an instance of none of the usual laws of science. Described, though, in suitable ways any event may become an example of one or more of these laws. It would seem, then, that description of evolutionary events might be developed which would enable us to see them as examples of evolutionary laws of some kind. If so, the thesis that evolutionary explanation does not employ laws is either true or false *in fact* but no *principle* seems to prevent the possibility.[3]

If there might be evolutionary laws the case for the necessity of narrative explanation, on the grounds that they can't exist, collapses. Those who defend this form of explanation must then argue that such laws are so rare that they can play little part in evolutionary understanding. We shall now see, however, that, if evolutionary laws are so difficult to come by, evolution would be devoid of explanation as much by narrative description as by covering laws! The reason is that narration seems to be impossible without at least a disguised utilization of law, a constraint which has been pointed out by various writers.[4]

Let us suppose that explanation in an historical area like paleontology means the presentation of a sufficient number of relevant circumstances preceding or accompanying an event, that is "E because C_1, C_2, C_3 . . . ." The measure of sufficiency is that the event could reasonably have been predicted had we known C_1, C_2, C_3 . . . . ; thus "If C_1, C_2, C_3 . . . then E." The probability which we may claim for our prediction depends upon the number of relevant circumstances which our narrative provides. Dray, who argues for explanation in this style, calls this ground for E an "inference rule."[5]

Compare this with the covering law model employed in physical science: one or more laws L_1, L_2, L_3 . . . together with a set of relevant circumstances C_1, C_2, C_3 . . . allows us to infer event E. (If the laws are statistical, we may conclude that there is a certain probability of E). Dray clearly wishes to remove laws from the explanatory schema and to replace them by a rule for moving from the circumstances to the event directly. However, as Hempel[6] has noted, not only is the move often difficult or impossible, but it seems apparent that we are merely moving from one form of empirical generalization to another. The inference rule is less like a rule in chess than a rule such as meteorologists might use in discussing the weather; it is a sort of law experientially derived, subject to change when new insights in science alter our view as to which conditions are relevant to an event and modified each time the conditions which are described vary in number.

Looking at narrative accounts from a different perspective leads to similar conclusions. Let us suppose that we are offered an explanation of the origin of some property of a group of organisms such as Goudge's account of the origin among amphibians of limbs suited to locomotion on land. We are told a story of drought and of the necessity to find water which resulted in an advantage for these animals capable of moving from pool to pool, an advantage which by accident permitted them to remain on land. Unfortunately, as Ruse[7] has noticed, the account provides no understanding of such things as how limbs might have developed, nor of why amphibians needed to remain in water initially yet could eventually remain on land. The probable explanation of these calls for the use of laws such as those of natural selection and genetics and of adaptive advantage. As these are all arrived at by modern studies and carried back into the past they cannot be reduced to the language of historical narrative.

It appears that the case for narrative as *the* explanatory model for evolution is not easily made. Explanation by the use of scientific laws appears to be unavoidably present. Two further illustrations should re-enforce this observation.

(i) Inherent in narrative attempts at describing events there is a tendency toward classification in spite of frequent reference to the uniqueness of historical happenings. If this classification is to avoid arbitrariness and is to be explanatory it would seem that some general pattern of understanding must be employed; and this pattern can hardly be anything more than a covering law.

(ii) Narrative explanation also carries with it the implication that each step in an account can be shown to lead to the next, at least with reasonable likelihood. Surely this calls for the use of some covering law which makes the appearance of each stage predictable given what has preceded it.[8]

It is evident that whenever narration is employed in an explanatory role in evolution it reduces to either a simplified account, called for by the need for brevity or by a lack of information, or to a combined and informal presentation of the initial conditions and lawful premises which appear to make some event which is of interest intelligible. All of these are necessary in telling the story of the history of life; hence the wide use of the style.

(b) *Non-Scientific Explanation*

We have been looking at the thesis that evolutionary explanation of the paleontological record is different from that found in the physical sciences but is nonetheless scientific. Now we must explore briefly the quite different argument, offered by several writers, that evolutionary explanation of not only historical data but also of contemporary living things is not scientific at all.[9] In essence this means that it is supposed that the theory contains no laws, that it lacks theoretical entities, and that the theory is not testable and consequently is not revisable in the light of experience. In examining this view, I comment only on Manser's version.

Manser begins by sharply distinguishing Darwin's concept of evolution from what we may call Mendelian genetics, later introduced into Darwinism as a specific assertion about the mechanism of variation where the original concept had needed to say nothing. Evolution is explained in Darwinian terms, as Manser summarizes it, by structural variations which are inheritable appearing randomly with respect to any benefits they confer, by natural selection where the environment (internal or external) as related to some variation is more beneficial than to others, by selection conferring on those with more beneficial variation the capacity to survive and to reproduce themselves more successfully than others lacking these variations, by these benefits likely resulting in more numerous progeny, and by inheritance distributing the beneficial variation throughout the population.

As with any explanation of evolution, evolution is of course accepted as a fact by Darwinism; it states the way that environmental selection and variation are related and shows how it leads to the evolution of organisms. It is not, though, in Manser's opinion, a set of premises from which predictions may be made, with the result that it isn't testable. In form, it is a scheme of categories conceptually related to one another into which we place examples derived from a study of living and fossil forms so that we explain them in evolutionary terms. It formulates no laws and its terms are defined circularly. For example, we cannot predict the fitness of an organism to survive, as the theory offers no criteria, but we can assert instead that an organism which has survived is fittest, and fittest because the organism had certain characteristics which were suited to the environment in a special way so that the organism gained an advantage over its competitors.

If Darwinian evolution is to show no more than how, after events have been discovered and described, they may be categorized so as to reveal their evolutionary relationship to one another, it is necessary that the scheme cannot be expressed in the theory form sketched in the first section of this paper. This is so because, should Darwinism be expressible by a set of axioms, the theorems deduced are predictions and thus are potentially testable. In fact, Darwinism *can be* expressed in just this fashion: in an important paper almost 30 years ago (and 16 years before Manser's papers), Mary Williams provided a short set of axioms which include, or from which can be deduced, all the statements of Darwinian evolution.[10] The non-scientific appears to be scientific after all.

There is, though, a catch here because the theorems which Williams derived were so general as to be to all intents untestable. It would require a great deal of work to state an improved set of axioms necessary for deriving much more specific, and thus testable, consequences. The alternative is a less-rigorous, a rather intuitive, derivation of these predictions from the original set.[11] Surely that shouldn't bother us too greatly for much of even a "hard science" like physics is in the same position; for example, we explain empirical laws within Newtonian mechanics, just as Newton did in the *Principia*, in a quite intuitive and nonrigorous manner in our classes and textbooks.

Nonetheless it is a fact that many remain convinced, if I may judge from numerous letters and conversations, that evolution appears in too many ways to be untestable. Perhaps this is due to a lack of knowledge as to just what testability accrues to the intuitively-derived predictions of Darwinian theory, or of that theory *cum* genetic principles, as well as to the application of laws within evolution. We shall look at these accruals in due course, but, whatever the reason, a thesis such as Manser's meets with considerable sympathy. Others equally bothered have turned to Sir Karl Popper, the leading modern advocate of testability as the criterion demarcating scientific discourse, to determine whether evolutionary theory might be otherwise understood. With Popper they conclude that it is a metaphysical speculation.[12]

(c) *Metaphysical Explanation*

As is by now well-known, Popper opposes the view that science may properly ever claim to have grasped the essential character of nature's patterns and regularities. Likewise, he stands in opposition to the alternative instrumentalistic thesis that science shouldn't attempt to explain nature save in the sense of inventing whatever useful fictions result in correct prediction. His own view is that science properly makes tentative suggestions as to what

is going on in the world, suggestions which may be true but at best can be shown to be corroborated by severe testing. At worst they are falsified by experience, with the advantage however of teaching us ways by which nature does not function. The Popperian view may then be called *fallibilism*.[13]

The line between science and other claims to understand our world is now drawn in these terms. Science stands as the composite of actual and potential fallible explanations which are open to severe testing, that is testing which could well show them to be false. All else is unfalsifiable—including essentialistic and instrumentalistic, as well as Popper's own, evaluations of how to do science. However, Popper is scarcely likely to treat Zen Buddhism and the hundreds of pages of defence of his fallibilistic model as on a par; we find that he does not, for he takes one to be far more open to critical application than the other. For example, his view of science may be compared with its competitors to determine which best fosters open-minded research and which hinders most the retention of error. Likewise, metaphysical speculations may be judged among other things, in terms of the degree to which they support science or suggest scientific theories and directions of scientific study.[14]

In this light we may understand Popper's comment that "Darwinism is not a testable scientific theory but a *metaphysical research programme*—a possible framework for testable scientific theories."[15] We may also realize just why Popper has invested considerable effort into developing his own explanation of the trends found in the fossil record: a suggested improvement in present-day evolutionary theory which, in his opinion, cannot make sense of such directional sequences.

But why does Popper consider contemporary theory on evolution metaphysical rather than merely scientifically insufficient? Presumably because the theory is untestable in areas even where it seems to make sense. Popper provides several examples, each of which he feels exhibits a failure of the theory to predict and thus to explain (he believes that if we cannot say "If such and such had been the case then this would have been predicted," we cannot say "This occurred because such and such is the case").[16]

One example is the evolution of variety (speciation) where he thinks we can merely report that certain species were apparently adapted sufficiently to survive but we could not predict that these alone, or indeed that any, would have survived. Another is the idea which we mentioned earlier that fitness to survive (adaptability) is measured by actual survival but would not have been predicted. Lastly, he argues that we cannot predict any specific evolutionary change so that when we find sudden changes in fossil forms we can only claim that, in light of current doctrine, we should look for an explanation in terms of a missing record of small and accumulating mutational events.

Each of these is discussed at length in a recent paper by Ruse.[17] As he properly points out, all that is necessary to refute Popper's thesis is to report actual predictions in each case which have been tested or which are open to testing in some future research programs. This Ruse does; consequently the illustrations point up issues which lie within science so that speciation, adaptability and rates of evolutionary change are not merely metaphysical concepts as Popper claims.[18] I might add that this does not prevent the concepts being given additional metaphysical interpretations whose worth, or lack of it, must be assessed on appropriate grounds but that is quite another matter.[19]

In sum, then, Popper has failed to show that evolutionary explanation is either non-scientific or metaphysical on his own criteria. With Ruse I would put the failure down to Popper's being poorly informed about current work in evolution and not to his criteria. They remain invaluable tools for further work in demarcating science from other things.

(To be continued.)

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[8]See Hempel, *Aspects*, p. 446.

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[13]See my "Notes on the Predispositions of Scientific Thought and Practice," *this journal*, Vol. 24, 6/72, pp. 51-57 for an outline. Detail is provided in Popper's *The Logic of Scientific Discovery*, Hutchinson of London, 1959; in his *Conjectures & Refutations*, Routledge & Kegan Paul, London, 1963, pp. 66-96, 184-200, 253-292; in the Schilpp volumes (see note 12); in B. Magee, *Popper*, Fontana Books, Glasgow, 1975; and in R. Ackermann, *The Philosophy of Karl Popper*, Univ. of Mass., Amherst, 1975.

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[15]Popper, "Darwinism," p. 134.

[16]*Ibid.*, pp. 136-138.

[17]M. Ruse, "Karl Popper's Philosophy of Biology," *Philosophy of Science*, Vol. 44, 12/77, pp. 638-661.

[18]Compare M. Ruse, "Confirmation and Falsification of Theories of Evolution," *Scientia*, Vol. 104, 1969, pp. 329-357 and Z. Kochanski, "Conditions and Limitations of Prediction-Making in Biology," *Philosophy of Science*, Vol. 40, 1973, pp. 28-51.

[19]See M. Beckner, *The Biological Way*; M. Grene & E. Mendelsohn (eds.), *Topics in the Philosophy of Biology*, Reidel, Dordrecht, 1976; D. Hull, *Philosophy*; M. Ruse, *Philosophy*; J. Monod, *Chance & Necessity*, Collins, London, 1972; B. Rensch, *Biophilosophy*, Columbia Univ. Press, New York, 1971; W. Elsasser, *Chief Abstractions of Biology*, N. Holland Pub. Co., Amsterdam, 1975; F. Ayala and T. Dobzhansky, *Studies in the Philosophy of Biology*, Univ. of California Press, Berkeley, 1974; V.E. Smith, *Philosophy of Biology*, St. Johns Univ. Press, New York, 1967 and his *Philosophical Problems in Biology*, same publisher, 1966; M. Grene, *The Knower and the Known*, Faber and Faber, London, 1976, her *Understanding of Nature* which is Vol. 23 of *Boston Studies in the Phil. of Sci.* and her *Interpretations of Life and Mind*, Routledge and Kegan Paul, London, 1971, which all contain discussions of metaphysical questions. From the large journal literature the following topics are illustrative: G. de Laguna, "The Role of Teleonomy in Evolution," *Philosophy of Science*, Vol. 29, 4/62, pp. 117-131; L. Wright, "Explanation & Teleology," *Philosophy of Science*, Vol. 39, 1972, pp. 204-218 and Vol. 42, 1975, pp. 299-306; M. Beckner, "Function and Teleology," *Jour. Hist. Biol.*, Vol. 2, 1969, pp. 151-164; P. Schievella, "Emergent Evolution & Reductionism," *Scientia*, Vol. 67, 1973, pp. 323-330; M. Beckner "Metaphysical Presupposition and the Description of Biological Systems," *Synthese*, Vol. 15, 1963, pp. 260-274; A. Plamondon, "The Contemporary Reconciliation of Mechanism and Organicism," *Dialectica*, Vol. 29, 1975, pp. 213-221; H. Hein "The Endurance of the Mechanism-Vitalism Controversy," *Jour. Hist. Biol.*, Vol. 5, 1972, pp. 159-188; and F. Ayala, "Biology as an Autonomous Science," *Amer. Scientist*, Vol. 56, 1968, pp. 207-221.

Depression: Biochemical Abnormality or Spiritual Backsliding?

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Of all the ills which afflict humanity mental depression is one of the most common and universal, involving people of all ages, all occupations, and all strata of society. Indeed it is the opinion of many authorities that more human suffering results from depression than from any other illness affecting mankind.

According to Dr. Nathan Kline there are at least four million cases per year in the United States alone. Possibly as many as eight million individuals per year suffer from this malady, and less than one third of all cases receive any form of treatment. There are 22,000 known cases of suicide in this country per year, but these figures most likely are a tremendous underestimate of reality. Many cases are not reported because of uncertainty. For instance, in relation to automobile accidents some instances are not reported for religious or other reasons. Probably in actual fact 50,000 to 70,000 suicides occur each year. Apart from the successful suicidal attempts there are probably a quarter of a million unsuccessful attempts or suicidal gestures in this country per year.[1]

Depression is an affliction which produces many symptoms, but as Dr. Nathan S. Kline points out in his book

From Sad to Glad, one universal symptom which is common to every sufferer is a lack of pleasure and enjoyment.[2] Although a mood of sadness is generally a feature of this type of illness, an obvious feeling of depression need not be experienced. One can feel a loss of joy and happiness in place of the more obvious feeling of depression. Usually the patient experiences a sadness and gloominess of mood which in a mild case may present itself as a loss of normal cheerfulness accompanied by a general lack of interest and zest for life.

In a severe case of depression the patient will be overwhelmed by a feeling of deep gloom and abject misery. He may feel that life is no longer worth living, and may contemplate or even attempt suicide in order to escape from his hapless and unbearable condition of anguish. He may even have a terrible foreboding of some awful doom falling on himself or his loved ones. A very depressed individual has even been known to kill spouse and children to prevent them from suffering some awful fate, afterwards attempting suicide himself.

A depressed person may experience difficulty in concentration, and may not be able to retain the information which he has read in a book or magazine, or has heard on the radio or television. He may also show a general loss of interest in his hobbies, his recreation, his work, people, and ideas that once meant much to him. He may experience a decrease in love and affection for family, friends, and even for God. For the individual who is a Christian it may be extremely difficult to read the Bible, to pray, and to show love and devotion to the Lord.

Depressed patients frequently exhibit a loss of self esteem, and a feeling that they are utterly worthless. They may also express feelings of guilt, and in the case of a person who is a Christian, may have lost their assurance of eternal salvation. The patient may even feel that he is guilty of the unpardonable sin and has indeed committed the sin against the Holy Ghost so that he is irrevocably and eternally damned to everlasting punishment. Argument and reasoning, and even pointing out the precious promises in the Word of God such as justification by faith and the eternal security of the believer, is of no avail when the sufferer is in this wretched and unhappy condition. However when adequate treatment has been given he will then become amenable to spiritual exhortation and counseling.

Depressed individuals are frequently tired and exhausted, and in severe cases there may be evidence of psychomotor retardation which is characterized by a general slowing down of responses, thinking processes and movements. The patient may have a feeling of utter emptiness inside, and occasionally the retardation attains such severity that he may be unable to engage in conversation, becoming mute yet presenting an appearance of abject and total misery. Sometimes a depressed patient may be very anxious, tense and frightened, and may even present an outlook of severe restlessness and agitation.

In many cases of depression the sleeping pattern is altered and often the patient suffers from a lack of sleep. Frequently, however, he has no difficulty in getting off to sleep at night, but awakens in the early hours of the morning. Very often a depressed individual will sleep excessively, taking refuge in his bed rather than facing the world. Many patients suffering from depression feel worse early in the morning, but tend to experience a certain amount of improvement in their mood as the day progresses.

Occasionally a depressed person may hear hallucinatory voices which are generally of an accusatory nature consistent with the patient's feeling of guilt, self depreciation and worthlessness. Complaints of various physical symptoms are extremely common in depression including loss of appetite, alterations in bowel functions, nausea, headaches, abdominal cramps, pains in the chest, and various other aches and pains. Sometimes the physical symptoms may so overshadow the depressive mood that the latter is overlooked, and the patient's condition is misdiagnosed.

In severe cases of depression bizarre delusions of a hypochondriacal nature may sometimes occur where the patient may allege that his intestines have rotted away and his blood has decayed. Nihilistic delusions where the patient may actually deny his own presence or allege the absence of a vital organ can also occur in such cases. One patient suffering in this fashion once said to me, "I have no body."[3]

Depression can wear many faces and present many symptoms, and the question that usually follows this descriptive account is whether depression consists of only one type or whether there are various different kinds of depression arising from different causes, and requiring different types of treatment.[4] However most authorities in the field of psychological medicine would share the opinion that there are different types of depression, but there would be disagreement about the best and most accurate manner of categorizing these conditions. Indeed a new classification of mental illness including mood disorders is now being contemplated by the Task Force on Nomenclature and Statistics of the American Psychiatric Association (DSM111)[5]

According to this new classification, mood disorders are divided into unipolar and bipolar varieties. A patient suffering from a bipolar disorder (manic-depressive illness) experiences manic episodes in which he is elated, overactive and overtalkative in addition to periods of depression. The individual who is the victim of an unipolar mood disorder suffers from either episodes of depression or manic behavior but not from both. In the manic phase of manic depressive illness the patient is overactive, overtalkative and demonstrates excessive energy. His mood is generally one of cheerfulness and elation, but he is frequently irritable and may become angry and bad-tempered, particularly if any attempt is made to thwart his plans or to interfere with his activities.

In addition to being excitable, overactive, garrulous and talkative, the manic individual flits rapidly in his thoughts, conversation and activities from one topic or project to another. He may plan a host of different projects one right after another, but may fail to complete

any one of them properly. As a result of his excessive energy he appears to be tireless in his activities. Usually he needs much less sleep than is normal, awakening several hours before his usual time, his excessive energy unabated. When the disturbance of sleep is particularly severe, he may actually continue being active for days without obtaining any sleep, and in spite of this may not be tired at all.

As a result of his elation and joyous exaltation ideas of grandeur may develop, sometimes accompanied by fleeting delusions of wealth and power. Businessmen suffering from this condition have been known to embark on very risky and venturesome business speculations, sometimes losing thousands of dollars in the process. I recollect the case of a housewife who used to suffer from repeated manic episodes in which she would order lavish amounts of new clothes and other commodities from nearby shops in an extravagant fashion, much to the dismay of her husband. Another case involves a middle aged woman suffering from mania who ordered approximately one thousand dollars worth of furniture, and arranged for it to be delivered to her apartment despite the fact that the apartment was already fully furnished.

In very severe attacks of mania the patient may be extremely noisy, singing and shouting, and may become very destructive, tearing personal clothing and bed linens into shreds; he may also become very angry and even violent as a result of relatively minor provocation. I can remember one manic patient who became so angry that she threw a chair at me, but fortunately she missed her target.

In unipolar manic illness the patient is liable to have recurrent attacks of mania separated by periods of normality, whereas in a bipolar disorder he may experience recurrent aberrations of mood, sometimes characterized by phases of manic elation and overactivity. At other times it is characterized by bouts of depression separated by periods of time in which he can appear quite normal. In some instances the individual suffering from a disorder of mood may plunge from a state of manic elation directly into a condition of severe depression or vice versa.

Classifying Mood Disorders

A very convenient manner in which to classify mood disorders is to divide them into Primary Affective Disorders and Secondary Affective Disorders.

A Primary Affective Disorder is an affective episode which could occur in an individual who has had no previous history of any psychiatric illness except perhaps previous similar affective episodes.

Secondary Affective Disorder occurs in an individual who has had a pre-existing illness such as hysteria, anxiety neurosis, obsessive compulsive neurosis, alcoholism, schizophrenia, chronic brain syndromes, drug addictions, character disorders, etc. It also includes depression secondary to organic medical illnesses such as influenza, infective hepatitis and infective mononucleosis, and also as a side effect of certain drugs such as reserpine and methyl dopa which are used in the treatment of hypertension, certain hormones such as birth control pills, corticosteroid preparations and other medications.

Primary affective disorder is divided into bipolar (manic depressive illness) and unipolar varieties. Unipolar depression has been further subdivided as a result of the work of Winokur and others into Depression Spectrum Disease and Pure Depressive Disease.

Depression Spectrum Disease is of early onset occurring in females under forty years of age. These patients have a family history characterized by increased rates of alcoholism, sociopathy and depression. There is a considerable amount of alcoholism among male relatives, but there is more depression in female than in male relatives.

Pure Depressive disease occurs in males aged over forty, and in the family history of these patients depression occurs more equally in male and female relatives. There is also no familial increase in alcoholism above the average expectation.[6]

Causes of Depression

There is still much discussion and debate regarding the causes and nature of depression. Even today there remains considerable disagreement among mental health experts concerning the relative importance of biological factors in comparison with psychological influences in the production of depression. Many Bible-believing Christians including numerous ministers, Christian workers, and pastoral counsellors are of the opinion that depression is predominantly, perhaps entirely, due to spiritual problems such as a sinful life pattern, unconfessed sin, and/or a faulty relationship with God. It is my purpose to discuss and evaluate these three different viewpoints in the light of present knowledge, and to offer conclusions about the causation of depressive illness which are both scientifically reasonable and are also in accord with the teaching of the Bible.

Many psychiatrists are proponents of a medical model of emotional disorders, regarding them as analogous to hypertension (high blood pressure) or diabetes mellitus, and believing them to be caused by aberrations in the functioning of the brain.

Indeed for many years diligent efforts have been made to search for specific abnormalities of the brain in individuals suffering from mental illness. Post mortem examinations performed on patients who had suffered from emotional disorders revealed no such abnormalities, not even when sections of brain tissue were viewed under the microscope. The exceptions were in cases where the mental symptoms were associated with an organic brain syndrome caused by such conditions as brain tumors, syphilis of the nervous system, alcoholism or arteriosclerosis (hardening of the arteries).

In consequence of these negative findings it has been realized that the problem is of a much more subtle nature and appears to be biochemical. The emphasis for research in biological psychiatry is now being focussed mainly on two areas: the biochemical aspects of mental illness and the genetics of emotional disorders.[7]

Biochemistry of Mental Illness

During the past 25 years there has been much scientific research directed towards the biochemistry of mental illness and the biogenic amine or catecholamine theory of mood disorder has been developed. According to this theory a deficit of biogenic amines located in specific areas of the brain is associated with depression, and an excess of such substances is found in mania. The biogenic amines include norepinephrine, dopamine and serotonin, and act as neurotransmitters facilitating the passage of a nerve impulse or signal from one nerve cell to another.

The brain consists of about ten billion nerve cells or neurones, and billions of electronic circuits formed by the numerous interconnections of these nerve cells. This marvellous organ has been likened to a very elaborate and complicated electronic computer with the individual nerve cells comparable to vacuum tubes or transistors such as have been used in the mechanism of electronic computing machines.[8]

Nerve cells or neurones are found in numerous shapes and sizes, but each nerve cell has a cluster of fibres called dendrites sprouting from one end of the nerve cell. Each neurone also has a cell body containing a nucleus and a long cable-like fibre called an axon leading from the opposite end of the cell body from the dendrites. The axon terminates in a number of branches which end in very close proximity to dendrites of adjoining neurones. Between the axon of one nerve cell and a dendrite of another nerve cell is an infinitesimally tiny gap, perhaps only about 1/50,000 of a millimeter wide, called a synapse.[9]

When a dendrite receives a signal from an adjoining nerve cell a disturbance is created in the cell by altering the ratio of sodium to potassium. As a result of this disturbance an electric current is triggered off, and this current flows down to the terminations of the axon where are situated tiny sacs of one of the biogenic amines. As soon as the electrical impulse reaches the end of the axon, minute packets of this neurotransmitter substance are released into the synapse where they activate a dendrite of an adjoining nerve cell so that an electrical impulse is generated in this neurone. In this way the nerve message or signal is transmitted to the next nerve cell. Meanwhile most of the neurotransmitter substance is absorbed back into the neurone whence it was emitted, and is recycled.

One single nerve cell may transmit signals to tens of thousands of other neurones. A delicate switch system is attached to each of the nerve cells so that any individual cell is switched on or off at any given instant. The biogenic amines or neurotransmitter substances act as the "on" part of the switch mechanism by facilitating the passage of the nerve signal across the synapse from one nerve cell to another. Certain substances function as the "off" portion of the switch, some of these compounds destroying the neurotransmitter and others blocking the action of the biogenic amines.[10]

In manic illness where there is an excess of biogenic amines the nerve cells fire excessively and too frequently so that the patient manifests symptoms of excessive energy, excitement and overactivity. In depression on the other hand, where there is a deficiency of biogenic amines, too many nerve cells are switched off and the patient shows evidence of decreased energy, an unhappy mood and other signs of depressive illness.[11]

There is much evidence to support the biogenic amine theory of mood disorder. It has been noted that antidepressant medications increase the levels of available biogenic amines in the brain, and in experimental animals, those treated with drugs which raise the concentration of these substances in the central nervous system, become much more alert and active. Certain drugs such as reserpine, which reduce the level of biogenic amines in the brain, are liable to cause symptoms of depression in man, and produce lessened activity and sedation in experimental animals.[12]

Evidence is being accumulated to suggest that there are at least two biochemical subtypes of depression. One type is characterized by low urinary MHPG levels (3 methoxy 4 hydroxy phenyl glycol—a metabolite of norepinephrine), and indicates a possible deficiency of norepinephrine in the central nervous system. This type of depression tends to respond well to imipramine and desipramine, but not to amitriptyline.

The other biochemical type of depression is associated with normal or increased MHPG levels together with a reduced concentration of 5 hydroxy-indole acetic acid (a metabolite of serotonim) in the cerebro spinal fluid. This type of illness tends to respond well to amitriptyline and not to imipramine and desipramine.

It appears that there are other biochemical derangements present in patients suffering from depression in addition to the disorder related to biogenic amines. There is evidence of a disturbance in the metabolism of sodium and potassium. These substances are intimately involved in the electrical activity of the nerve cells. Most of the sodium found in the nervous system is located in the spaces between the nerve cells, whereas the bulk of the potassium is found within the neurones. There is some evidence that there is an increase in the concentration of sodium within the cell in depression and also in mania. It appears that the concentration of potassium in the cell is decreased.[13] These changes affect the metabolism of the nerve cell, and the transmission of the electrical signal along the nerve fibre itself.

It has been observed that many depressed patients, particularly those who are severely depressed or suicidal, secrete an excess of cortisol.[14] This is a fatty wax-like steroid substance produced by the cortex of the adrenal glands. It has important effects on various metabolic processes in the body, and these effects are designed to enable the individual to meet stressful situations including psychological and emotional stress.[15,27] The production of cortisol by the adrenal glands is controlled by delicate and intricate mechanisms involving the pituitary gland and the hypothalamus. Certain nerve cells in the hypothalamus produce the biogenic amine norepinephrine which inhibits the secretion of the corticotropin releasing factor. The corticotropin releasing factor which is secreted by the hypothalamus stimulates the production of the adrenocorticotropic hormone (ACTH) by the anterior lobe of the pituitary gland. ACTH in turn activates

the secretion of cortisol by the adrenal cortex. As there is a relative deficiency of biogenic amines in depressed individuals, this braking action upon the secretion of the corticotropin releasing factor is weakened and an increased amount of cortisol is manufactured by the adrenal cortex.[16]

A number of studies, involving both twins and families have indicated the presence of a definite hereditary and genetic basis for the development of depressive illness. Studies of identical twins have shown that in situations where one twin develops a depressive illness the other twin has approximately a 60% chance of becoming a victim of the same disease. According to Dr. Nathan Kline when there is a history of severe depression in one parent there is approximately a 10% to 15% chance that the same affliction will appear among the children. The fact that there is a genetic tendency to mood disorders is strong evidence of the presence of a biological malfunction in these conditions.[17]

Beyond Brain Biology

I have attempted to describe briefly the current theories relating to the biological basis of mood disorders. In my opinion these theories are fairly well substantiated. However, the brain is an exceedingly complex organ, and although there has been an explosion of new discoveries in recent years relating to its functions there is much that still remains mysterious. From a scientific point of view we know very little about the relationship between the electrical and chemical changes which take place in the myriads of nerve cells of the brain, and the phenomena of consciousness, mind and spirit. Nevertheless we do know that biochemical changes in the brain influence mood and personality, and even affect our appreciation of God's love, the enjoyment of our fellowship with the Lord Jesus, and our own personal, daily walk with Him.

