JOURNAL OF THE AMERICAN SCIENTIFIC AFFILIATION

An evangelical perspective on science and the Christian faith

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

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MEMBER EPA EVANGELICAL PRESS ASSOCIATION

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Dietrich Bonhoeffer
Letters and Papers from Prison, Revised Edition edited by Eberhard Bethge, Macmillan (1967). pp. 14, 15

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JOURNAL OF THE AMERICAN SCIENTIFIC AFFILIATION

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The purpose of the *Journal ASA*

1. *For the conservative Christian community*

To inform about the developments of modern science and their meaning for Christian faith and life, so that ignorance or misunderstanding may not impede Christian witness.

2. *For the liberal Christian community*

To explore the correlation of the findings of modern science with the historic doctrines of the Christian faith, so that insights into eternal truth may not be forsaken for transient theological fashion.

3. *For the non-scientifically-trained layman*

To define the purpose and potentialities of science with respect to spiritual and religious aspects of life, so that misconceptions about science or Christian faith may not lead to unfounded convictions.

4. *For the non-Christian professional scientist*

To clarify the relationship between science and Christian faith and to testify that scholarly men of science may also be committed Christians, so that caricatures of Christians and Christian faith may not be perpetuated.

5. *For the evangelical Christian scientist*

To broaden each individual's perspective by exploring insights into all the diverse branches of science as these relate to the understanding and expression of Christian faith, and to guide in Christian service, so that each may effectively develop a Christian witness for his colleagues in both the Christian and scientific communities.

The New Copernican Revolution*

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There are many signs that men may be undertaking a systematic exploration of the vast, imperfectly known universe of his own being, a step as epochal as his construction of a science of the galaxies.

The Most Significant Event

As future historians look back on our times what will they conclude to have been the most significant event of the present decade in terms of its impact on the future? The riots in the cities? The Vietnam War? The Great Society programs? The hippie movement? Student protest? Technological and scientific advances? Man to the moon?

None of these, I would make bold to guess. Nor any of the events or trend discontinuities which the in-vogue forecasters are picking out with their current methodologies. I will suggest below that it will be something quite different from any of these, an event perhaps well symbolized by an obscure scientific conference held in Council Grove, Kansas, in April 1969.

What follows is a report on research in process. It does not pretend to present demonstrated conclusions. Rather, it raises questions and advances possible interpretations which are so momentous in their possible implications for the future that the fullest possible amount of responsible dialogue is called for.

The Copernican Revolution

Let us suppose for a moment that we are back in the year 1600, concerned with forecasting probable future trends. In retrospect it is clear that one of the most significant events in progress was what came later to be called the Copernican revolution. Would our futurist researchers have picked this up? They might have, if we were looking at the right things. What was the essence of this remarkable transformation that started with the brash suggestions of Nicholas Copernicus and Giordano Bruno and led to consequences as diverse as a tremendous acceleration in physical science and a decline in the political power of the Church? One useful interpretation is that a group of questions relating to the position of the Earth in the universe, and the nature and significance of the heavenly bodies passed out of the realm of the theological and philosophical and into the realm of empirical inquiry. No longer were these questions to be settled by referring to this or that ecclesiastical or scholarly authority; rather they were to be subjected to illumination by systematic observation and experiments. The consequences of such a shift are manifold. New research activities are started; familiar phenomena are given new interpretations; educational approaches are altered; power structures in society undergo change; new bases for consensus are applied to conflicts between belief systems.

The Darwinian Revolution

A later similar event occurred with the work of the geologists, paleontologists, and biologists of the nineteenth century culminating in the controversial evolutionary hypotheses. Questions relating to the origin of the earth and of man were relabeled "empirical" instead of "theological." Again the consequences reverberated throughout the worlds of research, education, and politics.

I believe there is good reason to suspect that we are in the midst of another such saltation today. Much evidence suggests that *a group of questions relating to the commonality of and interpretation of man's subjective experience, especially of the "transcendental," and hence to the bases of human values, are shifting from the realm of the "philosophical" to the "empirical." If so, the consequences may be even more far-reaching than those which emerged from the Copernican, Darwinian, and Freudian revolutions.*

Evidence for the New Revolution

The evidence is of various sorts. The most obvious kind, of course, is simply the indications that scientists —that is, persons with recognized scientific training, on the staffs of research organizations and universities with high standards, and holding membership in good standing in recognized scientific associations—are manifesting more and more interest in developing an adequate science of ordinary and extraordinary subjective experience. This is not completely new, of course.

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The phenomena of hypnosis have been studied in a scientific way, off and on, for at least a century and a half. Phenomenology has been a sometime influence in psychology. Freud's psychoanalysis and its offshoots have attempted to probe the unconscious processes. Pioneering books in the exploration of supraconscious processes include F.W.H. Myers' *Human Personality and Its Survival of Bodily Death,* Richard Bucke's *Cosmic Consciousness,* William James' *Varieties of Religious Experience,* and Pitirim Sorokin's *The Ways and Power of Love,* the first three being approximately two-thirds of a century old. Early in 1969 the first issue appeared of the *Journal of Transpersonal Psychology,* dedicated to the systematic exploration of "transpersonal experience." The April 1969 Council Grove (Kansas) conference on "voluntary control of inner states," cosponsored by the Menninger Foundation and the American Association of Humanistic Psychology, represented an unprecedented assemblage of scientists working with altered states of consciousness through such techniques as autohypnosis, aural feedback of alphawave signals, and psychedelic drugs.

In the field of clinical psychology several scientists are proposing to formulate through their researches "a natural value system, a court of ultimate appeal for the determination of good and bad, of right and wrong" (A. H. Maslow), "universal human value directions emerging from the experiencing of the human organism" (Carl Rogers).

An ever-increasing number of students, now in the millions at least, are involved with "awareness-expanding" activities in free-university courses and elsewhere. This concern is intimately related to student demands for a person-centered, rather than scholarship-centered, education.

Predictions for the New Science

The science of man's subjective experience is in its infancy. Even so, some of its foreshadowings are evident. With the classification of these questions into the realm of empirical inquiry, we can anticipate an acceleration of research in this area. As a consequence there is new hope of consensus on issues which have been at the root of conflict for centuries (just as earlier there came about consensus on the place of the Earth in the universe, and on the origin of man). The new science will incorporate the most penetrating insights of psychology, the humanities and religion. These developments will have profound impacts on goal priorities in society, on our concepts of education, on the further development and use of technology, and perhaps (as in the case of the Copernican revolution) on the distribution of power among social institutions and interest groups.

Young and incomplete as the science of subjective experience is, it nevertheless already contains what may very well be extremely significant precursors of tomorrow's image of man's potentialities. Space does not permit documenting them here; however, the following three propositions have accumulated an impressive amount of substantiating evidence:

- The potentialities of the individual human being are far greater, in extent and diversity, than we ordinarily imagine them to be, and far greater than currently in-vogue models of man would lead us to think possible.
- A far greater portion of significant human experience than we ordinarily feel or assume to be so is comprised of unconscious processes. This includes not only the sort of repressed memories and messages familiar to us through psychotherapy. It includes also "the wisdom of the body" and those mysterious realms of ex-

NOTHING REALLY NEW

History, they say, has a way of repeating itself.

As I read Dr. Harman's interesting article, my mind went back, not to the age of Copernicus, but to a time less than a hundred years ago when psychology was just beginning as a science. In 1879 a German named Wilhelm Wundt set up the world's first psychological laboratory at the University of Leipzig and established his place in history as "the founder of modern experimental psychology." Wundt defined psychology as "the science of experience" (Boring, 1950, p. 331). He concluded that the psychological method should be introspection and his studies investigated such topics as perception, feeling, attention, consciousness, and immediate experience. Many of the pioneers in American psychology were Wundt's students who brought the introspective study of conscious experience back across the Atlantic.

Meanwhile, in Vienna, Sigmund Freud was developing his theory of psychoanalysis. After a period of infatuation with hypnosis, Freud stumbled upon the method of free association. Later he developed an interest in dream interpretation and studied slips of the tongue, all in an attempt to understand how the unconscious influences behavior.

Although they gave birth to very different psychological approaches, both Wundt and Freud looked *within* man to understand his behavior.

Then came John B. Watson with the theory of behaviorism! According to this view, the psychology of introspection and any attempt to analyze unconscious forces are not scientific. If psychology is to be a real science, the behaviorists suggested, it must forget subjective experience and study observable behavior instead. This view caught on quickly and gave rise to an avalanche of experimental studies, as did the Stimulus-Response psychology which followed.

But many modern psychologists are unhappy with what has happened to their discipline. "Psychology is really in the doldrums right now," wrote Sanford a few years ago.

Actually, the study of man's subjective experience is very old. Its current popularity is, I suspect, a reaction against the disappointing fruits of experimental and clinical psychology and a return to the study of man, not as a responding organism, but as a person.

> It is fragmented, overspecialized, method centered, and dull. I can rarely find in the journals anything that I am tempted to read. . . .
>
> The psychologists who are filling up the journals today just do not have sensitivity to human experience, and the fault lies in their training—which is an expression of what academic psychology has become.
>
> We have produced a whole generation of research psychologists who never had occasion to look closely at any one person . . . who, indeed, have long since

The science of man's subjective experience is in its infancy. . . . The new science will incorporate the most penetrating insights of psychology, the humanities, and religion.

perience we refer to with such words as "intuition" and "creativity." Access to these unconscious processes is apparently facilitated by a wide variety of factors, including attention to feelings and emotions, inner attention, "free association," hypnosis, sensory deprivation, hallucinogenic and psychedelic drugs, and others.

✸ Included in these partly or largely unconscious processes are self-expectations, internalized expectations of others, images of the self and limitations of the self, and images of the future, which play a predominant role in limiting or enhancing actualization of one's capacities. These tend to be self-fulfilling. Much recent research has focused on the role of self-expectations and expectations of others in affecting performance, and on the improvement of performance level through enhancing self-image. On the social level research findings are buttressing the intuitive wisdom that one of the most important characteristics of any society is its vision of itself and its future, what Boulding calls "organizing images." The validity of the self-fulfilling prophecy and the self-realizing image appears to grow steadily in confirmation.

Assuming that the evidence substantiating these propositions continues to mount, they have the most profound implications for the future. For they say most powerfully that we have undersold man, underestimated his possibilities, and misunderstood what is needed for what Boulding terms "the great transition." They imply that the most profound revolution of the educational system would not be the cybernation of knowledge transmission, but the infusion of an exalted image of what man can be and the cultivation of an enhanced self-image in each individual child. They imply that the solution to the alienation and widespread disaffection in our society is not alone in vast social programs, but will come about through widespread adoption of a new image of our fellow man and our relationship to him. They suggest that the pervasive illness of our nation is loss of the guiding vision, and the cure is to be found in a nobler image of man and of a society in which his growth may be better nurtured. They reassure that an image of fully-human man and of a new social order need not be built of the gossamer of wishful thinking, but can have a sound foundation in the research findings of the most daring explorers of the nature of man and his universe.

It is perhaps not too early to predict some of the characteristics of the new science. Preliminary indications suggest at least the following:

✸ Although we have been speaking of it as a science of subjective experience, one of its dominant characteristics will be a relaxing of the subjective-objective dichotomy. The range between perceptions shared by all or practically all, and those which are unique to one individual, will be assumed to be much more of a continuum than a sharp division between "the world out there" and what goes on "in my head."

✸ Related to this will be the incorporation, in some form, of the age-old yet radical doctrine that we perceive the world and ourselves in it as we have been culturally "hypnotized" to perceive it. The typical commonsense-scientific view of reality will be considered to be a valid but partial view—a particular metaphor, so to speak. Others, such as certain religious or metaphysical views,

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lost sight of the fact that their experimental subjects are, after all, people (1965, p. 192).

As a protest against a psychology which is method centered rather than person centered, a new force has arisen. Known as *humanistic psychology*, this approach "rejects the attempt to describe or account for man wholly on the basis of physics, chemistry, and animal behavior" (Severin, 1965, p. xvii). The humanistic psychologists (a group of whom co-sponsored the Council Grove conference about which Harman writes) seek, instead, to study man's values, feelings, aspirations, perceptions, and potentials. In short, psychologists are once again looking within man to discover what makes him uniquely human.

This is nothing really new. I was surprised, therefore, to discover that Harman believes we have a "new" science which is "in its infancy." Actually, the study of man's subjective experience is very old. Its current popularity is, I suspect, a reaction against the disappointing fruits of experimental and clinical psychology and a return to the study of man, not as a responding organism, but as a person.

That history has gone in a circle like this is not without significance, however. Social and behavorial scientists (and apparently some physical scientists such as Dr. Harman) are coming to recognize that the objective study of observable behavior has failed to teach us very much about the real reasons for man's actions. In looking for another approach to the study of man, it is now becoming scientifically respectable to study "deeply-rooted beliefs, values, attitudes" and subjective experience.

But where do we go from here? Harman is very optimistic that the science of subjective experience will make great strides in significantly furthering our understanding of "the vast, imperfectly known universe" of man's own being. I sincerely hope that he is right, but I am less optimistic. There are three reasons for this.

1. The scientific study of subjective experience has already been shown to be unproductive. Behaviorism was partially a reaction against the introspection of Wundt and the internal probings of the Freudians. Of course, the fact that we failed before is certainly no guarantee that we will fail again. Much has been learned about human behavior in the past fifty years and a fresh look at inner man might be very profitable. If I can be permitted to use a cliché, however, it is still true that the best predictor of future behavior is past behavior.

2. The "new" science really has no methodology. Humanistic psychology, for example, has been described by one of its leading spokesmen as being

> . . . in the paradoxical position of having at once a tremendous range of available methods for its work and yet a serious methodological problem. The result is that there is a very chaotic condition in the whole field.
>
> Humanistic psychology has a tremendous range of available methods. . . . Philosophy, religion, history, literature, art . . . prayer, meditation, mystical insight, magic, contemplation, naturalistic observation, introspection, interviews, experiments, surveys—all these and more are possible tools to the task.
>
> Yet, it is evident, where there is such profusion there must be—and indeed there is—much confusion, contradiction, and ambiguity. Therein lies the paradox-

will be considered also, and even equally, valid but more appropriate for certain areas of human experience.

- The new science will incorporate some way of referring to the subjective experiencing of a unity in all things (the "More" of William James, the "All" of Bugental, the "divine Ground" of Aldous Huxley's *The Perennial Philosophy*).
- It will include some sort of mapping or ordering of states of consciousness transcending the usual conscious awareness (Bucke's "Cosmic Consciousness," the "enlightenment" of Zen, and similar concepts).
- It will take account of the subjective experiencing of a "higher self" and will view favorably the development of a self-image congruent with this experience (Bugental's "I-process," Emerson's "Over-soul," Assagioli's "True Self," Brunton's "Over-self," the Atman of Vedanta, and so on).
- It will allow for a much more unified view of human experiences now categorized under such diverse headings as creativity, hypnosis, mystical experience, psychedelic drugs, extra-sensory perception, psychokinesis, and related phenomena.
- It will include a much more unified view of the processes of personal change and emergence which take place within the contexts of psychotherapy, education (in the sense of "know thyself"), and religion (as spiritual growth). This view will possibly center around the concept that personality and behavior patterns change consequent upon a change in self-image, a modification of the person's emotionally felt perception of himself and his relationship to his environment.

The New Man

John Rader Platt has argued in *The Step to Man*—as have Kenneth Boulding and Teilhard de Chardin before him—that the present point in the history of man may well, when viewed in retrospect by some future generation, appear as a relatively sudden cultural step. The portentous impact of the new technology is the heady yet sobering realization that we have the future in our hands, that man recognizes his role as, to use Julian Huxley's phrase, "a trustee of evolution on this earth." The new man, *"homo progressivus"* in Teilhard de Chardin's words, is described by Lancelot Law Whyte as "unitary man," by Lewis Mumford as the "new person," and by Henry A. Murray as an "ally of the future." The challenge of our time is whether we make "the step to man" or our Faustian powers prove our undoing and the whole vast machine goes off the track through the strains of internecine conflict and degradation of the environment.

To become the new man and to construct the new moral order require a guiding image which is worthy of the task. Man's highest learning has seemed to compromise, in C. P. Snow's terms, not one culture but two. And the noblest of the images of man to be found in the culture of the humanities appeared somehow alien to the culture of the sciences. The preceding arguments suggest this state of affairs is probably a temporary one. For example, Ernest Becker proposes that the two cultures can be joined in a true science of man through admission of the universal value statement that that which estranges man from himself is unwholesome. Whether this or something else becomes the unifying principle, the reconciliation may soon take place. On the one hand, we will come to use comfortably many pluralistic images of aspects of man—one for his biochemical functioning, another perhaps for dealing with pathologies, still another for encompassing his most fully human actions and proclivities. But on the other hand we will find an overarching image of what man can be, or perhaps more accurately, can come to realize that he is already.

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ical position of humanistic psychology, and thus there is its methodological problem. (Bugental, 1967, p. 79).

In spite of these difficulties, the "new" scientists are very aggressive and enthusiastic. Sometimes people like this with a strong will eventually find a way.

My main criticism is that the "new" science has ignored the Biblical view of man as a sinner in need of salvation.

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3. The presuppositions about man and the suggested solutions to his problems are contrary to divine revelation. The "new" science comes close to deifying man. "We have undersold man," writes Harman. "The potentialities of the individual human being are far greater, in extent and diversity, than we ordinarily imagine them to be." Our educational system, therefore, must be concerned with "the infusion of an exalted image of what man can be." The cure for national problems "is to be found in a nobler image of man." With such a optimistic view of human potential, it is not surprising that the "new" science looks within man to find a solution to his problems. An understanding of our inner experience, the development of our capacities, "belief in ourselves,' and a "will to act" are seen as important steps in dealing with the great issues facing our Western civilization.

In contrast, the Bible paints a very different picture of man. He is a creature whose "heart is deceitful above all things and desperately wicked." Man is not good and noble. He is, instead, a sinful creature in rebellion against God. The solution to his problems *begins* not by looking to human potentialities within, but by looking to a Savior without. When we confess our sin and acknowledge the Lordship of Jesus Christ, we become new creatures. Then, as the Holy Spirit works through us, we can develop the potentialities about which Harman writes.

I have no quarrel with the goals of the "new" science. On the contrary, I am delighted to see a renewed and broader interest in man's inner potential and problems. Many of the writings of humanistic psychologists interest and excite me. My main criticism is that the "new" science has ignored the Biblical view of man as a sinner in need of salvation. Like the introspectionists of Wundt's day, the "new" science is unlikely to make much progress until the divine revelation about man is acknowledged.

Clearly, this is a potentially rewarding "new" field for committed Christians who are also competent scientists.

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Social Significance

The social significance of our dominant basic assumptions regarding the interpretation of subjective experience can be made more specific. At the surface level, so to speak, the nation is beset by numerous social problems which we point to with the terms poverty, crime, racial discrimination, civil disorder, unemployment, pollution, and the like. Experience with attempts to deal straightforwardly with these problems —to tackle discrimination with civil-rights legislation, to alleviate the ills of poverty with minimum-wage laws and welfare payments, to eliminate ghettos with urban-renewal programs, to deal with civil disorders by increasing police power—indicates that such direct measures typically have unexpected and unintended outcomes. It is as though an "ecology of situations" were upset by a piecemeal approach.

The reason appears to be intrinsic. It seems that these manifest problems are in a sense symptoms of underlying conditions that are more pervasive and less easy to objectify. At another level these problems reside in the institutions of the society, in built-in power distributions, in the traditional roles to which persons are trained, in the time-hallowed structures and processes. At a still deeper level they involve the most basic assumptions, attitudes, and felt values held by the individual and promoted by the culture. The most carefully designed social measures will not achieve their desired goals unless they involve not only rationally designed programs and structures, but also changes in deeply-rooted beliefs, values, attitudes, and behavior patterns, both of the individuals who constitute "the problem populations" and of the self-righteous others who assume that they are not implicated.

An analogy with the process of psychotherapy may reassure that in attending to these underlying conditions we are dealing with that which is more, not less, real and relevant. In the end the neurotic discovers that he was divided against himself, and in a sense lying to himself to conceal that condition. So it may be with our social problems that the significant constructive change is first of all an inner one rather than outer, and in the direction of recognizing the hidden lies and resolving the hidden divisions. To put it in somewhat different terms, just as it is possible for a person to have a pathological set of beliefs about himself, so it may be possible for our society to possess a dysfunctional belief and value system.

In fact, much of today's student unrest centers around the accusation that the society's operative assumptions about man's deepest desires are indeed not consistent with individual inner experience nor in the long-term interest of man or society. A dominant theme among disaffected students is that the American corporate capitalist system manipulates and oppresses the individual.

Survival Value

Thus it is not solely in an idealistic vein that the new science of subjective experience is hailed as having profound significance. It has survival value as well.

Several recent scholars of the future such as Robert Heilbroner, Kenneth Boulding, and Fred Polak have

AN EMBARRASSING QUESTION FOR PSYCHOLOGISTS

Harman's article appears to me to be rather vague at many points. He seems to throw a number of things together in hodge-podge fashion rather than articulate a clear position. It is also worth pointing out that many of the problem areas which he discusses have already yielded considerably to traditional approaches and analysis without the necessity of a "new revolution."

However, if I understand him correctly, Harman raises a somewhat problematical and perhaps even embarrassing question for most psychologists. As I understand him, his basic point is that we need to know much more about "inner" space now that the secrets of outer space are within our grasp. This is a point being made by many people and one which is well taken. It is true that we are solving more and more problems in more and more scientific realms. The field of psychology and the understanding of human behavior, while not without its progress and achievements, does not seem to be keeping pace with the other sciences. Perhaps if we spent billions on the study of human behavior, as we do in other areas, we might see rapid progress and striking breakthroughs. However, it may be that the field is still sufficiently puerile and unenlightened that simply dumping billions of dollars into the effort would not begin to solve the theoretical and methodological problems which beset a potential investigator in this area. I suspect that the latter is the case.

Is it possible that with the methodological progress and the improved conceptualization of psychological research that has accrued through the years, we may now fruitfully return to a study of the inner events?

Historically psychology was for many centuries exclusively the study of inner events and thoughts. Originally most of the work of psychology was done by philosophers using the introspective method and developing theories of mind, soul, etc. Following the work of the philosophers, some psychologists, though still interested in inner events, attempted to objectify and refine their procedures. Thus was born the school of structuralism in psychology. The structuralists attempted to analyze the mental processes in terms of their basic psychological components and the rules by which these components operated on one another. This has been likened to a type of "mental chemistry." The sum total of all of the effort along this line historically in the field of psychology turned out to be practically nothing.

At about the turn of the century, a number of psychologists became convinced that focus on inner events, components, and thoughts via introspection was inherently and methodologically an inadvisable method. They, therefore, developed a new approach to psychology, called behaviorism. The battle cry of

made much of the concept that it is the *image* of the future which is the key to that future coming into realization. "Every society has an image of the future which is its real dynamic." As previously noted, much evidence has been accumulated to indicate that the power of the image may be far greater than we have heretofore suspected.

To whatever extent the science of the past may have contributed to a mechanistic and economic image of man and a technocratic image of the good society, the new science of subjective experience may provide a counteracting force toward the ennobling of the image of the individual's possibilities, of the educational and socializing processes, and of the future. And since we have come to understand that science is not a description of "reality" but a metaphorical ordering of experience, the new science does not impugn the old. It is not a question of which view is "true" in some ultimate sense. Rather, it is a matter of which picture is more useful in guiding human affairs. Among the possible images that are reasonably in accord with accumulated human experience, since the image held is most likely to come into being, it is prudent to choose the noblest.

It is strange to observe that at this point in history when we literally have the knowledge and material resources to do almost anything we can imagine—from putting a man on the moon, to exploring the depths of the oceans, to providing an adequate measure of life's goods to every person on earth—we also seem the most confused about what is worth doing. The great problems facing us are a sort where we need belief in ourselves and will to act even more than we need new technologies, creative social program concepts, and program budgeting. At a time when the nation may well be in its gravest peril in over a century, and Western civilization may hang in the balance, it could even come to pass that a new "Copernican revolution" might provide a missing balance in some four-century-old trends started by the first one.

We have undersold man, underestimated his possibilities, and misunderstood what is needed for "the great transition."

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this school was that psychology must be reduced to *observable behavior* which can be studied externally and understood in terms of objective scientific laws and principles. This point of view is the predominant one in the field of psychology today. However, there are many groups of psychologists who subscribe to different positions. Behaviorists, themselves, come in all different degrees. Some adopt behaviorism as a philosophy of life and as a world view. These psychologists tend to adopt completely the position of logical positivism, determinism, and a psychology of objectively observable behavior, thereby declaring anything not amenable to study by these approaches and techniques as irrelevant and nonexistent. Others take a somewhat different orientation toward these problems in stating that the positivistic-deterministic-behavioristic approach is more useful as a strategy and as a way of getting on with the work of psychology than as a satisfying world view. These psychologists feel that there are ways other than the scientific method to achieve knowledge and information and also there may be many significant things about human beings that cannot be discovered by scientific methods. However, they feel that at the present time, the behavioristic and scientific strategy appears to be the most fruitful.

I fall in the latter category. I regard the framework of behaviorism, determinism, and positivism as a useful strategy for studying human behavior at this time. I do not, in any sense, feel that what can be studied by these techniques exhausts the complete realm of human behavior. For psychologists who think of themselves as behaviorists of this type, the article and suggestions by Harman are extremely enticing. Is it possible that now is the time to return to a study of inner events? Is it possible that with the methodological progress and the improved conceptualization of psychological research that has accrued through the years, we may now fruitfully return to these problems? Is it possible that we will have more success in this area now than we have had in the past? It seems entirely possible that this is and will be the case. However, psychologists familiar with the history of psychology in which the "wilderness wanderings" took place when this was attempted previously, will understandably feel somewhat uncomfortable and reluctant.

If Harman's thesis is broadened somewhat, I think all psychologists would readily agree. If we were to state simply that we must find out immediately much more about human behavior in general (without specifying that inner events be the focus) and that we must increase the progress in this area to be more concordant with the progress that we are making in other areas, most psychologists would agree. Many have pointed out that it is dangerous to produce a technology that gives man unlimited power without creating a situation in which man can be counted upon to behave rationally and productively without destroying himself. This does seem to be the problem.

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A Model for Our Time

On Man's Creativity

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It is shown logically that belief is a necessary initial condition for scientific thought. Our beliefs modify what information we receive and how we receive it. This paper postulates a second mode of the human thought process which parallels the familiar conscious thought process. It is based on a wealth of subjective data and an increasing amount of objective data. It explains how popular biases in our present culture have kept this mode hidden. The two modes are described in terms of general semantics and the role they play in man's creative process is presented.

The professional skepticism of the scientist can limit his professional progress. The Christian with his experience in the practice of faith as well as his belief in Christ can make a unique contribution. He can give scientific beliefs the dispassionate scrutiny they need and he can reexamine scripture for the insights it can give into the processes of nature—not just human nature.

A New Beginning

It is not uncommon for the Christian in science to ask, "How can I demonstrate that my faith and my vocation are not incompatible?" But perhaps this is the wrong question. It suggests that the two, while not in conflict, are at least compartmentalized. Surely the Way demands that all of one's actions, including vocation, spring from one's faith. Should not the scientist aim higher and ask, "How can I contribute to science specifically because I am a Christian?" To answer calls for a new approach; epistemologically we need to go back and start over.

But where to start? I believe we need to go back to where science first went its separate course, back to Descartes. In the Middle Ages the whole field of reality was often regarded as beyond the appreciation of man, and supernatural revelation was the center of all thought. With the Cartesian revolution the scientist turned his back on revelation and tended professionally to divorce himself from God.

Philosophically, Descartes started with his famous axiom *"Cogito ergo sum."* But "thinking" is a complex process. Let us break it down a bit. In today's vernacular it might well be expressed, "I am aware; therefore I exist." (The very statement implies self-awareness, and thereby, conscious thought.) Newborn babes and sentient creatures less than man are also aware and exist, in the homeostatic sense, but they are not aware of their awareness and are incapable of making this statement. Such a statement is incomplete; we must recognize that it is an axiom, a belief. It demands another clause. ". . . and I believe; therefore I live." To live is to create, to modify nature beyond oneself.