It is an established fact that the limbic system is intimately connected with emotion. The limbic system includes parts of the frontal and temporal lobes of the brain, thalamus and hypothalamus, together with the nerve pathways connecting these different areas. The different portions of the limbic system have connections with numerous other parts of the central nervous system. Areas of the limbic system have been stimulated in conscious patients submitting to brain surgery under local anesthesia. Feelings of anxiety and fear have been evoked when certain areas have been stimulated by an electric current, whereas stimulation of certain other areas have induced feelings of joy and even elation.[18] It appears that a function of the biogenic amines, by means of their role as neurotransmitter substances, is to influence the normal variation of emotional expression in the daily lives of healthy human beings. There is an appropriate experience and expression of such feelings as grief, sadness, or joy.

Many psychiatrists ascribe depression as almost entirely due to psychological causes. They adhere to the theories of psychoanalysis as the explanation for the causation of mood disorders. Sigmund Freud, the father of psychoanalysis, in his paper "Mourning and Melancholia" (1917), compared melancholia or depression to normal grief. He postulated that depression could occur in reaction to a vaguely perceived or even imaginary loss. The studies of Sigmund Freud and Karl Abraham (1924) led to the conclusion that a combination of an experience of loss in early childhood and a recent loss in adult life, were of prime importance in the causation of depressive illness. Melanie Klein (1934) held the view that the predisposition to depression was dependent upon an unsatisfactory mother-child relationship during the first year of life. The failure of the mother to show sufficient love to the child, was in her opinion, a potent factor in setting the stage for depressive illness in the future.

Generally speaking, psychoanalytic theory indicates that depression originates in faulty early childhood relationships. The infant suffers a loss or deprivation of maternal love and this traumatic experience renders his developing personality vulnerable to future stressful situations, particularly those in which another loss of some kind is involved. The anxiety and misery produced by the rejection and lack of love on the part of the mother produces much anger and resentment in the infant, who being unable to express his rage openly against the parent turns his anger in against himself. This unresolved anger produces depression. Feelings of guilt, rejection, inadequacy and worthlessness develop out of this unsatisfactory early childhood situation, and the child's personality becomes weakened, vulnerable and excessively sensitive to emotional stress. Although these feelings may become buried in the unconscious mind of the child, they may be reactivated strongly by some loss in adult life or even in later childhood so that a severe depressive illness is precipitated.

The types of losses which are reported to be able to trigger off episodes of depression include bereavements, divorce, separation from loved ones, aging, loss of health, retirement, financial reverses, loss of friends and loss of self confidence and self esteem. Bereavement not infrequently triggers off a depressive illness, and even the anniversary of a loved one's death can aggravate or reactivate the symptoms of depression.

Not only does there appear to be ample evidence that depression can occur in infancy and early childhood, but clinical data have been collected which seem to indicate that such children are liable to become more vulnerable and more sensitive to subsequent losses when they are older, and react more frequently by developing a depressive illness. R. A. Spitz described the development of symptoms of severe depression arising in 19 out of 123 infants who had been separated from their mothers and placed in a nursery. Not only did these babies show weepiness and loss of interest in their surroundings, but in addition their rate of development was slowed down.[19]

Engel and Reichsmann described the case of the infant, Monica, who had been born with a congenital atresia or narrowing of the esophagus. In order to enable the baby to obtain nourishment, an artificial connection had been produced surgically between the stomach and the exterior of the abdomen, and a tube had been inserted into the stomach for feeding purposes through the surgically constructed opening in the wall of the abdomen. Because of the presence of this tube the mother was not able to

cuddle her baby or even to hold it. After the age of six months the child became very fretful and cried for long periods of time. The infant failed to gain weight and became extremely withdrawn and depressed. However, after a few months in a hospital where a doctor and one of the nurses were able to spend a considerable amount of time with the baby, her depressive symptoms subsided, but thereafter she remained liable to suffer from episodes of depression.[20]

John Bowlby claimed that complete separation of an infant from its mother produced prolonged and devastating effects including anxiety, an insatiable need for love and affection, strong feelings of anger and vengefulness, and consequent depression and feelings of guilt. He postulated that a loving, close and continuous relationship with the mother was essential for the emotional well being of the infant and young child.[21] However many workers have presented evidence that does not entirely agree with Bowlby's conclusions. From the information that they have collected they have come to the conclusion that favorable events and situations of childhood or later life could alleviate the psychological injury sustained during infancy, and that the ill effects of emotional deprivation during babyhood are not necessarily permanent and irreversible.[22] In other words a supportive and loving relationship provided in later childhood, adolescence or even beyond that time can have a beneficial effect upon the personality of an individual who has been emotionally hurt by a lack of love and affection during infancy. When the Lord Jesus Christ comes into the life of such a person the impact of God's eternal, unchanging, and infinite love brings healing and an increase of emotional stability.

States of depression resembling those observed in human infants have been produced under experimental conditions in baby monkeys. In these experiments the infant monkey has been separated from its mother or from other monkeys which were a significant source of security. Separation of rhesus monkeys for one or two periods of six days each at the age of approximately six months caused depressive symptoms resembling those shown by human infants under similar circumstances. As long as two years later these monkeys still showed some manifestations of their original depression though not as severely as at the time when they were separated from their mothers. The animals which had been twice separated from their mothers showed more pronounced effects than those which had been separated only once. Repeated short term separation of baby monkeys from their mothers produced a marked arrest of social development and led to extremely immature behavior.[23]

Correlating Emotional and Biological Causes

I have sought to demonstrate the role of emotional deprivation in early childhood and subsequent losses later in childhood and in adult life in the production of depression. How can these findings be reconciled with the modern biological theories of the causation of mood disorders? At first sight it would appear that these two different points of view are contradictory, but in my opinion it can be demonstrated adequately that these contrasted approaches to the causes of depression are not only reconcilable but also complementary towards each other.

Experimental studies with laboratory animals have shown that factors in the environment can produce a definite effect upon the brain. For example a series of experiments on rats was conducted a number of years ago at the University of California in Berkeley. In these experiments one group of rats was placed in an enriched environment in which the animals had ample opportunity to interact socially with their peers, and in which various suitable toys and playthings were provided. Another group of rats was kept socially isolated, each animal in the group being placed in a single cage without any toys. The different cages were sufficiently far apart to prevent any social interaction. The animals which had been provided with the enriched environment demonstrated a higher intelligence as shown by performance tests than the rats which had been subjected to the impoverished environment.

After a while the animals from both groups were killed and their brains were examined. It was noted that the cerebral cortex of the rats which had been exposed to the enriched environment was thicker and the nerve cells, although they had not increased in number, had formed a more complex network of interconnecting nerve fibres. It was also observed that these brains contained a higher concentration of the enzymes cholinesterase and acetylcholinesterase than was found in the brains of the rats which had been subjected to the impoverished environment.[24]

In his book *From Sad to Glad* Dr. Nathan S. Kline describes some experiments with rats. They were placed in specially constructed cages and there given a mild electric shock. The animals thrashed around wildly, trying to escape from this most unpleasant experience, and eventually touched a bar or ran across a barrier quite accidently. Contact with the bar or barrier automatically turned off the electric current. When the rats were exposed subsequently to the same situation they continued to thrash around until they eventually managed to touch the bar or trip the barrier. This continued to happen more frequently until they finally learned to turn off the electric current almost immediately.

Further experiments were performed in which the animals were placed in cages that were contrived in such a way that random electric shocks were administered and no matter what these rats did they were unable to escape from it. At first they ran around frantically trying to escape, but after a while their efforts to obtain relief became more and more feeble, and they eventually gave up the struggle, lying down passively and silently. They manifested a behavioral state corresponding quite closely to a condition of depression. Even when the electric shocks were not being administrated these rats remained listless and apathetic with impaired appetites and with a loss of interest in sex.

Finally another research worker carried the experiment a stage further with different rats. After he had induced chronic patterns of depressive behavior in these animals in the manner already described, he killed them and performed autopsies. He discovered that the level of norepinephrine, one of the biogenic amines which serves as

a neurotransmitter in the central nervous system, was abnormally low. In this connection it must be remembered that a deficiency of biogenic amines in the central nervous system is an important feature of depression in human beings.[25]

It appears, therefore, that psychological and environmental stress, provided that it is sufficiently prolonged and severe, may alter the biochemistry of the brain in such a manner that a deficiency of biogenic amines and other biological abnormalties that are characteristic of depressive illness is produced. Thus it may be seen that a psychological approach to depression is not necessarily antagonistic to a biological view of this condition; indeed both viewpoints are complementary to each other.

Depression as a Spiritual Problem

Many Christian people including numerous ministers and pastoral counsellors are of the opinion that depression is purely a spiritual problem, and is the direct result of the sufferer's sin.

Dr. Jay E. Adams believes that depression is the result of the counselee's sin, and that the sole remedy of the problem is to bring him or her to repentance by the effective use of the Word of God. In his volume, *The Christian Counselor's Manual*, he states that almost anything can be at the root of the counselee's depression including hormonal changes, financial loss, feelings of guilt over a specific sin, self pity resulting from jealousy or unfortunate events in the life of the individual, bad feelings arising from resentment and worry, and circumstances which are merely the consequence of ordinary negligence. He is of the opinion that the depression does not result directly from any one of these factors but arises out of a faulty, sinful response to the problem. Because of this sinful response, additional problems, including a burden of guilt, are added to the original problem. The additional complicating problems may again be met by a further inadequate sinful response and the victim of this situation may plunge into a downward cycle of repeated patterns of sinful reactions to his circumstances. The end result of this vicious cycle is a state of despair, hopelessness, guilt and deep depression.

Dr. Adams insists that this cycle can always be reversed at any point by biblical action in the power of the Holy Spirit, and that the hope for the depressed individual lies in the fact that the depression is the result of the counselee's sin. He tends to characterize the manic phase of manic depressive illness as a faulty sinful attempt to overcome the depression and bases these conclusions on the fact that beneath the elated and euphoric facade there lurk feelings of sadness and misery. He expresses the idea that a depressive phase in manic depressive illness generally precedes a period of elation and the patient generates manic symptoms in order to obtain relief from the misery of depression.[26]

Dr. Tim LaHaye emphasizes "spiritual therapy" for the relief of depression and states that most miserable or depressed people are not conscious of the fact that their misery emanates from the absence of God in their lives. He categorically states that the primary causes of depression are spiritual.[27]

Both Adams and LaHaye correctly point out that the spiritual dimensions of man's nature are virtually ignored or denied by the vast majority of psychiatrists, psychologists and other mental health workers whose evaluation of the nature of man is generally based upon the philosophies of secular humanism. They have rightly emphasized the necessity for and the importance of sound biblically oriented spiritual counselling in helping the depressed individual, but in my opinion they have grossly oversimplified the issues by assuming that the cause of depression is always of a spiritual nature. At the same time they deny or play down psychological and biochemical causes despite the fact that the evidence for the operation of these factors is virtually overwhelming.

In my own psychiatric practice I have treated many patients suffering from depression, and a significant number of these individuals have been people who were totally committed to the Lord and seeking to live lives of complete dedication and surrender to Him. If mood disorders were invariably and wholly caused by a condition of alienation from God, one would expect an improvement in the mental condition of such an individual as soon as he had entered into an experience of conversion or, in the case of an erring Christian, as soon as he had confessed his sin and surrendered his life completely to the Lord Jesus Christ. This, however, is not necessarily the case.

After conversion to Christ, two female patients of mine temporarily developed symptoms of manic excitement, and one man who had a history of perverse and obscene sexual behavior went into a psychotic depression from which he recovered eventually. In the cases of these patients it may well have been that the emotional impact of their conversion experiences and the accompanying joy born of a new personal knowledge of Christ, together with the sense of relief arising from the forgiveness of sins was too much for their biologically unstable nervous systems so that the man was plunged into a state of suicidal depression and the two female patients were launched into a flight of manic excitement and elation.

I would also like to emphasize, as further evidence that problems of a spiritual nature are not the sole causes of depression, that a treatment program based upon a theoretical framework which ignores the biological and psychological factors operating in the production of depressive conditions is liable to end in disaster. In other words if, as a result of the mistaken notion that all mental illness is caused by a faulty relationship with God, spiritual therapy alone is employed to the exclusion of medical and psychological modes of treatment, the patient's emotional condition may fail to improve. He may become worse, or even be driven to an ever deepening despair, possibly terminating in suicide. This type of reasoning is not only unscientific, as we have already seen, but is also unscriptural. In the account of the healing of the man who had been blind from birth (John 9) we are told that the disciples asked the Lord Jesus the question, "Master, who did sin, this man, or his parents, that he was born

blind?"[28] Let us note carefully our Lord's reply, "Neither hath this man sinned, nor his parents, but that the works of God should be made manifest in him . . ."[29] In this statement our Lord clearly teaches that disease, and this includes mental illness, is not necessarily caused directly by the sin of the individual who is afflicted.

It is true, however, that mental illness, in common with every other kind of sickness, is ultimately the result of the sin committed by Adam and Eve in the Garden of Eden. With the fall of man sin first entered the world, and with it came death, both physical and spiritual, sickness, sorrow and all the manifold afflictions and evils which beset mankind. Nevertheless mental illness occurring in a particular individual is not necessarily the direct consequence of that person's sin, although in some instances that individual's sin may be an important factor in the genesis of his emotional breakdown. It is important for us not to go to the other extreme of denying that sin plays any part at all in relation to the development and perpetuation of mental illness. I am firmly convinced that a wrong relationship with God, backsliding, grieving the Holy Spirit and unbelief or an attitude of rebellion against God, including a refusal to receive Jesus Christ as Saviour and Lord, are all significant factors which have a definite bearing upon the incidence of mental and emotional suffering and breakdown.

Depression in Non-Christians

In addition to those individuals who deliberately and wilfully reject the claims of the Lord Jesus Christ, there are many men, women and young people who are either totally ignorant of the way of salvation or who have been robbed of any faith and confidence in the Bible by apostate clergymen who have abandoned sound doctrine and who preach theological liberalism from their pulpits. Others have been successfully brain washed by high school teachers and university professors who are steeped in the teachings of secular humanism, atheistic existentialism, Marxism or other antiChristian philosophies. As a result of this type of indoctrination countless individuals have been intellectually confused and have been plunged emotionally into a state of utter hopelessness and complete despair, not knowing the purpose of their existence, where they come from, or where they are going.

Dr. Francis A. Schaeffer in his excellent volume, *The God who is There* has ably pointed out that much of the modern philosophy, art, music, and literature, and the so-called New Theology, whether it be the "God is dead" theology, neo-orthodox or Christian existentialism, is an expression of deep despair. "To live below the line of despair," says Schaeffer . . . "is in a real sense to have a foretaste of hell now, as well as the reality in the life to come. Many of our most sensitive people have been left absolutely naked by the destruction . . ." These thinkers do not have a unified philosophy which encompasses science, the material universe on the one hand and faith and human experience on the other. To them there is an unbridgeable chasm between concepts which are rational and logical such as the facts of science and the whole body of established knowledge on the one hand, and faith and experience on the other hand. To move from the realm of the former to that of the latter involves an irrational leap of faith. The realm of the rational and logical including man is meaningless and purposeless, and the realm of faith and experience is vague, illusory and uncommunicable according to these modern thinkers. The effect of these dreadful concepts, with their attendant loss of hope, upon the human personality can lead only to despair, deep and unrelieved gloom, and possibly in some instances suicide.[30]

Ensnared by the teachings of science, falsely so called, many educated persons including myriads of our young people believe that the universe came about by chance and that man is the end product of a blind godless evolutionary process. The late Bertrand Russell, English mathematician-philosopher and a militant atheist and pacifist gave expression to utter pessimism and the blackness of deep despair stating that man ". . . his origin, his growth, his hopes and fears, his loves and his beliefs, are but the outcome of accidental collocations of atoms. No fire, no heroism, no intensity of thought and feeling, can preserve an individual life beyond the grave; all the labours of the ages, all the devotion, all the inspiration, all the noonday brightness of human genius, are destined to extinction in the vast death of the solar system, and that the whole temple of Man's achievement must inevitably be buried beneath the debris of a universe in ruins . . ."[31]

Jean Paul Sartre, exponent of atheistic existentialism, paints a picture of man which can be described by three words: anguish, abandonment and despair. Man he says, is constantly forced to make decisions without any guidance and with no guarantee that anything he does is correct because, continues Sartre, there is no God. Man is placed in an unsoluble dilemma resulting in deep and undying anguish. He is abandoned without a purpose and with no a priori values. Furthermore, according to Sartre, man is reduced to despair because he is free, yet without hope, since to will something is not necessarily to achieve it. Finally, when he dies all his efforts may have been in vain.[32]

Socialism, political liberalism and Communism have devalued the unique importance of the individual human being making him subservient to the collectivist state, so that in these days of increased government control and intervention there has arisen an increasing depersonalization of the individual rendering him little more than a cypher or a social security number.

In addition to the false and evil philosophies, which I have briefly outlined, unregenerate and unsaved human beings are assailed by terrible anxieties and the possibilities of impending doom which threaten our society and hang over it like the Sword of Damocles. Many thinking individuals today are troubled because of the possibility of a nuclear war which could devastate civilization, the dangers of increasing pollution of the earth's atmosphere and waters, the population explosion with its accompanying threat of famine and starvation, and the prospects of a Communist dominated one world government with its accompanying terrors. Thus this existential despair and loss of hope can trigger off a depressive illness in the same manner as other kinds of losses. If the individual concerned has already experienced a previous loss such as lack of parental affection in early childhood or if there is already a biological predisposition to depression the intensity of his suffering is likely to be much more severe.

Similarly the guilt and unhappiness resulting from a broken relationship with God due to unconfessed sin, and the burden of guilt arising from sins and transgressions of the past in the life of the unconverted individual can generate symptoms of depression or aggravate an already preexisting depressive mood. I believe that the emotional tension associated with these spiritual problems can cause biological changes in the brain, especially in relation to biogenic amine metabolism which can further enhance the state of depression, plunging the sufferer into a vicious circle of deepening misery. In this case the individual may not respond to spiritual counselling alone but may also require treatment with antidepressant drugs.

While I cannot agree with those Christian counsellors who attribute all mental illness to sin in the life of the believer or a state of alienation from God in the case of the unconverted individual, I must emphasize very strongly that any treatment program which neglects the spiritual dimensions of the human personality and fails to take into account the tremendous healing which God brings to bear upon the emotionally disturbed person who submits his life to Him is to say the least, extremely deficient and inadequate.

Treatment of Depression

As far as the treatment of depressive illness is concerned, about 95% of patients can be relieved of their symptoms by physical methods of treatment which include electric convulsive therapy, antidepressant drugs (the tricyclics and monoamine oxidase inhibitors) and in a few specific cases lithium carbonate.

The advent of the antidepressant medications about twenty years ago has sharply reduced the need for electric convulsive therapy (ECT), but this mode of treatment is still useful in severely suicidal patients or in persons who for some reason do not respond to antidepressant drugs. The biggest disadvantage is the temporary impairment of memory which generally occurs as an undesirable side effect of the treatment particularly if the electrodes are applied to the head bilaterally. Unilateral ECT, in which the electrodes are applied to the side of the non-dominant cerebral hemisphere, is in my opinion about as effective as the bilateral treatment, but also has the added advantage of producing much less memory impairment. In studies of animals it has been demonstrated that experimental electric shock treatment, acutely administered, has caused an increase in the turnover of biogenic amines in the brain.[33]

The tricyclic antidepressants, which include imipramine (tofranil) and amitriptyline (elavil) are the drugs most frequently chosen to be used, particularly in severe endogenous depressions. They operate by blocking the reuptake of the neurotransmitter into the presynaptic neuron thereby increasing the concentration of biogenic amines at the synapse.[34] Biochemical studies suggest that patients with low urinary MHPG concentrations (norepinephrine deficient group) respond best to imipramine or desipramine, whereas patients with normal or high urinary concentrations of this metabolite are more successfully treated with amitriptyline.

The monoamine oxidase inhibitors which include isocarboxazid (marplan), phenelzine (nardil) and tranylcypromine (parnate) are the drugs chosen in atypical depression associated with anxiety, phobic and hysterical symptoms, and also in depressive illnesses including endogenous depressions, which have failed to respond satisfactorily to tricyclic antidepressants. Certain foods such as cheese, pickled herring, lima beans and others, and certain medications should be avoided by patients being treated with monoamine oxidase inhibitors as they may cause an acute and sudden rise in blood pressure. However if these foods and medicines are avoided, monoamine oxidase inhibitors are relatively safe.[35] The monoamine oxidase inhibitors exert their antidepressant effects by the inhibition of the enzyme monoamine oxidase. As a result of the inhibition of this enzyme there is an increase in the concentration of biogenic amines in the brain.

Small subgroups of depressed patients require lithium carbonate combined with a tricyclic antidepressant or a monoamine oxidase inhibitor for the successful treatment of their illness. Patients who have failed to respond to ECT and to both types of antidepressants administered separately, have sometimes responded to combined antidepressant therapy (tricyclics and monoamine oxidase inhibitors used together). Finally in relation to antidepressant drug therapy it must be remembered that there is generally a two to three week time lapse before therapeutic effects are manifest.

In addition to biological forms of treatment a supportive type of psychotherapy, together with more specific biblical counselling in patients who are amenable and open to spiritual truth, is in my opinion usually sufficient. More extensive psychotherapy should be reserved for the depressed individuals in whom neurotic or characterological factors represent a major aspect of their illness. Many patients cannot afford the money or time to indulge in prolonged and frequent psychotherapy sessions, nor are there enough therapists to go around as far as this type of treatment is concerned. If all the psychoanalysts in this country were to treat nobody except depressed patients they would be giving therapy to less than 1% of such cases.

In the process of psychotherapy the following areas may require attention: (1) Explanation of the nature of the patient's illness including the use of drugs and ECT together with their side effects. (2) Discussion relating to the handling of every day problems, preferably in the light of Scripture. (3) Discussion and exploration of such issues as true and false guilt, anger, poor self esteem and feelings of rejection.

The patient needs to be assured of the love and concern of his therapist. If he is a Christian he should be assured from the Bible of his imputed righteousness in God's sight; yet if there is unconfessed sin ruining his fellowship with the Lord, he should be encouraged to repent and confess that sin.[36]

Finally the Christian therapist must always bear in mind that it is not enough to treat the biological and psychological aspects of depression; he must do more than that. He must treat the whole man and that includes the spiritual dimension of the depressed individual. If possible the patient should be led to a saving knowledge of the Lord Jesus Christ and thence to a life of total commitment and victorious Christian experience.

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The Biblically-Oriented Family: A Reassessment

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What Are the Biblical Roles in the Family?

The sociologist Zetterberg (1965) wanted to pursue sociological theory as systematically organized, law-like propositions about society and social life. Nye and Berardo (1966) in their work on family analysis state they were unable to find or formulate a family theory which had law-like propositions. They view the individual as maturing through his important social contacts with others, the family having the earliest and greatest influence on the personality (cf. Leary, 1957; Laing, 1972; and Mead and Heyman, 1965). Thus the family is not seen as a static institution, but one that is malleable, for these writers view the individuals, institutions and society itself as flexible because they are capable of growing to include new stimuli. The family does not exist as a group because of its comradeship, but its solidarity is based upon the degree of interdependence of the roles played by family members.

A quite different viewpoint is expressed by many Christian writers. Bonhoeffer (1967) believed that marriage is a divinely-ordered institution of dignity and power. A couple's love is a private possession, but the condition of their marriage is a concern of the public and society. A similar view of marriage was espoused nearly a century ago by Thiersch (Christenson, 1970), who advocated the claim of the wife for the fidelity of her husband. He is perhaps the earliest proponent of equality in a marriage based upon the biblical concept of the fellow-heirship of the husband and wife.

Christenson (1970) is concerned that the roles of which Nye and Berardo (1966) speak have been seriously weakened. His basic principle is: "cultivate the family's relationship with Christ." There are two steps to be taken to fulfill this principle. First is the establishment of the order of the home as God originally required it to be administrated. Christ is to be the head of the husband in *authority* and *reponsibility*. The husband is to function in the same role using Christ as an example in the proper use of *authority* and *responsibility*. He is also accountable to Christ for the proper functioning of his family. The wife has *authority* and *responsibility* over the children primarily (in partnership with the husband) and is accountable to the husband in the way she orders and cares for the household. The children are to be obedient to

their parents. The second step in Christenson's principle is to "practice the presence of Jesus." It is:

> . . . the adventure of sensitizing ourselves to the invisible presence of Jesus in the home—developing our capacity for spiritual perception—learning the practical ways in which we may intensify our awareness of His way and His will for our family.

He insists that any deviation in the family from the Divine Order will cause conflict and disharmony and an eventual breakdown of the family structure. The only cure will be a return of that family to the Divine Order.

Hocking (1969) and Seifert (1972, 1973) have specified in detail how they understand the Scriptures to define the roles of the husband and the wife. The husband is to love his wife, meaning he is to provide for her every need and to sacrifice his own personal wants, comforts and needs, if necessary. He is to love his wife "as Christ loved the Church" (Ephesians 5:25). Similarly, loving his wife implies that he become a provider, protector, teacher, ruler (i.e., an administrator), a leader (one who breaks new ground), and a priest (one who is concerned with the spiritual welfare of the family).

These pastors believe that, according to Ephesians 5, the role of the wife is to be encouraging, loving, submissive, stable and attractive. The emphasis is upon the submissiveness of the wife, for Scripture speaks of the wife submitting to her husband "in everything."

Roberts (1975) agrees with Hocking (1969) and Christenson (1970) that there are definite priorities to be used by every individual Christian, and, more importantly, every husband of a Christian home to make decisions and conduct the affairs of the family, which follow a certain descending order: (1) his relationship to God and Jesus Christ, (2) his relationship to his family, (3) his relationship to other believers of the Body of Christ (I Corinthians 12), (4) his responsibility to non-believers, and (5) the husband's responsibility to his vocation or profession.

Roberts (1975) and Toffler (1970) object to the belief of Nye and Berardo (1966) that the family is merely growing to include new stimuli. They assert that the world is undergoing rapid change which causes them to fear the disintegration of the family, and with it the extinction of society as we know it. In addition, Roberts (1975) believes that every available sign indicates that the home is disappearing as an effective educational and stabilizing force. If biblical principles are not taught to families in the matter of how to function in a home as God intended, then the end draws near for the entire system.

Timmons (1973) suggests four principles to which the believer must be committed in order to have a successful family life: (1) a commitment to the Lord, resolving to yield every area of one's life and marriage to the Designer of the family; (2) a commitment to completeness, viewing one's mate, especially his or her weaknesses, as God's provision to make him a more mature individual and reflect Christ's character; (3) a commitment to responsibility, where the husband and wife resolve to fulfill their responsibilities given to them by God in the Scriptures, putting one another before business, ministry, home or children; (4) a commitment to communication which involves being willing to bless one's mate and activity, loving them especially when the other has offended him or her.

This same writer also addresses the question of the wife's submission to the husband in great detail by comparing the example of Christ's submission to that of a successful wife. The common characteristics he finds are: (1) they both submit totally and give up all their rights (Ephesians 5:22-24; John 5:19; Luke 22:42); (2) they seek to glorify their "head," the one in supreme authority over them (I Corinthians 11:7); (3) they both trust their "head" even when they do not understand the basis for their "head's" decisions (I Peter 3:5; Luke 22:42; Matthew 11:26); (4) they live to love and please their "head" (Titus 2:4; Proverbs 31:12; John 5:19-20); (5) they become totally identified with the role of their "head" (Matthew 19:5; John 17:21).

While Timmons (1973) does believe that the wife should submit to the husband in everything, he is one of the few to *warn* about the boundary of total submission. His principle is "total submission without personal sin." He feels the wife should question herself regarding the needs in her husband's life motivating the request. She should then suggest a way of meeting that basic need without resorting to violation of Scripture. She should trust God as Sarah did, for God may want to intervene and demonstrate His power (I Peter 3:5-6). He also insists that the "conscience" (Isaiah 44:20; II Timothy 3:5; II Peter 3:16) and doing what you "feel the Lord leading you to do" (Numbers 30:6-16) are unreliable guides for behavior. But in the final analysis when the husband asks his wife to disobey Scripture, she should decline to do so. Gothard (1969) espouses a view similar to Timmons'.