When we say, "I am aware and I believe; therefore I live," we accomplish two things. First we open the door for the Christian formally to include his faith as an integral part of his work. We officially recognize that both awareness and faith are necessary initial conditions for man to be creative. We affirm that we are indeed made in His image, even though man's creativity is but a modified reflection of part of what God offers us. Second, we highlight the areas which need the scientist's attention.

We need to examine both our beliefs about our awareness and our awareness of our beliefs. Each of us finds himself in the center of, and part of, a continuum bounded by infinity—the unknowable. What each of us regards as unknowable (not merely unknown) shapes not only the periphery of our universe, and indeed its characteristics, but, more importantly the way we receive information about it, i.e., become conscious of it. This is just as true of what we believe we *do* know. Thus, our beliefs shape our perceptions, the very stuff with which we must start if we are to be creative. We need a fresh and simultaneous look at the boundary conditions, both the center and periphery of our universes—and much in between.

One Approach to the Problem

One approach to the problem is to recognize two things. Not only is there knowledge available to man which falls outside the domain of present day science, but apparently man's method of receiving it is different from the accepted methods of science. The stigma attached to others who have recognized this presents the modern scientist with a dilemma. There is need to steer a course between the Scylla of the medieval mystic and the Charybdis of the modern exponent of psychedelic drugs—but there is value to science in sounding the calm waters between. The value lies in an understanding of the process rather than in a use of the methods.

There seem to be two distinct but interrelated modes by which man receives and processes information. The first, one might call the focused mode, and the second, the non-focused mode or the awareness. At present our formal methods are related almost exclusively to the focused mode. As a rough analogy, the focused mode compares with photography, and the awareness with holography. Both abstract information from the continuum, but differently. The former, being focused, deals with one area at a time, is of higher order (less information) and is always conscious. The latter (awareness) is non-focused, holistic, of lower order, and largely subconscious. All of the information which the focused mode accepts is also available to the awareness, and much more. The additional information available only to the focused mode is its consciousness of at least part of the awareness.

Brain Processes

There has been some research which tends to substantiate that the brain 1) uses holographic methods to receive and process information and 2) bypasses the higher brain centers to do it. For instance, some studies by Pribram on memory[1] suggest this, and findings of Trevarthen and Sperry at Cal Tech[2] of a second human optic system could be explained by a holographic process. In their study, brain surgery separating the left and right hemispheres leaves both the usual visual system and the newly discovered one functioning but affects them differently. "Perception in the classical system becomes divided into right and left fields of vision, but perception in the newly found system remains unified—with left and right hand vision in each hemisphere." There is also recent evidence that the brain receives and responds to stimuli not consciously perceived.[3,4]

There is beginning to be enough objective data available now for this subject to assume some aura of respectability. There is however, a wealth of subjective data from which this search for objective data stems. Modern science's concern for objectivity has made it the custom to present available data first and follow them with an hypothesis as a conclusion drawn from the data, or at least to present theory and supporting objective data simultaneously. This obeisance to objectivity and formal conscious logic tends to mask a fact which needs more careful scrutiny. The actual process which more usually occurs is to have a "flash of insight", form an hypothesis, and seek data to test it. For instance, Pribram's interest in photography and holography led him to look for holographic processes in the brain.[5] We need a dispassionate, if not objective, look at what the process of "insight" is.

We need to examine both our beliefs about our awareness, and our awareness of our beliefs.

Limitations of Objectivity

The value of objectivity to science is well established; it should not be denied or discarded. However, the very success of objectivity as a part of the scientific method has hidden its limitations. Objectivity is but one of many man-made concepts for coping with change. None of them is more than an abstraction of reality, and therefore less than the full reality, indeed often a poor model. Since it is an abstraction by the observer it is not independent of the observer.

Some ideas from the non-Aristotelian discipline of general semantics may provide a helpful framework to explore this process of abstracting, both as it relates to objectivity and to the initial steps in man's creative process. At some time or other, most of us have wondered what there is in common between the world around us and the thoughts inside our heads about this world. Let us use a man's pen as an example of part of this world. Surely the man's thoughts about his pen are not the pen itself, and yet equally obviously, there is something common to both. The common denominator is structure; the link between the two is his nervous system, including his brain. It too is similar in structure to both the pen and his thoughts about the pen. To explain further, science tells us that the pen, at a subatomic level, is an aggregate of unique, transitory events, involving protons, orbiting electrons, neutrons, etc. The man is blissfully unaware of all this because his gross nervous system through eye and finger has abstracted (selected) some of the more invariant relationships among all these teeming events, passed this structure on to his brain—*and left out everything else.* The vehicle for these sensations, the material with which his nervous system is made, is certainly different from the pen, but there are now relationships between some of its parts which are similar to some relationships between the parts of the pen; their structure is similar. His consciousness of the pen is still at a subverbal level, what Korzybski calls the "unspeakable" level.[6] As soon as he gives it a label (symbol) he has abstracted even further, retaining only part of the relationships which his eyes and fingers noted, and has identified these with the verbal sounds of "my ballpoint pen". It is this discontinuity in the abstracting process—this making one set of sensations (the feel and look of the pen) "equal" to another set of sensations (the sound of "my ballpoint pen")—which separates man's thought processes from the lower animals. Humans then are able to continue this process of abstracting to indefinitely high levels, for instance, "my ballpoint pen", "ballpoint pen", "pen", "writing implement", "recording device", "artifact", etc. These are each symbols at successively higher levels of abstraction. They stand for successively smaller groups of relationships abstracted from successively larger classes of objects. A statement about any one of these is again a higher order abstraction, and still higher is a statement about the statement, etc. These statements, in effect, manipulate the symbols.

We need constantly to remember that the filter of our nervous system already has us removed from the

There seem to be two distinct but interrelated modes by which man receives and processes information: the focused mode, and the non-focused mode or the awareness.

full external reality whenever we observe, and removed farther still when we label an observation and then deal with the labels. It is Korzybski's thesis that most of man's unsane behavior stems from confusing these different orders of abstractions, from equating different steps of what has been called the abstraction ladder. While our thoughts or feelings about the pen have as much reality for us individually as our observation of the pen, they too stem from more complex events, this time inside our skins.

Application to Focused Mode and Awareness

The initial step of abstracting from the continuum applies both to the focused mode and to the awareness. The latter would appear to get lower order information—information which is less invarient and thereby closer to reality but harder to cope with. The awareness mode also continues up the abstraction ladder. It too sets its objects "equal to" symbols and then manipulates the symbols, but there are important differences. The most important one is that we have complete control over the focused mode and only the right of refusal over the awareness, i.e., the ability to limit how much of it shall become conscious. To avail ourselves of it we must act in faith that we will not be hurt and relinquish the self control we cherish. Phrases such as "empty ourselves", "lose ourselves", "let go and let God" suggest that Christians are not unfamiliar with this process, at least in their spiritual life.

Another difference between the modes in their use of the abstraction process is that they often set their objects "equal to" different symbols. Dreams and visions are good examples of this process in action. Dream interpretation, for instance, is the translation of awareness mode symbols into focused mode symbols. The reason we have so few visions or remember so few dreams in modern society is simply that we are not willing to relinquish our apparent control of ourselves. They are perfectly natural processes, neither abnormal nor supernatural. With the exponentially increasing evidence all about us of man's ability to control, modify and expand his world, it is scarcely surprising that our faith in ourselves (in our selfcontrolled minds) should increase. It is understandable, but dangerous, because this is the area where we play God if we are not careful.

The Creative Process

Let me relate the creative process to the abstraction ladder and give some examples of how we abuse the process. Man's creativity is obviously not *"ex nihilo"*; it starts as an abstraction from what God has made available to us. We then label, abstract further, manipulate these abstractions and devise from them an idea, plan, concept, theory, etc. This must then be brought back down the abstraction ladder and be illuminated by reality. If the first approximation is an inadequate match with reality, the process is repeated and the model refined. This iterative process of reconciliation continues until the author is satisfied. This "creation" is not complete until it gets out of the author's mind and into the continuum surrounding him. We cause problems when we confuse the higher abstractions with the lower, when we deny the process of reconciliation. We have a tendency to "create" an abstraction, declare it good, and try to stop there. We try to equate it with lower order reality—to give it an "allness" that it does not have. This tendency to play God has a vast gamut of guises, from blatant to very subtle. A few pertinent examples may be helpful.

One example is that of the physical scientist who finds objective information of such value in science that he tries to make it the only information by denying the validity of any other kind. This is not unlike blindfolding one eye. It limits the field of vision and also eliminates all the advantages of the two functioning together. In the unexplored infinity around us, our research, and therefore our discoveries, is largely limited to those areas which we have permitted to catch our attention.

Another example is the intellectual who so delights in the powers and pleasures of the conscious thought process (the focused mode) that he makes it "all" and denies the existence of any other, especially any over which he does not have complete control.

A third example is the Christian who finds the idea that "God is a person" good and satisfying, and tries to protect the idea by denying that God is anything else. God is no less a person for being process also. "The Way, the Truth and the Life" are answers to "how" and "what", not "who". The Way is not limited to social behavior. "How" and "what" are clearly the domain of the physical scientist also.

Reconciliation

Scripture tells us that the process of reconciliation is an important characteristic of the Way. This process has not received the explicit attention it merits in any field save social behavior. It is relevant at once to the physical world about us, to our nervous system and to our thought processes. This is so because reconciliation is a process common to all self-organizing systems. One of its characteristics is selecting only the parts which have value for higher order and discarding everything else. To determine what has such value requires comparison of the selected parts (our model) with the best evidence available to us of the highest order, the reality about us. Our models are not unlike the first term in a converging series. We need the process of reconciliation to complete the series.

With reconciliation an integral part of our vital processes we are compatible with such processes and are equipped by nature (God) to detect and understand them. Two such physical processes which come to mind are impedance matching and various types of entrainment of nonlinear systems. Both help us understand and cope with nature. There are undoubtedly many more.

The Christian would do well to look to Scripture for other insights which will help his investigations in all fields of science. For instance, it is no accident that Christ used parables and analogies to teach men. They are entirely compatible with the abstraction process of setting something "equal to" something very different. Also there are many verses which we might

reexamine—this time from the point of view of process. For instance, one which may be relevant to this discussion is Mark 10:15 "Whoever does not receive the Kingdom of God like a child shall not enter it." This is generally interpreted to mean a childlike trust. But what does the trusting child actually do which is different from the behavior of the guarded adult? Is it not possible, in the language of this paper, that he is using his awareness mode to receive?

At the same time science would benefit by a fresh look at some of the ideas which have served it so faithfully. For instance, much of modern science is built on our concepts of mass and time. We tend to forget, even to deny, that both are manmade abstractions to help us cope with change. Neither is directly observable. They are useful fictions whose usefulness may indeed be limited at the present frontiers of science. Creative revolutions in thought occur only when we specifically recognize our limitations and look actively in new directions.

They also would be more likely to occur if we understood the process of being creative and practiced its skills. The ideas in this paper on two modes for receiving and handling information are an effort to understand this process. The model is rough and incomplete; it says little about the interaction between the modes. I would like to think of it as the first term in a converging series. Yet even if the series turns out to be divergent and must be discarded, I hope this model will stimulate fruitful discussion in an area which needs much attention.

A New Revolution

Mankind is at the portals of a new intellectual revolution based on science. Each such revolution in the past, Copernican, Darwinian, and Freudian alike, has attacked man's model of himself. Each time his picture of his own preeminence, or of his control has been diminished. However, once reconciled with each fresh and humbling insight, man has been able to move forward. We are on the threshold of including subjective experience in the family of respectable science. Not only will it become a reputable science in itself, but it will contribute greatly to the physical as well as social sciences of today. It will have many characteristics,[7] but the most revolutionary, as always, will be those which diminish our image of ourselves. The revolutionary thought this time is that we have no choice but to start with faith. What we *may* choose is whether we will start with faith in ourselves or faith in Christ. The Christian's role in this revolution is obvious.

What does the trusting child actually do which is different from the behavior of the guarded adult? Is it not possible that he is using his awareness mode to receive?

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The fact that the fool is stubborn must not mislead us into thinking that he is independent. One feels in fact, when talking to him, that one is dealing, not with the man himself, but with slogans, catchwords, and the like, which have taken hold of him. He is under a spell, he is blinded, his very nature is being misused and exploited. Having thus become a passive instrument, the fool will be capable of any evil and at the same time incapable of seeing that it is evil. Here lies the danger of a diabolical exploitation that can do irreparable damage to human beings. But at this point it is quite clear, too, that folly can be overcome, not by instruction, but only by an act of liberation. . . . The Bible's words that "the fear of the Lord is the beginning of wisdom" (Ps. 111:10) tell us that a person's inward liberation to live a responsible life before God is the only real cure for folly. . . .

The world is, in fact, so ordered that a basic respect for ultimate laws and human life is also the best means of self-preservation, and that these laws may be broken only on the odd occasion in case of brief necessity, whereas anyone who turns necessity into a principle, and in so doing establishes a law of his own alongside them, is inevitably bound, sooner or later, to suffer retribution. The immanent righteousness of history rewards and punishes only men's deeds, but the eternal righteousness of God tries and judges their hearts.

Dietrich Bonhoeffer
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Evangelical Theology and Technological Shock*

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Evangelical Strategy of the Past

In the past, the evangelical response to new scientific theories (and/or their ethical or theological implications) has gone through somewhat the same pattern. The new theory is announced. In that it apparently conflicts with evangelical theology, evangelicals denounce it. The evidence piles up overwhelmingly for the theory. Then the evangelicals scramble around to undo their initial interpretation and find how the new science and its implications can be absorbed into evangelical theology.

Our proposal is to reverse that procedure. We shall attempt to anticipate what is coming at us and think out our possible theological responses before it gets to us. Thus by "technological shock" I mean those radical things that we anticipate will be done in the next thirty years, and by "evangelical theology" I mean how an evangelical may now think provisionally about how he will absorb this into his theology.

We shall not be talking about scientific advance in general, [as suggested by the article, Anton J. Schwarz, "What Lies Ahead—Blue Sky Speculation" (*Bioscience*, October, 1966)], but those things anticipated which have *theological* implications.

I am not a scientist, so in what follows I am at the mercy of the scientists. If I default in explanation or interpretation on the technical aspects, it is simply because I am out of my field of specialization and over my head in scientific waters.

Furthermore, these theological interpretations I intend to make are heuristic, exploratory, and provisional, not final nor definitive. Our intention is to anticipate theological developments in science, rather than let science first kick us in the head (as evangelicals) and then start to do our theological retooling.

The politicians are aware of the significance of "technological shock" as there is now in Congress a bill to set up *The Office of Technological Assessment* (OTA) to inform the government of unusual strides in technology (John Lear, "Science, The Endless Search," *Saturday Review*, March 28, 1970). The World Council of Churches is also interested in "technological shock." They held a conference in Geneva on the topic, "Exploratory Conference on Technology and the Future of Man and Society" (*The Los Angeles Times*, July 5, 1970).

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The Concept of a Genetic Pool

Stemming mainly from the writings of Augustine, Christian theologians have linked the passing on of original sin with the genetic process of the begetting of children. The Roman Catholic Church has been for the most part insistent on *monogeneticism*, i.e., that the human race originated from one pair so that the doctrine of original sin would have a sound biological foundation. *Polygeneticism*, the origin of the human race from many pairs, has been criticized as it breaks the genetic continuum necessary to support the doctrine of original sin.

Modern genetic engineering, which we shall return to later, is making this unilateral, uninterrupted connection somewhat tenuous. It is anticipated that biologists can make genes, alter genes, substitute genes, and replace genes (Paul E. Lutz, "What's Around the Corner for Humanity in the Life Sciences?" *Concordia Theological Monthly*, Vol. 41, May 1970. Robert L. Sinsheimer, "The Prospect for Designed Genetic Change," *American Scientist*, Vol. 57, I, 134-142, 1969).

It is anticipated that biologists can make genes, alter genes, substitute genes, and replace genes.

Furthermore there is the prospect of "clonal man." The Greek word for twig is *klonos*. Plants that can be started from twigs and not seeds are clonal plants. The nucleus of the egg of a frog was shot out with a nuclear beam, a cell from the intestine of a frog (with the dormant DNA code in it) was put in the egg, and a tadpole was developed. This was a clonal frog. It is remote but not impossible that female ova be activated by cells from the male and not the sperm, and such a man would be a "clonal man." The advantage of a clonal man would be the unusual genetic control man would have over reproducing the race (C. A. Clark, "Problems Raised by Developments in Genetics," *Ethics and Biology*, pp. 93-99).

If genetic engineering makes the unity of the race less and less a matter of lineal, genetic descent, then maybe both the concepts of monogeneticism and polygeneticism are inadequate. I suggest the concept of mankind as a "biological pool" and its unity thought of in terms of this logical construct. But this must be supplemented with a theological and spiritual concept of the unity of man as decreed by God, or else we make

sin virtually a biological substance. All the human race is part of one "biological pool" and hence genetic engineering does not disturb the Christian concept of the unity of the race at its physical level.

The Concept of a Paternal Rather Than Genetic Family

A *genetic family* is one in which a male and female by intercourse produce children. A *paternal family* is one in which there is a male who plays a father role, a female who plays a mother role, and children who play brother and sister roles. Historically theology and Christian ethics have placed great emphasis on the genetic family.

Part of "technological shock" is that the genetic family is on its way out. In present artificial insemination the father is not a genetic father but he is a paternal father. The process can now be reversed and the mother is not a genetic mother but only a paternal mother. In the future with "sperm banks" and "ovum banks," parents will "shop" for the kind of child they want, so neither mother or father will be a genetic parent but only a paternal parent (Paul E. Lutz., *op. cit.* Lutz goes one step further and says that parents might even shop supermarkets for frozen embryos).

If the genetic family disappears, then all of Christian theology and Christian ethics has to be reformulated purely in terms of paternal families. Therefore we ought to begin at least in mind, in projection, to think of a Christian home, a Christian church, a Christian ethic, and a Christian theology, built totally in the concepts that characterize a paternal family.

We Need a New Concept of Mental Death

The transplantation of organs has raised afresh the problem of when a man is dead. Some consider the removal of the heart to be murder. If the heart can be used in some sense the donor is still alive.

The Christian Church has functioned with the metaphysical definition of death: that moment when the soul leaves the body. However the theological definition of death and the medical definition are growing further apart. That is why I think in the immediate future we should start thinking of *mental death* as well as metaphysical death in Christian theology. (For the following see Paul Ramsey, "Updating Death," *The Religious Situation 1969.*).

This complicated matter of dying in degrees was dramatically highlighted by the death of Senator Kennedy in Los Angeles: (i) looking back from the autopsy he was "good as dead" when he was shot; (ii) examined by an expert neuro-surgeon the next morning at 10:30 a.m. he was declared "practically dead;" (iii) when the brain waves ceased to register he was declared physiologically dead at 6:30 p.m. that same day; (iv) when all life processes stopped at 1:30 a.m. the next day he was declared officially dead; (v) according to microbiologists, cell division may go on for three weeks after burial (cf Lutz, *op. cit.* p. 304); so that cellular death occurred then; and (vi) as a Roman Catholic, somewhere along the line he died metaphysically, i.e., when his soul left his body.

If we are entering a whole new epoch of transplants, then the Christian theologians must put more thought into the definition of death than the traditional philosophical and theological one of the soul leaving

"Of course this kind of merchandising is still pretty embryonic."

the body. This new concept of death is currently called "mental death," i.e., the patient has reached a point beyond which he cannot be recalled to normal existence. Furthermore the theologians have to face the problem of difficult death (*dysthanasia*) and the morality or immorality of spending huge sums of money to perpetuate the physiological life of a person who has already entered the realm of mental death.

In short, technological advance in medicine means that Christian theologians are going to have to move out of the traditional rut and bring their theology of death into some sort of rapport with what is going on in modern technological medicine.

We Need a New Theology of the Holy Spirit

One of the main themes of evangelical thinking is that the Holy Spirit can do the *unusual.* Harold Begby's famous book, *Twice Born Men,* showed how the Holy Spirit could transform the most hopeless of cases that one could find in the slums of London. When doctors and psychologists must give up, the Holy Spirit can take over and work a miracle. This aspect of the work of the Spirit we do not want to forget or ignore, let alone deny. But in the light of developments in behavioral sciences and psychiatry we need to take a second look at our doctrine of the Holy Spirit.

Put in simplest and most direct terms, many of the things we now claim *only* the Holy Spirit can do with man supernaturally, man will do for himself. We see no ceiling to the control, shaping and modulation of human behavior in the future.

All forms of criminology and personality pathology that can be traced to heredity or physiology will be eliminated. (cf. J. E. Williams, "Legal Concepts of Responsibility," *Biology and Ethics,* p. 52ff.). It is speculated that this could even lead to the elimination of war!

Donald Huisingh speaks of three kinds of genetic engineering ("Should Man Control His Genetic Future?" *Zygon,* 4:188-189, June 1969).

Euphenics is adding substances to man which he no longer can make. Insulin is the most common example, but now a great number of substances can be given the haemophiliacs to control bleeding.

Genetic Engineering is working with and exploring the functions of DNA, the family of RNA chemicals, chromosomes and genes.

Eugenic Engineering is the control of reproduction so that all that is detrimental, which is genetically transmitted, will be eliminated, and all the positive genetic goals of mankind will be achieved.

In addition to this there is a Neo-Lombrosianism emerging. Lombrosio was an Italian sociologist of the last century who believed criminals were of certain physiological types. He was refuted on the grounds that criminality can be accounted for adequately by psychological and sociological understanding of man. But there now appear to be criminal types. If this is true then all such criminality that can be traced to criminal types can be engineered out of existence (see the pro-and con- Neolombrosian literature in J. E. Hall, "Legal Concepts of Responsibility," *Biology and Ethics,* p. 52).

In addition to the genetic control and shaping of human behavior we also have unlimited horizons on the electrical, chemical, and surgical alteration of man's behavior.

(i). *Electrical.* Recently the following dramatic episode took place in Barcelona. A bull charged furiously at the matador. When but a few feet away the bull suddenly turned and trotted away. The crowd did not know an electrode was implanted in the "happy center" of the bull and just before the bull reached the matador the electrode was activated. The bull lost his anger, felt happy, and trotted away (Cf. Hudson Hoagland, "Some Biological Considerations of Ethics," in *Technology and Culture in Perspective,* p. 18). Already monkeys can be stimulated into joy or depression by electrodes. We are just now microscopically mapping the brain. The long hours now spent with the psychiatrist and patient, for the patient to relearn his responses and so eliminate his symptoms, may be replaced with implanted electrodes.

If we are entering a whole new epoch of transplants, then the Christian theologians must put more thought into the definition of death than the traditional philosophical and theological one of the soul leaving the body.

(ii). *Chemical.* In the last century the scientist Ehrlich spoke of "chemical bullets." They were chemicals that would hit specific behavorial patterns in man. Now psychiatry works with generalized drugs that effect over-all moods like depression, anxiety, apathy or rage. By the year 2000 we might have our Ehrlich bullets in psychiatry, bullets that control love, hate, morality, etc. (Lutz., *op. cit.,* p. 302). Lutz is so bold as to predict that by chemically modifying behaviour we could eliminate war.

(iii). *Surgical* operations on the medial surface of the temporal lobe can turn ferocious animals into tame ones (Hoagland, *op. cit.,* p. 17). The most savage of all monkeys (the macaque), which under usual conditions would bite off the hand of any human who approached him, can be made surgically as docile as a kitten. Anger can be turned back on by an operation on the ventromedial nucleus of the hypothalmus.

The prefontal lobotomy is a crude operation compared to what may be done surgically either with knife or by freezing. One small slice at the right place may cure the psychopath or the criminals who now exist in such permanent rage or hostility that they would immediately kill if released from their cells. Granted at the present we cannot predict what these operations will do to man, as life in a cage is very simple compared to life in society. But profound surgical modulation and modification of behavior will be here by the year 2000.

Another amazing development is that Lawrence Massett has been able to by-pass the cerebro-spinal nervous system where conditioning usually takes place and can reach and condition the autonomic nervous system. This he does by the use of curare. As yet he can only do this by blocking out the regular nervous system with curare, but he is working on how to do it without curare. If we can condition the autonomic nervous systems where neurotic impulses have their derivation, psychiatry will be revolutionized ("Learn-

ing to Control the Uncontrollable," *Science News,* 97: 274-275, March 14, 1970).

Space and time forbid the formulation of the new doctrine of the Holy Spirit I have in mind, but it is not an *ad hoc* thing called in to fill a so-called gap in present knowledge. Briefly I would build my case on the following: (i) the Holy Spirit in the Old Testament as the immanent touch of God with his creation in *all* its facets; (ii) the Augustinian and Medieval idea of the concursive action of God with natural events, i.e., the so-called difference between primary and secondary causation; (iii) the rich materials in Calvin's essay, "The Secret Providence of God" (published in *Calvin's Calvinism,* Cole, editor); (iv) the concept of common grace well-known in Reformed theology; (v) the effort of V. Hepp of Holland at the turn of the century who tried to add a natural theology of the Holy Spirit to the more traditional doctrine of the witness of the Spirit; and (vi) Lindsey Dewar's startling book, *The Spirit in Modern Thought: An Inquiry into the Historical, Theological and Psychological Aspects of the Christian Doctrine of the Holy Spirit* (1959). Dewar tried to show how the Holy Spirit's working is to be read into modern medicine and psychiatry. Thus if we have worked out an adequate doctrine of the natural workings of the Holy Spirit, the immanent operation of the Holy Spirit in the cosmos and in every dimension of the cosmos, we shall have a theological stance whereby to meet the increasing technological revolution we are experiencing. While maintaining the *uniqueness* and *discontinuity* of the work of the Holy Spirit at the right places, we shall also be able to point out the *continuity* of the work of the Holy Spirit with man's technological control over nature. By such a doctrine of the Holy Spirit we shall be more adequately prepared for the confrontation of the Church with "technological shock."

We Need to Rethink the Concept of the Authenticity of Holy Scripture

The ideal concept of authenticity which evangelicals have worked with is as follows: if we know the author, date, nature of composition of a book of the Bible, it is then authentic. It can be considered inspired and authoritative and therefore part of the Sacred Canon. It is not possible to do this directly with every book of the Bible for we do not know the authors of many Old Testament books. So we build up our case as much indirectly as we do directly (such as noting that the New Testament sanctions the entire Old Testament as the Word of God.)

Many of the things we now claim only *the Holy Spirit can do with man supernaturally, man will do for himself.*

I am not dealing here with ordinary literary criticism. I am anticipating how technology is going to be called in to solve literary problems or historical problems outside of Scripture. I anticipate that these methods will then spill over into Biblical criticism, and when it does, evangelicals must have some answers.

The beginning is already here. By computer it has been established that Paul wrote the standard Pauline letters of Romans, I and II Corinthians and Galatians, and that he did not write the Pastoral Epistles. Recently it was claimed that the computer proved there were two Isaiahs.

The response of the evangelicals has been mixed. Generally they have been sceptical on the basis that the variables are too great and the computer sampling too small. But let us look at the situation twenty years from now. Computers will have become far more complex. Men of literature and historians will have run thousands of tests on documents. Computer analysis of documents has already become a well-established methodology. What are we evangelicals going to say to the results of computers in Biblical research at that future level of sophistication?

We must add one more item to this. Geologists and archeologists are finding more and more "clocks" in nature and in archeological reconstruction. The methods of dating documents and events twenty years from now will also reach a higher level of sophistication. What if computers and clocks prove as far as things can be demonstrated in science, history and literature that the Pentateuch is a highly composite document, or that the date of Daniel is around 165 B.C., or that Paul could not have written even Ephesians or Colossians? Please remember that we are not dealing with literary problems but with what *technology* may do to Biblical criticism.