Recently there has been a reaction in some evangelical circles to the "traditional" position regarding the biblical roles in the family. Scanzoni and Hardesty (1974) believe that the roles of "male domination," social positions decreed by birth, were rejected by Christ, and, indeed, was one of His goals in His teaching (Bube, 1976). They believe that He rejected the traditional roles of women, and never exhorted women to be good wives and mothers. They believe Christ to have been "gentle, meek, generally unassertive." Regarding the biblical roles, they feel that Christ is the ultimate example for both men and women and we are not to seek cultural definitions of male and female roles.

These two writers conclude that marriage is a partnership, that the New Testament writers were really for the abandonment of culturally defined roles in the home, but they did not insist that social change must be immediate. They feel that the wife is not bound by the Christ-Church analogy of Ephesians 5, and that to say that women should be submissive because otherwise the analogy would break down is the same as advocating the continuance of slavery, for it is a good illustration of what it means to be a bond-slave of Jesus Christ. They firmly insist that the roles of the family commonly understood by Christians to be biblical promote the depersonalization and dehumanization of not only the wife, but all Christians.

In concluding this discussion, we find ourselves with the following questions: What are the biblical roles in the family? How are these roles to be culturally defined today? Does the common understanding of these roles conform to the biblical imperatives? Do the biblical family roles really function to accomplish their stated goals?

The present writers have addressed themselves to some aspects of these questions. It is their hope that from their research some direction for further resolution of this controversy may be given. Further, an attempt has been made to empirically observe the religious community in an objective manner. The authors believe such an attempt is long overdue. Clear thinking is needed if Christian concerns are to make constructive impact upon society.

Hypotheses Tested

It is the present researchers' desire to test the theories postulated by several writers (Hocking, 1969; Christenson, 1970; Zetterberg, 1965; Nye and Berardo, 1966; and Roberts, 1975). There will be two hypotheses tested: (1) if a family knows and fulfills priorities according to the biblical order relating to the home and family, then there should be observable, measurable, and significant behavioral differences between the non-biblical and church-going families as compared with the biblically-oriented families; (2) if the first hypothesis is tested positively, then Zetterberg's (1965) and Nye and Berardo's (1966) assertion regarding the study and lack of law-like propositions in the area of the family is, in part, nullified. In addition, the authors above (Hocking, Christenson, and Roberts) and the present researchers would have, in fact, discovered some law-like propositions relating to the family.

Definitions

Family: This is the universally accepted nuclear human biological family consisting of legally married parents (male and female) and their one or more natural or adopted children.

Christian/Believer/Born-Again: All those who "accept" or receive Jesus Christ as their Savior and their Lord become children of God and receive eternal life; thus, a person "who lives together with Jesus Christ" (Christenson, 1970).

Biblically-Oriented Family (BOF): Members of this family follow the headship of the father-husband, adhering to the "chain of command" or "Divine Order" concepts, and are Christians who daily "live together with Jesus Christ." They are strongly and consistently biblically oriented and evangelical, attending church three (3) or more times a month.

Church-Going Family (CGF): This is a family who attends church three (3) or more times a month, yet does not indicate on the questionnaire that they follow the biblical principles of the family, such as the headship of the father-husband, the hierarchy of family administration as promulgated by Hocking (1969), Christenson (1970), Gothard (1969), *et. al.* However, it is important to see that this group considers itself to be "born-again" believers in Christ, theologically speaking.

Non-Biblically-Oriented Family (NBOF): The term is applied to a family who attends church three (3) or fewer times annually, and by definition *is not* "Christian." Members of this family may question the existence of God and the authority of the Bible. While not ready to name themselves agnostic or atheistic, they are by culture and family tradition church-goers on high Holy Days. This family, to the outside observer, has no distinguishing characteristics from the mainstream of the families of their culture, even though a profession of faith may have been made at one time or another. Therefore this sample group will include not only "unbelievers" who make no profession of faith, but also those who are believers in the strict theological sense of the term but have not followed through in any way on that commitment.

Divine Order/Chain of Command/Divine Priorities: When a family follows the biblical pattern for its behavior, that family magnifies and exalts the excellencies of God. Roberts (1975) calls this biblical pattern "Divine Priorities," whereas Christenson (1970) terms this belief in the authority in relationships between various family members "Divine Order." Bill Gothard (1969) of the Institute in Basic Youth Conflicts and Tim Timmons (1973) of Christian Family Life call this the "Chain of Command."

Design of the Study

The Questionnaire, Administration and Scoring. A questionnaire was created by the investigators and administered by them or a trained assistant to both the husbands and wives in each of the three population groups, or six subgroups of husbands and wives. The questionnaire contained eighty-eight items on a weighted Likert-type (1-5) scale. The total possible score to be obtained on this instrument ranged from eighty-eight (1x88), indicating that the items showed little or no relationship or did not apply to the individual husband or wife, to a score of 440 (5x88), indicating a strong relationship between the items and that individual. Therefore, the higher the score, the greater the conformity of behavior to the principles commonly taught by Hocking (1969), Timmons (1973), Gothard (1969) *et. al.*

The Demographic Data-Gathering Questionnaire. A second questionnaire containing forty-seven items was developed to gather demographic data (age, race, savings, times divorced) since it was believed that these data may be used to demonstrate family unity and stability, thereby offering further support for the hypotheses being tested.

Sample Groups

The three population groups, or six subgroups, were composed of mainly white, legally married males and females who had one or more natural or adopted children. The sample was gathered from many evangelical (Baptist, Brethren, Free Methodist, etc.) churches and secular college campuses, libraries, parks, social groups, and other gatherings within the greater Los Angeles and Orange County areas. The first two groups (NBOF,

CGF) were the control groups for this study because of the expectation set up by the first hypothesis. Thus, in the first of these two groups named (NBOF) there were sixteen couples (n=32) who were legally married and have had one or more children. For the second group (CGF) there were twenty couples (n=40). For both groups (n=72), there was a total of thirty-six husbands and thirty-six wives. The biblically-oriented group, which became the sample group, had thirty-one couples (n=62) who were legally married with at least one child. The total subjects employed in this study were three populations of couples (n=134) distributed throughout six subgroups of husbands and wives. The authors obtained random samples drawn from their respective populations and then matched these groups to create a matched-group design (Kolstoe, 1969), carefully controlling for age, ethnic background, religious preference, education, income and other variables as reported by the respondents.

Main Questionnaire Results

On the eighty-eight items the total scores for the husbands and wives of the NBOF were 4124 and 4394 respectively. For the CGF they were 5434 and 5861, and for the husbands and wives of the BOF, 9946 and 10,073, respectively. The means, total mean, and score ranges for 134 subjects were:

	Sample Size	Score Ranges	Husbands' Mean	Wives' Mean
NBOF	32	198-359	258	275
CGF	40	236-369	272	293
BOF	62	279-380	321	325

Total Mean: 290
Total Sample: 134

These data suggest that the differences between the means, for many of the groups, would be significant. Therefore, the F-ratio was employed, allowing one source of variance to reflect the variation within samples and a second source of variation between the different groups. The differences among the group means was found to be significant.

Significance of Results

What significance may be drawn from these results? Development of a model which lends itself to the observation and measurement of significant behavioral differences between the non-biblically-oriented and church-going families (NBOF and CGF) as compared with the biblically-oriented family (BOF), and as postulated by the first hypothesis, was supported and demonstrated. Regarding the second hypothesis, there was some indication that the BOF does in fact have law-like propositions contained within the applied system; therefore, it is guardedly supported and demonstrated.

The differences between the different groups is believed to be attributed to the application (BOF) or non-application (CGF and NBOF) of biblical principles to their lives. Another important factor is their belief in and conversion to Jesus Christ (CGF and BOF).

There was, however, one interesting difference found in comparing the means between the CGF husbands and CGF wives. This is perhaps not so strange when it is seen that the scores for the husbands in the group were 5434, and for the wives 5861, yielding a difference of 427. An explanation for this difference can be found in the apparent desire of the wives of the CGF group to apply those behaviors which are associated with biblically-oriented principles to their lives; that is, wives were striving to practice biblically-oriented principles, while their husbands tended not to make this application. This "striving," no doubt, makes for some interesting behavior within the homes of the CGF group.

What meaning can be concluded from these data and their obtained results? Unequivocally, God created the family, and He can make it work (Timmons, 1973). The evidence presented tends to support this concept, for those who practiced the biblically-oriented principles (BOF) have scores higher than the other two groups (NBOF and CGF). However, other questions have been generated by this study. How is the biblically-oriented family working? How are these principles being applied in relationships, roles, and the family group process? What is the effect of the application of biblical principles, as they are now being employed, by family members on family members who are evangelical Christians? How do these principles stand the test of time? Or, do they seemingly cause psychopathology?

Unexpected Demographic Observations For the Biblically-Oriented Family

If the BOF is doing what pastors and Christian teachers claim, then the BOF should be generally free from systems disequilibrium. Keeping in mind that the BOF group is composed of those who so designate themselves, consider the following:

(1) 47% of the sixty-eight BOF couples refused to answer the investigators' questions because they involved sexual behavior and role behavior questions.

(2) 50% of the husbands' spouses worked (wives).

(3) 11% of the BOF children living at home had become known to the juvenile authorities since their parents' conversion.

(4) 8% of the BOF sample had served time in jail/prison since their conversion.

(5) 11% did not know if their children used alcohol or drugs.

(6) 45% of the BOF used alcohol since their conversion, but none admitted use of drugs or narcotics—not even for "medical" purposes.

(7) In rating their marriage, the worst description was "somewhat happy" by 13%. None were "very unhappy."

(8) 11% thought about suicide.

(9) 16% were under the care of a mental health professional. 84% failed to respond to this question.

(10) When asked what activities the BOF engaged in as a family, 2% (1 wife) said they did T.V. viewing. 98% missed the question.

(11) 50% believed in abortion in some cases.

(12) 3% responded to the child born from an unwanted pregnancy with less love or some form of rejection.

(13) 39% of the BOF believed God controlled the purse strings of the family.

The present investigators believe these are indices of some biblically-oriented families which are not working. Personal honesty seems to be a real factor in this denial of reality process as Stanley E. Lindquest of the Link-Care Foundation (1976) suggests.

Perhaps another reason for this discrepancy between theory and result can be found in the matter of communication. While much teaching occurs in the evangelical Christian community, the present study raises the question as to whether many biblically-oriented families translate this teaching into considered behavior, seeking a consistent application of those principles.

We suggest that the church and misapplications of the concepts of the BOF are harboring and causing psychopathology. Indeed, clinical interviews and general observations of the BOF by the authors raise questions as to whether, in some cases, biblical principles are used as excuses to violate those same principles. The principle of voluntary submission to authority ("wives, submit to your husbands") used in exclusion of the balancing love for those under authority ("husbands, love your wives") is specifically in mind here.

The authors are not suggesting the abandonment of the BOF concepts. If God did make the family, and these concepts, He can make them work. But the writers are suggesting that we be honest enough to see how it is working and change what needs to be changed. Perhaps there is a *need to really hear* what Scanzoni and Hardesty (1975) are saying:

> . . . Christians must *honestly* face the historical fact that the church has erected many barriers—socially, legally, spiritually, psychologically—against women's advancement. By propagating the notion that God ordained women to be passive and dependent, lacking initiative and assertiveness, confined to kitchen and pew, the church has hampered growth and fostered low self-esteem in women. It has not challenged women to recognize their God-given gifts, encouraged them to fully use their talents, or helped them to gain a mature sense of personhood. In fact objective outside observers have concluded that "churches are one of the few important institutions that still elevate discrimination against women to the level of principle."

It is the conclusion of the writers that the application of biblical principles *does* make a difference. It is the conviction of the writers that careful analysis of *how* that application is accomplished must be made in order to avoid a dishonest and reality-denying family environment.

The Working Wife

One of the most hotly debated topics regarding the Christian home has been that of the working wife. Some Christian writers have made the assertion that the "wife's great realm of responsibility is her home. . . . There is no scriptural basis to justify a working wife."

What is the motivation of such a statement? We live in a society which is in social trauma due to the breakdown of family relationships. Anything which might indicate or help support that breakdown is vehemently avoided. If the wife is not at home, it is assumed that the relationships within the family, especially with the children, will break down.

There are a number of fallacies with this position. It assumes that the breakdown of family relationships is due to a lack of "time" spent by the wife in the home. There is abundant evidence to even the observant layman that many homes break down where there is a wife at home. Obviously, the strength of family relationships is not a function only of quantity of contact between persons. Second, there *is* evidence for a working wife in Proverbs 31. Third, even if there were no evidence *for* the justification of a working wife, neither is there evidence *against* it.

A biblical family depends upon the quality of relationship, not the quantity of contact between persons. While contact is necessary, the type of interpersonal exchange is the operant factor. The crux of whether a working wife is a positive or negative factor in the family is a function of the motivation of the wife in working. Certainly the advocates of the "homemaker" wife are not opposed to the physical exertion of the woman required by the tasks in the home. But if the emotional focus of the wife is outside the home because of her feelings of unfulfillment and bitterness, then her role has broken down, even if she is not working. Admittedly, many women work outside the home because they desire to escape their problems and responsibilities, yet her employment is only the effect—not the cause—of the breakdown of relationships in the home. They were *already* in "systems disequilibrium." Conversely, if the emotional focus of the wife is toward the family and her fulfillment in that relationship, then whether she works or not makes little difference. Her physical exertion is pointed toward the family, no matter where she is.

It is admitted that if the wife works in a home where there are young children, then the time variable, even in the best of situations, becomes important. It is not an ideal situation. Yet even here the quality of relationship is central. If the children realize at an emotional level that their mother is leaving them to help support the family because of economic necessity, then it is our opinion that the children will not become emotionally disturbed, but will tend to be well-balanced emotionally.

There will be problems and stress, but if the parents have good relationships with each other, then that stress will tend to draw the family together and not push them further apart. If the family does fall apart, then it is our contention that the cause lay not in the wife working, but in the poor quality of the relationships. The family would have broken down in any event.

The preceding is the result of general observations on the part of the researchers and the primary contention is that this position of some pastors and Christian writers against a working wife is too simplistic and superficial, since an adequate explanation could be given proving the opposite from the same evidence. Thus there is the necessity for research giving empirical data supporting one contention or the other.

The matter of Proverbs 31 is a sticky one. Various interpretations have been presented. It is felt that this passage of Scripture harmonizes with the position stated above. First, verses 11, 12, 20, 25, 27 and 28 indicate good relationships within the home. Obviously, the passage teaches that the wife is not to "eat the bread of idleness" (31:27). There is evidence that the woman is to work hard. Further, verses 14, 16, 20 and 24 indicate that she operates in real estate, industry and trade outside the physical boundaries of the home. Yet her emotional focus is towards the home (31:12,15,21,27).

One final issue is to be raised. Observations of the wives who do not work seem to fall into several categories: those who have little to do at home and withdraw into their own little world; those who have much to do in the home and either adapt and find fulfillment or not; those who have little to do in the home and find many community and church activities to occupy their time. The first category is pathological. The third category is functionally equivalent to the working mother.

The key to whether the working wife causes problems in the Christian home is rooted in her motivation for working. If material wealth is the highest ideal, will not the children at some level sense this and internalize a concept that money and a high standard of living is more valuable than themselves? And if the mother works out of economic necessity, will the children not receive the opposite impression?

The point to be made from the discussion above is not to justify *any* working wife. Such a position is not defensible biblically. But neither can one say without qualification that a working mother is *not* justified by the Scripture.

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Errata
~~Erratta~~

The worst kind of typographical errors are those that misspell a person's name, give the wrong address for a person, or reverse the intended sense of what was written. In the December 1979 issue of the **Journal ASA**, *we were guilty of all of these errors.*

On page 190, we listed the author of the segment on "Response of the Press" as Ann H. Hart of Eli Little Research Laboratories. It took two tries to get it right: the author is really **Ann H. Hunt** *of the* **Eli Lilly** *Research Laboratories, Indianapolis, Indiana 46285. Ann says that we are forgiven if we will ask for Lilly drugs at our pharmacist's.*

On p. 210 of the same issue near the top of the right hand column, author Robert D. Knudsen was horrified to find himself saying, "Dooyeweerd's own position is clear, however, with respect to the meaning of science. Science has its own sense, its own meaning of itself." His manuscript had read instead, "Dooyeweerd's own position is clear, however, with respect to the meaning of science. Science has its own sense, its own meaning; **but that does not entail that it is autonomous, having its meaning** *of itself." Students of Dooyeweerd, please take note.*

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

Part **12**

Creation
(A) How Should Genesis be Interpreted?

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The biblical doctrine of Creation is far more than an historical option; it is a fundamental necessity that drives a sharp wedge between competing worldviews and perspectives on the nature of man. It stands in unique opposition to naturalism on the one hand, with its denial of meaning and purpose in the universe, and pantheism on the other hand, with its denial of the difference-in-kind between God and the universe. Out of the many possible models for the human being, it singles out that one in which human beings are creatures like other creatures, and yet are creatures made in the image of God and hence unlike other creatures. It establishes both the transcendence and immanence of God, and reveals that evil is not intrinsic to the created universe but is a moral aberration upon that good creation.

The concept of Creation is so fundamental that no discussion of the integration of science with Christian faith could possibly be complete without including it. Unfortunately contemporary debates about Creation in conservative Christian circles frequently obscure the issue by posing creation and evolution as two mutually exclusive options, as though one must choose between a biblically sound faith that supports Creation and an atheistic Bible-contradicting position that supports evolution. It is the purpose of this and the following installment to add just a few more words to the volumes that have been written on this subject[1] in the hope of providing some clarity and summary of the issues involved.

Reversing customary procedures I would like to give some conclusions at the beginning of this discussion rather than at the end, so that they can be held in mind throughout these two installments.

1. Every Christian believes in Creation and confesses, "I believe in God the Father Almighty, Maker of Heaven and Earth."

2. What is frequently under debate is *not* the *fact* of Creation but the *method* or *mode* of creation.

3. To identify the fact of Creation with a specific mode of creation so that both stand or fall together is unwarranted and inappropriate.

4. We do not know in any detail the method of creative activity used by God; dogmatic assertions one way or the other are not justified.

5. All of our opinions in these matters arise from human interpretations, either of the biblical record or of the created universe. Either one or both of these interpretations can be incorrect at any given time.

6. Disagreements about possible but uncertain modes of God's creative activity should not be allowed to separate Christians.

Genesis and Contemporary Creation Stories

The unique and divinely inspired nature of the Genesis creation account can be seen most clearly by comparison with contemporary creation stories.[2]

In the Babylonian *Epic of Creation* a deadly conflict rages between Apsu and Tiamat, the fresh and salt-water primeval waters. Ea, the Ruler of the Sea, slays Apsu in his sleep. Tiamat prepares her revenge but is met by Marduk, the god of spring, the sun and the thunderstorm. Marduk kills Tiamat and creates the world:

> He split her into two parts, like an oyster.
> Half of her he set up and made the heavens as a covering.
> The Lord measured the dimension of Apsu.
> A vast abode its counterpart he fixed—even the Earth.

Finally a god, Kingu, who had been Tiamat's general is killed. With his blood Ea made mankind.

In Greek myths of the origin of the world, Earth bore many powerful and terrifying divine children to Heaven, but Heaven hid them away. Striking back, Earth has Chronos, her youngest son, emasculate Heaven and separate Earth and Heaven forever. As Lord of the World,

Chronos devours his own children to prevent them from doing what he had done to Heaven. Zeus, the youngest, is cleverly saved, grows up and dethrones his father. Several different Greek myths offer descriptions for the origin of man at the hand of the gods.

In the Icelandic *Edda* evil Ymir lived in the earliest of times; from his sweat came a man and a woman, and one of his feet begat with the other a son. From these came the races of the frost-giants. From the licking of salt-stones by a cow came a man Buri who begat a son named Bor. Bor's sons slay the evil Ymir and rule heaven and earth.

> From the flesh of Ymir the world was formed,
> from his blood the billows of the sea,
> the hills from his bones, the trees from his hair
> the sphere of heaven from his skull.
>
> Out of his brows the blithe Powers made
> Midgarth for sons of men,
> and out of his brains were the angry clouds
> all shaped above in the sky.

The *Edda* goes on to tell how man and woman were made by the gods out of an ash-tree and an elm-tree.

A vast literature exists as to the significance and origin of these myths, their meaning for the peoples who repeated them, and their meaning for us. It is sufficient for us to compare them with the stately lines of Genesis to get a full sense of the divinely inspired grandeur of Genesis and its freedom by inspiration from the contemporary myths:

> *In the beginning God created the heaven and the earth.*

A well-ordered report lies before us, without a slaughter of the gods, without dragons of the sea, without building of the world out of corpses. A God without adversary builds the earth, tends a garden, speaks and acts to accomplish His will by the power of His word.

How then shall we interpret this Genesis account? What kind of literature is it?

The Basic Choices

There are four basic types of interpretation framework within which the meaning of Genesis can be sought. Briefly we may categorize these as follows:

1. *The completely literal view.* The record of Genesis is read in the same way as a page from the New York *Times*, and it is therefore concluded that the world was created in 6 days of 24 hours each, a few thousand years ago (even if not exactly the date given by Bishop Ussher as 4004 BC from analysis of the genealogies, or with more exactness yet by the 17th century Hebrew scholar Lightfoot who reported that creation occurred within the week of October 18 to 24, 4004 BC, with Adam created on October 23 at 9:00 am, 45th meridian time).

2. *The essentially literal view.* The record is taken to reveal specific historical and empirical data but with some figurative elements, so that an aged earth of some 4.5 billion years may be accommodated, but instantaneous creation acts within time are still proposed.

3. *The essentially non-literal view.* The record is interpreted to speak of real historical events, but in a literary form not to be directly correlated or harmonized with empirical history.

4. *The completely non-literal view.* The Genesis account is divested of divine inspiration and read as the same kind of literature as any other, describing the traditional stories of a particular ethnic group.

As evangelical Christians, we need not consider this fourth option any further, but instead confine ourselves to a consideration of the other three, all of which have been defended on the grounds of satisfying the available biblical and scientific data.

First, however, to appreciate the grand scope of the biblical revelation concerning Creation, we consider briefly what such revelation tells us that is *common to all three forms of interpretation.* For differences between these forms of interpretation are concerned mostly with the *modes* and *methods* of creation, not with the essential meaning and consequences of the biblical teaching.

Genesis 1–3 as the Foundation for the Biblical Doctrine of Creation

The two great themes of the biblical revelation are Creation and Redemption. These two themes are not independent but are woven together in both Old and New Testaments.[3] The Israelites asked themselves in remembrance, "Who is the God who has delivered us from the land of Egypt?" with the answer, "It is the Lord, the maker of heaven and earth." The Christians asked themselves in remembrance, "Who is this Jesus Christ who has died and risen again for us?" with the answer, "He is the Lord of the Cosmos, by whom all things were made." He is our God of Creation and our God of Redemption; no one who belongs to Him can separate them.

The biblical doctrine of Creation sets off all Judeo-Christian thought from the major competing metaphysical systems of the world.[4] On the one hand there is naturalism, which supposes that there is no God and that all the things we see have arisen totally from forces devoid of any intrinsic purpose or meaning. Against naturalism, the doctrine of Creation proclaims that everything that exists depends for its origin and for its moment by mo-

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This continuing series of articles is based on courses given at Stanford University, Fuller Theological Seminary, Regent College, Menlo Park Presbyterian Church and Foothill Covenant Church. Previous articles were published as follows. 1. *"Science Isn't Everything," March* (1976), *pp.* 33-37. 2. *"Science Isn't Nothing," June* (1976), *pp.* 82-87. 3. *"The Philosophy and Practice of Science," September* (1976), *pp.* 127-132. 4. *"Pseudo-Science and Pseudo-Theology. (A) Cult and Occult," March* (1977), *pp.* 22-28. 5. *"Pseudo-Science and Pseudo-Theology. (B) Scientific Theology," September* (1977), *pp.* 124-129. 6. *"Pseudo-Science and Pseudo-Theology. (C) Cosmic Consciousness," December* (1977), *pp.* 165-174. 7. *"Man Come of Age?" June* (1978), *pp.* 81-87. 8. *"Ethical Guidelines," September* (1978), *pp.* 134-141. 9. *"The Significance of Being Human," March* (1979), *pp.* 37-43. 10. *"Human Sexuality. (A) Are Times A'Changing?" June* (1979), *pp.* 106-112. 11. *"Human Sexuality. (B) Love and Law," September* (1979), *pp.* 153-157.

The specific format of this paper follows lectures at an interterm on Creation given at George Fox College, Newberg, Oregon, in September 1978.

ment continuance in existence upon the free activity of God. The doctrine of Creation does not deny the possibility of scientific descriptions of human and earth history; it affirms that in all we see, we can know that God has acted and is acting.

The other competing metaphysical system is that of monistic pantheism. Here everything is viewed as a manifestation of the same ultimate essence, and hence the world *is* God, not a separate creation made by a self-existing God. Since the world and everything in it is identified as "God," there is no place for speaking of "creation." Against pantheism, the doctrine of Creation proclaims that the universe is a creation of God, a creation with separate although not independent existence from God, a creation endowed with certain characteristics by the continuing free activity of God.

In terms of the relation between science and Christian perspectives, the doctrine of Creation provides the foundation for scientific description and inquiry. Naturalism left unchecked leads inevitably to scientific reductionism; pantheism by its very nature is inimical to the historical scientific process and the two are strongly opposed antagonists wherever they meet. Much of the current modern movement toward "broadening" science beyond its traditional boundaries is in fact an effort to remove the barrier that historic authentic science places in the road of any kind of pantheism. The doctrine of Creation shows that it is right and good for the human being to understand what God has made so that he may be a faithful steward of God's creation according to the mandate given to him.

Metaphysical systems of the universe also lead to different views on the nature of the human being. Naturalism carried to its physical extreme, leads to the view of man as a complex biochemical machine, responding in totally mechanistic fashion to the stimuli that fall upon his senses. Carried not quite so far and given a humanistic tinge, naturalism leads to the view of man as a highly developed animal, the product of a purposeless evolutionary process, conditioned psychologically by his environment within the limits left by the determination of his genetics. Pantheism leads to a view of man as God, possessing within himself the essence of the divine, and hence capable of exceeding all the limitations of his present finite temporal existence by bringing himself into unity with the great Unity of the universe. Those who reject the consequences of naturalism, but have no foundation upon which to build an alternative, reach out to posit man existentially as a free being, a rational being in an irrational universe, who must validate his own existence. Against all these bankrupt views of the human being, views that finally manifest their inadequacy when confronted with reality, the doctrine of Creation proclaims man as a creature made by God. Because he is a creature, he is one with the rest of creation, sharing creaturehood with the mountains, rivers, trees and animals. But he is also a creature made by God in his image; therefore man is a unique creature with potentialities for personal relationship with God not shared by other creatures and created things.

Furthermore the biblical doctrine of Creation informs us concerning the nature of God. He who is the foundation of all existence cannot Himself be confined to categories of description derived from created existence. Because He is Creator, God transcends the natural order; its existence depends upon Him totally but He is not to be identified with it. Because He is transcendent, we can expect to know Him truly as He chooses to reveal Himself to us, but we cannot expect to know Him fully. But the doctrine of Creation extending on into the biblical doctrine of Providence emphasizes also the immanence of God in and with His creation, as well as His transcendence over it. The creation does not have independent existence of the kind the Deists supposed, in which God wound up the world and then stepped back for it to run down on its own. Instead God is involved in many different ways with the ongoing existence and life of the world; on the material level, He holds all things together, and on the personal level He comes to us in personal relationship in Jesus Christ.

The biblical doctrine of Creation teaches us that the God who speaks is the God who acts. Profound implications spread like waves from the statement that God spoke and it was so. Speaking and acting are not separated, but are together indications of a united purpose; so also we are called to make our deeds suit our words. The God who speaks also acts; His is not an impotent voice calling us from afar. The God who acts also speaks; He is not acting *incognito* nor has He left us without His revealing Word to us.

Finally, the biblical doctrine of Creation expresses itself with respect to the presence of evil in the world. Naturalism cannot recognize evil for it is able to see only what is, and not what ought to be. Pantheism attributes evil to a faulty perception of reality with its roots in our finite temporal limitations and thus denies the possibility of moral evil. The doctrine of Creation affirms the reality of evil and at the same time it shows that evil is not inherent in the finite temporality of the creature, but is instead the consequence of moral rebellion against God. God's created order is pronounced good, but the misuse of human choice bequeathed in that good creation then leads to evil thoughts and acts.

Because God has created, we can rest secure in the knowledge that there is an objective reality suitable for investigation by the techniques of science. While marveling, still we can expect that we may be able to come up with descriptive pictures of this reality out of the conceptualizations of our minds. As we come to describe and understand what God has made, we have no need to come with philosophical, metaphysical or theological constraints in hand into which our descriptions must be made to fit; rather we can come openly to that which God has made and seek to learn from it what God has done.

All these—and more beside—foundational aspects of the Christian faith are to be found rooted in the biblical doctrine of Creation. Their understanding, their truth, their comfort and their claim on our lives depend in no critical way on the *method* of creation.