Maybe our current evangelical theory of authenticity is wrong. Maybe it is time right now to do a total rethink on what kind of authenticity is necessary to support our views of the inspiration and revealedness of Holy Scripture. In short, maybe the *processes* we have assumed as necessary to go along with our concept of authenticity are products of our own cultural conditioning and not of Scripture itself. A new theology of authenticity would have as its goal to show that modern technological advances in documentary analysis of dating are not incompatible with the manner in which God reveals himself and inspires Holy Scripture.

> [This is but an aside that I have not had the time to investigate. When the furor about communication set off by McLuhan has died down and an immense amount of sober research has gone into the nature of language theory and communication, we might have to develop a whole new theory of inspiration and revelation. I am always haunted with the suspicion that *our* theories of inspiration and revelation are severely culturally conditioned *by our culture* and not, as we hope and think, by the Scriptures themselves. It may well turn out that when modern theory of communications is developed, we will find that Holy Scripture is far more in harmony with that than it is with the kinds of concepts of language and communication we have worked with in the past few centuries in developing an evangelical view of revelation and inspiration].

We Need a New Meaning for Life

Two very different processes are converging on mankind. First, man's life is being extended. By ordinary increase of scientific knowledge and of medicines and surgery in the next twenty years, it is expected that life will be extended fifteen years. There are about twenty theories why the human body ages. One of these is that the older we get, the more elongated molecules we accumulate which gum up the physiological works. If we had an enzyme that could dissolve these molecules we could add thirty five years to man's life. (Cf. Bernard Strehler, "Ten Myths About Aging," *The Center Magazine,* 3:41-48, July-August,

Maybe it is time right now to do a total rethink on what kind of authenticity is necessary to support our views of the inspiration and revealedness of Holy Scripture.

1970, for a general discussion of this problem). Then there are those who claim we will develop "system shockers." The real fountain of youth is to shock our organs back into their youth by some sort of chemical. The literature on this subject is divided. Some think that after one million years of evolution the limitation of man's age is fixed and we can extend it only a decade or so at the most. Others think "system shockers" or advanced knowledge of the DNA-RNA processes will enable us to keep man alive until he is one hundred and fifty years old. Let us presume that by 2000 A.D. life expectancy is 100 years.

It is now agreed that if all of American industrial manufacturing could be done by automation, only 2% of the population would be necessary to run our factories. The more technologically sophisticated we become, the fewer people it takes to operate factories. Yet the more technological we get, the longer we are going to live.

Rollo May is one of the outstanding theorists in America in psychiatry. He claims that the psychiatrists know the pulse of society better than anybody else because they see how society makes people sick. The heavy Victorian sexual ethic in old Vienna created many sexual problems and that is why Freud's basic theory has such a dominant sexual motif. This was followed by the plague of anxiety neuroses. In his book, *Love and Will,* May says our present problem is apathy. This explains why people are murdered while their neighbors do nothing. The neighbors are suffering from apathy and that is why they cannot arouse themselves to come to the person's help or even phone the police.

Now let us put all of this together. If man is suffering from apathy *now,* what degree of apathy will he suffer if he retires at age 50 (as retirement age is going to drop rapidly too) and has another 50 years to live? Or if we are suffering from apathy now, what degree of apathy will we suffer if only 10% of our population can manufacture all we need and supply all our services so that most of us will be born retired?

Right now the backbone of the meaning of life is the work week. If technology knocks out the work week as we know it, it also knocks out the meaning of life for the mass population. The question is this: *will technology plunge us into a pandemic of apathy?*

Maybe not. Maybe as one area is shut down a new one will open up. Maybe when one cultural routine becomes obsolete another one will move in and fill the vacuum.

I want to speak theologically at this point. Perhaps the only source of the real meaning of life *if* technology does create this vacuum in civilization, this pandemic of apathy, will be that given to us in Holy Scripture. Perhaps the greatest hour of the Christian Church is ahead. As technology drains meaning and purpose out of life, perhaps it will be the Christian Church with the Holy Scriptures that will be able to pump meaning back into society so that life will be meaningful in an age of technological utopia but spiritual apathy. (The one article that really gets down to a debate about technology and ethics and meaning is that of Donald Huisingh, "Should Man Control His Genetic Future?" *op. cit.*).

Until the natural philosopher and the theoretical biologist, in a cooperative and professional effort, elaborate canons of biological methodology, and apply those canons to the best available data on organic process, the question of the fact and theory of organic evolution will remain an unverifiable and unintelligible matter to both.

Raymond J. Nogar, O.P., "The Darwin Centennial: A Philosophical Intrusion,"
The New Scholasticism 33 (October, 1959) p. 444

A scientist is a person seeking insight into the harmony of things. The harmony and the human spirit seeking to comprehend it are there first. They are prescientific. Darwin seems never to have grasped the implications of this fact. He had a profound intuition of the harmony of nature, of her "endless forms most beautiful and most wonderful," but he distrusted his intuitions. He distrusted them, his autobiography shows, because he feared that they could be explained scientifically as holdovers from man's animal past. Having doubted the reality of spirit, he suffered the spiritual consequences of his doubt. There is no escape from reality, least of all from spiritual reality. Insofar as our own world view, deriving from Darwin, Freud, Marx, Comte, and innumerable other sources, denies the reality of spirit, whether human or divine, we too must pay the price of that denial.

John C. Greene
Darwin and the Modern World View, Mentor Books (1963), p. 116

A Structured Model of Reality

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A brief description of a model of reality that is hierarchical in structure is presented. A simple pictorial representation of the model is given. For this model faith is seen as a guide in relating one's world-view to actual reality; inherent in such faith is feedback between the individual perspective and the motivating and focusing processes of which faith is composed. Inanimate matter, life and consciousness, and spiritual qualities are seen to be distinct and unique though interrelated, levels of existence. The model preserves the order and openness apparent in all of reality while avoiding both reductionism and compartmentalization.

INTRODUCTION

In recent years men of competence in scientific, philosophical, and religious affairs have testified to the open-ended and yet ordered structure of reality;[1] they have also pointed out the limitations present in any individual perspective of reality.[2] The artist, the scientist, the psychiatrist, and the theologian all possess very different outlooks on the world and yet truth exists in each.[3] A model of reality which the author believes does full justice to these factors is now presented. This model of reality is based upon the fundamental contributions of Blaise Pascal and Michael Polanyi, and it is hoped that it incorporates the many helpful insights of W. Thorson,[4] D. Dye,[5] and C. Hummel.[6]

COMPONENTS OF THE MODEL

As the author has argued earlier,[7] faith is an integral part of all human understanding of reality. A faith-faculty (Pascal termed this "the heart") is analogous to a telescope by which an individual views the world, thereby formulating a particular perspective or world-view. Inherent in this faith-faculty of men is a continual feedback between the individual perspective and the motivation and focusing processes present in the "faith-telescope." Without this feedback between a given perspective and that part of reality focused upon, one would wind up selecting the data of reality to be studied in a random way; any perspective formulated in this manner would lack both clarity and simplicity.

Figure 1 illustrates the telescope-like role that faith plays in formulating a particular world-view. The faith faculty

1. motivates the search;
2. decides from what vantage point we view reality;
3. selects, *focuses* on what an individual perspective considers significant; and
4. relates different aspects of reality to one another.[8]

Implicit in the telescope analogy is the limited nature of any perspective. Focusing on a wide area of reality results in a broad overview but it is difficult to identify and relate fine details. If we focus on a narrow

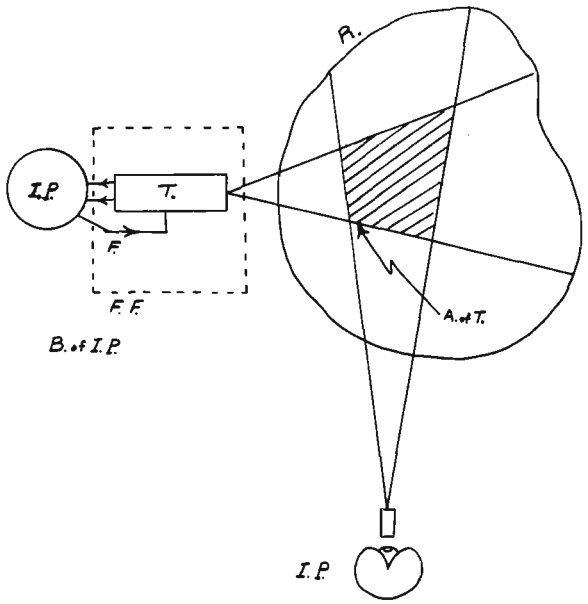

Figure 1. The role of faith in the formulation of a world-view.
Nomenclature:
R.—reality
I.P.—an individual perspective
B. of I.P.—blowup of an individual perspective
F.F.—faith-faculty (Pascal's "Heart")
F.—feedback
T.—telescope
A. of T.—area of tension

Faith is a necessary component of the probing and viewing processes by which man encounters all of reality and formulates a consistent picture of it.

area of reality, great clarity is possible but our perspective may be one-sided and fail to recognize or appreciate much valid experience. Narrow focusing does possess the advantage that the precision inherent in it enables meaningful tests to be made of the soundness of any perspective.

In summary, faith is a necessary component of the probing and viewing processes by which man encounters all of reality and formulates a consistent picture of it.

The basic propositions of the reality-model are now presented so that further discussion may make use of the model. The propositions are:

1. Reality is structured in a hierarchial fashion; a hierarchy of qualitatively different levels exist.
2. These levels complement each other; some levels may even be mutually exclusive to one another but taken together they exhaust all valid knowledge of a segment of reality.
3. To view or accept the validity of only one level leads to a very incomplete world-view. Such a world-view is not *consistent* with *all* the levels of reality.
4. The levels of the reality structure are coupled to one another in the sense that they cannot be humanly separated (spirit is not separate from matter—God become man). The coupling is furthermore unidirectional.

It is first seen that this model preserves the uniqueness of different facets of reality while not denying the existence of relationships between them; a simple compartmentalization of reality into different isolated segments is thereby avoided. The history of the conflicts between theology and science in the past has shown that simple separation of reality into spiritual and material realms has always resulted in the spiritual portion shrinking as time goes on.[9] Aside from the pragmatic disadvantage for Christian apologetics, such compartmentalization goes fundamentally against the great Biblical evidence for the uniqueness and yet interconnectedness of Spirit (God) and matter. Reality is structured but exists as a whole. One's perspective then determines what is significant in a given part of reality. When different perspectives focus on the same portion of reality as illustrated in Fig. 1, tension can develop. Such tension can be genuine, arising from the fact that differing perspectives use very different methods of inquiry and are looking for very different things. Part of the tension may be false, a result of one perspective failing to recognize the limited nature of its outlook or misunderstanding another point of view.

Figure 2 illustrates the particular characteristics of a model of reality based upon a hierarchical level structure. A Pascalian triad of levels is used for illustrative purposes; the level structure may be much more complex. It is immediately noted that the vantage point one views reality from is a great influence on the insights the particular perspective develops. In what follows, horizontal and vertical positions are taken to be analogous to the background and many temperamental, creative, and aesthetic traits that a man or group of men bring with them as he or they formulate a particular perspective.

A horizontal vantage point requires a wide focusing to encompass all the levels of reality with a loss of some detail. A narrow focusing from a horizontal vantage only examines one or a minimum range of levels. The perspective of the physical scientist given in the diagram[10] sees only matter as valid experience; he would view life not as unique in character but reducible to a complicated physical-chemical phenomenon. The perspective of life and social scientist of the diagram sees life and personality as unique, capable of regulating matter but lacking the higher dimension of divine love.

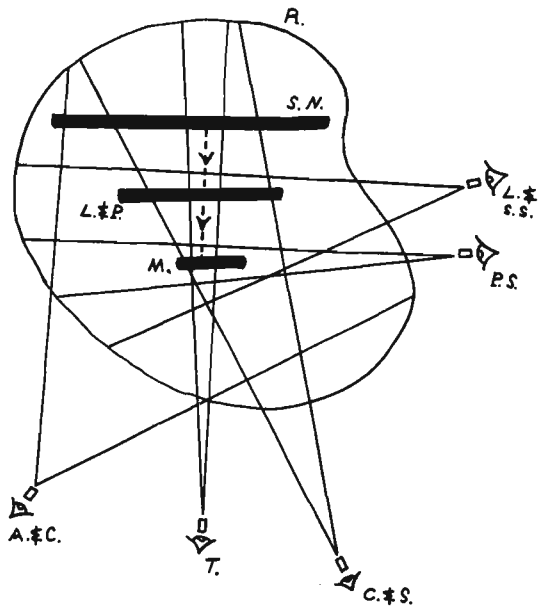

Figure 2. A hierarchial model of reality, the Pascalian triad.
Nomenclature:
R.—reality which is composed of
S.N.—supernature
L. & P.—life and personality
M.—matter
The structure is coupled as shown. Individual perspectives viewing reality are:
A. & C.—artist and Christian
C. & S.—Christian and scientist
L. & S.S.—life and/or social scientist
P.S.—physical scientist
T.—theologian

A Christian, well-versed in all the sciences, viewing reality from a horizontal vantage point, would see the further realm of supernature transcending and giving ultimate purpose to both life and matter, but wide focusing necessarily obscures some of the details

A vertical vantage point allows even a narrow focusing to encompass all levels of reality and in this outlook great detail is present in the narrow-segment of all levels viewed. The Christian and the scientist, or the theologian of Fig. 2, illustrates this point.

In summary, the diagram represents a visual attempt to make clear the assertion that what you see depends on your background and outlook, what you consider significant. It should be stressed that to see reality as hierarchically structured, as existing and functioning at different levels, is not to deny God's sovereignty over each and every level. Each level has its own

unique law-structure not reducible to those of levels below but utilizing the lower level's properties and regularities to accomplish those goals that are consistent with the richness and uniqueness of the higher level's law-structure. God's trustworthiness and sovereignty guarantee the existence of laws in all levels of His creation which are both dependable and discoverable by humans made in His Image. To see certain levels as complementary to one another, as being mutually exclusive when observed from a human vantage point, is not to deny God's sovereignty as manifested both in the law-structure of each level and in the hierarchy itself forming a unified whole, a cosmos (of all levels, complementary and non-complementary). Finally if reality is a whole, created and sustained by God, changes that occur at one level will affect the other levels. As one example, a man's physical condition will effect both his mental and spiritual states, or a fit of mental depression can result in both spiritual and physical downgrading. Similar examples can be cited for complementary levels. If we use the wave and particle descriptions for an elementary particle, each have characteristic properties related by their own law-structures. One cannot observe phenomena in terms of the law-structure of one model without limiting the extent to which one can observe characteristics associated with the other model. Yet both descriptions are related to another by simple laws (Energy = Planck's constant × frequency, and momentum = Planck's constant ÷ wavelength) and both descriptions while being mutually exclusive in terms of simultaneous observation, nevertheless taken together form an exhaustive, unified explanation of the diverse experimental behavior of elementary particles.

JUSTIFICATION OF THE MODEL

The Bible clearly teaches that qualitatively different levels of reality exist and these levels are arranged in a transcendent order. In II Corinthians 4:18 and Colossians 3:1,2, Paul asserts that the eternal realm of God is very distinct from physical existence:

> Because we look not to the things that are seen but to the things that are unseen; for the things that are seen are transient, but the things that are unseen are eternal.
>
> If then you have been raised with Christ, seek the things that are above, where Christ is, seated at the right hand of God. Set your mind on things that are above, not on things that are on earth. (*Au.: I trust the reader accepts the use of the word "above" as pointing to a realm transcending the physical and not as literally above the earth.*)

The Bible further maintains that the transcendent realm of Spirit permeates all the other realms of reality and cannot be humanly separated from them. Psalm 139 testifies to the continual presence of God's Spirit; Colossians 1:16 emphasizes that in Christ all things hold together; God's transcendent presence permeates and maintains all of His physical creation, both living and non-living. It is by recognizing that this higher "dimension" of God's activity upholds all physical existence that one can seek what is significant, thereby making proper value-judgments as to what should be done to better and to preserve God's physical creation.

It is by faith, viewing God's objective acts in history, that we see the transcendent realm of God (supernature if you like) is responsible for the great ordering principles we have found present in both the physical and moral realms. Note that Christian theology clearly opposes the reductionism that application of ordering principles found in physico-chemical laws can lead to the development of moral, spiritual laws. Romans 1:19-20 states that understanding of man and the external physical world points to a God who has created and who sustains all nature. Indeed, there is ample evidence that man has moral notions, needs love, fears non-being, has longings for beauty and for meaning that cannot be explained by purely animalistic or machine-like concepts. The nature of man reflects his being made in the image of a God whose character possesses supreme love and rationality. In a similar manner the great order found in the external physical word cannot be explained in physical terms alone, but points to a rational Creator who sustains all his creation rationally.[11] But mere acknowledgement of God's existence, of His structuring man like Himself, of His providing and sustaining an orderly creation, is not by itself sufficient to enable one to understand and obey the moral imperatives permeating the eternal realm of the Creator-God. Only an encounter with the living God can lead to such understanding. Biblically, Eternity or Supernature, that realm where God's presence is not hidden but clearly seen, is qualitatively distinct from the created space-time continuum we live in, yet it permeates and upholds it. Knowledge of God's realm and its relation to the natural world comes to us by God's revealing acts of word and deed; such knowledge does not come by human reasoning. In Figure 2 the arrow downward illustrates the uni-directional nature of this coupling.

Christian theology clearly opposes the reductionism that application of ordering principles found in physico-chemical laws can lead to the development of moral, spiritual laws.

It is my conviction that other levels of reality are unique in character, though correlated, in analogy to the relationship of the spiritual realm to other realms. Life itself, while composed of matter obeying physical-chemical laws, is not merely a form that can be shown reducible to these laws. A variety of arguments can be given to justify this position. Niels Bohr[12] has pointed out that attempts to measure to arbitrary precision the physical-chemical processes existing in a living unit of molecular dimension will result in disturbance of the system, and such disturbance in the limit of ultimate precision results in the destruction of life present in the system. In other words, if we experimentally attempt to reduce life to just physics and chemistry, we wind up destroying life itself. Life's uniqueness is further seen in that a crystal or polymer displays a stability of form, while living matter displays a stability of process or function.[13] In physical systems the amount of matter remains constant whereas in a living unit matter is constantly being replaced by metabolic processes.[14] Also, life's perpetuation is not obviously explainable in purely physical terms. As Jaki[15] points out:

> This perpetuation consists in the production by one another of strictly identical and highly complex molecular structures. Such a phenomenon, when analyzed from the angle of quantum mechanical probability, becomes

as E. P. Wigner noted, 'a miracle from the point of view of the physicist.' Startling as this conclusion may be, it is unavoidable in view of the following two considerations. The first comes from quantum theory, which states that the probability of self-producing states is zero. The second derives from the very process of reproduction, which is the succession of self-producing states.

A model of reality composed of qualitatively different levels is fully compatible with Biblical revelation and the physical universe.

Indeed, as Michael Polanyi[16] has recently suggested, life's uniqueness can be viewed as a hierarchy of boundary conditions acting on physical-chemical processes in such a way as to maintain the health and growth of the organism.

A significant aspect of all living matter is consciousness, the awareness of one's own state and that of the surroundings. E. Wigner[17] has given a number of interesting arguments to show that life and consciousness are a level of existence that is not reducible to the laws of inanimate nature. He first points out that alternate conceptual frameworks have been found to be valid in describing a given physical phenomena. Either conceptual level gives insight. Secondly, if one phenomenon is influenced by another phenomenon, in all known cases the latter one is also influenced by the former. As we clearly know that matter influences the state of our consciousness, so we would expect consciousness to alter the state of matter. Since the physical-chemical laws of today provide no such possibility, we would expect the reduction of life to these laws to be invalid. Lastly, Wigner points out that all extensions of physics were accompanied by drastic changes in the theory. The primitive entities of a given theory were replaced in a drastic manner by others. In the most successful physical theory today, quantum mechanics, observation and observables play the key primitive role. If the concept of observation, an essential aspect of consciousness, "is to be further analyzed, it cannot play the primitive role it now plays in the theory and this will have to establish regularities between entities different from the outcomes of observations." Life and consciousness can be understood adequately only in a much more open framework than the law-structure of inanimate nature. I believe that such an open framework may be far more congenial to spiritual truth.

S. Jaki has recently discussed[18] the many efforts to provide a purely physical, cybernetic explanation of human consciousness. He considers in great detail the relationship of computers to physics, to the physiological structure of the brain, to psychological understanding of consciousness, and to thought itself. He does not find the uniqueness of consciousness threatened. He pinpoints clearly how in analyzing consciousness one is immediately faced with experiences having no parallel in the physical world:

> . . . While in nature one finds a juxtaposition of extended objects, in the conscious perception spatially distinct elements fuse into a single field. While in the external world everything is separated in space and time, conscious memory brings into immediate relation objects and events occupying widely differing positions in the spatio-temporal coordinate system. Again, while in the four-dimensional space-time manifold of modern physics the dimension of time is on the same footing with the three directions of extension, time, as experienced in human consciousness, forms a unique class of its own. As a matter of fact, physics, to secure its own progress, had to divest the concept of time of almost all the richness implied in its conscious experience. Consciousness is accompanied by an awareness of esthetic and ethical values, at times held to be absolute, in marked contrast to the four-dimensional relativity of objects and events. Consciousness is the perceiving field of qualitative differences as opposed to the quantitative structure of external things. Consciousness is also the matrix of experiences about the self, about the purpose in action, and about the meaningfulness of judgments.[19]

Closely allied to consciousness is human thought. If words, or strings of words, were thought itself, how could one be conscious of ideas without uttering words? Jaki's applications of Godel's theorem to the reduction of the human mind to a purely mechanistic model explainable in physical-chemical terms and to the relationship of human rationality to intuitive reflecting is suggestive. Godel's theorem says essentially that it is impossible to show that an arithematic logic is consistent by methods which could be represented in the logic itself. From analysis of this theorem, Jaki concludes that the crucial question of the mind-machine problem is:

> . . . whether it is possible *in principle* to construct *one single* mechanical model embodying every facet of the working mind. It is immaterial whether this model should be as compact as the brain, or whether it should consist of a long chain of units each of which serving as a proof of consistency to the immediately preceding one. In order for such a construction to qualify as a machine, it must be in some sense finite and definite, and as such, it would not have its proof of consistency within itself. It follows, therefore, that the mechanist cannot even in principle derive an individual machine that might serve as an adequate model for the mind. And since machines are of necessity built of physical or chemical components, it also follows that the human mind cannot be fully explained in terms of physics and chemistry.[20]

Furthermore, concerning rational thought:

> What Godel's proof brings out so forcefully is that rationality, consistency, and anything that forms the bedrock of human reasoning is not merely a set of formal steps but implies the instinctive ability of man to reflect on the correctness of those steps. The fact that the mind cannot derive a formal proof of the consistency of a formal system from the system itself is actually the very proof that human reasoning, if it is to exist at all, must resort in the last analysis to informal, self-reflecting, intuitive steps as well. This is precisely what a machine, being necessarily a purely formal system cannot do, and this is why Godel's theorem distinguishes in effect between self-conscious beings and inanimate objects.[21]

If rational thought requires intuitive steps, faith can play a valid role in all human understanding, not merely religious understanding. Jesus Christ, who created and upholds all of reality, stressed the ultimate uniqueness and significance of personality, of personal relationships based on trust or faith of men towards God and themselves. Is it not reasonable to therefore assume that God structured all of reality in such a way that faith is required by man in order to gain an understanding of it?

CONCLUSIONS

What has been attempted here is to show that a model of reality composed of qualitatively different levels is fully compatible with Biblical revelation and the physical universe. The exact number and nature of the levels required for this model to be completely comprehensive is left open. Also, the uniqueness of life and consciousness, and the rational and emotional capabilities inherent to the human mind have been discussed and related to the material and spiritual realms. It is seen that the Pascalian insight which views mind and matter in the context of a level structure related uni-directionally is still a fruitful path to progress:

> Man is but a reed, the most feeble thing in nature; but he is a thinking reed. The entire universe need not arm itself to crush him. A vapour, a drop of water suffices to kill him. But, if the universe were to crush him, man would still be more noble than that which killed him, because he knows that he dies and the advantage which the universe has over him; the universe knows nothing of this.[22]

In summary, it is seen that a hierarchical model of reality, as represented in Figures 1 and 2 avoids compartmentalized and reductionist world-views. It is my hope that this approach can serve as a framework from which one can comprehend the richness of existing reality and easily and systematically incorporate new knowledge into it. Such further development must fully meet the criteria[23] for any theory to have validity. That is, it is noncontradictory in nature and capable of yielding a systematic and consistent perspective.

A further test of any theory or model is its ability to point out areas of significant research. The model under consideration holds the view that a transcendent realm maintains all creation and holds man responsible for what he does to the created world; the model also sees living creatures as possessing unique organizational features and relationships as compared to inanimate matter. Both pictures thus see the study of the relationships and interdependence of living creatures upon one another and the environment as important a study as the physical and chemical structures of such creatures. Such an approach is not meant to detract from the potential of molecular biology of which Dr. Warren Weaver, former director of research at the Rockefeller Foundation has said:

> I am convinced that molecular biology has now reached a point where it can make, over the next five to twenty-five years, some extraordinary advances in the general field of molecular analysis and interpretation of neurophysiological problems.[24]

It is meant rather to point out clearly the importance of organismic biology[25] in which the whole is indeed more than the parts;[26] the structure and organization of individual parts leads to qualitatively new features in living organisms just as atomic structure is qualitatively very different from a simple sum over individual particle properties. The insights to this model of reality therefore leads to a renewed interest in organicism and the allied study of ecology which the extreme reductionism of certain scientific viewpoints has tended to downgrade.[27] Certainly the rapidly deteriorating conditions of spaceship earth testify to the folly of world-views that ignore the significance of ecological relationships; the model under consideration thus leads to a very fruitful area of inquiry.

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Stanley L. Jaki, *The Relevance of Physics.* The University of Chicago Press, Chicago, 1966. Stanley L. Jaki is a Roman Catholic priest with doctorates in both physics and theology. He has been a visiting member of Princeton's Institute of Advanced Study. His book is a scholarly exposition of both the limits of physics and the great contributions it has given to culture.

[2]Jaki, *op. cit.*

[3]Charles Hummel. *Journal ASA* Vol. 20, No. 2, pp. 62-64 (1968)

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[5]David L. Dye, *Faith and the Physical World: A Comprehensive View,* W. B. Eerdmans Publishing Co., Grand Rapids (1966)

[6]Hummel, *op. cit.* and "The Scientific Revelation in the Sixteenth and Seventeenth Centuries," *Journal ASA* Vol. 20, No. 4, pp. 98-104 (1968)

[7]W. Jim Neidhardt, "Faith and Human Understanding, *Journal ASA,* Vol. 21, No. 1, pp. 9-15 (1969)

[8]*Ibid.*

[9]Hummel, *op. cit.* (2nd ref.)

[10]Bertrand Russell.

[11]Francis A. Schaeffer *Death in the City,* Inter-Varsity Press, Chicago (1969), pp. 91-107.

[12]Niels Bohr, *Atomic Physics and Human Knowledge,* Science Editions, Inc., New York (1961), pp. 8-9.

[13]Jaki, *op. cit.,* p. 328.

[14]*Ibid.,* p. 328.

[15]Stanley L. Jaki, *Brain, Mind and Computers,* Herder and Herder, New York (1969), p. 66.

[16]Polanyi, "Life's Irreducible Structure", *Science,* Vol. 160 (1968), pp. 1308-1312. See also *Journal ASA,* 22, 123-131 (1970).

[17]Eugene P. Wigner, Address at AAAS meeting, Boston, Dec. 27, 1969.

[18]Jaki, *Brain, Mind and Computers.*

[19]*Ibid,* pp. 118-119.

[20]*Ibid,* pp. 216-217.

[21]*Ibid,* pp. 220-221.

[22]Blaise Pascal, *Pensees,* The Modern Library, Random House, New York (1941), p. 116.

[23]Francis A. Schaeffer, *The God Who Is There,* Inter-Varsity Press, Chicago (1968), pp. 108-115.

Edward John Carnell, *An Introduction to Christian Apologetics,* W. B. Eerdmans Publishing Co., Grand Rapids (1952), pp. 45-62.