We consider now the three interpretational schemes that seek to make a connection between these ultimate meanings, common to all, and specific views of the mechanism or method of creation.

The Completely Literal View

In the completely literal view, God created by instantaneous *fiat*, bringing all things from nothing into full being in six 24-hour days on a date not more than about 10,000 years ago. This view has difficulties in view of the biblical text, and has major difficulties with respect to scientific understanding which it contradicts at essentially every point.

The biblical text does not support the argument for the necessity of instantaneous creation without the use of pre-existing materials. One might question whether such a concept were at all consistent with Hebraic thought.[5] Looking only at the text, however, attention focuses on the Hebrew word *bara*, commonly translated "create." The Bible does not provide us with a precise definition of this word. The word *bara* is used interchangeably in the Hebrew text with other words implying acts of purely human production.[6] Insisting that it must mean instantaneous creation appears to go beyond the biblical information available. Certainly in the Genesis 2:7 record of the creation of man, the record describes both pre-existent material (dust) and process (breathed into his nostrils). Dogmatic biblical defense of instantaneous creation as the revealed mechanism of God's activity is not linguistically justified.

Nor can it be effectively argued that acts of instantaneous *fiat* creation over a 6-day period testify uniquely to the omnipotence of God in a way that acts of creativity distributed uniformly or nonuniformly in time would not. If brevity were the key to omnipotence, why then did God not create in 1 day, or 1 hour, or less? When it comes to the subject of *mechanism*, we must ask not what *can* God do, but what *did* God do?

But clearly the most troublesome aspect of the completely literal view is its almost complete disagreement with scientific interpretations of the history of the earth. These disagreements are so wide and so fundamental, that only a radical thesis can serve to defend the completely literal view. We mention briefly three such radical theses that have been offered to relieve the conflict of this view with scientific interpretations.

(1) *The gap theory.* It is contended that a long gap in time occurs between Genesis 1:1 and 1:2. As summed up in the notes of the Scofield Bible, "The first creative act refers to the dateless past, and gives scope for all the geologic ages."[7] A judgmental catastrophe in the past is read out of Jeremiah 4:23-26, Isaiah 24:1 and Isaiah 45:18. Genesis 1:2 and following then describe the *re*-creation of the earth in the near past. This theory has neither sound exegetical or scientific support, and is not strongly advocated today.

(2) *The apparent-age theory.* It is contended that the world was really created about 10,000 years ago, but with the appearance of being much older. It is supposed, therefore, that the created world is not a reliable witness to its own age and history. This theory has no exegetical support; its very form is that of a non-scientific statement that cannot be tested. Whether the statement can be said to even have meaning is an interesting philosophical question, and its implications pose problems concerning the integrity of God the Creator who would create fossils *in situ*.

(3) *The flood geology theory.* It is contended that the world is really young but that it appears old if scientific data are misinterpreted, not realizing that fundamental changes have occurred in earth history through cataclysmic events, most notably the world-wide flood of Noah's time. Supporters of flood geology have exhibited considerable ingenuity and untiring effort in constructing a mechanistic theory adequate to the task.[8] I think it is fair to say, however, that no one advocates flood geology today for scientific reasons, but rather as a means of supporting a completely literal view of Genesis. The vast majority of professionally engaged geologists, both Christian and non-Christian, reject the arguments for flood geology as indefensible science. This is true even of evangelical Christians who reject the evolutionary development of the human race, but who have had a good background training in geology.[9]

In summary, then, a completely literal view of Genesis proposes a special instantaneous creation or series of instantaneous creations within a short period not more than 10,000 years ago, has no rigorous biblical foundation that admits of no other interpretation, and finds no support in commonly accepted scientific understanding. This view is supported primarily by those who hold strongly to a traditional biblical interpretation and have little involvement in or even a negative reaction against scientific descriptions. Advocates of this position reject evolution absolutely.

The Essentially Literal View

The essentially literal view holds to the thesis that Genesis 1-3 is conveying historical information but with some room for figurative elements to the account. The question then is, what is figurative? Again a number of theses have been advanced to show that the biblical account and modern science can be *harmonized* provided that the account is taken as essentially, if not strictly, literal. The most commonly chosen figurative element is the meaning of the word "day," which is interpreted to indicate a period of time, not necessarily a 24-hour day.

(1) *Chronologically accurate age-day theories.* The simplest form of such theories suggests that the Genesis account be left intact as an historical description with chronological accuracy, with the substitution of a long period of time for each day, so that creation events are separated by long periods of time in which process events and development occur. Other versions consider the creation days as the *beginnings* of new creation activity, each one being instantaneously initiated by *fiat* and then continuing on via other processes.[10]

(2) *Non-chronological day-age theories.* Efforts toward a strict chronological harmonization of biblical and scientific interpretations are decreased, and it is admitted within the day-age framework that the creation events in Genesis 1 may be ordered (topically, liturgically etc.) in some other than a chronological framework.

The essentially literal interpretation shares with the

completely literal interpretation the presupposition that the biblical record as history *should* be brought into a one-to-one harmony with modern scientific understanding of the origins of the earth and of life on the earth. No consideration is given to the often cited possibility that these passages are more like Hebrew poetry than prose, and that the key to their understanding may lie elsewhere than an essentially literal harmonization. The basic question confronted is how this harmony should be defended. Given the brevity of the record, the willingness to admit some figurative elements, and the common-sense style of the Genesis account, it is not difficult to bring about such harmonization with the exercise of a little ingenuity, even when "modern scientific understanding" changes from generation to generation. The basic question: "Is it indeed a proper interpretational framework to *insist* that the Genesis record be harmonizable with contemporary modern science?" is not addressed.

In summary, an essentially literal view of Genesis proposes some kind of *progressive creation*: instantaneous acts distributed over discrete time periods, these being separated by long periods of time; emphasizes the need to harmonize Genesis and science while allowing for an aged earth; and attempts to use the contemporary view of science (in spite of changes in it with time) to defend the integrity and historicity of the biblical account.

This view is supported primarily by those whose involvement and attachment to science prevents them from wholeheartedly accepting the completely literal view, but whose commitment to traditional biblical interpretation, particularly with view to the creation of life and human beings, leads them to insist that a harmonization of the Bible and science is essential. Advocates of an essentially literal view are open to evolutionary development between creation days, but preserve specific acts for the instantaneous *fiat* creation of God, particularly the origin of man.

The Essentially Non-Literal View

The essentially non-literal view holds to the genuineness of the record as revelation of God concerning real historical events, but regards the attempts at harmonizing the Genesis record with scientific descriptions to be fundamentally misguided—not because the record is suspected of harboring scientific absurdities, but because the record was not written for the purpose of informing us about 20th century scientific theories. Of course, once it is supposed that the account is non-literal, then there are many possibilities as to the most appropriate way to regard it. What kind of literature is this Genesis account that can function as authoritative and reliable revelation of God, but not as a reporting of scientific mechanisms involved in God's activity?

We consider a few of the terms that have been applied in an effort to describe the account with accuracy and integrity. (1) *Myth*. This term has received some undesirable implications at the hands of liberal theologians and in terms of its common usage for secular writings. Its purpose, however, is to assert that the account conveys an awareness of that which is beyond rational comprehension, not propositional truth. A distinction must be made between *mythic* and *only myth*, the latter leaning toward the implication of fairy tale and fiction, whereas the former suggests the transcendent expressed in the finite. Genesis can actually be considered as an *anti-mythical myth*:[2] an account presented to contradict contemporary prevalent myths. (2) *Saga*. This is Karl Barth's term for Genesis. It describes what *happened*, but not as what happened historically. It is distinguished from myth—which involves no experience, and from history—which is based on human experience. (3) *Prophecy*. Genesis takes the form of prophetic literature with respect to the past, in the way that Revelation takes the form of prophetic literature with respect to the future. Primal events and apocalyptic events are separated by the period of salvation history. (4) *Parable*. As parable, Genesis is seen as providing examples for imitation, interpretations of events, representations of divine-human relationships, and transcendental attributes of God in human language. (5) *Confessional liturgy*. The record of Genesis is seen as in the form of a confessional liturgy, through which the people of God confessed their continuing faith in God the Father Almighty, Maker of Heaven and earth. Thus the account is suitable for worship, witness and apologetics, not for discovering scientific mechanisms of God's creative activity.

Since the essentially non-literal view regards scientific and theological descriptions as complementary, neither conflict nor harmony with modern science is relevant except in the most general terms. In summary, the essentially non-literal view of Genesis sees the Genesis record as revealing the basic truths of Creation mentioned earlier in this installment, but is *agnostic* about the methods that God used to accomplish this, is willing to consider the possibility of process in time as well as *fiat* instantaneous creation as mechanisms of God's creative activity, requires that the particular traditional interpretation of Genesis as *necessarily* giving historical details harmonizable with scientific descriptions be relaxed, and involves a spectrum of issues in biblical interpretation both within the text of Genesis and with the New Testament authors' use of this text. Traditionally Jesus' and Paul's words about Adam have been interpreted as indicating a specific literal historical figure, and a relaxation of this interpretation requires careful consideration.

This view is supported primarily by those with an active involvement in science, who view aspects of traditional biblical interpretation as inconsistent with the biblical record as a whole. Advocates of this position are open to the possibility of evolutionary development of all forms of the created world, including man, but in view of their agnostic stance with respect to the *methods* of creative activity avoid dogmatism on the issue.

Intermediate Summary

In this first of a two-part discussion on Creation, we have taken a look at a number of ways of answering the question: How should the biblical text be interpreted? We have seen how one's presuppositions about the kind of interpretation that is appropriate affect the conclusions that one draws with respect to the scientific description. We have also seen how the basic biblical teaching on Creation does not depend in any significant way on the specific interpretation adopted to answer the questions concerning the mechanisms describing God's creative activity.

In the next installment, we conclude our consideration by examining the relationships between the biblical teaching on Creation and the scientific descriptions involving evolutionary mechanisms.

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[2]Information presented is based on the discussion by Carl F. von Weizsacker in *The Relevance of Science*, Collins, London (1964)

[3]Richard H. Bube, "Tension in Theology: Creation vs Redemption," *Journal ASA* 32, 1 (1980)

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[5]See Matthew Fox, "Elements of a Biblical Creation-Centered Spirituality," *Spirituality Today*, p. 368, December (1978), and Aldert Van der Ziel, *Genesis and Scientific Inquiry*, Denison, Minneapolis (1965)

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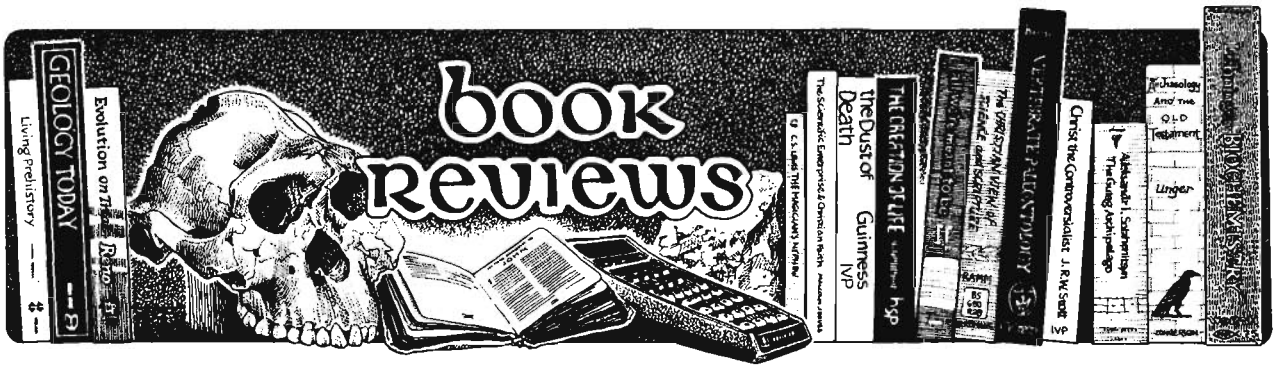

THE EARTH IS THE LORD'S, Edited by Mary Evelyn Jegen and Bruno Manno, Paulist Press, New York, 1978, 216 pages, $4.95.

The essays in this volume grew out of a cooperative effort by *Bread for the World* and the University of Dayton. Few debate the need for education the public about issues of social justice. Even the most optimistic are gloomy about prospects for the world's poor. While efforts such as this one will feed no one they could stir the consciences of some to reflection and even action.

However, even understood as no more than a stimulant to investigation and action, the book falls short. What may have been a thought-provoking seminar does not really succeed as a book. Too many of the essays stimulate questions that could have been discussed in a seminar. No thesis can be adequately explored in eight to ten printed pages.

The authors rush about in different directions touching in quick succession the fields of economics, religion, and agriculture without ever pausing to clarify their insights. No topic is analyzed in depth; many topics are scanned quickly. The essays by Sider on the "Biblical Perspective on Stewardship" and Pignone on "Concentrated Ownership of Land" were the best of the collection. They also happen to be two of the authors who violated the editors' apparent nine to ten page limit.

One author makes a point by reversing the order of Cain's sacrifice and Abel's murder (p. 24). Another misrepresents Levirate marriage (p. 63) as well as Old Testament legislation on adultery (p. 64). All of the authors envisage gradual solutions by religious conversion, economic development, and political change. The feasibility of any semblance of national or international justice be-

Books Received and Available for Review

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

Beauchamp and Childress, *Principles of Biomedical Ethics*, Oxford Univ. Press

Bissonnier, *The Pedagogy of Resurrection* (The Religious Formation and Christian Education of the Handicapped and the Maladjusted), Paulist

Cochrane, Hamm and Kazepides, *The Domain of Moral Education*, Paulist

Conway, *Men in Mid-Life Crisis*. InterVarsity

Dooyeweerd, *Roots of Western Culture*, Wedge

Enroth, *The Lure of the Cults*, Christian Herald

Fleck, *Genesis and Development of a Scientific Fact*, Univ. of Chicago Press

Gettinger, *Sentenced to Die* (The People, the Crimes, and the Controversy), Macmillan

Haughey, ed., *Personal Values in Public Policy* (Conversations on Government Decision-Making), Paulist

Ladd, *Ethical Issues Relating to Life and Death*, Oxford Univ. Press

Lindskoog, *The Gift of Dreams*, Harper & Row

Medawar, *Advice to a Young Scientist*, Harper & Row

Reidy, *Foundations for a Medical Ethic*, Paulist

Roszak, *Person/Planet*, Doubleday Anchor

Shelly, *Caring in Crisis: Bible Studies for Helping People*, InterVarsity

Steidl, *The Earth, the Stars and the Bible*, Baker

ing achieved by such methods is never investigated.

Beyond question, people who "experience the world as limited, interconnected, and fragile" would accept without debate that the earth belongs to everyone (p. 127). However, most human beings experience the world only as a battle field for survival. These authors believe the world belongs to everyone to cherish and to share, not only for their own loved ones but for unknown present and future generations.

Although they worry about the future, they appear resigned to life in the present. Only strategy for gradual change is proposed. The issues examined are specialized such as "Adam Smith, Milton Friedman, and Christian Economics" and "World Grain Reserve" whild most of the responses proposed are non-political, familial or individualistic.

In spite of its many shortcomings, this book may be valuable as a primer on social justice issues for the uninitiated. Four sets of questions and action suggestions make the book a possible text for discussion groups. Selected bibliographies also extend the book's worth as a resource to facilitate the readers' efforts to broaden their understanding of stewardship.

Because their concern is of such great and immediate urgency, the book should be read, contradicted, affirmed, extended, and improved. Many people are searching secular as well as religious scriptures for answers that will resolve our modern crises of justice. This much can be said: This book confronts readers with a major tension between capitalism and communism which concerns us all. The earth is the Lord's. No system yet conceived has successfully resolved the tension between private ownership and public good on the one hand and God's creation for the benefit of all the people on the other.

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

GOD, FREEDOM, AND EVIL by Alvin C. Plantinga, Eerdmans, 1977 (Reprinted from a 1974 Harper & Row Edition) 112 pages, $3.95.

Alvin Plantinga's works have been recognized for some time as an important contribution to philosophy. (I recently heard him lecture at Princeton University where he was introduced by a member of the philosophy faculty as the foremost person today working on the relationship between metaphysics and the philosophy of religion.) The Calvin College professor is a first-rate logician and his writing is marked by precision and technical proficiency. Unfortunately, this means that much of what he has written is inaccessible to all but philosophical specialists. The significance of *God, Freedom, and Evil* is that it was written for a much wider audience.

The basic thrust of this book is simply that it is rational to believe that God exists. Classic arguments for and against God's existence are dealt with. Plantinga focuses upon two of these. In the first part of the book, his major concern is to refute the atheistic argument from evil. Part two is composed mainly of an examination and restatement of the famous ontological argument, first formulated by St. Anselm. Plantinga approaches these topics armed with recent insights from the philosophy of logic, particularly those concerning the idea of possible worlds.

The argument that God's existence is incompatible with evil is answered by "the free will defense." What is crucial to the free will defender is the "possibility that it is not within God's power to create a world containing moral good without creating one containing moral evil" (p. 44). For if we are truly free, there are any number of possible worlds such that it is partly up to us whether or not God can actualize them. Plantinga goes on to argue that neither the amount nor the variety of evil in the world make it any more unlikely that God exists. He concludes that the free will defense solves the main philosophical problem of evil. Having so concluded, he analyzes and rejects the objection that God's omniscience is incompatible with human freedom. There have been other attempts to refute his free will defense, but none that I know of have been successful.

Professor Plantinga is also known as a specialist in the ontological argument. He does not share the opinion of many philosophers that it has been successfully refuted. His version of the argument relies on the truth of this premise: "There is a possible world in which maximal greatness is instantiated" (p. 111). A being has maximal greatness only if it has maximal excellence, i.e. omniscience, omnipotence, and moral perfection, in every possible world. While Plantinga believes that the premise is true, and the consequent argument sound, he does not claim to have proved the existence of God. All the argument establishes is the rational acceptability of theism. "And hence it accomplishes at least one of the aims of the tradition of natural theology" (p.112).

I conclude that there are any number of possible worlds in which many people read *God, Freedom, and Evil.* They must employ a measure of concentration to follow the author's arguments, but they are duly rewarded. They benefit from the exercise in rigorous thinking while adding understanding to their faith.

[Printing errors: p. 15 line 2, "sense of question" should be "sense in question"; p. 37, line 10, S should be $\bar{S}$; p. 100, line 6 from bottom, "Step (14)" should be "Step (15)"; line 5 from bottom (15) should be (14).]

Reviewed by Jerry L. Walls, Student, Princeton Seminary, Princeton, New Jersey.

THE MORMON PAPERS: *Are the Mormon Scriptures Reliable?* By Harry L. Ropp, InterVarsity Press, Downers Grove, Illinois (1977), paperback, 118 pp., $2.95

The credibility, reliability, and the inter-relationships of the doctrines on which The Church of Jesus Christ of Latter Day Saints is based are the subject of this book written by the founder of a mission to the Mormons based in Utah.

Ropp begins by clearly stating the differences between

orthodox Christian doctrines on the Bible, God and Christ, and salvation and those espoused by the Mormon Church. He examines and quotes from the writings of LDS literature and Mormon leaders to show why Mormons are not Christians. The first chapter is an excellent overview of some of the major doctrines of the LDS Church.

With that discussion as a background, Ropp, in Chapters 2-5, examines the Mormon papers which are the foundation of the LDS faith, i.e., the *Book of Mormon, The Book of Commandment, The Doctrine and Covenants,* and *The Pearl of Great Price.* Beginning with *The Book of Mormon,* he describes the official version of how Joseph Smith received and translated the Book from gold plates. A weakness in this presentation is the failure to describe the fate of the plates as described by Smith and the reason that they are no longer available for examination. Through a review of other authors who have examined the origins of the *Book of Mormon,* i.e., Fawn Brodie, Sandra and Jerald Tanner, George Arburghey and Hal Houghey, Ropp brings together the main problems with accepting the Mormon position on the book's authenticity.

The most important claim made for the book is that it is the Word of God and that it is correct, perfect and has no need for changing. Yet Ropp points out that hundreds of grammatical errors and spellings have been corrected as well as additions of words which change original meanings. The Tanners cite almost 4,000 changes and corrections. Ropp gives several of these examples and then describes the dilemma for the thinking Mormon:

> Either Joseph Smith copied mistakes that were on the plates, which are not now available for examination, or *The Book of Mormon* was not translated by the gift and power of God and may, therefore, contain countless errors.

Young Mormon missionaries often refer to archeology as a support for *The Book of Mormon.* They have been quoted as saying that even the Smithsonian Institution uses it as a guide to its research. Ropp includes documentation from the Smithsonian to dispel this assertion. The author also details contradictions between *The Doctrine and Covenants* and *The Book of Mormon* in their teachings on baptism and its relationships to the forgiveness of sin, the gift of the Holy Spirit, and plural marriage.

Another Mormon scripture, believed to be divinely inspired is *The Pearl of Great Price,* a short work which is a compilation of "The Book of Moses," "The Book of Abraham," and "The Writings of Joseph Smith." "The Book of Abraham" is the only extrabiblical scripture of the Mormons that can be studied in the light of the original papyri from which it is purported to have been translated. In great detail, Ropp explores the authenticity of the "Book of Abraham," comparing it to the analysis of internationally accepted Egyptologists and concludes, "The Book of Abraham" is a false translation of the papyri Joseph Smith had in his possession and not the Word of God.

The final chapter, "Witnessing to Mormons," is realistic in approach. Understanding the pervasive nature of LDS doctrine and teaching, the author believes that long-term friendships with Mormons is the basis of a fruitful witness. Many Mormons are not aware of the weak foundations for the origins of Mormon scriptures but rather believe that it is the Bible that has a questionable archeological and textual basis. Christians, Ropp advises, should be very sure of the evidence for the Bible's authenticity in translation and he suggests several good helps. He gives practical help in casting doubts on the reliability of Mormon extrabiblical papers and in helping to bring a Mormon from the place of doubt to an understanding of the person and work of Jesus Christ. He concludes:

> Witnessing to Mormons is not easy. Yet because of the threat they pose to the body of Christ and because of our love for them, we must accept the responsibility of trying to help them see the truth.

This book is a good beginning for those Christians eager to accept that responsibility since *The Mormon Papers* is a concise easy-to-understand presentation of the basic beliefs of Mormonism and the documents upon which it stands.

Reviewed by Janet G. House, Information Specialist, Public Television-KGBI., Pocatello, Idaho 83209 and Edwin W. House, Professor of Biology, Idaho State University, Pocatello, Idaho 83209.

THE ART OF LISTENING WITH LOVE by Abraham Schmitt, Waco, Texas: Word Books, 1977. 174 pp., $5.95 hard cover.

"My central motive for writing this book," states Abraham Schmitt, "is to define the highest form of love in a way that the average reader can practice it effectively (p.13)." To accomplish this Schmitt wrote about 12 individuals to whom he had listened with love throughout his career as a social worker. According to Schmitt, love requires attending to the uniqueness of individuals. Love requires caring. Love requires hearing "the voice of the hurting person. . .in the scream of the voiceless-voice of that life experience (p.12)." Love requires participation in the life of another. If we practice such love, love transforms the person loved and gives meaning to the life of the lover. Schmitt's approach matches his message that individuals are important. He examines a life crisis of each of the people in some detail, and he tells how those who were listened to with love responded with transformed lives.

Although I enjoyed reading *The Art of Listening With Love,* I do not think Schmitt effectively showed how to practice the art. He concentrated on telling the story of each individual crying out to be heard. However, he gave few examples of conversation between two communicating people, and the little conversation that he did relay had the flavor of recalled and reconstructed rather than spontaneous conversation. Schmitt did not model how a listener, within the warp and woof of life, might demonstrate that he or she is listening to and hearing a person in pain. The rewards of participatory caring and listening were stressed, but the elements of listening were touched on only slightly. Thus, as a result of reading this book, I will probably practice loving more often—something very valuable in itself—but my method of listening with love will remain untransformed.

Schmitt writes as a loving, concerned human being.

Assumptions originating from his roles as social worker and as Christian are evident throughout the book. As a social worker he emphasizes a psychodynamic model of humans, specifically drawing from Erik Erikson's developmental perspective. In fact, the vignettes follow a developmental sequence from child through older adult. This leads to a historical-developmental insight-oriented approach to human helping. Psychologists are divided in their opinions of the helpfulness of this approach. As a Christian, Schmitt emphasizes the love of one person for another as that which "will give life its ultimate meaning." He cites "love thy neighbor as thyself" as the greatest commandment. Many evangelical Christians will disagree with that emphasis, placing the relationship of a person with Jesus as the reference point of life and seeing our love for others as a reflection of God's love rather than as an end in itself. Nonetheless, Christians are commanded to love people, and to this end *The Art of Listening With Love* is a valuable motivational book.

Reviewed by Everett L. Worthington, Jr., Department of Psychology, Virginia Commonwealth University, Richmond, Virginia 23284

COMMITMENT TO CARE, by Dean Turner, Old Greenwich, Ct.: The Devin-Adair Co., 1978, 415 pp., $12.50

This book demonstrates clearly the futility of constructing a theology entirely on the basis of general revelation. A science of necessity and logic can lead to conclusions which openly contradict the clear teaching of Scripture and thereby reveal the latent predispositions of the architect of the system.

The overriding purpose of this book is to establish the existence and necessity of God *contra* the widespread view of a universe governed by chance. Chance and atheism are held to be unworkable, absurd, and suicidal. Only faith in a God of order and care is consistent with an objective perusal of the nature of the cosmos.

In this respect the book represents something of a restatement of traditional, rational apologetics for the existence of God, e.g., the argument from moral necessity and the argument from design, etc. The author is able to supplement these traditional arguments with precise and often beautiful discussions of such things as cosmic order (as in mathematics, particle physics, etc.), cellular activity, and philosophical and psychological considerations, such as the problems of evil and of human need. These rather general discussions point out the incongruency of atheism and the impossibility of a chance-governed universe. These discussions are then bolstered in Part 2 of the book by further discussions of specific philosophers of science and scientific achievements.

Thus, in opposing what are commonly held views among contemporary scientists, the author makes some powerful and helpful observations. Would that he had been content with that.

A major shortcoming in the book is that the author's scientific observations lead to conclusions which are contrary to the teaching of Scripture. The most glaring of theses is that there is something beyond God which gives meaning to all that is. That something the author chooses to call "love" or "care":

> The ultimate reality in which the universe is grounded is the abiding love of a Supreme Being who cares for himself and all he creates (page 3).
>
> All meaning and value in life ultimately is located in care, and can be sustained only by care (page 9).
>
> We can afford to settle for nothing less than a philosophy of the primacy and permanency of *care* in the very heart of reality (page 10).

What pure care is, is not always clear. The author defines it as "the will to discover, conserve, and propagate the instrinsic values and meanings of life" (page 10), but defining precisely what those values and meanings are merely begs the original question, "What is care?"

Care, at any rate, is beyond God and appears to be a philosophical concept to which even He is subject. Care gives meaning to God as it does to all things in the universe and, therefore, must be greater than God. This, as the orthodox Christian will readily acknowledge, runs contrary to Christian faith and the teachings of the Bible.

The author also denies such doctrines of Scripture as creation *ex nihilo*, the centrality of redemption in the cosmic plan, the necessity of the atonement and of salvation by grace, and the independence and sovereignty of God.

There are helpful ideas in *Commitment to Care*, but these must be carefully and critically gleaned.

Reviewed by T. M. Moore, Minister of Education, Coral Ridge Presbyterian Church, Fort Lauderdale, Florida 33308

THE BOY CHILD IS DYING: A SOUTH AFRICAN EXPERIENCE by Judy Boppell Peace. Downers Grove, Illinois: InterVarsity Press, 1978. 91 pp. $2.25.

How does a young white American homemaker face the realities of life under apartheid in South Africa? In eighteen short vignettes, Judy Boppell Peace recounts her attempts to relate to her African housekeeper as co-worker and friend, to treat African acquaintances as persons, to discover the different values and coping mechanisms in African society, and to grasp some of the indignities of life when lived under the pass laws and the ban. Without moralizing, the author reports encounters with police, hospital personnel, and restaurant workers whose concepts of the worth and place of Africans are at variance with her own beliefs.

After eight years, Mrs. Peace returns to America. What has she accomplished? The blind African woman to whom she carried food and coal has died and left her children homeless and abandoned. Her African housekeeper is now dissatisfied with her lot in life, unable to fit again into a job

where she is black servant, not colleague. By refusing to accept the status quo for herself or for her African friends, has Mrs. Peace done them an injustice, increased their discontent with a situation they cannot change? Or, in touching other lives, has she opened the way for new ideas on both sides? Perhaps among her class of South African high school girls who began to feel that Africans might be "people just like me"; perhaps in the life of a young African who found that her children could relate to him "as man and a friend, not as a black boy."

Is Mrs. Peace too naive and idealistic? She does not analyse the structure of South African society or delve into the history of apartheid or examine the feasibility of economic sanctions against the government of that country. But her stories in simple, unadorned prose carry an impact. They can help us to see beyond the politicians' rhetoric and the financiers' calculations to the flesh and blood humanity of some African peoples, to their struggles and joys, to their values and lifeviews. Her stories may show us in everyday terms what it means to give a cup of water in Christ's Name and to esteem others regardless of color, nationality, or status.