Both Carnell's and Schaeffer's books have excellent discussions of the criteria a theory must possess if it is true.

[24]Victor Guillemin, *The Story of Quantum Mechanics,* Charles Schribner's Sons, New York (1968), p. 119.

[25]Ian G. Barbour, *Issues in Science and Religion,* Prentice-Hall, Inc., Englewood Cliffs, N. J., (1966), pp. 326-27.

[26]Richard H. Bube, "The Whole and the Sum of Its Parts," *Journal ASA,* Vol. 18, No. 1, pp. 8-11 (1966).

[27]Jaki, *op. cit.,* p. 327.

What government by the proletariat is to the communist, and the coming of the kingdom of God is to the Christian, the forward surge of evolution to a better future is to many a humanist. It is the ultimate hope behind his creed.

T. M. Kitwood
What is Man?, Inter-Varsity (London) 1970, p. 46

Professional Responsibility and Social Issues

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Introduction

In dealing with the problem of social issues and their impact upon society, we have a responsibility as citizens, Christians and professional scientists. The exercising of this responsibility will depend upon the particular role in which we find ourselves at the time. While the responsibility which we have as Christians and citizens may be shared with many others with diverse backgrounds, professional responsibility is limited to a specific community and involves a unique, subtle relationship with the rest of society.

For these reasons, a professional cannot refer clearly to traditional patterns of behavior in making decisions which he faces in his daily life. The scientist who is involved in military research is both rewarded by his peers for his work and criticized by his pacifist son at the same time. As a Christian, he might regret the fact that his knowledge is being used for military purposes, but as a citizen he recognizes that he might have a contribution to make for his country. Thus, he is torn among the various options open to him.

The Question of Legitimacy

Fundamentally, the problem centers on the question of legitimacy.[1] The determination of what constitutes a legitimate decision in any professional undertaking is largely in the hands of a professional complex.[2] In order to structure decision-making, the complex establishes a system of norms which the professional learns to accept in his training. These norms have far-reaching effects, not only on the professional himself, but also on the value systems of society.

For one thing, basic moral questions are implied in these normative systems. The question of the maintenance of life has become one of the more incisive issues in this sphere. Indeed, the fact that segments of the medical profession have misgivings about the norm of using extreme artificial means to sustain a person's life suggests that a profession is severely limited in its ability to make final and appropriate moral judgments. Thus, the fact of mushrooming technological change suggests that normative systems advocated by a profession can no longer be taken for granted. As technology produces strain on these systems, responsibility for dealing with moral questions must be placed somewhere.

Within a professional normative system are found some of the expectations which help to produce a relationship between the layman and the professional which is unique. Unlike the relations one finds in the world of business, the professional does not relate to his client on purely economic terms. The professional is characterized as one who has expertise which is needed by the layman. The client is vulnerable and needs to put complete trust in the judgment of the professional. He must assume that a professional decision is the best one which could be made and that it is in his best interests. It is this exclusive right of the professional to exercise his judgment which is a critical element in the role of the professional.

The professional finds himself with dual responsibility: a technical responsibility and a social responsibility.

A Dual Responsibility

As a result, the professional finds himself with a dual responsibility. In his relationship with the layman, he has a technical responsibility which is based on his specialized knowledge. There are, nevertheless, social consequences. The lawyer who pleads an important case to obtain a favorable verdict for his client may lay the foundation for significant changes in the law. The decision by a doctor to use a drug in an unorthodox fashion for the purpose of saving a life may result in the eradication of a dangerous disease and the extension of the life span of the populace. Indirectly, then, the professional has a social responsibility, since his decisions affect the moral bases of society in the determination of what should be defined as good or valuable.

The individual is not left completely alone to make these decisions by himself. The profession recognizes the risk involved in abrogating responsibility in such matters. It cannot afford to jeopardize the public image of the profession by allowing an irresponsible act by one of its members to go unnoticed. Instead, each profession controls its members and their decision-making processes through a system of rewards and punishments. Scientists are rewarded with prizes and grants. Teachers who do not fulfill the minimum requirements for certification may be denied some perquisite. Ultimately, the profession establishes values for society and provides for the formation of a normative system which extends to the level of the layman. In the process, the definition of what constitutes legitimate decision-making is decided as well.

The influence of the professions in the formation

of the society's system of values has been heightened by the respect granted to them by the layman. Public awe over the accomplishments of science is a rather obvious example. The feverish efforts of pseudo-professional groups such as engineers and morticians to establish an image of professionalism is another. In any case, the layman has relinquished much of his perspective on such matters and has accepted the leadership offered by the professions. Quite likely, it is the traditional confidence placed in the professional by the client which is at the root of the matter. The question now is whether this confidence which is placed in the professional organization by the public is well founded.

Elements of Strain

It becomes apparent, then, that significant elements of strain are to be found in the relationship of professions with the public. For one thing, technical questions have become separated from social and moral questions. Doctors may experiment with life-saving techniques because of the challenge of the technical question and not necessarily with regard for the meaning of human life. Professional techniques acquire their own ends and are not seen as means to some social or moral end. Further, the structure of a professional clientele has been greatly altered. The trend has been for the individual client to be replaced by the organization, largely because the services of a professional become too costly. This is particularly true for science which serves the interests of complex business and governmental enterprises. In this case, social and moral consequences of immediate technical actions are, at best, quite obscure. Indeed, too often the professional is unable to perceive an apparent end for the technical means he has employed to attain an immediate objective.

One can explain this separation of technical means from social and moral ends by attributing it to the secularization of professions.[3] This process develops with an extensive and complicated social change which has its origins in a unified environment. From the earliest times, the professional was in harmony with this environment until the development of secularizing trends. One need not take too much of a backward glance at medicine, for example, to find a time when general practitioners dominated the field. Generally speaking, the doctor was less specialized and more totally involved with his patient than he is today. Tracing the development of medicine from an even earlier period, one notes the broader involvement of the doctor in the affairs of the community. This process was merely a continuation of the earlier religious-medical unity of the doctor's role in society. Ultimately, one finds the religious basis of the medical profession as fundamental. As a result of social change, which produced a need for greater expertise, secularization developed and weakened the religious and unifying relationship of the doctor with his patient and society.

It would be naive to assume that one could correct the problems one finds as a result of weak professional responsibility by a return to a professional role which is less specialized. While it would be proper to suggest that professional organizations, as well as individuals, must be sensitive to the problems they create and attempt to prevent them, it must be recognized that their means for dealing with these problems are limited. An historic analysis of the development of professions would probably show that the demand for expert services comes from the public. Even though professional organizations have made a significant contribution to the secularization of professions, in the final analysis, the bulk of the responsibility should probably be borne by the public.

Two major areas of concern are unique to the Christian: professional stewardship of gifts, and stewardship of the created world.

Determining Responsibility

Once again, the delicate and unstable relationship which exists between the layman and the professional can be seen. Now, however, it is not a question of confidence in professional competence but a matter of determining responsibility in social matters. There is no question but that the professional must continue to exercise control over technical questions relevant to the profession. Increasingly, however, it will be necessary for the public to have a stronger voice in the establishment of normative and moral positions on social questions, due to the limited influence of the profession in dealing with such matters. Not only must the traditional professional-layman relationship be maintained, but it must be expanded in some fashion to allow it to deal effectively with the social consequences of professionalized action. This can not be accomplished, however, while it remains unrecognized that professionals do make a definite contribution to the development of social issues.

The Christian Professional

For the Christian, the problems are even greater. There are two major areas of concern which are unique to the Christian professional. One is in the matter of proper stewardship of gifts which he has, and the other is concerned with the stewardship of the created world. In his work, the Christian professional must exercise care that he faithfully responds to the "call" to use his gifts. Too often, professional demands imposed upon him will result in a movement away from his call. Further, he must recognize his responsibility in caring for the earth and its contents in a fashion which is consistent with God's provision that the earth should be replenished. This close relationship of man with the earth is no longer clearly recognized by secularized professions which ignore the fundamental unity of the world and its parts.

It is critical, then, that the Christian professional understand that many of his decisions are influenced by a secularized profession. He cannot assume that absence from the world of business with its connotations of avarice and irresponsibility produces an inherent tendency toward the performance of important and moral services in the professions. Nor can it be assumed that the public can provide a check on professions which is acceptable to the Christian. It is clearly apparent that normative systems which may be acceptable to society as legitimate may not be defined in this way by the Christian.

In the final analysis, one can readily discern the strain which exists among the professions, the public and the Christian professional. Finding himself in the middle, the Christian has a unique opportunity and responsibility to locate those values which are common

to all three systems. Such values undoubtedly exist at the root of many professions but have been obfuscated by the process of social change. Extension of these values will produce tension as the normative systems of these three groups come into conflict. It is at this point that the Christian needs to understand the moral and normative positions which should be asserted. Ideally, these will be traced from the creative act of God which provides us with the clearest understanding of the relationship of man with the social and physical environments. Since the professions do not have the perspective to deal with the problem and the public has been traditionally submissive to the professions, leadership can be assumed most readily by the Christian professional. Lacking such leadership, the uneasy liaison which exists between professionals and the public will remain and social issues will probably not be dealt with effectively.

NOTES

[1]Support for some of these comments comes from an article by Talcot Parsons, "Research with Human Subjects and the 'Professional Complex'", *Daedalus* 98 (Spring, 1969) pp. 325-360.

[2]The definition of a professional complex offered by Parsons is "a complex of occupational groups which performs specialized functions for laymen . . ." p. 331.

[3]By the secularization of professions, I mean the development of specialization in a profession which has resulted from the need to deal with the increase in knowledge. A consequence of this specialization is the separation of the technical aspects of knowledge from their moral and religious bases.

Towards Consistent Christian Social Involvement

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Introduction

Consistent Christian social involvement is one of the greatest needs of contemporary Christianity. It is common for persons in the various branches of Christiandom to level charges of inconsistency at each other, thus making the task even more difficult. Much of the confusion and disagreement over Christian social involvement today may be the result of inconsistent usages of concepts which prevent real communication. As an example, the concept "social action" can mean a religious organization passing and establishing social resolutions or the sponsoring of social welfare agencies, or attempting to change the institutional structure of society. Further misunderstanding arises when social involvement is discussed without clear indications as to whether the involved unit is meant to be the individual, the local church, the denomination, or the interdenominational organization. The purpose of this paper is not to attempt to determine the bounds of legitimate Christian social involvement, but rather to present possible guidelines whereby such bounds can systematically and Biblically be determined.

A Paradigm

It is proposed that the following paradigm can serve as a systematic classification scheme within which all potential types of Christian social involvement can be placed. The structure of the paradigm is based on the concommitant considerations of two dimensions. At left from top to bottom the acting agent in social involvement can be: (A) the individual Christian; (B) the local church; or (C) the denomination or interdenominational organization. At the individual level, Christian conscience should be quite clear as the individual Christian seeks to gain a knowledge of God's directive in his own life. With increased collectivization of social involvement there is a parallel decrease in the clarity of Christian conscience. The larger the involved group, the less the likelihood of consensus concerning the desirability of the social involvement. Across the top from left to right the type of Christian social involvement can be: (1) ministering to an individual's spiritual needs; (2) ministering to an individual's social needs; (3) taking a position on an existing social issue; and (4) engaging in social action in an attempt to change existing social structure. Biblical verification is quite clear commanding our attention towards individual spiritual and social needs, but becomes less clear as the Christian seeks for guidance in taking stands on social issues and engaging in social action.

Examples of behavior given within each cell of the paradigm are for illustrative purposes only and should not be interpreted as examples of what this writer considers legitimate social involvement. The legitimacy of the behavior in each cell is directly dependent upon Biblical support. Biblical support must be of both the *type* of Christian activity (legitimacy of the cell itself) and the specific issue (within the cell). Explicit Biblical support, such as the application of the parable of the good Samaritan for love towards a minority group member, constitutes the most legitimizing kind of support. Implicit support, such as using Paul's appeal to Philemon in regards to Onesimus as an injunction against slavery, is subject to differences in

CHRISTIAN SOCIAL INVOLVEMENT

Type of Christian Activity

Acting Agent	1. Individual Salvation	2. Individual Social Needs	3. Position on Existing Social Issues	4. Attempt to Change the Social Structure (social action)
	← False Dichotomy →			
			Support — Opposition	
	Clear ← Biblical Verification → Questionable			
A. Individual Christian	1A Personal Evangelism	2A "give a cup of water . . . in my name" Good neighbor	3A Expressing views as an individual or as a member of an extra-Christian organization. *Example*: segregation, alcohol, war, gambling, drug addiction, etc.	4A Actively work for change. *Means*: open housing, prohibition, marches, demonstrations, lobbying, etc. a. within the law b. against the law *Goal*: change formal and informal social structure
B. Local Church	1B Evangelistic Meetings, Evangelistic Bible Studies	2B Brotherly love Heb. 13:1-3 Congregational member in need. Individual and families in need within the community	3B Issue statements of positions on social issues. *Example*: same as above	4B Church acting as a collectivity to induce social change. *Means & Goals*: same as above
C. Super-Church Structure (Denomination, Interdenominations)	1C Evangelism through mass media Literature Cooperative Evangelism Services	2C Orphanages Retirement homes Christian social welfare agencies	3C Issue statements of position on social issues. *Example*: same as above	4C Acting as an institution to induce social change. *Means & Goals*: same as above

Clear ↑ Christian conscience ↓ Questionable

exegetical interpretation. Many types of social institutions such as slavery are definitely against the norms and ideals of Christianity, but such conclusions must often be implied and may not be based upon the "proof text" method.

The real issues facing the church today center upon the legitimacy of the type of social involvement which falls within cells 3B, 3C, 4B, and 4C. A legitimate question can be raised as to whether a religious organization, be it a local church, denomination, or interdenominational organization, should take positions on social issues or attempt to change the social structure through collective social action. It is the duty of the church to make its members knowledgeable and aware of social issues and problems which clearly have a moral basis. Discussion of social problems such as racial prejudice and discrimination, law and order, poverty, justice, war, and alcoholism is not "getting involved in politics" but rather is the rightful duty of the church concerning itself with moral problems of society. The church's entrance into the-realm of "politics" takes place only when it goes beyond a discussion of the goals or ends of a social problem and starts concerning itself with the *means* to desired ends.