Reviewed by H. Miriam Ross, Doctoral candidate, Department of Anthropology, University of Washington, Seattle, Washington 98195

ANTI-CHANCE: A REPLY TO MONOD'S CHANCE AND NECESSITY by E. Schoffeniels, New York: Pergamon Press, 1977, 142 pp., $7.50.

The author of this book is Professor of Biochemistry, University of Liege, Belgium. This book is an answer to Monod's *Chance and Necessity*. The origin of life and the evolution of biological systems are explained in terms of a deterministic approach in which chance has no place. All physicochemical processes are determined, and biological systems are no exception to this general rule. The inadequacy of classical thermodynamics to explain biological systems is stressed, and information theory is used to describe these systems in a more satisfactory manner.

This book appears to be a valuable resource for clarifying the relationship between thermodynamics and biological evolution and the role of chance and determinism in evolution.

THE EVOLUTION OF THE BIOENERGETIC PROCESSES by E. Broda, New York: Pergamon Press, 1978, 232 pp., $13.00.

Available for the first time in a soft-covered student edition, this is a comparative study of the bioenergetic processes. Looking towards evolutionary trends, it reveals the inter-relationships of the diverse systems functioning in the animal, plant and protist kingdoms.

The central thesis states that the bioenergetic processes of fermentation, photosynthesis and respiration, no matter how different they might appear, have a common origin.

An appendix has been added to update the book to 1977 and the text has undergone minor improvement. Over 2000 literature references are included. The author is at the University of Vienna, Austria.

Reviewed by Jerry D. Albert, Mercy Hospital Medical Research Facility, San Diego, California.

FOSSILS IN FOCUS by J. Kerby Anderson and Harold G. Coffin, Zondervan Publishing House, Grand Rapids, Michigan 49506. 1977. 95 pp., $3.95.

The authors, from Probe Ministries International in Dallas, Texas, have impressive credentials, both in education and experience. The book is easy reading and not encumbered with heavy thoughts or big words. In its 95 pages it has nine chapters with topics ranging from "Questions of Origins" through ones on fossil records of invertebrates, vertebrates and plants to "Fitting the Pieces in the Paleopuzzle." It has a bibliography of nine pages and another 14 pages of no or little use (i.e., chapter abstracts) and lastly 15 illustrations, so the textual substance is packed into the remaining few pages. Consequently, the vastness of the topic and the intention of making a point means the textual material is either concentrated and/or superficial, so some of both is present. Obviously, the book is not a thorough treatise on the subject.

Four models of origin are presented with some discussion of each; Neodarwinism, Saltation, Punctuated Equilibria and Special Creation, which wins most of the arguments by default (interpretation of existing data) rather than by deliberate presentation of countering data. The weaknesses of the other models, particularly Neodarwinianism, are emphasized with quotes from scientists who have taken a critical look at the theory of evolution or recognize the paucity of data. The text touches upon some of the premises and insufficient explanations for: Pre- or Cambrian explosion; gaps in the fossil record; complexity of unicellular organisms; meaning of primitive/advanced (simplicity/complexity); lack of change in basic structure through alleged time; transitions from invertebrates to invertebrates, invertebrates to vertebrates, and vertebrates to vertebrates; fragmented or absent evidence of evolution in the plant kingdom (only 3 pages on this kingdom); and discontinuities in adaptive structures in transition from one environment to another (land to air, land to water).

Lastly, all four models are evaluated in relation to the gaps in the fossil record and the absence of transitional forms. The closing comments state that ". . .broad unifying and coherent world view," substantiated by the Bible and Jesus Christ, has the most justification as an explanation of the fossil evidence. The book presents in a simple, succinct, straightforward manner the case against Neodarwinianism based on the fossil record.

In a closing chapter, Russell Mixter responds in a well stated analysis of the purpose of the book when he reconciles what we see and know about what is here with what the Bible teaches on creation. He also presents what he feels is meant by the biblical "kind" in a scientific sense.

Part of the value of the book to me is that it is a good

summary of the inadequacies of Neodarwinianism; I am using it as a reference in my course, "Evolution in Perspective."

Reviewed by D. Wayne Linn, Professor of Biology, Southern Oregon State College, Ashland, Oregon 97520

Since this work is a product of Probe Ministries, whose avowed intent is to provide perspectives on the integration of the academic disciplines and historic Christianity, I expected great things of this book. My expectations were largely unfulfilled.

It soon becomes obvious that Anderson and Coffin intend to convey a single main thesis: there are unbridged gaps in the fossil record separating all major systematic groups. This phenomenon, they maintain, contradicts the neo-Darwinian model and is most closely fit by the creation model. Their study of the problem includes examination of the invertebrate and vertebrate fossil records, as well as a very brief survey of the history of plants.

The strong points of this work include:

(1) The authors of this work have been trained in the fields of biology, evolution, and paleontology, unlike all too many authors of works of this genre. (2) Consequently, they incorporate works which are largely representative of the available literature on these subjects, and they generally do not misrepresent these authors. (3) As *Fossils in Focus* attempts to document, there are more gaps of a serious nature in the fossil record than are commonly indicated in standard texts.

But the shortcomings are many. One of the most basic flaws is that there is absolutely no indication of which creation model Anderson and Coffin believe to be substantiated by their study. (As several authors have recently demonstrated, there is a multitude of possible creationist positions.) The only explanation they give for how the amassed evidence supports "the creation model" is that there are gaps separating generally homogeneous groups.

A second major flaw is that, rather than attempting to give the reader an objective knowledge of the nature of the fossil record, Anderson and Coffin concentrate on the gaps in the record. In the section on the vertebrate fossil record, proposed transitional forms between major groups are critiqued as belonging either to the ancestor's group or to the descendant's group. Hennigian (cladistic) systematic thought does not recognize paraphyletic groups as natural entities. Thus, the fact that *Ichthyostega* shares derived features with other tetrapods does not negate the idea that it is a crossopterygian, since all tetrapods are a type of crossopterygian.

Although Anderson and Coffin reject the interrelationships of higher taxonomic groups, they offer no suggestions as to how creationists of their breed might do systematics. Since Haeckel, the underpinnings of the entire systematic enterprise are implicitly phylogenetic. Do these authors propose to return to some typological concept? Furthermore, they never address the problems of why hypothetically descendant groups almost invariably possess the derived characters of their proposed ancestors. Neither do they attempt to explain the temporal or geographic distribution of organisms. It would appear that the only predictive value in their system is that gaps will persist in the fossil record. But they artificially enhance these gaps by defining truly transitional forms out of existence.

The work contains a number of false or misleading statements. For example, it is not true, as stated, that most modern reptiles lack teeth. Another example is that a study of the embryology of the hoatzin is misconstrued to indicate that this bird has claws on four digits of the manus. The author cited was not even certain that the fourth digit was present, much less a claw. Misusing this work to demonstrate that the hoatzin is more primitive than *Archaeopteryx*, Anderson and Coffin never inform the reader that it is the hoatzin's embryonic condition that is being compared to the adult *Archaeopteryx*.

If this book was intended to provide some perspective on the integration of this academic discipline and historic Christianity, it certainly says very little about Christianity or the integration. Absolutely no coverage is given to any prior attempts at integration, or to exegetical evidence for the authors' reading of the early chapters of Genesis. In summary, this work is quite unbalanced and is not a particularly helpful classroom supplement.

Reviewed by J. D. Stewart, Graduate Student, Department of Vertebrate Paleontology, University of Kansas, Kansas.

THE HUMAN MYSTERY by John C. Eccles, Springer International, Berlin, 1979, 270 pp., $18.70.

Sir John Eccles, besides his fame as a neurophysiologist, has long been a proponent of Cartesian dualism. What is more, his advocacy of this cause has become increasingly firm and vigorous over the years, coming to full flowering only in the 1970s. In this, he leans heavily on the writings of Sir Karl Popper, particularly on ideas expressed in his three-world philosophy. The interaction between Popper, the philosopher, and Eccles, the neurobiologist, resulted in 1977 in a joint magnum opus, *The Self and its Brain*, lauding dualism and interactionism. *The Human Mystery* expresses Eccles' position in rather briefer compass, being the published version of his 1977–1978 Gifford Lectures at the University of Edinburgh.

Like all the writings of Eccles in this realm, the bulk of the book consists of detailed scientific exposition. Inevitably, therefore, it is difficult going for anyone not acquainted with the fields, and one wonders whether all this detail is really necessary for the philosophical-theological position espoused by Eccles. In *The Human Mystery* Eccles finds it necessary to stray beyond the neurobiological terrain into such topics as the origin and evolution of the universe, the origin of life and biological evolution, and human and cultural evolution. Having arrived at man, he is in a position to devote his attention to the human brain, and this leads on to such issues as the creation of a self, conscious perception (the neocortex),

learning and memory, and the mind-brain problem.

There can be little doubt that, for the neuroscientist, Eccles makes informative, lively reading. His data are up-to-date, beautifully comprehensive and always stimulating. Of course, the problem remains—does this wealth of data support the dualism and interactionism he is marketing? Whatever our answer to this question, Eccles cannot be accused of hiding his presuppositions. One of the great values of *The Human Mystery* is the clarity and openness with which Eccles uncovers the assumptions underlying his philosophical stance.

The origin of Eccles' enthusiasm for dualism goes back to another great neurophysiologist, Sir Charles Sherrington, whose own Gifford Lectures were published in 1940 on the theme, *Man on His Nature*. Sherrington, too, was a dualist, feeling the pangs of disconnectedness between brain and mind, but finding no answer to the dilemma of how the two cohere. For Eccles, Sherrington and others with dualist aspirations, what is essential is the primacy of our conscious experiences, which constitutes for us the primary or first-order reality. This starting-point need not lead to the strident dualism proclaimed by Eccles, and yet for him it leads to a dualism which he contends is diametrically opposed to monist-materialism. The latter he sees as ushering in a world of chance and circumstance, with no meaning for life, no values, no freedom and no responsibility. Against this, he wishes to put forward a worldview incorporating the mystery of our existence, its supernatural meaning, and the fact that we are part of some great design.

The motives of Eccles are, from a Christian perspective, exemplary. He is intent upon viewing human beings as ends in themselves, with meaning, values, purpose and responsibility. In starting from the self-consciousness of individuals, he ensures that individuals will not be reduced to partial materialistic components and thereby lose their identity. For such strong premises we are to be grateful. It is when Eccles proceeds beyond basic principles that concern creeps in. His defence of human dignity and meaning rests on an explicit dualism between the self and the brain, such that the self-conscious mind is described as acting on the neural centres of the brain, thereby modifying the dynamic spatio-temporal patterns of the neural events. This is *interactionism par excellence*, and if it should fail as an explanatory principle, human dignity and meaning are placed in serious jeopardy. The issue is not simply, therefore, whether dualism and interactionism can be justified, but whether this is the most appropriate way of defending human significance.

The fundamental postulate for Eccles is the three-world view developed by Popper in the early 1970s. Eccles argues that the brain in World 1 and the world of culture in World 3 are necessary for the development of the conscious self in World 2. The uniqueness of the personal self is, according to Eccles, a phenomenon not amenable to scientific explanation; rather, the coming-into-existence of each unique self is the result of a supernatural creation of the soul. In adopting this position, Eccles has already committed himself to a strong dualist position on the brain-mind problem, the brain being a World 1 entity and the mind a World 2 entity. These, Eccles contends, interact across the World 1-World 2 interface.

The implication of this interaction is that the mind can influence the brain, and this Eccles argues occurs in special areas of the neocortex termed "the *liaison brain*." He attempts to support this view using neurophysiological data, although it must be admitted that—ingenious as his arguments are—they are open to alternative interpretations.

The Human Mystery provides a fascinating insight into an attempt to reinterpret Cartesian dualism in contemporary neuroscientific terms. Some Christians will undoubtedly feel great sympathy for the attempt, and yet this should not blind us to the difficulties inherent in dualism of this nature. Massive as is the evidence accumulated by Eccles to support his position, he has failed to overcome the objections that have been meted out for very many years against dualist interactionism. This book should be read, however, because it shows in contemporary guise both the attractions and failings of dualism. You will also learn a great deal about the brain, and you will be introduced to the thinking of a man intent on upholding human dignity. One may not agree with his ultimate position, but one must appreciate what he has attempted to do.

Reviewed by D. Gareth Jones, Department of Anatomy and Human Biology, The University of Western Australia, Nedlands, Australia.

MORAL DEVELOPMENT: A GUIDE TO PIAGET AND KOHLBERG by Ronald Duska and Mariellen Whelan, Paulist Press, 1975. 128 pages, $4.95.

Jean Piaget and Lawrence Kohlberg have conducted extensive investigations of the process of moral maturation in children. Because the results of these investigations have important implications for parents and teachers Duska and Whelan have written for the general public an exposition of the Piaget and Kohlberg studies. The discussion of specific studies and research techniques is kept to a minimum allowing the lay reader to better grasp the general concepts under discussion.

The first two chapters of the book present a readable summary of the studies and theories of Piaget and Kohlberg. Moral maturity is defined as more than knowing and doing what is right. Knowing and doing the right thing must proceed from mature reasoning. In the development of moral maturity Piaget has postulated two broad stages. Children at the stage of heteronomy see rules as "external laws which are sacred because they have been laid down by adults" (p. 8). For autonomous children rules are the outcome of free personal choice and are necessary for the maintenance of group relationships. The development of moral autonomy is closely linked to the development of higher cognitive levels.

Since in the first two chapters Duska and Whelan present the work of Piaget and Kohlberg without commentary, some Christians may be put off by the obvious secular worldview of these two researchers. However in the third chapter the authors discuss the relationship between moral development theory and Christian morality. The thrust of their argument is that Piaget and Kohl-

berg have provided a formal structure for describing moral development. This structure however is without content. The content and reasons for the content are provided by Christianity.

The fourth chapter presents practical applications of moral development theory for parents and teachers. There are some good suggestions well worth trying, but only after the first three chapters have been read carefully. The suggestions make sense and can be used wisely only in light of the developmental theory presented.

There are weaknesses in the book, one of which is common to almost all non-technical interpretations of research. This book takes a non-critical approach to Piaget and Kohlberg's work. For instance the book implies that no research has contradicted Piaget's stages. This is not true. Piaget has his share of qualified critics.

On the whole the book is thought provoking. Since the actions of children are easier to understand when moral maturity is seen as the result of a developmental process, this book should be helpful for teachers. The teacher who is aware of developmental processes should be able to work more expertly with children.

Reviewed by William W. Cobern, Department of Education, University of Sokoto, Sokoto, Nigeria.

WOMEN: NEW DIMENSIONS edited by Walter Burkhardt, S. J. New York: Paulist Press, 1977. Pp. 189 + viii. $5.95.

Readers are perhaps surprised to find a book on this topic under review in the *Journal ASA*. This volume, however, qualifies on at least two counts: It raises in a sociological context the central hermeneutical question of the science-religion conflict, namely, to what degree is Scripture conditioned by its socio-historical matrix? Further, the wholistic aim of both science and religion precludes their overlooking any social movement with potential impact upon crucial theoretical concerns.

The nine articles in this collection divide roughly along sociological and theological lines. On the sociological side, Constantina Safilios-Rothschild first surveys the global status of women and concludes from impressive data that discrimination, far from being eliminated, has merely shifted toward more subtle, sophisticated forms. Rosemary Radford Reuther locates the problem within the domestic structure itself. Home and work will therefore have to be correlated in a "more integral relationship" for the demeaning of femininity to cease. The final two essays by Mary Aquin O'Neill and Anne Patrick, orient the reader to the burgeoning literature of the feminist movement, and would be better placed at the beginning of the collection.

The theological essays represent a response to the sociological. Essentially, these authors view sexual equality historically along lines of an age of purity (New Testament), a period of decline in later Christian tradition, and a new anticipated order which hearkens back to and enriches the abortive vision of the New Testament. In spite of some residual ambivalence, Elizabeth Carroll, Raymond Brown, and Elisabeth Fiorenza are unanimous in evaluating the New Testament evidence as basically favorable to women's rights.

George Tavard, in perhaps the most significant essay of the collection, debunks the common misunderstanding that surface structure of gender-specific language necessarily reflects sexism. Feminism, hence, should not content itself with superficial adjustments of language, but should aim for depth reform in social, political, and theological symbolism.

This symposium raises several urgent challenges for theology. Primary, of course, is the relationship of biblical authority to cultural mores embedded in Scripture. What is the *degree* of cultural accommodation of the biblical revelation and what criterion must therefore be employed to distinguish eternal principles from their relative Sitz? The manner in which evangelicals tackle this issue with regard to the women's movement might conceivably guide them hermeneutically in appropriating the scientific statements in Scripture. The problem of sexual discrimination, at the same time, must find resolution against the constant danger of making the scriptural text conform to contemporary social (and scientific) models in the name of legitimate exegesis. In other words, to paraphrase Tillich, we must not allow the "question" to so determine the "answer" that the latter is blunted in force.

Nonetheless, the issue of sexual bias is real in both church and society. Churches will eventually have to respond, and in so doing, will have to work out an adequate hermeneutic capable of dealing justly with both text and social problem. Hopefully this response will affirm full feminine equality.

This book provides an excellent introduction to the socio-theological quandary raised by feminism and serves to pose the right questions. It is recommended reading for those troubled about discrimination, regardless of the form it takes.

Reviewed by Jerry A. Gladson, Associate Professor of Religion, Southern Missionary College, Collegedale, Tennessee.

THE PROBLEM OF WAR IN THE OLD TESTAMENT by Peter C. Craigie, Wm. B. Eerdmans Publishing Co., Grand Rapids, Mich., 1978, 125 pp., paperback, $3.95.

Peter Craigie began his adult life serving in the Royal Air Force and later turned to the study of theology. As a seminary student he felt a theological anxiety about the identification of God with war in the Old Testament. But his studies dealt only with a mass of linguistic, historical, and cultural data. It seemed that nothing was developed from these data and that any conclusions were left to the individual's initiative. Craigie has taken the initiative in this book. He sees the problem of war in the Old Testament as lying in three areas: the representation of God as a warrior, God's self-revelation in war, and the ethics of war, especially in light of New Testament teachings.

Craigie deals in depth with each of these areas. His extensive notes and references show the great amount of time he has spent in his subject. In a small book the coverage cannot be exhaustive, but what is discussed is very interesting and the author's approach is often out of the ordinary. This prepares the reader for the surprise conclusion when, having dismissed the pacifist and just war positions, Craigie declares the problem unsolvable. The problem of war is a paradox he says, on the order of the Trinity and other Christian paradoxes. He agrees that his position may seem "woolly," being neither one thing nor the other, but he believes that we are called upon to live this paradox.

Craigie's conclusion will be unsatisfactory to some, but it may be the logical result of one of his key assumptions. The author assumes that the fundamental principle of the state is violence and that the police and armed forces are instruments of violence. But what would be the logical conclusion if one assumes that the fundamental principle of the state is justice and that the police and armed forces are instruments of justice? Craigie briefly addresses this concept, but develops it in the context of the meaning of defeat in war. In addition, the key area of the difference between power (violence) and authority is not addressed at all. The lack of examination of key assumptions detracts from this otherwise interesting and intellectually stimulating book.

Reviewed by E. T. McMullen, Major, USAF, Aeronautical Systems Division (AELE) Wright-Patterson AFB, Ohio 45433.

MAKING MORAL DECISIONS by Edward Stevens, S.J., Paulist Press, New York, 1969. 138 pp. $2.25.

This book grew out of discussions in an upper-division college course in ethics. Because the author is a philosopher, the issues are dealt with solely from the point of view of human reason. Issues debated include war, revolution, medical-moral questions about life and health, marriage and sexuality, race relations, and poverty.

The approach is stimulating. Stevens does his best to reflect at least two positions on each issue. He admits his own bias is evident but that is not the major nor even the most serious weakness in this text.

Making Moral Decisions first appeared in 1969, priced at $1.95. Its 1979 price of $2.25 represents an increment of 15%. However, inflation is not the only nor even the most significant change in the American scene in the past ten years. Though this book may stimulate debate and discussion today, its footnotes are dated, science, the people, and the courts have changed some of the givens, and new issues have appeared.

For example, abortion has become the major American contraceptive. Many understand permanent marital commitment to be only one step in a continuum which also includes the option of pre-, post-, and in some cases, extra-marital partners. Amniocentesis now makes it possible for parents to be sure of the condition of their child well before birth.

Some lacunae are obvious. Vasectomy is not mentioned as a means of birth control. Nor is there discussion of the quasi-inevitability of violence in the escalation of non-violent protest. The issue is both real and frightening because current anti-nuclear protests recall the early anti-Vietnam war demonstrations.

Opinions become facts. For example, ". . . infants start to act human as they approach their first birthday . . ." One may as easily assert that infants act human when they are born, when they tumble about the womb as foetuses, or even at their third birthday. The author believes, "Discrimination which recognizes realistically their differences and inequalities is just and moral." Movements against racism and sexism have created honest doubts about "realistic" inequalities and differences.

As a model of a method of discussion, this book remains valuable. However, its substance is in important ways outmoded. Its exclusion of religious principles from the discussion, while theoretically sound, is artificial. Philosophers, who also happen to be men and women of faith, bring not only reason but also religious belief to bear upon the problems of the age. Stevens consciously excluded religion from the discussion but admitted his bias would be evident. It was.

Moral decisions are based on the best insights of every age. As technology changes and knowledge grows, the basis for moral judgements changes. That is only to say that the debate about moral decisions is on-going. This book has frozen it in 1969.

Reviewed by William J. Sullivan, S.T.D., Department of Religious Studies, St. John Fisher College, Rochester, N.Y. 14615.

THE GREAT ECONOMIC DEBATE: AN ETHICAL ANALYSIS by J. Philip Wogaman, Philadelphia: The Westminster Press, 1977, 182 pages, $5.95.

The author introduces his subject by stating that the term "great debate" has come into wide use in recent years in connection with discussions of a wide variety of economic and political issues. In the midst of worldwide depression in the 1930s when the central issue focused around the unemployment of human and material resources, Western man found himself in the ambiguous context of actual want in the presence of potential plenty. The solution adopted, in slightly differing but essentially similar form, in virtually all the nonsocialist western nations was basically Keynesian. This school of thought, essentially a compromise between the extremes of Marxist socialism and *laissez-faire* capitalism, became a kind of conventional wisdom which in the subsequent decades has been assumed to possess the needed magic for creating satisfactory media of exchange in a world cut loose from all "orthodox" economic rubrics such as the gold standard.

Suddenly however, in the 1970s, the assumptions of the past forty years have begun to appear naive in the face of such new economic realities as the energy crisis, the new phenomenon known as stagflation, and the equally new demands and rising expectations of the world's poor.

Wogaman sees the potentially strategic role of the world

minority known as Christians in terms of their potential for active and involved participation in these economic issues as they seek in unique and challenging ways to focus society's attention on questions of human value and personal worth.

The book is unique, not so much in its subject matter as in its application of value-related ethical principles to economic and ideological issues. On the basis of these principles it discusses and evaluates five contrasting economic systems: (1) the Marxist reinterpretation of Hegelian idealism into dialectical materialism, (2) the Protestant ethic and classical *laissez-faire* capitalism, (3) the mixed economy or "social market" currently found in the Scandinavian countries, (4) the ideologically-defined but largely untried schemata contemplated in the preachments of Michael Harrington's *Accidental Century*, of the British Fabians and George Bernard Shaw, of Eugene Debs and Norman Thomas, and of the briefly-tried "Prague Spring" of Alexander Dubcek and (5) the "steady-state" economy of limited growth envisioned for the future by the Club of Rome and by such economists as Herman E. Daly.

The case for each ideology is presented, its contributions are cited, its weaknesses are noted, and its relationships to the Christian value-system that was presented at the book's beginning are rather definitively enunciated.

If there is a single keynote which emerges from the reading of this volume it is the importance of non-economic factors in the making of economic decisions and in the shaping of economic policy. The writer has found no other volume which shows in such detail as does this book the relevance of Christian values in the deciding of issues within the area of economic ideology. Wogaman's work will serve as a starting point for many who have hitherto become reluctantly reconciled to those simplistic answers which have seemed to be their only alternative to involvement in the "mine field" which has characterized for them the complexities of the "dismal science."

Reviewed by Loren W. Dow, Professor of Sociology, Emory and Henry College, Emory, Virginia 24327.

THE UNITY IN CREATION by Russell Maatman, Dordt College Press, Sioux Center, Iowa 51250, 143 pp. (paperback), $3.75.

True to its title, this book argues for the unity of the universe as the creation of God, and pursues the implications of that unity for our understanding of the scientific enterprise and for the presentation of science in Christian education. "The history of physical science shows that physical scientists understand more clearly, as time passes, that there is but a single cause of all physical scientific observations" is Maatman's statement of the central principle of physical science.

Maatman begins with an attempt to show that the type of thought which goes into the development of scientific explanation is not something completely different from the thought of the non-scientist. Two fictitious non-scientists, Mr. Black and Miss White, are imagined investigating simple problems in mechanics by means of observations and logical analysis. This leads to the understanding that a number of observations can be explained in terms of a smaller number of physical laws. The laws which are most general are called "fundamental ideas," though it is pointed out that there is no sharp separation between laws and fundamental ideas. This general structure, observations—laws—fundamental ideas, from the specific to the general, is presented as a triangle representing our understanding of reality, the many observations being the base and the few fundamental ideas being the apex. This triangular structure is then illustrated with a sketch of the development of physics and chemistry.

In these first chapters of the book, there is a tendency to make physical science perhaps a bit too close to common sense. It is certainly desirable that non-scientists be aware of the continuity of their thought with that of scientists, but the distance of modern physics from the world of common sense should not be minimized. Maatman has deliberately avoided the use of virtually all mathematics, as is perhaps appropriate in a book of this scope, but the essential role of mathematics in the sciences requires more attention than it is given here.

The Christian does not believe that the physical universe is self-contained, and the symbolic triangle thus cannot give a complete representation of his understanding: the universe is created and sustained by God, and the fundamental ideas are "empowered" by Him. The author says that "Our knowledge, also a mental construct, of what God does precedes our fundamental ideas." Maatman then deals with some objections to his development, one of which is the natural one that there are many scientists who do not recognize God as Creator, and who do not admit a Christian basis for the fundamental ideas of science. While a satisfactory answer is given to this, one is tempted to ask a more uncomfortable question: Why have so many of the fundamental developments in twentieth-century physics been made by non-Christians?

Maatman makes some valuable suggestions about scientific education in a Christian context, two of which may be mentioned. First, there is an inadequate Christian contribution to the teaching of science if the teacher simply adds to a secular science course the statement that God created the world. Second, it is suggested that perhaps scientific education should reverse the traditional order of topics, proceeding from physics to chemistry to biology. There is a good deal of sense in this proposal, but one must confront the fact that a certain amount of mathematical maturity is required for physics and chemistry. In fact, the lack of a treatment of mathematical education is one of the defects of this chapter.

Biological evolution is mentioned rather briefly, and it is simply stated that evolutionary theories are wrong, with only a brief reference to gaps in the fossil record given as evidence. There is nothing here to change the mind of one who believes that evolution is itself an important example of the unity of the created universe.

The Unity in Creation is too brief to be able to provide a detailed analysis of the interaction of theology and

science. For those who are comfortable with a conservative theology, it does provide useful ideas for the consideration of science in Christian perspective.

Reviewed by George L. Murphy, Assistant Professor, Department of Physics, Luther College, Decorah, Iowa 52101.

THE BIBLE IN ITS WORLD: ARCHAEOLOGY AND THE BIBLE TODAY by Kenneth A. Kitchen, Downers Grove: InterVarsity, 1978. pp. 168. Paper $3.95.

Professor Kitchen, best-known as an Egyptologist, has written a useful little book. It not only surveys a vast canvas succinctly, but also provides copious pointers for further study in its endnotes. The book will well serve the educated layman who desires a clear introduction to some of the historical and archaeological issues about the Bible (mainly Old Testament) in its ancient Near-Eastern surround.

The first chapter instructively outlines the scope, methods, and limitations of archaeology. For instance, the modern excavation of ancient Ashdod of Philistia has left over 98% of the site still covered. This is not at all untypical of our limited ability to unearth and assimilate the material remains of the past. The chapter concludes with a brief look at the fascinating topic of inscriptions and ancient writing.

Next, Kitchen provides an overview of the 8,000 years which precede the appearance of the biblical Patriarchs sometime after 2000 B. C. Abraham was a late-comer to a world which had been literate for over a thousand years before. Genesis 1-11 is discussed in connection with the mainly Mesopotamian documents which provide parallels to it.

Chapter 3 contains one of the earliest English summaries of the archaeological finds at "Ebla—Queen of Ancient Syria." In 1975 scholars were electrified by the discovery of some 15,000 clay tablets inscribed in cuneiform. *Some* scholars have hailed some of these tablets as "Early-Canaanite" and thus linguistic (and cultural ?) ancestors of Biblical Hebrew. Unfortunately, all judgements—including Kitchen's—concerning the language and content of these tantalizing tablets must be held in abeyance, since none of them have been properly copied, published and analysed by the scholarly community. The earlier example (1929/30) of the erroneous identification of O. T. names at Ugarit (Ras Shamra) should warn us to caution. (Note already the retraction of the "discovery" of the five cities of the plain (Gen. 14:2) in the Ebla tablets: *Biblical Archaeologist* 41 [1978] p. 143).

The remainder of the book surveys the history of Israel and its literature in its ancient oriental context. Special attention is devoted to problems such as the historicity of the Patriarchal narratives ("the quest for the historical Abraham"). Kitchen's position on all these questions is consistently conservative, if not fundamentalist, and his rhetorical over-kill from time to time belies his stated ideal of objectivity: "Speculations by T.L. Thompson . . .simply beggar belief as a species of cabbalistic gematria" (p. 59). The book is, in fact, a polemic against any historical criticism which might detract from the Bible as a reliable account of history, history taken in a somewhat positivistic, nineteenth century sense which demands an exact, one-to-one correspondence between "actual" event and all history-like narrative. This tendency on Kitchen's part raises a host of exegetical and hermeneutical issues which cannot be treated here. The interested reader may refer, for example, to Hans W. Frei's masterly *Eclipse of Biblical Narrative* (Yale, 1974) and to John Vander Stelt's recent *Philosophy and Scripture: A Study in Old Princeton and Westminster Theology* (Marlton, N.J.: Mack Publishing Company, 1978). The Westminster tradition came to influence the young British scholars associated with the evangelical Tyndale House through the offices of both E.J. Young and O. T. Allis after the Second World War (Cf. D.J. Wiseman's Forward to the O. T. Allis *Festschrift: The Law and the Prophets* [J. H. Skilton, ed.; Nutley, N.J.: Presbyterian and Reformed, 1974]). Among these young scholars was K. A. Kitchen.

Kitchen's little book focuses on historical problems in a polemical way to *validate* scripture—though he himself would probably not wish to put it this way. Ironically, with such an exclusive interest in the Bible as history, readers may overlook the Bible as God's living Word to His Church.

Reviewed by Raymond C. Van Leeuwen, York University, Ontario, Canada.

WHAT IS THE BAHAI FAITH? by William Mc Elwee Miller, (An Abridgement by William N. Wysham). Grand Rapids, Michigan: William B. Eerdmans Publishing Company, 1977. 151 pages, $3.95.

One of the challenging modern "isms" that the college-based counselor of today's young people often encounters is Bahaiism whose adherents claim for it the right to be regarded as "*the* world religion for the next thousand years." The sect's members, as the writer can testify from several first hand encounters, take issue alike with those describe Bahaiism as an offshoot of Islam and with those who see it as a syncretistic amalgam of diverse world faiths. The answers appropriate to both these disclaimers on the part of the sect's supporters is to be found in a consideration of the historical facts of the faith's origin and in a delineation of its present teachings. Miller's book represents an attempt to document within a specific historical framework the thesis that Bahaiism arose when a descendant of Islam's founder, or Sayyid Ali Mohammed, proclaimed in 1844 that the time was ripe for the revelation of a hidden Imam or revelator of the will of Allah and that he himself was the Mahdi or messianic figure whose role was to act as "Bab" or "gate" for the new revelation.

The setting for the revelation was Shiraz in southern Iran where the majority of the population is of the Shiite or legitimist persuasion. Miller's volume makes it clear that the Bab at first conceived his own role as the last in a series of relevators within the accepted Shiite context. When, however, he claimed for his writings the authority accorded to scripture, and sought their acceptance as superseding the Koran and as demanding sweeping re-

forms both religious and social, he was executed as being not only a heretic but also a disturber of the peace.

Among the Bab's followers was a young man who took the name Baha Ullah, "Glory of God," who assumed a position of leadership with the sect and, in seeking to implement some of the master's reforms, laid himself open to the accusation that he had been involved in an attempt to assassinate the Shah. For this he was exiled to Baghdad where he became the acknowledged leader of a Babi group. As time passed and the loyalties of some of some members of the group began to wane he sought to intensify their commitment by proclaiming himself to be the expected one whose advent had been predicted by the Bab himself. The historic result was the formation of a hierarchical structure within which occurred a series of power struggles. A line of succession was established resulting in 1921 in the accession to headship in the sect of one Shogi Effendi who was interviewed at his headquarters (by now removed to Haifa, Palestine) by William M. Miller, author of the present volume.

With the death of Shogi Effendi in 1957 the founder's lineal descendants became extinct, and the headship passed to one Mason Remey who remained the "Guardian" until his death in 1974 at which time a nine-member "Universal House of Justice" assumed direction of the sect's affairs.

The gist of the leader's claim for his faith as set forth in the Haifa interview and elsewhere is as follows. The leader himself does not maintain that he is an incarnation of God. He claims only to be a divine "manifestation" in whom can be found and known all of God's attributes. The religion's principles, according to Shogi Effendi are different from those of Christianity only in their outward forms and in their claim to greater contemporaneity. The sect's major tenets, briefly summarized, consist simply of the following: international peace, conformity of religion to science and reason, the banishing of prejudice, equality of the sexes, love and harmony among social classes, universal education, a universal language, and the establishment of a parliament of man as a court of last resort in international questions. It is difficult for the non-Bahai either to find anything to quarrel with in these stated beliefs or to perceive in them aught that is either especially distinctive or uniquely religious.

Miller points up the strengths and weaknesses of the posture taken by the Bahai International Community on the contemporary scene. Some of the positions which it publicly espouses appear at first glance to represent nothing more than proposals for implementation of those basic principles of brotherhood which the sect enunciates. However, on further examination it becomes apparent that their implications for social action are hardly as innocuous as they may at first appear. The proposal for a World Parliament and for an International Executive with unchallengable authority reveal an excessive gullibility concerning the moral nature of man. The proposal for a world superstate to which all nations would cede the right to make war is equally naive. These notions are directly related to the Bahai optimism concerning "progressive revelation." Since, to Bahais, revealed truth already given is, by definition, inferior to the greater revelations that are to come, even the Bahai scriptures are rendered less than ultimately authoritative, as is, by the same definition, the Bible. Thus, the Bahai view of man's condition is superficially optimistic, failing to take account of the Christian concept of fallen man's inability to act according to the demands of true justice. The view of sin as estrangement and alienation from God is foreign to Bahai thinking. Miller's question as to what the Bahai would say to the addict, alcoholic, denizen of skid row, or inmate of a death cell reaches the heart of the difference between this religion and that of Christians. This being true, the Bahai's hope for the future, too, fades into sentimental phrases concerning a vague and not-reassuring concept of immortality from which is lacking both the personal dimension and the qualitative differentiation of eternal life. The writer heartily commends Dr. Miller, a former missionary, for his insights into the discussions between Christianity and this demonstrably syncretistic faith which so signally falls short of meeting the needs of the human condition.

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THE TASTE FOR THE OTHER: The Social and Ethical Thought of C.S. Lewis by Gilbert Meilaender. Grand Rapids: Eerdmans, 1978, x + 245 pp. $6.95 paper.

The years since his death have seen C. S. Lewis (1898–1963) transformed into a virtual industry, scholarly and otherwise. J. R. R. Tolkien is said to have remarked, not a little ironically, that Lewis was his only friend to publish more books after his death than before.[1] A 1973 bibliography by J. R. Christopher and Joan K. Ostling of works relating to Lewis runs to 389 pages.[2] Wheaton College now has an exhaustive collection of C. S. Lewis books, manuscripts, and memorabilia, including Lewis' desk and family wardrobe. Narnia has invaded prime time television, while Billy Zeoli's sometimes egregious Gospel Films has unleashed (what else?) a seminar-film series on Lewis' life. All of this, no doubt, would have horrified the gregarious but essentially private Lewis. And yet, despite the questionable taste or value of much of the Lewis wave, it is hard to regret it. One is tempted to feel that if anyone is brought into serious actual contact with Lewis' work and ideas, the how is of little moment.

It is a pleasure to report that this new study of Lewis by Gilbert Meilaender in no way falls into the category of questionable Lewisiana. It is a first-rate book by a serious and sympathetic scholar, a book that truly does "justice to the coherence of Lewis' vision, a coherence which pervades his very diverse writings." (p. 3).

Meilaender describes and analyses Lewis' ethical and social thought under five general themes: (1) The Sweet Poison of the False Infinite; (2) The Revelry of Insatiable Love; (3) The Divine Surgeon; (4) The Tether and Pang of the Particular; and (5) The Primeval Moral Platitudes. Each theme is nicely introduced with an illustrative passage from the Narnian Chronicles and then developed at length through wide-ranging references in the appropriate sectors of the Lewis corpus. Each section concludes with an analysis of ambiguities or difficulties in Lewis' thought.

The first theme, which Meilaender feels is Lewis' central concern (p. 39), deals with the dialectic of joy and desire, of pleasures and denial. Lewis' varied works are seen as presenting a pilgrim view of life where enjoyment and renunciation are both appropriate. For Lewis, this is "the blessedly two-edged character" of the Christian life—coupling acceptance of the given with an attitude toward created things that might require their renunciation—and a major portion of his work is aimed at helping cope with the resultant problems. In the end, this dialectical process is crucial to the ultimate purpose of human beings, fellowship with God.

This leads to Lewis' images of community with God, the second theme. A primary image is that of the dance of life, a dynamic and festive image that no sympathetic reader of Lewis can fail to delight in. A less popular image in Lewis' work is the community of hierarchy. Meilaender's treatment of this image is excellent. These images (and others) are, in Lewis' thought, grounded and guided by love, the love of God. Lewis' point about community with God is made strikingly clear by a contrast with the opposite community, that of hell. In Hell, community is dead, "the taste for the other, that is, the very capacity for enjoying good, is quenched . . ."[3] Meilaender goes on to expand on several other Lewis' themes in this connection, including pride, the "Inner Ring," and the conflict between good (Logres) and evil (Britain).

The third theme deals with the drastic measures necessary to make a person fit for community with God. Lewis' view of this painful process is carefully outlined, including a full discussion of the continuation of that process after death, i.e. "purgatory." Meilaender devotes a good deal of attention in this section to the difficulties involved in the idea of God as dentist.

Fourthly, there is man's relationship to the particular time, place, other people. While community with God is based on agape-love, our earthly (or natural) loves are part of the creation as well and must not be rejected (though they must be limited). The problem, as Lewis sees it, is to reconcile the two, another dialectical process. This process gets a full treatment from Meilaender.

Finally, there is the theme of the "Tao," the law of nature that is so fundamental to Lewis' apologetic. The existence of these "primeval moral platitudes" was for Lewis a given, though not undefendable. The relationship of this idea to Lewis' views of ethics, morality, and education is the focus of the final chapter.

Meilaender's conclusion is a good summary: "His (Lewis') essential concern is to perceive the whole of human life in relation to God, the Creator and Redeemer . . . ." (p. 235) "All are created to . . . share in the divine fellowship. But the journey to that destination is a long one and requires self-renunciation. No one finds his life unless he loses it." (p. 236) Meanwhile, "Lewis never loses sight of what it means to be human." (p. 237)

And Meilaender never loses sight of Lewis' vision. He is fair, but does not avoid identification and discussion of hazy or mistaken areas in Lewis' thought (various readers will disagree, of course, on some of these). His work is a study and critique in the best senses and avoids rather well the twin pitfalls of such a book: either wasting the reader's time with ill-digested summaries of Lewis' works or assuming extensive previous knowledge. It is a genuine analysis, not a concealed anthology, and will be useful and instructive to any reader interested in the kinds of concerns to which C. S. Lewis devoted his theological efforts.

[1]W. H. Hooper's preface to C. S. Lewis, *Fern-seed and Elephants* (London: Collins, 1975), p. 7.

[2]J. R. Christopher and Joan K. Ostling, *C. S. Lewis: An Annotated Checklist of Writings about him and his Works* (Kent, Ohio: Kent State University Press, 1973).

[3]C. S. Lewis, *The Problem of Pain*, quoted by Meilaender, p. 89.

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HOW TO READ SLOWLY: A Christian Guide to Reading with the Mind by James W. Sire, InterVarsity Press, Downers Grove, Illinois 60515. 179 pp. + Appendix, notes, and index, $3.95.

Everyone today is aware of the importance of reading rapidly. *How to Read Slowly* is clearly a new approach. The author recognizes that too much reading clamors for our attention; consequently some readers attempt to cope by learning to read at phenomenal rates, gorging themselves by swallowing every word that crosses their path. Many others, however, have just given up in the face of this information explosion. This book was written to urge upon readers, especially Christian readers, a balanced approach, one which will end neither in indigestion nor in despair. What the author proposes is selective, critical reading. Reading, he believes, should be enjoyable, educational, and, above all, an integral part of the life of every Christian.

The book is addressed primarily to Christians:

> . . . most of this book should be useful to anyone who wants to learn to read better. Still, I am most interested in encouraging Christians to think and read well.

The plan of the book is simple. Each chapter is independent of the others so that the reader can select those most appropriate to his needs and interests. The introduction is followed by "how-to" discussions on reading nonfiction, poetry, and fiction. These are followed by a chapter on the value of knowing biographical details about the author and historical, literary, and intellectual details about the context of the work. The text concludes with a challenge to take time for reading and suggested answers to the question, "What shall I read?" In the appendix the author provides a reading list—a complete course which will equip the serious student to "read virtually any work and find its place in the scheme of intellectual history and contemporary world views."

The author, editor of InterVarsity Press, is clearly a teacher at heart. Throughout, he writes clearly and elucidates his points with frequent, well-explained examples and with a touch of humor. It is obvious that he enjoys reading and writes from the viewpoint of an informed practitioner.

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Mythological Features and the Polemic Nature of Genesis 1:1—2:4a

For the past 200 years, Old Testament scholars have had to deal with the problem of parallels and similarities between the Hebrew Cosmogony of Genesis, and Cosmogonic literature (or myths) of ancient pagan cultures. Important questions arise as to the originality and theological significance of the biblical Cosmogony. To fully grasp the purpose of the biblical Cosmogony, these questions must first be answered.

It is the purpose of this paper to investigate some of the significant similarities and differences and show that the author of Gen. 1:1–2:4a had a specific intention in using them. It is important for all those who attempt to relate science with Scripture to understand the fundamental goal in studying Scripture: uncovering the author's intention. To apply authorial irrelevance to Scripture, due to its divine inspiration, would result in an endless number of possible meanings. To find God's meaning we must uncover what the biblical author intended.

Through careful study of the text of Genesis and that of *Eneuma Elish* the intention of the biblical author emerges. His goal was to present a cosmogony unique to ancient Near Eastern thought so as to exhibit a polemic nature. This we will see through a comparison of the texts and an investigation into the concept of myth.

In the early 1800's archeologists uncovered certain ancient scripts containing cosmogonic writings from past civilizations in Mesopotamia and Egypt. These were of a flood story in ancient Babylonian literature that had striking similarities to the flood story in Genesis. Following this, a translation of the Babylonian creation account commonly called *Eneuma Elish* was published.

The most famous passage in the Old Testament that contains parallels and similarities to other pagan myths is Genesis 1:1–2:4a. This section of the Old Testament is the subject of this study.

Gerhard Von Rad points out many characteristics that make the Gen. 1:1–2:4a account of creation distinct. The language was meant to be precise rather than artistic and differs greatly in this way from the creation narrative in Genesis 2:4bff.[1] The goal of the priestly account of creation was precision, as E.A. Speiser describes:

> "It is the result of special cultivation, a process in which each detail was refined through endless probing and each word subjected to minutest scrutiny. By the same token, the end product cannot have been the work of an individual, but must be attributed to a school with a continuous tradition behind it. The ultimate objective was to set forth, in a manner that must not presume in any way to edit the achievement of the Creator—by the slightest injection of sentiment or personality—not a theory but a credo, a credo untinged by the least hint of speculation."[2]

We can now go to the text and discover what elements parallel myth and why. It is then possible to see what the function and purpose was in the priestly account of creation.

The opening lines of the Bible: "In the beginning God created the heavens and earth" (Gen. 1:1) can be more accurately translated, "In the beginning of . . .," or, "When God began to create . . ." E.A. Speiser presents many arguments favoring Gen. 1:1 as a dependent clause rather than a complete statement.[3] It should be noted that the beginning of all Akkadian cosmogonies start with *eneuma* or *inumi*, "in the day that," or, "when." This does not challenge the originality of the biblical cosmogony nor exclude the doctrine of *creatio ex nihilo*. The opening structures are similar due to similar traditions and mythopoeic thinking.

Continuing in the text, a primary verse in the entire Old Testament for possible mythological elements is Genesis 1:2. In particular, the word, *tehom*, "deep, primeval ocean, sea," has been connected with *Tiamat*, the monster god of *Eneuma Elish*. This view has recently come under strong attack. Gerhard Hasel points out that *tehom* and *Tiamat* come from a common semitic root word that is found in many derived forms in many semitic languages and with various meanings. Throughout the Old Testament the word is never a proper name, and is simply used as a descriptive word common to cosmogonic writings.[4] The author surely knew of its mythical connotations, but used the word in a different sense so as to purposely draw a similarity. It is obvious that the word and the entire clause has been reinterpreted from its traditional mythical meaning. No mythological overtones are seen in the way it is used throughout the Old Testament. The connection drawn between the two words is that of a primeval battle as shown earlier. In this battle, the earth is formed out of the losing god, *Tiamat*, the foe of the creator god, *Marduk*. This has no similarity to the Hebrew account of creation. The *tehom* is no foe of God, and is depicted as inanimate, simply an element in the creation process. The implications of the purpose in this are quite clear. The use of *tehom* was to describe the inanimate cosmos before creation. By using a word with known mythical connotations, a polemic nature is displayed. The antimythical purpose was to give the Hebrew God and the creation account a distinctiveness. Other words and phrases that have a slight connection with pagan mythology are treated similarly.

In Genesis 1:3 we have a description of the way in which the Hebrew God creates: by "Word." This is unparalleled in pagan mythology, although Marduk creates by the use of magic words. The Genesis description of creation by "Word" is radically different; the Hebrew God spoke and it was so. This effortless creative power of God is unique to the Hebrew thought.

In Genesis 1:14–19, the strongest indication of the radical polemic nature in the account of creation is found. This section begins in verse 14 of Chapter 1. Through God's spoken word it reads, "Let there be lights in the firmament." There is a clearly antimythical nature in the Genesis description of the creation of the luminaries when it is compared to the same account in *Eneuma Elish*. In Genesis 1:14 ff. the sun, moon, and stars were created to separate day from night, and control seasons and time as in days and years. *Eneuma Elish* depicts the luminaries as having the same purpose but refers to them as gods themselves. They put great emphasis on the stars due to the Babylonian astral worship. This indication of overt polytheism found in *Eneuma Elish* and related cosmogonies is strongly reacted to in the Genesis account.

In Genesis 1:14ff. the sun and moon are strictly referred to as the greater and lesser lights (vs. 16). This is an obvious avoidance of any possible reference to a Babylonian god, especially their highest deity, the sun god, Marduk. The text of *Eneuma Elish* also implies that there was no definite creation of the sun, moon, and stars,

rather, they have been fixed in their stations by the creator god. It should also be said that the order of reference to the astral bodies in *Eneuma Elish* is stars, sun, moon. This is also due to their astrological beliefs. This obvious polemic against the circulating pagan cosmologies was meant to distinguish the Hebrew monotheism from the pagan polytheism. Also, in its polemic against paganism, the Genesis account specifically refers to the sun, moon and stars as "luminaries." Gerhard Hasel points out that this term is used to give them a "degrading" status. Hasel concludes this section of Genesis in this way:

> "The form in which this Hebrew creation account has come down to us attempts to portray the creatureliness and limitations of the heavenly luminaries as is consonant with the world-view of Gen. 1 and its understanding of reality."[5]

The final significant point is the seven day creation scheme. It has been argued that this is a reworking of an earlier eight period scheme. The significance of this is not its antimythical purpose, rather its importance in instilling distinctiveness in the Hebrew religion at a time when it was badly needed. Arvid S. Kapelrud explains the importance of the Sabbath day to the Hebrews in the following way:

> "The exiles needed that day, which plays such an important role in P's creation story, to devote to worship and to mark themselves out as a special religious and national group which must not be mixed up with the many other groups in the mighty Babylonian realm."[6]

One view holds that two creation periods were pressed into the third and sixth days respectively. This was done in order to present the creation week and the distinctiveness and holiness of the Hebrew sabbath as a day of rest. It is evident in this view that a "search for identity" by the Hebrew people is seen as the reason for the polemic nature of Genesis 1:1–2:4a. The Hebrew people needed a distinct identity and to remain a unity among the Babylonians and other pagan influences.

A refined definition of myth is required to fully understand the interpretive process of the traditions which formed the Genesis Cosmogony. Brevard Childs' phenomenological approach allows well for this. Before defining this approach, one other view must be critiqued that deviates greatly from all the others. It is an anthropological approach that began in the early 1900's, called structuralism. This view, developed by Claude Levi Strauss, holds that myths consistently exhibit a binary structure (heaven and earth, male and female, etc.). These binary oppositions appear because they are intrinsic in the mind of a human. Myths are an attempt to overcome these innate oppositions by setting up a category of mediation between the natural and supernatural.[7] Structuralism is a valid approach to studying the mythopoeic mind. However, it also fails to distinguish the functions of myths in different cultures, and therefore, is not helpful in finding what the author of Genesis 1:1–2:4a intended in his editing of the traditions.

The phenomenological view differs greatly from this and works well in the study of myth in relation to the Old Testament. Brevard Childs explains that his approach views myth as representing a culture's understanding of reality. To fully understand the phenomenological conception of myth and how it can be used to study certain passages in the Old Testament, we must grasp his basic definition of myth:

> "Myth is a form by which the existing structure of reality is understood and maintained. It concerns itself with showing how an action of a deity, conceived of as occurring in the primeval age, determines a phase of contemporary world order. Existing world order is maintained through the actualization of the myth in the cult."[8]

Thus, the phenomenological approach sees function in myth and views it from that perspective. Scholars, such as Gunkel and Heidel, have pointed out a number of Old Testament passages rich in elements and fragments found in pagan mythology. This approach holds the view that the author of these Old Testament traditions used the mythical elements in a way so as to better express their view of reality. This foreign material was included intentionally, but not without much tension. The Hebrew writers meant to make it clear that their cosmogony was unique theologically. Purpose is found in myth, a purpose for explaining unknown phenomena in a way that gives the culture a theological distinctiveness.

First, we must consider what is meant by a "view of reality." One aspect of a culture's view of reality can be seen in their annual festivals involving cultic repetition of primordial events from their myth. This is done in hope that this cultic repetition will secure a supernatural intervention and blessing from the gods. The main function of myth within its culture is not purely aetiological, but to maintain existing world order through its annual cultic ritual.[9] *Eneuma Elish* displays examples of purpose within these cultic rituals. The following is a brief section of *Eneuma Elish*:

> "Then joined issue Tiamat and Marduk, wisest of gods.
> They strove in single combat, locked in battle.
> The lord spread out his net to enfold her,
> The Evil Wind, which followed behind, he let loose
> in her face."[10]

Through early Babylonian history during their yearly coronation festivals, this battle and Marduk's subsequent victory is reenacted in order to assure supernatural blessing and maintain present world order for the coming year. This supports the view that the common pagan worldview of time is cyclical.

Another part of the yearly ritual in Babylonia calls forth Marduk, the sun god, from the land of the dead. Marduk, being the sun god, is seasonal. He dies during fall and winter and then rises by way of this cultic ritual to usher in spring, thus allowing for a fertile ground and much agricultural productivity. This is another function of the myth within its culture by way of cultic repetition. To maintain world order and productivity, annual rituals of returning to past events are necessary. Time is viewed as cyclical, not linear.

The Old Testament cosmogony contrasts with this by looking forward to the coming of a new creation. Time is viewed as a linear succession of events. Their primordial events are viewed as a part of Israel's past history. This difference between the Hebrew and Babylonian culture's view of reality shows a great difference in the function of myth within the two cultures.

The Genesis author had many traditions to compile and rework. This reworking was based on how God revealed himself to him and the Hebrew people in general. He also saw a need for an identity among the Hebrew people. This cosmogony represents their understanding of reality as God has revealed it through his dealings with them. Through theological reinterpreting and precise literary style, the author successfully fulfilled his purpose in Genesis 1:1–2:4a.

[1]Gerhard Von Rad, *Genesis*, Trans. by John W. Marks (Philadelphia: The Westminster Press, 1961), p 27f.

[2]E.A. Speiser, *Genesis* (The Anchor Bible), (New York: 1964).

[3]*Ibid.* p 10f.

[4]Gerhard F. Hasel, "The Significance of the Cosmology in Genesis 1 in Relation to Ancient Near East Parallels," *Andrews University Seminary Studies*, 10 (Ja. 72):1–20.

[5]*Ibid.* p 89.

[6]A.S. Kapelrud, "The Mythological Features in Genesis 1 and the Author's Intentions," *Vetus Testamum*, 24 (April 1974), p. 181.

[7]Edmund R. Leach, "Genesis as Myth," *Discovery* (May, 1962).

[8]Brevard S. Childs, *Myth and Reality in the Old Testament* (Naperville: Alec R. Allenson Inc., 1960), p 29.

[9]*Ibid.* p 26.

[10]James B. Pritchard, ed., *The Ancient Near East, Volume I* (Princeton University Press, 1958), p 34.

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The Christian's Edge: Research Guided by the Holy Spirit

Science as Frankenstein

Science is approaching a crisis in significance. It is expanding so fast that it is impossible even to estimate the amount of scientific knowledge published internationally yearly, let alone what is important in that knowledge.[1] In the United States alone, some 14,000 books and 151,000 journal articles on some aspect of science are printed every year.[2] This is equivalent to generating a new Encyclopedia Britannica *every two days*! This sheer mass of knowledge has pressured, and pressured, and finally fragmented science into uncountable subspecialities, each a new science in its own right. Science is no longer a unified field of knowledge. No one person, indeed, no computer system, could possibly master it. The day of the scientist as one who generally knows science is over.

"If you are doing science, you are constantly bombarded with a thousand tantalizing facts, nine hundred and ninety-nine of which are useless. The problem is that you don't know, and might not ever know, which are trivial and which are important," Dr. Carl Hindman, mathematician for TRW, Inc., has said. There are so many possible directions of inquiry, the vast majority of which are inconsequential, that a serious scientist in his quieter moments despairs of ever doing anything significant. Science wallows about like Frankenstein, created by man, but too large to be controlled by him.

Nor is an end in sight. The more science discovers, the more it realizes how much is yet to be discovered. But this is nothing new. Solomon made the same observation several thousand years ago: "I saw every work of God, and I concluded that man can not discover the work that has been done under the sun."[3] Science may continue to go through the motions, but its heart is gone; it faces a bankruptcy of meaning.

Into the void steps Christ. Christianity offers a solution to the crisis of significance. Although man can never know, much less synthesize, anything but the smallest fraction of creation, the Creator knows and understands it all, and He has given us a way to share in that knowledge. He has given us His infinite Spirit to lead us around any impassable roadblocks our finite minds encounter. The Apostle that Christ loved wrote: "But when He, the Spirit of truth, comes, He will guide you into all truth."[4]

Relying on the Spirit of God, then, dehorns the dilemma of significance in science. For He, knowing all things, can surely lead us into what is important, whatever our field. Research guided by the Holy Spirit is the Christian's edge. With the Holy Spirit one need not engage in shotgun science, performing thousands of experiments, hoping one of them will yield the answer needed. The Christian guided by the Holy Spirit can go right to the essence of the problem and solve it quickly. More importantly, the Holy Spirit will inspire one to ask the significant questions, the ones that have meaning for all of science, that will open whole new vistas for exploration.

The Application of the Spirit

Having God on one's side is, of course, desirable, but is it one of those things that is easier said than done? Practically, how does one go about applying it? The best way is to observe how Spirit-led scientists go about it.

The first thing one notices about these Christians is that they pray about everything, from experiments to equipment. Dr. Roger Burgus, a biochemist, said that the first time he realized what prayer could do was when he was working with Roger Guillemin on the project that later won him the 1977 Nobel prize. They were trying to work out the structure of a hypothalamic hormone.[5] Nothing was going right, and they were running out of the sample, which took a half million sheep brains to produce. "I just grabbed my colleagues and said let's pray. Not being believers, they thought it was a joke. But we prayed, and the next day some guy down the hall who didn't know anything about the problem yelled out the exact answer," Dr. Burgus said. "I have found that a few minutes of prayer can save hours in the library or days in the lab."

Prayer can be applied to everything in science. "Why wait until something goes wrong? Every time I get a new piece of equipment, I lay hands on it and dedicate it to the Lord," one Christian microbiologist said.

These Christian scientists do not pray that an experiment will come out a certain way, but that they will be able to understand the reason for the way it did turn out. To pray for a certain result would be presuming against God, according to Dr. Daiel Markel, of the Oral Roberts University School of Medicine. "That would be asking God to deny truth. He will not honor that kind of prayer." Dr. Markel went on to say that the Holy Spirit can make wonderful sense out of experiments that give confusing results. "Prayer can open your eyes to what is really going on in experiments you thought were flops."

Once an experiment has been prayed for, Dr. Eric Brown, of the Chicago Medical School, says to listen carefully for answers from unlikely sources. God can speak through wives, children, and friends who do not know anything about the project. It is important not to box God in, Dr. Brown says. "Several years ago, I had massive grants from NIH to try to isolate viruses from human leukemias, but I just wasn't getting anywhere. Prayer didn't seem to help either. One Saturday, I took my boys fishing at a local river. We caught six carp, three of which had tumors from the water pollutants. I didn't think much about it at the time, but later the Lord clicked the two things together. The same thing could be happening in the human situation. As it turned out, the water pollutants were inducing expression of tumor viruses in the carp. Reducing the pollutants lowered the rate of human leukemia in the area, so now I had an exciting lead on how viruses might cause human cancer."

The Charismata

Another frequently mentioned way that the Holy Spirit guides research is through the gifts of the Spirit or *charismata*. While this area is quite controversial, it cannot be ignored. A complete doctrinal discussion is outside the scope of this paper. Two things seem clear, however. One is that many of the Christians doing research led by the Holy Spirit are applying the gifts to their research. Second, God is bigger than any controversy. "God does not fit our neat little perceptions of Him. We say that science is unexpected, yet all too often we don't apply that to God," Dr. Markel said.

"The charismata are one of the inputs leading from doubt to conviction," Dr. Robert Herrmann, of Oral Roberts University, said. "This conviction must be consistent with other confirmation, however. If the guidance to a particular problem came from the Holy Spirit, it will stand up to any test. One must be honest and be open not only to the leading of the Spirit in the first place, but also in allowing that leading to be checked by colleagues or actual

experiments." This, it is hoped, will prevent any of the excesses that have occurred in the charismatic movement from being duplicated in the laboratory, Dr. Herrmann said.

Two passages in the Scriptures give examples of the gifts of the Spirit, Romans 12 and I Corinthians 12. Of these gifts, six appear applicable to research. These are the gifts of wisdom, knowledge, miracles, prophecy, and tongues followed by interpretation. Dr. Burgus tells of the time when he was sequencing an unknown protein and his vacuum system started leaking. "If air got at my unknown, it would have oxidized it, and weeks of work would be lost. I prayed pretty hard there, and immediately the vacuum was restored. How many times does a high vac system heal itself? I consider that a miraculous intervention of the Holy Spirit."

For whatever reason, the two gifts most commonly reported used in science are the gifts of knowledge and wisdom. Dr. William Standish Reed, a physician in Tampa, Florida, said that the Spirit can consistently reveal original answers to previously imponderable medical problems. He first realized this when, as a resident in pathology, he was faced with a child that had a severe diaphragmatic hernia. "They told me when I came on that he wasn't going to make it. After looking courageously around to see if anyone was watching, I stuck my hand through the oxygen tent to touch him and prayed for him. No miraculous healing took place, but right then several things that I could do sprang to mind where before it seemed that it was hopeless. Sure enough, these things worked, and I have used them ever since," Dr. Reed said.

Merging the Compartments

The underlying presupposition in research guided by the Holy Spirit is that Christianity and science are not contradictory. Currently, the church and science are locked in dispute over evolution, medical ethics, and recombinant DNA research without any end in sight. Shrill voices on both sides claim that one believes either science or Christianity, but not both. In effect, this is saying that what goes on in church has no bearing on what goes on in the laboratory, and vice versa. All too often, scientists who are Christians separate their science and their faith into compartments. When they enter church, they are in one compartment, and when they enter their laboratory, they are in another.

This, however, is clearly unscriptural. God not only created all things (Gen. 1) but sustains them moment by moment (Col. 1:17). The Psalter reads, "The heavens are telling the glory of God; and the firmament proclaims his handiwork."[6] This makes all truth God's truth.[7] Thus, science and Christianity both really have the same purpose. They both seek to know God's handiwork, one in man, the other in nature. Looking at science this way, it becomes the study of God's characteristics evident in creation. Nothing in the end will contradict the *fact* of God. Realizing this would destroy any walls, no matter how sturdy their construction, between the Christian's science and his faith. Instead of defending God, the walls limit Him. Do away with the walls, and science will not flood over and inundate one's Christianity, but rather one's Christianity will overflow into one's science.

Scientists who are Christians readily accept the guidance of the Holy Spirit in their religious lives. They should do the same in their science, for both science and Christianity have the same end, and that is to know God. "We make everything so complex," Dr. Dominic Desiderio, of the University of Tennessee, said. "But it really is very simple: all we are to do is go to our Father every way we can, including through science."

[1]Garfield, E., ed. *Science Citation Index*. ISI Press, Philadelphia, PA. 1977.

[2]King, D.W., ed. *Statistical Indicators of Scientific and Technical Communication 1960-1980, Vol. II: A Research Report*. King Research, Rockville, MD. 1976.

[3]Ecclesiastes 1:17, NASB.

[4]John 16:13, NASB.

[5]Burgus, R., Ling, N., Butcher, M., and Guillemin, R. 1973. *Proc. Nat. Acad. Sci.* 70:684.

[6]Psalms 19:1, RSV.

[7]Jeeves, Malcolm, *The Scientific Enterprise and Christian Faith*. Inter-Varsity Press, Downer's Grove, IL. 1971.

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The Bible: Truth and/or Error?

The recent attention (June 1979) given to the topic of inerrancy by the *Journal ASA* is well deserved. The editor has graciously given me the opportunity to interact with the articles.

I. A Response to Bube

First, let me comment on Richard Bube's article, "The Relation Between Christian Truth and the Natural Sciences." His first two points are noteworthy. (1) Truth is "that which conforms with reality." This is a correspondence theory of truth. As such it stands in contrast to some non-inerrantists (such as Dan Fuller) who define truth in terms of intentionality. This allows them the loophole of saying the Bible is wholly true (inasmuch as it accomplishes its intended redemptive purposes) even though it may affirm some factual errors. (2) Further, Bube notes that "total truth is something we seldom—that we really never have in our possession." We are, of course, finite. In biblical terms, "now I know in part" (I Cor. 13:12). A clarification, however, is called for. *What* we know as Christians (through God's revelation) is the *whole truth*. We simply do not know it *wholly*. Put another way, we know God who *is* infinite truth; we, however, do not have an infinite grasp (only a finite one) of the infinite Truth. Let us, then, be cautious. There is a needed epistemological humility, but we should not neglect either the *certainty* we do have of the essential truth, nor the *completeness* of truth as we know it, nor the *infinity* of the truth we know (viz., God).

As to the "metaphorical" nature of knowledge, I believe Bube overstates the case. First, not *all* theological language is metaphorical (an implication that can possibly be drawn from this section). Something must be literally true or else to speak of the non-literal (i.e., metaphoric) would make no sense. Even Paul Tillich saw the logic of this and changed his earlier view that all religious language was symbolic. He later included at least one non-symbolic statement, namely, God is Being or the Ground of Being.

Further, Bube states that all scientific descriptions are "transient" and "none represents *the* true picture of the universe." Besides the implied scepticism in this statement, it is self-defeating. It implies that one already knows what "*the* truth" about the universe is and, hence, can see that the present scientific descriptions fall short of this knowledge.

Also it is not clear whether Bube believes that theological "models" really *describe* God (as he seems to imply that scientific models really describe the world), or only "reveal" some "inspired pictures" of God (as he indeed says). Does the Bible tell us only how to *think* about God or does it tell us something about the way God *really* is?

Finally, has not Bube "punted to paradox" when he says that the metaphors "cannot [?] be *simultaneously* applied." The orthodox Christian position is that God's attributes are not mutually contradictory. It is the more radical "modern" existential thelogians who see this kind of irrationality within the nature of God.

It is worth noting that we may not assume so easily, as Bube does, that there is no "inevitable strife between creation and evolution." At least we may not assume this if truth is "that which conforms with reality" (as Bube defined it). For if scientific truth entails factual conformity with space-time reality, then surely the description in Genesis of the special creation of certain forms of life and especially of Adam and Eve from "dust" and a "rib" would be false. It would seem that either one must hold a different definition of "truth" or else give up the belief that total evolution is compatible with the view of the factual description of creation in Genesis.

In the concluding paragraph there is an inexcusable (and false) caricature of what Bube believes to be "many" inerrantists. I would challenge the author to even find *one* contemporary writer on inerrancy who holds, as Bube charges, that the Bible is "a book that tells the absolute truth in *every conceivable category regardless of whether the authors of that book under divine inspiration were using that category or not*" [emphasis mine]. This is an unfair, untrue and unscientific exaggeration.

Furthermore, the author misconstrues the normal inerrantist's claim for "scientific accuracy" in Scripture. Inerrantists do acknowledge the "transient and changing" nature of scientific theories. That is precisely why most inerrantists are not willing to allow present theories about evolution to overthrow clear teaching of the Scripture to the contrary. As a matter of fact, what concerns inerrantists is that many non-inerrantists too easily capitulate the scientific (i.e., factual, space-time) affirmations of Scripture to the current moods of changing scientific opinion (which is all too often built on naturalistic presuppositions).

One final point on Bube's article. He strongly objects to the supposition "that *the* scientific truth can be known and stated once and for all." Surely he does not mean that God cannot *know* it and *state* it in Scripture. Of course, no one is claiming that God stated *all* scientific truth in Scripture. However, inerrantists do wish to claim that *some* of it is there.

II. A Response to Pinnock

It is personally and professionally sad for me to witness my friend and former colleague Clark Pinnock turn his talented pen from a strong and articulate exposition of inerrancy (in his earlier writings) to a militant attack on the proponents of the doctrine he once so fervently defended. Unfortunately, as his first paragraph indicates, Pinnock has bought into a "peace-at-any-price" mentality regarding inerrancy. While we all desire true unity among brothers in Christ I would ask thinking Christians to ponder these questions: can we have true unity without having unity *in the truth?* And can we have the truth if we do not stand firmly (even militantly at times) for the complete truthfulness of Scripture? This is, after all, precisely what the inerrantists are concerned about—*the complete truthfulness* of Scripture in whatever it affirms.

In the second paragraph Pinnock implies that divine authority and inerrancy can be separated. How can we have a divinely inspired error affirmed in Scripture? Surely it is nonsense to suggest that the God of all truth, who cannot lie (Heb. 6:18), can utter an untruth. The only way out of this dilemma for the errantist is to deny either that the Scriptures are uttered or "breathed out" by God (see II Tim. 3:16), or that God is unchangeably truthful (see Titus 1:2). Surely no evangelical—Pinnock included—should deny either of these.

A little later Pinnock uses a curious phrase to describe the Warfield-Hodge type inerrantist. He says they believe the doctrine of "perfect errorlessness." Does this not mean that those other inerrantists (such as Pinnock himself claims to be) hold to "*imperfect* errorlessness." Now I soberly ask, does this really make sense? Do we not really have here death by qualification—the "qualification" of one word ("errorless") by another ("imperfect") which is really the negation of the first?

I have observed Pinnock's pilgrimage away from the historic position on inerrancy (which he held himself) in a gradual but continual movement over the past few years. I was none the less shocked to read what seems to be his personal prophecy: "Indeed, it may well be, that modified inerrancy [his present view] will prove to be a temporary way-station on the road . . . to a non-inerrancy position on biblical inspiration."

As to the alleged "serious discrepancies" in Chronicles, Pinnock is no doubt aware of the able and scholarly explanation of these by the late Barton Payne. In this connection, it seems to me that somehow Pinnock and modern opponents of biblical inerrancy have allowed a subtle but definite shift in the burden of proof issue. For if the Bible is accepted as God's Word, then the burden of proof is not on us to demonstrate *how* all these problems are to be reconciled. We need only show that there is a *possible* answer. Inerrantists, however, are more likely to really *try* to find an answer because they believe it is possible. In other words, the non-inerrancy position does not really provide the motivation for research because they believe either that reconciliation is *impossible* or at least *unfruitful* to attempt a solution.

For instance, in court one need not explain how he could not have committed the alleged murder. He is to be presumed innocent until *proven* guilty. If there is a *possible* explanation of his whereabouts and no *proof* to the contrary that he did commit the murder, that is all that is necessary. To use a scientific illustration, few scientists give up looking for an explanation of an anomaly which stands in contradiction to present scientific theory. On the contrary, most scientists assume (by faith) there is an explanation and keep on looking to find it. They assume the unity of the natural world and are often convinced, against evidence which seems to be to the contrary, that there is some possible explanation. Why, then is it so incredible if the Christian, who accepts (with good reason, I might add), the unity of God's Word, rests in the *possibility* of a reconciliation until there is more evidence?

Later in the article Pinnock touches on a fascinating point (which he more clearly states elsewhere). He speaks of the inspiration of the Bible in our hands (as opposed to the autographs, as inerrantists hold). How, I would like to ask, in the name of good logic can the Bible in our hands be inspired? Everyone admits there are copiests' errors in it. This means that the Bible contains "inspired" errors! This becomes all the more ludicrous when we remember that "inspired" (from II Tim. 3:16) means "breathed out" by God. Are the "writings" "breathed out" of God's mouth—errors and all?!

At least Pinnock is honest in calling this a "new" view. It is certainly not the one held by Jesus who said "every jot and tittle" is true (Matt. 5:17, 18) and Scripture "cannot be broken" (John 10:35).

As one reads on in the article he has second thoughts as to how "new" Pinnock's view really is. When he speaks of the Bible's "sufficiency" (not really inerrancy) in the "practical realm" and of hearing God's voice "in" Scripture (evangelicals hold that Scripture *is* God's voice), one wonders how different this "new" view is from the "old" neo-orthodox view.

III. A Response to Coleman

Coleman correctly observes that virtually everyone places some qualification on inerrancy. For example, almost all inerrantists limit it to the original writings (not every copy). He correctly adds, "this qualification has not been overly abused." In addition, virtually everyone holds that it is only what the Bible *affirms* (not everything

it contains, such as Satan's lies) that is true (or inerrant). However, Coleman goes well beyond the evidence when he says this first qualification "is nothing less than a Catch 22." I personally believe, however, that Coleman strikes a sensitive nerve in the common defense of inerrancy which retreats behind the affirmations of Scripture into the alleged "intentions" of the author. He correctly observes that this "involves the interpreter in a game of mind reading." It seems to me that inerrantists should stay *in* the inerrant text (not go "behind" it) and in the *affirmations* of the text (not in the alleged intentions behind it). To be sure there are intentions behind the affirmations, but we know what the intentions were only by examining the affirmations; we do not (and cannot) know what the affirmations mean by an independent examination of the intentions.

On other matters, Coleman's comments are less than penetrating. Sometimes they seem clearly misdirected or misinformed. For example, he argues (a priori) that "if the Bible is infallible on all matters, . . . the Holy Spirit must have inspired the authors with supernatural knowledge in such matters as biology and astronomy in the creation account(s)." While acknowledging the legitimate distinction between what is being "asserted" in a passage and what is not, Coleman wrongly assumes that this reduces to the "intention" of the author. I would claim that one need not (and should not) retreat to an author's alleged *intentions* behind the text but simply engage in a good historico-grammatical exegesis of what the author *asserted* in the text. Inerrancy holds that whatever the author really *asserted* in the text as true, is true.

In a strange twist of logic Coleman argues that if Warfield and Hodge were right that biblical language is only "adequate" but not "perfect," then the Bible cannot be inerrant in expressing the truth for all times. Why not? Inerrant only means "without error" in what *is* expressed. As everyone knows, there are other (even better) ways of saying the *same* truth. The fact that one is *different* (whether better or not) does not make the other one *wrong*. Coleman seems to believe that because the Bible is *expressed* in culturally conditioned language, the truth expressed cannot be absolute. But this confuses the *truth itself* as absolute and the *medium* by which it is mediated to us (namely, language). "Seven plus three equals ten" is not a culturally conditioned truth even though the English words used to express it are culturally conditioned.

While Coleman rightly criticizes some inerrantists for too quickly giving up the "literal" method of interpretation for an easy solution to biblical problems, it seems to me that Coleman too quickly gives up on the historico-grammatical hermeneutic for a "spiritual" one. He raises questions about whether the author of Genesis I was "a poet first and an astronomer last" and about the biographical nature of the Gospels. It seems to me this goes somewhat beyond the limits of a legitimate hermeneutic. Indeed, Coleman falls prey to his own criticism about retreating to the intentions of the author when he insists that one must ask whether his method is "in accord with the *purpose of the author*" (emphasis mine). A few lines later he clearly says, "infallibility is limited only by the *intention* of the author . . ." (emphasis mine).

The interesting thing about Coleman's article, in contrast to Bube's definition of truth, is that the latter conceives of truth as correspondence and the former in terms of intentionality. I personally believe that the theory of truth is the heart of the debate between errantists and inerrantists and that only on Bube's (correspondence) view of truth can inerrancy be defended. (We have spoken to this point elsewhere in a paper entitled: "What is Truth: The Central but Neglected Issue in the Inerrancy Debate," given before the Evangelical Theological Society, December, 1979, St. Paul, Minnesota.)

IV. A Response to Phillips

Space allotted permits only brief response to some of the central points raised by Phillips. The main point of his article is to show that contemporary inerrantists are epistemological foundationalists who have raised the doctrine of inerrancy from its earlier secondary order status to a first order doctrine from which one can deduce indubitable truth. This he feels is neither exegetically sound, philosophically correct nor spiritually fruitful.

It seems to me that Phillips is wrong on almost every point. Several things should be pointed out in response.

First, he wrongly assumes that there is only one kind of epistemological foundationalism for inerrantists—a *deductive* kind where absolutes are deduced from an absolute principium in a kind of geometric way. There is also a *reductive* foundationalism which says that all valid knowledge must sooner or later be reducible to some irreducible first principles of knowledge—some absolute.

Second, Phillips confuses ontology (what is known) with epistemology (how we know it). He fails to see that the foundation—the inerrant originals—can be absolute even though we do not know them in an absolute way.

Third, he confuses the formal and the material questions regarding the truth of Scripture. He apparently does not understand that inerrantists insist only that *whatever* Scripture teaches is true (the formal principle), and this leaves open the question as to *what* the Bible is teaching (the material) to hermeneutics.

Fourth, his argument is a "straw man" as applied to the main stream of contemporary scholars who defend inerrancy. The International Council on Biblical Inerrancy (ICBI) which met last October and produced the 19 article "Chicago Statement" in no way committed themselves to a foundationalist posture in their statement. Rather than using words like "absolutely necessary" the ICBI spoke of "vital" importance (Article XIX) of the doctrine of inerrancy. Phillips is attacking a largely non-existent foe.

Fifth, Phillips seems not to appreciate the kind of foundational argument that inerrantists do sometimes use. They do *not* usually claim that if one accepts even one error in the Bible then nothing else in the Bible can be accepted as true. It is an obvious truth that a single mistake made by one's friend does not forever shroud all their statements in uncertainty. What inerrantists do often argue is that if one's friend claims to be *the voice of God to mankind* and then makes one mistake, then they can no longer be trusted as the voice of God to mankind, regardless of how much truth may be in their statements.

Sixth, space does not permit refutation of Phillip's weak exegesis. But even more glaring is his overlooking of many crucial passages which—if he had correctly exegeted—would have answered his problems (such as Matt. 5:17, 18; Matt. 22; Gal. 3; Heb. 1, 3; Ps. 19, etc.).

Seventh, one can easily see how Phillips misunderstands the Reformers and post Reformers by reading the excellent chapters by Preus, Gerstner and Krabbendam in the forthcoming ICBI book *Inerrancy* (Zondervan, 1980, edited by N.L. Geisler).

Eighth, Phillips wrongly assumes that one must have an infallible interpretation in order to have an infallible principium of Scripture. But why? Suppose the U.S. Constitution were the absolute political truth for mankind. Despite the fact that the Supreme Court is fallible in interpreting it, it would be a whole lot better to live in the United States than under a totalitarian constitution which did not guarantee our freedoms, even if this constitution were infallibly interpreted by someone.

Finally, Phillips seems to assume, contrary to Bube, an incorrect intentionalist's theory of truth. He speaks of the "primary intent and purpose of Scripture" in terms of "redemption." If it is only salvific or moral intentions which are the primary focus of the truth of Scripture, then one need not concern himself with whatever(minor?) historical or scientific affirmations there are in Scripture that may prove to be false. His faith, built unshakable as it is on only the

"redemptive" truth of Scripture, is in the final analysis really unfalsifiable. At least an inerrantist's position is "red-blooded" enough to claim something that is subject to scientific and historical falsification. The non-inerrantists' and "modified" (?) inerrantists' view is, in the final analysis, unfalsifiable.

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Replies to Geisler

It is important to realize that the partial truth we have is *truth* because it partially corresponds to reality, but it is *partial* truth because it does not correspond wholly to reality. There are similarities between partial truth and parabolic statements. Parables present a truthful message in terms of a story with its own characters, script and scenario; to confuse the latter with the truthful message, however, can often lead to confusion. In the same way our models of reality tell us *something* truthfully about reality, but we may be in serious error to suppose that the model itself faithfully mirrors reality.

Certainly all theological language is not metaphorical. Metaphors are essential when trying to describe something outside our experience. Such descriptions must be given in terms of categories that are within our experience. Thus biblical statements about human actions and crucifixions etc. are not metaphorical, but biblical statements about the origins and consummation of the universe and about the nature of God are necessarily metaphorical.

The existence of an objective reality given to us by the creative activity of God is accepted solely on faith. Our experience tells us that scientific descriptions of this reality have always fallen short of its full description (as witness the continual change in scientific paradigms throughout human history), and it is hardly an act of scepticism to conclude that any particular scientific description is likely to prove inadequate or incomplete in the future. The history of science is replete with examples of situations where scientists believed they had the final *true* description of the universe, only to be promptly or gradually proved incorrect.

The Bible does tell us *something* about the way God really is. It tells us in what ways God is like things and persons we know, and in what ways God is unlike things and persons we know. Such descriptions take the form of "inspired pictures."

I am surprised that Dr. Geisler apparently confuses paradox with contradiction, and believes that acceptance of paradox is a sign of neo-orthodoxy. Nowhere did I state that God's attributes are paradoxical, and certainly not that they are contradictory. Still, no less an orthodox theologian than Vernon Grounds writing in the orthodox Christian *Bulletin of the Evangelical Theological Society* [7, 3 (1964)] has described seven basic paradoxes in the biblical revelation. I would not think that Grounds fits in the category of a " 'modern' existential theologian." And of course a paradox is an *apparent* contradiction, *not* a genuine logical contradiction.

I do indeed mean that God *cannot* state *the* scientific truth in Scripture. But this is not a limitation on God; it is a limitation imposed by human communication. It is highly likely that *the* scientific truth about nature requires concepts, categories, and thought processes as far removed from us as would a description in terms of quarks, leptons, photons, supernovae etc. have been for the people for whom the communication of the Scriptures was given. The basic question remains unanswered: *Why* would anyone suppose that God would choose to reveal scientific information in the Scriptures when it is evident that such a revelation is far from the total context and purpose of the scriptural writings?

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Much as I regret being the occasion of sadness to my friend Dr. Geisler, I cannot accept for a moment his depicting my essay as an *attack* on the proponents of biblical inerrancy, a view he says I formerly held. It was a *description* of a discussion which is ongoing, not an attack on any view. In it I placed myself in the camp of those who advocate inerrancy in a nuanced sense, and expressed sympathy for those who are trying to work out a high doctrine of biblical authority without using the term at all. Evidently Geisler feels absolutely no sympathy in that direction himself, and this must explain why he distorts the nature of both my essay and my convictions.

What disappoints me with Geisler is his obvious unwillingness to recognise that the concept of biblical inerrancy is an extraordinarily tricky one, owing to the nature of the Bible. He complains that I do not endorse what he calls the "complete truthfulness" of Scripture, a phrase which he must suppose conveys some uncomplicated meaning. As a matter of fact it does not, since the manner in which the Bible chooses to be truthful in many places is in keeping with canons of truthfulness ancient rather than modern. A simple comparison of the synoptic gospels will reveal to any reader numerous examples where the authors have taken the liberty of rearranging their material in a way suitable to their didactic purpose, but hardly in the "correct" (by our standards) chronological order. So long as we think of inerrancy as a timeless quantity, the Bible itself will resist our use of the term in relation to it. If on the other hand we allow that the term inerrancy has to be understood in relation to cultural norms which are not perennial, then the term is certainly subtle, and to some evangelicals problematic. Geisler himself limits the inerrancy of the Bible to that which the text affirms (surely a wise limitation), but does not seem to recognise what that limitation implies: that the Bible in those aspects of the text where affirmation is *not* made may well be errant. If he would only attempt to be more self-conscious within his own position, he would be compelled to look more charitably upon those who find the term less than satisfactory, and never be able to term those culturally conditioned aspects of the text "lies." The fact that he can do so here is proof that his militancy for inerrancy is preventing his thought on this subject from rising to the ordinarily high scholarly level of his work. I must confess I was surprised to find him maintaining in his reproof of my essay that in the case of a biblical difficulty any hypothesis however implausible would suffice to ease his anxiety about total inerrancy. I had come to expect Mormons and Moonies to go to irrational lengths to save their religious assumptions, but not a first class Christian scholar. Geisler is comforted by the work of the late Barton Payne on the books of *Chronicles* and the long list of improbable statistics found in them. For my part I admire the stubborn commitment Payne always shows in his work, but find it impossible to endorse his special pleading. Far more likely in my judgment are the efforts of Harrison and Carnell to explain the data in terms of the secular sources employed there and the purpose lying behind the narrative.

Geisler goes to great lengths to defend perfect inerrancy because he believes Jesus Christ taught it and requires adherence to it on the part of his followers. This conviction explains, I believe, why his tone is strident and his arguments reckless. He believes a great deal is at stake. For me to express in my essay a degree of hesitation about the suitability of the term inerrancy is enough to provoke a person of this theological temper to consternation and wrath.

The best way to answer his criticism and get at the heart of the issue is to point out the objectionable fact that Jesus did not teach the doctrine of inerrancy as Geisler understands it. Although he wishes to conceal it, Geisler's concept of inerrancy is complex indeed, difficult to define, and replete with qualifications. Inerraney is relative to what the Bible affirms, and does not extend further. It pertains to the nonexistent original autographs and not to any Bible today. Inerraney is by no means a simple concept, and is not found in Jesus' teaching, neither the term nor the subtle theory. This is not to deny that the position could not be a good one for Christians to hold, given the alternatives, but only that it is a theory born out of the history of doctrine and not a concept explicitly taught by Christ and the apostles. The Princeton doctrine of inspiration is one that I personally admire and work from, but I do not make the mistake of equating it with biblical revelation, and therefore I do not accuse evangelicals, who find the concept defective, of bad faith as Geisler does. Sometimes I get the feeling that people regard the Princeton theology as a kind of Protestant magisterium which one cannot criticise without being considered a little heretical. It is not, and I fully expect evangelical thinking on the inspiration and authority of the Bible to advance far beyond Warfield's imperfect theory. There is certainly room for improvement.

Geisler is an apologist for Christianity of considerable ability, and one of the occupational hazards of that profession is a tendency to prefer theological theories with reference to their serviceability in the task of verification. Such a person weighs such a question as biblical inerrancy not first of all in relation to its scriptural foundations (which in this case are flimsy), but in the context of debating the truth of the gospel. As a debater of humanists myself, I am sympathetic to and aware of this pressure. In this case the apologist of Dallas is on thin ice, committed as he is to a militant position on inerrancy which cannot withstand the test of the biblical text itself. Up to this point he cannot imagine defending Christianity apart from a strong inerrancy plank in the argument, and therefore he comes on very strong against my essay. But I venture to say that in the future even Geisler may come to understand why the majority of evangelical scholars today are less than enthusiastic about the term, and when he does that he will be able to rework his apologetic accordingly. After all the apologetic task is a process of continual revision and readjustment—at least that is my experience.

Geisler says that I am affected by a "peace at any price" mentality. I must admit I do seek to be a peacemaker, but not at any price. Indeed, as one teaching in a liberal setting theologically, I venture to say that I am more often on the front line battling for the truth of the Bible than some who take delight in criticising me. The fact of the matter is that I am chiefly motivated by honesty in this case. The term inerrancy seems to me to be a coin of uncertain value. There are many evangelicals wiser than myself who express their hesitation about using it. I do not believe they are motivated by evil impulses, but by the sincere desire to understand the gospel better. Geisler would place them outside the evangelical camp and cast doubt on their theological soundness. This is something I am not prepared to do. I suspect this is really what saddens Geisler.

In my essay I describe first "the militant advocates of biblical inerrancy." Geisler is obviously one of these. If I seemed to attack this view, I certainly did not intend to. I appreciate the force of their convictions. But what I refuse to do is to grant that only they are sound in the faith and evangelical in theology, and that only they deserve to be considered faithful to the Lord in this generation. There are many more besides who are running the race and following the Lord, without the benefit of the category of biblical inerrancy.

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Dialogue is frequently an excellent method of clarifying issues, and so I welcome the opportunity to respond to Dr. Geisler's critique.

I am surprised by the fact that Geisler agrees with me, and many other evangelicals, that "there are intentions behind the affirmations" of Scripture and that therefore it is legitimate to inquire about those intentions as long as we do so by examining the text itself. I am surprised by our agreement concerning such an important hermeneutical principle because even this limited examination of the author's intention becomes a crucial and pervasive qualification of strict inerrancy. As Geisler continues, however, I begin to doubt that he is really committed to paying much attention to the intention of the author by engaging in "good historico-grammatical exegesis of what the author asserted in the text." My hunch is that Geisler has already made assumptions about what those intentions were and therefore does not submit them to examination or questioning by the written text.

Let me cite two examples to clarify my position. Good grammatical-historical exegesis is predicated upon a process of critically questioning the text by asking such questions as, What is the central purpose of the author? What was the character of his audience? What were the social and theological questions he was addressing? Thus we are led to ask: Can we determine what the author of Genesis affirmed about creation, or what Matthew and Luke meant to say in their narratives about the birth of Jesus, independent of ascertaining what their purpose was? We are, of course, led back to the familiar question whether the authors were making statements of fact about biology, astronomy, or biography. If the strict inerrantist claims that the author of Genesis, for example, was indeed making a statement of chronological fact in regard to the time period of creation (7 days), then he must support his position not only by reading the text literally but by presenting supportive evidence from the broader context (chapter, book, written strand or redaction extending through several books). The issue is further complicated because the author may have had more than one purpose. His primary purpose may have been to answer "why" type questions (Why were the world and man created? Does the story of redemption include the beginnings of time?), but he used "how" type statements to buttress his primary faith affirmations. But then we must ask just how literally he expected (or insisted) his readers to understand his statement about seven days and whether the interpreter today can legitimately accept the faith affirmations of Genesis but within a new scientific context.

A similar process of exegetical inquiry arises in regard to the birth stories. After studying the texts in parallel, the interpreter is driven either to conclude that the authors are in disagreement concerning some basic historical details or they are not writing as collaborating eyewitnesses. Without assuming anything about the intention of Matthew and Luke the interpreter must face the issue of apparent or real disagreements (Cf. Raymond E. Brown, *The Birth of the Messiah*, pp. 36ff.) and seek to find the most satisfactory solution that abides by the written material. Whether we like it or not, the interpreter, regardless of his beliefs about inerrancy, must inquire about the intention of the authors in order not to distort what he meant to say. One might conclude, as does Raymond Brown, that Matthew and Luke's primary concerns were theological—Matthew to show that Jesus was the heir to the promises made to David and Abraham, and Luke to make a transition from the story of Israel to the story of the Messiah. The alternative approach is to argue that their primary purpose was to write an historical biography and therefore the disagreements must be harmonized or some other explanation given whereby we assume the authors intended to write this or that but really wrote what the text records. Regardless of the approach, or even a mixture of the two outlined here, the interpreter engages the text and author in determining the intention behind the affirmation, because the affirmation cannot really be understood without appreciating the motivation behind the written or spoken words.

We must remember that even a literal interpretation makes

assumptions about the intention of the author. There are many of us who have the most difficulty in defending strict inerrancy because it proports to have a hermeneutical method that does not have to resort to questions about the author's intentions. This however is not the case, because inerrancy presupposes the author's intention was best served by a literal reading of his written words, or in some cases a poetic interpretation, and in other instances by harmonizing two or more passages. For all its many faults, James Barr's book, *Fundamentalism*, does highlight the typical inconsistency to which inerrancy is frequently forced to resort.

Dr. Geisler is right in raising the issues of "what is truth," because exegesis always assumes something about the biblical concept of truth. My point about absolute vs. adequate truth is that only God can know absolutely. Consequently, man's conceptualization and expression are always limited and circumscribed by various factors—the culture and his intention being just two fundamental factors. I do think a great deal of difficulty has been effected because of efforts to foist upon the biblical writers a twentieth century correspondence view of truth. I find it ironic that just as the scientific community is giving up such an understanding of reality for a relational one, evangelicals cling tenaciously to a position of inerrancy which presupposes a nineteenth century concept of correspondence (a world statically there and objectively known).

Whether the biblical writer wrote from a relational or a correspondence view of reality, his intention must be considered because it is one of the given limitations inherent in human language. Any author must necessarily center-in upon one purpose at the expense of other possible ones. It is crucial that we as interpreters know, insofar as it is possible, whether Matthew and Luke were intending to write a historical biography where there must be a one to one correspondence between the facts of Jesus' birth and his Messiahship, or whether they adapted their sources because of their prior relationship with the living Christ. The two are not mutually exclusive, but one point of view dominated as they wrote their accounts of Jesus' birth. Therefore we are indeed compelled to ask without assumption what prompted the writer and allowed the text to dictate what their overriding purpose was.

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Schematic Portrayals of the Personal Component in Scientific Discovery

In "Science and Religion: Compatible," *Journal ASA* 30, No. 4, December 1978, Wiebe has pointed out that scientific knowledge is in a key way similar to religious knowledge, for he asserts that scientific knowledge can be accounted for only "if science itself is seen as a 'fiduciary' enterprise—i.e. as involving personal judgement (*fiducia*, trust/faith) that of necessity exceeds the grounds of evidence from which it first arose."

Michael Polanyi, in his many writings, has more adequately provided the evidence for the validity of this premise. A novel way of representing Polanyi's thesis that scientific knowledge is personal knowledge is shown in Figure 1 where the processes of the act of scientific discovery that involve personal judgement and commitment are clearly differentiated from those processes that are more-or-less automatic, following strictly logical operations. One sees from Figure 1 that only the purely deductive steps in scientific discovery can be done in an automatic, strictly logical manner. The other steps, i.e. induction of a hypothesis (involving creative, imaginative elements), experimental testing, modifying a hypothesis, confirmation leading to strengthening of a hypothesis, and, finally, recognizing a strengthened hypothesis as a theory; all these steps are embedded in personal judgements and commitments, tacitly held.

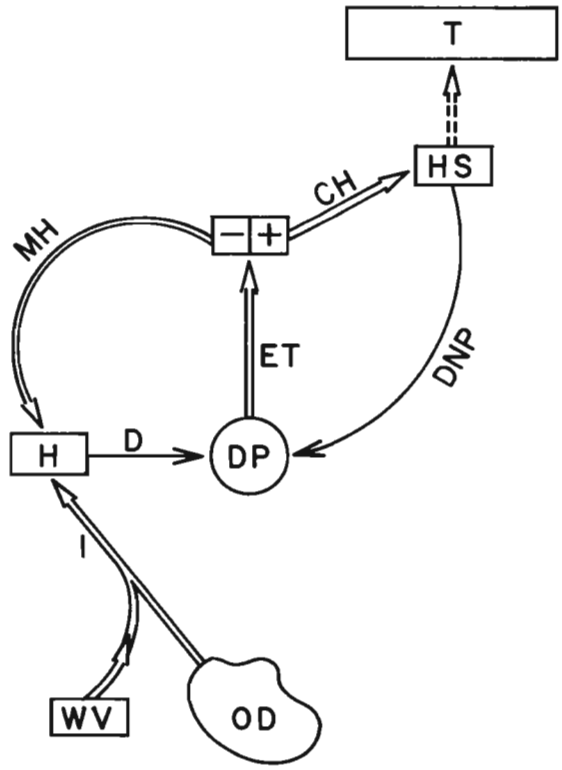

Figure 1. The Processes of Scientific Discovery

Double-line arrows: Process embedded in personal judgements and commitments.

Single-line arrows: Process completely logical, automatic.

OD—Objective Data. WV—Worldview. I—Inductive processes involving creativity and imagination. H—Hypothesis. D—Deduction. DP—Deduced propositions. ET—Experimental test. HS—Hypothesis strengthened. MH—Modify hypothesis. CH—Confirm hypothesis. DNP—Deduce new propositions. T—Theory.

Figure 2 extends the analysis to consider possible ways in which scientists come to accept a new theory rather than an established one. One way is to have an established scientific theory predict some results which are not confirmed experimentally. The actual, anomalous data obtained then serve as new objective data from which scientists can run through the cyclic processes of scientific discovery until a new theory is established. This is the typical physics textbook description of how Einstein utilized the anomalous results of the Michelson-Morley Experiment (an ether drift was not observed; the speed of light was not affected by the earth's motion) to formulate his theory of special relativity. Another way a new theory could come to be formulated and accepted is if a creative scientist of great ability departs from an established theory to formulate a new theory by an imaginative leap seeking greater unity and simplicity (thereby encompassing a wider field of knowledge). Such an imaginative leap obviously requires great individual personal judgement and commitment to standards of intellectual beauty and unity.

As Michael Polanyi has pointed out (*Personal Knowledge*, the University of Chicago Press, 1962, pp. 9–15) on the basis of personal correspondence with Einstein and considering the contents of his 1905 paper formulating relativity theory, such a creative leap is probably the way Einstein created his special theory of relativity.

The Michelson-Morley experiment did not, according to Einstein, play a major role in the origination of relativity theory. Einstein was in all probability motivated instead by the strong desire to preserve the beauty of nature and the laws that protected that beauty; he wanted to maintain the form of the laws of electromagnetism (Maxwell's equations) against deformation in going from one inertial frame to another.

To summarize, Figures 1 and 2 schematically portray the fact that personal judgements and commitments are a component part of the processes of scientific discovery. Also Figure 2 points out that scientific theories may originate in many different ways. The act of scientific discovery is thus seen to evolve not only out of completely logical, automatic, machine-like processes as portrayed by mechanistically inclined philosophers but also to evolve out of processes embedded in uniquely human personal acts of judgement and commitment which require both (what can only be called) genius and a persevering humble reflection upon the facts of nature. Thus as Wiebe has noted, scientific and religious activity bear deep similarities to one another for both are rooted in uniquely personal, human rather than automaton-like creativity. Theologically speaking, human beings imperfectly (due to sin) reflect God's creativity being made in his image; automatons or computers more imperfectly reflect man's creativity, as they are made in man's image.

An Einsteinian Model of Scientific Discovery

The assertion that science is indeed based upon personal judgement that necessarily exceeds the evidence from which it first arose is clearly seen if we consider the question of what it is that motivates a scientist to continue his work at times when established theories and concepts are no longer found adequate to describe physical reality and his or her own experimental and theoretical efforts to reformulate scientific understanding meet with repeated failure. The history of science provides many examples of scientists who faced such obstacles and difficulties and eventually overcome them. Such men and women could not have continued their work if not strongly motivated by a deep faith that reality, which exists independent of us, nevertheless possesses a structure that is at its core intelligible (perhaps at a deeply hidden level); reality is rational in nature and therefore capable of being grasped by the human mind.

As Figure 3 shows, the mind of the scientist, coupled to the presuppositions of the general culture, is composed of structures and laws that bear a striking correlation with respect to the entire realm of human experience which exists independent of it. Figure 3, adapted from a diagram of Einstein,[1] is a portrayal of how the mind of the scientist encounters reality. First, experience is scanned, and from this search the scientist imaginatively formulates a pattern or hypothesis that he thinks will explain what has been observed. It is important to note that creative scientists such as Einstein have acknowledged that there is no logical path from experience to a hypothesis but only intuition supported by being sympathetically in touch with experience. In this searching of experience for an explanatory pattern the scientist comes with an open mind; he tries to avoid as best as humanly possible attempting to fit experience to *a priori* models of reality. The scientist scans nature motivated by the strong conviction that the basic laws that describe nature will be simple and symmetric; but the exact form of the laws must be found from experience and not from preconceived ideas about experience. A good scientist is motivated and guided by his hunches but he is always willing to modify them and even to be completely surprised by nature's actual behavior. The following suggested creed for a scientist is fully in keeping with these last thoughts:

> "I believe in the intelligibility of nature, in the absolute difference between truth and falsehood, and in the duty of the scientist to discover truth. I believe that nature must be taken seriously; I think of myself as one among many who try to understand it, and I believe that arguments which are valid for me are valid for others also. I believe in the unity of nature's law; I accept that they can only be unraveled by observation and experiment, not by arm chair thinking; and I regard the scientific endeavor as endless. I believe that faith—expectation of results as yet unproved—must be exerted if progress is to be made. I believe that order does not arise of its own account but needs to be explained, whereas disorder calls for no explanation. I believe that nature is basically simple and beautiful and that much of it can be understood only in mathematical terms."[2]

Last in the sequence of scientific discovery, formal deductive reasoning is used to deduce propositions which can then be tested against reality. Imagination and personal judgement is again required in this last process of comparing and relating the deduced propositions to actual experience. In this sequence of processes that represent scientific discovery only the deductive steps are seen to be automatic, machine-like, and strictly logical in nature; the other processes are not contrary to logic but are alogical. But none of these processes will take place unless the working scientist has a strong faith that a correlation of rational structures and laws exists between the human mind and experience; such faith is essential to provide the personal motivation the scientist needs to overcome the many pitfalls and ambiguities present in ongoing research. One of the founders of modern quantum physics, Louis deBroglie had admirably expressed this faith:

> "When we find ourselves confronted with the still empty grid of a crossword puzzle, we know that a mind like ours has, according to certain rules, arranged in this grid words which we try to discover with the help of the clues given. When the scientist attempts to understand a group of natural phenomena, he begins with the assumption that these phenomena obey certain laws which, being intelligible to our

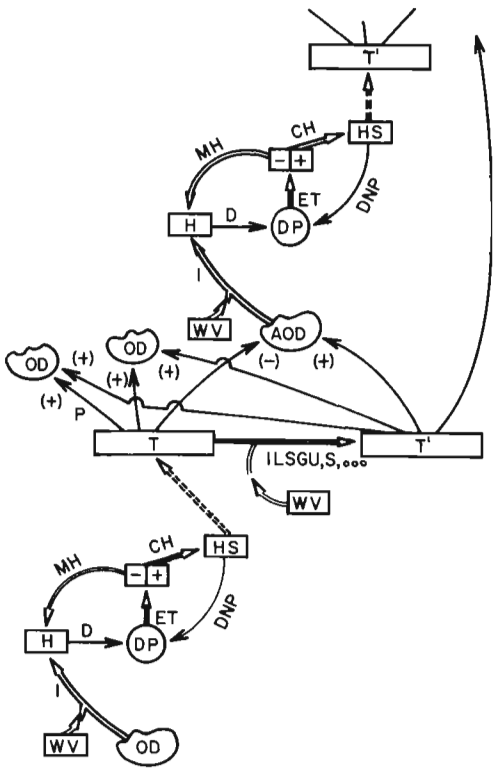

Figure 2. The Formulation of new theories in science.

Symbols the same as for Figure 1 with the following additions: AOD—Anomalous, objective data. T'—New theory. P—Predicting new objective data. ILSGU, S,...—Imaginative leap seeing greater unity, simplicity,...

reason, can be comprehended. This is not, let us hasten to note, a self-evident postulate which leaves no room for qualification. In effect, what it does is to reiterate the rationality of the physical world, to recognize that the structure of the material Universe has something in common with the laws that govern the working of the human mind. Having admitted this hypothesis, which we construct quite naturally without always fully appreciating its boldness, we try to discover the rational connections that this hypothesis suggests must exist between apparent similarities."[3]

That such a faith motivates the scientist to extend his enquiries ever forward into unknown regions is cogently pointed out by the theologian, Thomas F. Torrance:

"There is something (a basic rationality of the human mind and the universe) that we assume and operate with continually in ordinary experience and in science without attempting to explain it. If the nature of things were not somehow inherently rational they would remain incomprehensible and opaque and indeed we would not be able to emerge into the light of rationality . . . scientific knowledge is that in which we bring the inherent rationality of things to light and expression, as we let the realities we investigate disclose themselves to us under our questioning and we on our part submit to their intrinsic connections and order . . . it remains an awesome fact that if the nature of things were not intelligible and apprehensible, knowledge could not arrive at all . . . As the universe becomes progressively disclosed to our scientific enquiries, it is found to be characterized by an intrinsic intelligibility of an ever deepening dimension which far outranges our powers of comprehension, invoking from us awe and wonder. Moreover, we become aware of being confronted in and behind it all with a transcendent reality over which we have no control but which, while utterly independent of our minds, has an indefinite capacity for revealing itself to them in quite unanticipated ways. It is in response to this transcendent reality that our minds develop their own powers of comprehension and in recognition of it that they derive their primary thrust in passionate search for understanding and truth."[4]

To conclude, the personal component necessary to all good scientific work can be clearly seen if one considers Einstein's two criteria for theory evaluation.[5] His first criterion was that a theory must be capable of external confirmation and in doing so "the theory must not contradict experimental facts." Secondly a theory must be characterized by what he termed "naturalness" and "logical simplicity" in terms of theory components and the relationships between those components. Einstein clearly relied on both criteria, not only the first, in evaluating his own work as G. Holton has pointed out:

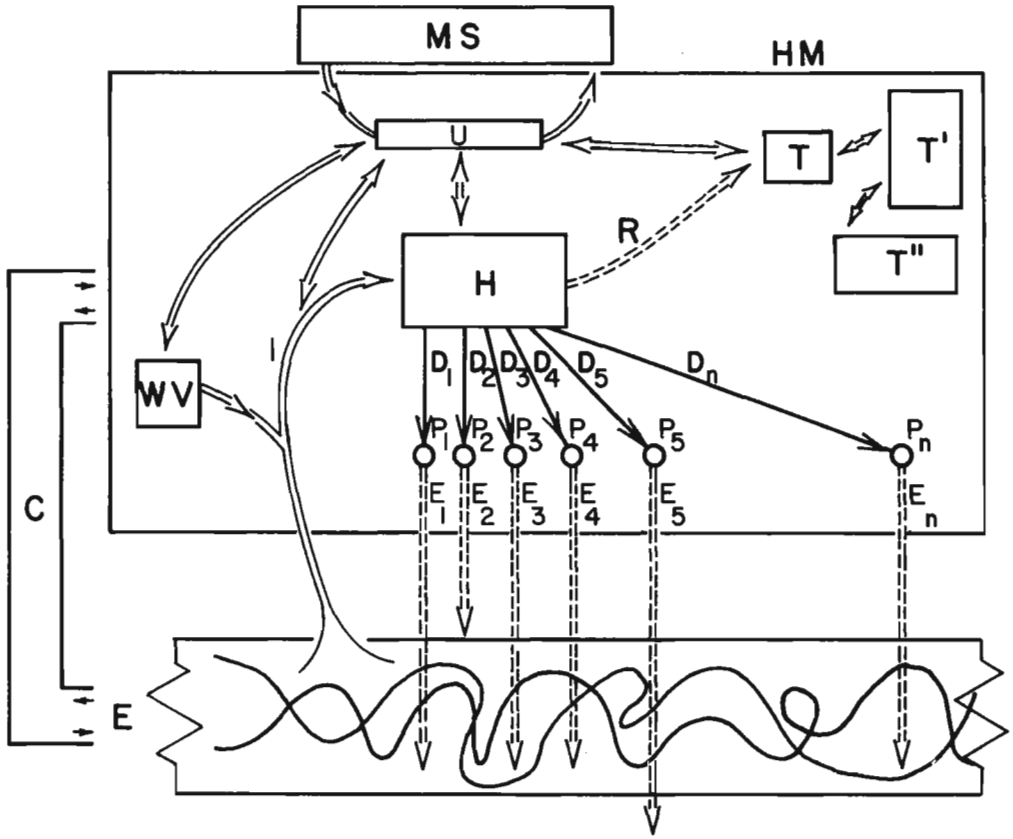

Figure 3. The interplay and correlation of the human mind and experience during scientific discovery.

WV, I and H, as in Figure 1. HM—The human mind. E—The region of experience. D1, D2, ..., Dn—Deductive processes. P1, P2, ..., Pn—Particular propositions. E1, E2, ..., En—Experimental tests against experience. MS—Metasystem of culture, general human values. U—Undecidability, basic questions of science that are not decidable from within science. R—Recognizing a hypothesis as a theory. T, T*, T"—Theories. C—Correlation. A basic, often tacitly held premise of all who do science is that the region of experience which exists independent of the human mind nevertheless bears a correlation with respect to the structures and laws of the human mind. Anyone who does science assumes that reality is intelligible, all experience possesses an intrinsic rational structure which can be grasped by a human mind governed by similar types of rationality. If scientists did not deeply believe this they would not have the fortitude to continue to formulate and test hypotheses when good agreement with experience is not quickly found. Scientists act out of a profound faith that the human mind can arrive at hypotheses that truly represent reality. From such a hypothesis one can deduce propositions that test in agreement with experience sufficiently to make the accepted hypothesis a reasonable representation of reality.

"Just how effectively he followed this first criterion was shown repeatedly, for example, in his steadfast and unswerving adherence to his ideas, when from time to time, evidence came that purported to show his predictions, though not in unambiguous flat *contradiction* to the 'facts of experience,' at the very least were not *supported* by experimental test. Moreover, though unwilling to accept the possibility of confirmation of a theory by 'verification' of its prediction, Einstein in practise also held to the falsification principle only skeptically (or weakly) when the theory being purportedly falsified by experimental test had in his views certain other merits compared with its rivals. (See, for example his refusal to accept Walter Kaufmann's experimental 'falsification' of 1906 of Einstein's newly published special theory of relativity. The limited, ad hoc character of the rival theories that seemed to be born out by Kaufmann's experiments signalled to Einstein that those theories 'have rather a small probability.' It turned out that he was right; the experiment, as is so often is the case, was far less decisive or 'crucial' than others had thought)"[6]

Why Present the Processes of Scientific Discovery in Visual Fashion?

The fragmentation of much of culture today stems partially from basic misconceptions as to the nature of science. Science is seen as the only valid way of seeking truth. Science is too often characterized as an activity devoid of uniquely human personal involvement. As a result many young people either worship science or hate it as lacking in true humanity. If science could be more universally recognized for what it is—an activity that is just as dependent upon personal involvement as other parts of human experience—both hate and worship of science could be replaced by a balanced appreciation of its true worth. Science could then be restored to its proper role as a means to appreciate more fully with awe the greatness of God's creation and, secondly, to manage it in order to preserve nature and mankind.

It is therefore appropriate that as many different means as possible be sought to communicate the true nature of science as a uniquely personal endeavor. One such means is a visual representation, particularly as visual learning is sometimes neglected in formal education. From considerations of his own work, Einstein suggested that truly creative thinking is a result of the integration of two complementary modes of thinking: sequential analysis and holistic vision. The analytic mode operates by breaking into parts, in this way abstracting, separating, distinquishing, and manipulating concepts. The holistic mode operates by connecting, holding things together; it unifies by wiping out boundaries, integrating, and finally enhancing visual patterns.

"Albert Einstein used visualization as well as analytical thinking to enable him to formulate and more fully understand his time and energy theories. He used both sides of his brain or consciousness as 'combinatory play' and claimed it was important for creativity. An example of how visualization helped him to understand motion and energy is demonstrated by the following anecdote. He tells of a man holding a sphere in his arms and standing in a cage which is being pulled away from the earth by a long rope. He asks the question: If the man lets go of the sphere does it fall to the floor of the cage, as we think gravity causes things to do, or does the cage move up to meet the sphere? The formulation of the energy-motion problem and its solution both depended heavily on Einstein's ability to visualize as well as analyze."[7]

Thus the two modes of thinking, sequential analysis and holistic vision alternate with one another in an integrative fashion when truly creative discovery takes place. Although our thinking processes form a whole, the creative person seems to have special ability for reaching into his intuitive, image-filled holistic mode while harnessing and illuminating his experience with his analytic mode of thinking. It is therefore quite appropriate to attempt to present the personal nature of scientific discovery in visual terms. Such a representation communicates by appealing to the creative elements in cognitive thought; hence it is an effective means to reinforce the assertion that science proceeds by utilizing personal judgement and commitment as well as formal, strictly logical thinking.

[1]Gerald Holton, *The Scientific Imagination*, Cambridge University Press, London, 1978, p. 97.
[2]*Transactions of the Victoria Institute* 88 (1956): 68.
[3]Taken from Arthur March and Ira M. Freeman, *The New World of Physics*, Vintage Books, New York, 1963, p. 143.
[4]Thomas F. Torrance, *Theological Science*, Oxford University Press, Oxford, 1969, pp. vi–vii; and *Space, Time & Resurrection*, W.B. Eerdmans Publishing Co., Michigan, 1976, p. 191.
[5]Holton, *Op. Cit.*, pp. 95–100.
[6]Holton, *Ibid.*, p. 98.
[7]Kurt Hanks and Larry Belliston, *Draw!*, William Kaufman, Inc., California, 1977, p. 14.

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I certify that the statements made by me above are correct and complete.

William D. Sisterton, Executive Director

Letters

Comments on September Issue

I want to thank you for your efforts through the years as you have served the Lord with this publication. I did enjoy the two papers, each a part three of a series. Two minor matters were observed in the Volume 31, September (1979) issue that I might bring to your attention. I suspect, however, that you will receive mail from others on this subject as well. On page 160 about three inches down in the right hand column, Martin LaBar criticizes the book he is reviewing by pointing out that Luke 3 gives the genealogy of Joseph, but Dowell says it is of Mary. Most conservative Bible interpreters feel that Luke 3 does indeed give the genealogy of Mary. In fact, many of the editions of the King James translation list a Luke 3:23 marginal reference as "son-in-law" instead of "son" of Heli. Why Joseph would have been called son of Heli is a subject of speculation. Perhaps Heli had only daughters and, therefore, Joseph would have become his legal son. The clear difference in the genealogies of Luke and Matthew pose no small problem otherwise. It is entirely consistent with what we know of the authors to conclude that Matthew would have given Joseph's genealogy which, of course, was the legal right to David's throne. Luke, being a Greek and also being a physician and also showing considerable interest in women and children, would be more likely to give Mary's genealogy or the biological genealogy if anyone were to do so. I cannot tell you exactly why the word "son" is used and not "son-in-law," but I would prefer to leave son-in-law as a marginal reference until better information comes in.

Another letter that I'm sure you're going to get some flack concerning is the one on homosexuality. It bothers me that Mr. Hamby Jr., like so many other defenders of homosexuals, completely ignores such passages as Romans 1:27. He claims that Paul's exposure to homosexuality was very limited. I think this passage clearly indicates that Paul knew exactly what he was talking about and condemns the practice in the strongest possible terms. To suggest that a stable homosexual "love" relationship is somehow a normal relationship flies in the face of both Scripture and good sense.

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Deception in Social Psychological Research: A Reply to Johnson

In the *Journal ASA*, September 1979, David E. Johnson criticized an earlier article of mine which appeared in the *Journal ASA*, March 1979. I would like to reply to his criticisms. First, I should point out that my original article was directed toward *all* of psychology, not just toward social psychology. Johnson seemed to be reacting basically toward paragraphs two and three of my article. Now let us consider his six criticisms.

1. Although the original purpose of deception was to produce a "real world" situation, it has not worked. Too large a percentage of the subjects are suspicious in our experiments and we are not that suspicious in real life. Although we may not be aware of the motives of persons in the world around us, we do not walk around all the time in the real world suspicious of others—if we do, we are soon classified as paranoid and given treatment.

2. I did not characterize anyone as "a devious individual who sits in his laboratory constantly developing techniques to be used in duping unsuspecting subjects." I said, "some authors even discuss ways of improving deception" and that we should do other things "rather than spending our time rationalizing our use of deception and creating more elaborate schemes of deception."

3. Although Johnson accuses me of being outdated, *I* was the one who pointed out that "most 'counts' of the frequency of deception were made in the late 1960s." I did not make any recent counts myself, but cited Stang, a social psychologist, who said in 1976 that suspicion is becoming more widespread. I *hope* that deception is becoming less widespread, but even if it is, the damage it has done is *still* with us.

4. I said "Although the evidence is conflicting, . . ." when introducing the material reacted to in Johnson's fourth criticism. I would hardly characterize that as leaving the reader with incomplete information. I was writing a brief Communication to present a position on an issue, not a complete article to present all the evidence. Such an article would go far beyond a "communication." Thus, I merely mentioned that evidence was conflicting. While Johnson has found no difference between suspicious and unsuspicious subjects, Stricker, Messick and Jackson did find a difference —as I said, the evidence is conflicting.

5. My paragraph on "truth" was misread. I was citing Seeman who said that deception was not a means to truth. My position is that deception is not a *legitimate* means to truth for us as Christians. I believe that this holds for any kind of "truth."

6. I see no ethical problem in doing such things as naturalistic observation. Anyone who appears in public must be aware that others see them and may be watching what they do. I do not believe that you have to get informed consent to observe a person—although you would if you manipulate him or her in any way. I watch people all the time and do not believe that I have to inform them that I am looking at them—that is assumed.

Finally, nowhere did I "totally dismiss the findings of research because deception was used." The thesis of my article was that we should not *engage* in research which uses deception, not that we should ignore what others have done. *Journal ASA* readers should read both Johnson's article and my article because he presented my position inaccurately. Although he says that he is "not advocating that Christian psychologists adopt deception . . ." I would characterize Johnson's article as one of those written while "rationalizing the use of deception," to use the words of my article. Again, I would say that we need to spend our time developing better methods.

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A closely affiliated organization, the **Canadian Christian and Scientific Affiliation**, was formed in 1973 with a distinctively Canadian orientation. The **CSCA** and the **ASA** share sponsorship of this publication. **CSCA** subscribes to the same statement of faith as the **ASA** and has the same general structure. However, it has its own governing body with a separate annual meeting in Canada.

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

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