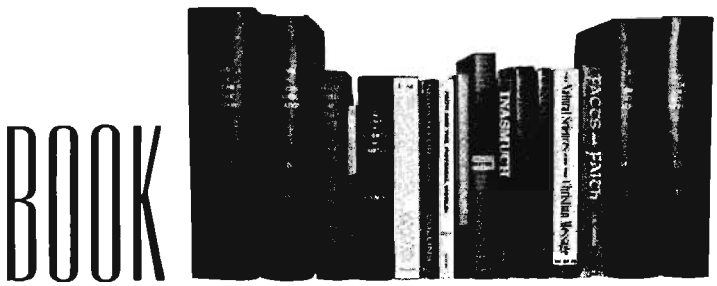
One very real function which the paradigm may serve is to force religious organizations to examine the consistency of their own beliefs about social involvement. A religious organization which takes the position that the church should never be involved in an attempt to change the existing structure of society must also behave according to this injunction. As an example, a religious organization which lobbies for greater law and order would be inconsistent if it at the same time criticized another religious organization for lobbying for social justice. Such a situation would be an example of a religious organization seeing the speck in another's eye and not the beam in it's own. It is possible for a religious organization to argue for the legitimacy of the church's participation in social action and distinguish between the legitimacy of the issues. However, the groups which are lobbying the hardest for law and order seem to ignore the Biblical injunctions for justice, and the groups which lobby for social justice often tend to slight Biblical teachings concerning law and order. If religious organizations were a little more introspective, they might be a little more

consistent in their social involvement, as well as reduce the often unjustified name-calling that exists between themselves. An attempt at consistent Christian social involvement is of course futile where Biblical teachings are rejected as the basis for legitimate social involvement. Where Biblical authority is rejected as a normative guide, a religious organization's social involvement is likely to be largely a reflection of present day societal norms.

A common phenomenon is for denominations to pass resolutions on social issues when only a very few of the local churches have done so and for interdenominational organizations to pass even stronger social resolutions than the denominations which it represents. Thus there develops the very interesting case where the social concern committee of a denomination recommends to its general conference the adoption of social resolutions which were adopted by the interdenominational organization of which that denomination is a member. Too often there is a filtering down process where the local church, instead of originating social resolutions, is the last collectivity of Christians to take stands on social issues. If the larger the group, the less the likelihood of consensus, then this method is the exact reverse of the ideal and is, in fact, an example of bureaucracy at its worst since the members of the religious power hierarchy are making the decisions. Whereas there is greater ease with which social resolutions can be passed at the higher echelon level, the dangers and inconsistencies in this method with the democratic process should also be realized.

An important question, but one beyond the scope of this paper, is the alternatives available in attempting to change the social structure. It appears that social ethics based on Biblical authority will produce definite priorities which a Christian must attempt to utilize in producing change. The most elementary suggestions would be that needed societal change must be attempted first within the law and only secondly against the law.

The time is past (if it ever was here) when Christians can fail to engage either individually or collectively in constructive social concern and action. However, because the church is in the constant danger of being reshaped by society and because each of us like to think that the problem is not ours but those who differ from us, the task in maintaining a consistent social involvement is often a difficult one.



THE RELEVANCE OF PHYSICS by Stanley L. Jaki, University of Chicago Press, Chicago, 1966. 604 pp. $12.50.

A blurb on the book cover says: "Physics has become the most powerful instrument at man's disposal for seeking out and revealing the hidden facts of inanimate nature. Are its methods and its insight equally relevant to other areas of human concern?" By a careful historical analysis of the development of physics and its interaction with the whole culture, Jaki seeks to make clear the proper strengths and limitations of the discipline of physics. His table of contents indicates the thoroughness and scope of his approach:

1. The Chief World Models of Physics
   a. The World as an Organism
   b. The World as a Mechanism
   c. The World as a Pattern of Numbers
2. The Central Themes of Physical Research
   a. The Layers of Matter
   b. Frontiers of the Cosmos
   c. The Edge of Precision
3. Physics and Other Disciplines
   a. Physics and Biology
   b. Physics and Metaphysics
   c. Physics and Ethics
   d. Physics and Theology
4. Physics: Master or Servant
   a. The Fate of Physics in Scientism
   b. The Place of Physics in Human Culture

Let me indicate the clarity of his approach by looking closely at two chapters of significance to those who value highly both religious and scientific endeavor. Those chapters are *Physics and Metaphysics* and *Physics and Theology*.

Many physicists of the last hundred years have taken a rather dim view of metaphysics. The following quotes are typical of this trend. " 'A metaphysician' wrote Maxwell, 'is nothing but a physicist disarmed of all his weapons,—a disembodied spirit trying to measure distances in terms of his own cubit, to form a chronology in which intervals of time are measured by the number of thoughts which they include, and to evolve a standard pound out of his own self-consciousness.' "[1] Lord Rutherford's comment to a philosopher friend who was prompting him to look into the philosophical foundations of science: "Well, what have you been talking all your life, Alexander? Just hot air! Nothing but hot air."[2] Or in a more serious vain K. Pearson's remarks in *The Grammar of Science* that "the difference between science and metaphysics consists in the fact 'the laws of logical thought' are valid in the former and do not obtain in the latter. Consequently, 'we must conclude,' advised Pearson, 'that metaphysics are built on either air or quicksands—either they start from no foundation in fact at all, or the superstructure has been raised before a basis has been found in the ac-

curate classification of facts.' "[3] Jaki argues that the historical roots of this distrust are varied. Physicists reacted severely to philosophic systems that have stifled orderly, experimental investigation of nature, Aristotle's metaphysics and Hegelian idealism being typical examples. Also, both physicists and philosophers have allowed ignorance of the other's discipline to stand in the way of mutual understanding.

Jaki clearly pinpoints the central fallacy of the scientist's mistrust of metaphysics: ". . . a quarrel with metaphysics usually goes hand in hand with the erroneous belief that science consists only of observations and deductions."[4] The falsity of such belief is clearly seen in the recognition by creative physicists of faith as a major foundation of all scientific work. In an extremely comprehensive review of the thought of major physicists Jaki clearly establishes the role that faith plays in scientific work. Creative scientists have a firm trust or faith that nature is intelligible, that an underlying unique and necessary order exists, that significant physical relationships are simple in structure, that underlying symmetries exist in the physical world, that nature behaves in the same way whether observed or not, that his own senses and memory are trustworthy, and that his fellow workers do and report their work honestly. Faith coupled with observation and deduction, not merely observation and deduction, is required for progress in science. I should add that he provides substantial evidence for the thesis that faith is an integral component of all human understanding, not merely religion.[5]

Jaki further points out the foolishness of physicists attempting to disown metaphysics by looking at the concepts they, themselves, have developed. Two examples among many will suffice to illustrate his arguments.

> He (the physicist) has to use terms such as I, you, it is, same, different, unity, diversity, and a host of others which by their very use raise questions that are pregnant with metaphysics—all this takes on an added metaphysical significance for the modern physicist, who must always be aware that the role of the observer plays an integral part of many of his experiments.[6]

Scientists today use the term "particle" not in the classical sense but as "a conceptual entity whose probability distribution is specified by a wave function." Because of such usage it was recently suggested that ". . . instead of particles one should speak of manifestations." This term immediately brings to mind the metaphysically laden question: "The manifestations of what?"[7]

Jaki's chapter on physics and theology is a superlative historical study of the continual encounter between theology and science, an encounter which has produced both negative and positive effects upon the two disciplines. After reviewing early Greek science he wisely concludes: "When the deity was extended into the world, as in the system of Aristotle, physics was deprived of its proper method. When the deity was negated as in atomism, the realm of human values came to be undermined. When the deity was absolutely severed from the cosmos, as in Epicurus' teaching, the concept of a generally valid physical law had to fall."[8] Theological perspectives had adversely effected science.

That Christian theology can make a positive contribution to the development of good science is seen from the work of the sixth century Christian philosopher, Philoponus.

> Led by the Christian view of a sharp difference between Creator and creature, Philoponus asserted that for the purposes of science, too, the whole cosmos, created in all its parts by God, and therefore essentially different from Him, was rather to be viewed as composed of the same type of matter and governed by the same laws (as found on earth) . . . To support this general principle, Philoponus insisted on rigorous observations, thereby exemplifying for the first time the purifying effects of the theological tenets in physical meaning . . . Stressing the uniformity of the physical world was not the only contribution of monotheistic beliefs to scientific thought. Even more important was another consequence of belief in a Creator. It opened the way to an autonomous scientific world picture in which nature neither usurped the attributes of God nor was itself exposed to incessant intervention by other-world powers.[9]

Note that the Bible presents God as moment-to-moment upholder of all reality—not an intervener into the regularity of the physical phenomena, but the one responsible for such regularity.

Jaki carefully reviews the development of science through the Medieval period to the blooming of modern science and then on till today. He argues convincingly that the Medieval period hindered the growth of true science by its insistence on only final cause explanations of all phenomena and yet it provided a needed cultural setting for the development of true science in its Christian perspective that God is a personal Creator of extreme rationality. It is a natural inference from this perspective that God's handiwork had to be supremely rational, thereby possessing regularities that could be discovered by rational beings. The Christian view of men as stewards responsible for God's creation would further lead to interest in scientific understanding of the world as a consequence of such stewardship. He also points out that the ancient Greeks had the intellectual tools to start modern science but their theological framework of a world governed by the whims of many gods gave little motivation for systematic study of nature's regularities.

Theology has also been often helped by science

Other Books Received and Available for Review

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

J.M. Aubert, *A God for Science,* Newman (1967)
A.J. Bellinzoni *et al.* (ed.) *Intellectual Honesty and Religious Commitment, Fortress* (1969)
M.A. Cook, *Prehistory and Earth Models,* Parrish (1966)
A.D. Dennison, *Shock It to Me, Doctor,* Zondervan (1970)
P.S. Moorhead and M.M. Kaplan (eds.) *Mathematical Challenges to the Neo-Darwinian Interpretation of Evolution* Wistar Institute (1968)
R.J. Nogar, *The Wisdom of Evolution,* Mentor-Omega (1966)
D.W. Patten *et al., Symposium on Creation II,* Baker (1970)
Cora Reno, *Evolution on Trial,* Moody (1970)
H.L. Smith, *Ethics and the New Medicine,* Abingdon (1970)
Dale White, *Dialogue in Medicine and Theology,* Abingdon (1968)
Alexander Wilf, *Origin and Destiny of the Moral Species,* Barnes (1969)
P.A. Zimmerman, *Rock Strata and the Bible Record,* Concordia (1970)
P.A. Zimmerman (ed.) *Darwin, Evolution and Creation,* Concordia (1959)

in that their interaction can lead to theology re-examining itself as to what its proper perspective on reality should be. Often such interaction has led to theology purging itself of improper tenets such as superstition and astrology. Jaki's central thesis on the interaction of theology and science is that both perspectives should be fully aware of what their true purposes are and what are the limitations of each outlook. For theologians to see evidence for God in gaps in current scientific understanding or evidence for God in a current (and very tentative) scientific theory is not a sound Biblical perspective of reality. Such attempts have historically reduced rather than strengthened faith. If it is recognized that science is only one way of looking at reality, the atheism of its method should be welcomed by theologians and not considered a threat. Questions of ultimate purpose, of why we are here are not properly answerable from a scientific perspective but a Biblical, a theological perspective.

The scientist who sees his method as the only source of true understanding and reality capable of only a materialistic explanation is going beyond the limitations of scientific method; ". . . although science speaks only of bodies and is therefore 'materialistic', materialism if it is to be 'scientific' should say things that are perfectly evident. But, as Pascal remarks, 'it is not perfectly evident that the soul is material.' "[10] Scientists should clearly recognize the Pascalian insight that their many discoveries represent: ". . . merely quantitative relations of matter, and whatever their numerical magnitude, they fall far short of the greatness of a thinking man, who belongs to a higher level of existence, where considerations, other than quantitative, master the solution of outstanding problems . . ."[11] Man is composed of matter but he is aware of his own existence as well as that of the universe; such awareness points to the uniqueness of the human intellect as compared to the purely physical. Moral and charitable considerations further transcend both physical and intellectual levels of existence. In summary, Jaki argues that both science and theology would benefit if they would recognize what Blaise Pascal clearly recognized—theology and science possess definite limits in their outlook.

Jaki shows that many physicists have found the great regularity present in nature pointing to an intelligence beyond nature. He acknowledges the validity of this viewpoint as long as one does not attempt to justify certain laws of physics as literally the way God runs the universe. Ultimately, however, evidence for God from physics, classical or modern, is not acceptable to a person unless he has "already found Him on more unchangable grounds."[12] It is interesting to note that Jaki sees the contingency present in nature, rather than regularity alone, as pointing to an intelligence behind the created world:

> . . . the paradoxical status of many basic principles and findings of modern physics illustrated vividly the view that order in nature is not simply the creation of the inquiring mind. More forcefully than ever, physics has had to recognize that its laws describing this order were not *a priori* constructions but had to be tailored meticulously to the stubborn, brute facts of nature. These facts are the actual setup, distribution, quantization of forces, and the sharply defined characteristics of the "fundamental" particles of matter, which simply state that not everything imaginable occurs in nature. Nature is a supreme paragon of drastic limitations of physical possibilities, and the order of the universe is just another aspect of this primordial fact . . . Yet, the fact of limitation remains inextricably present in the order and correlation of things as we see and interpret them, and of this limitation which in principle can take on so many various forms, nature itself gives no explanation.[13]

Einstein phrased the same argument beautifully when "he said the world is like a well-constructed crossword puzzle; you can suggest any number of words, but only one will fit all the facts."[14] I agree with Francis A. Schaeffer's observation[15] that the fact that such contingency exists in nature and cannot be explained by nature alone is a valid pointer to an intelligent Creator-Upholder God in the manner of Romans 1:20, "For the invisible things of him since the creation are clearly seen being perceived by the things that are made."

I have partially reviewed two chapters in order to convey some feeling for the great insight and clarity present in Jaki's historical approach to the relevance of physics as part of human culture. For any person or course that is attempting to identify the proper role of physical science in all of human understanding, this book is required reading. In the last chapter of Jaki's book, he argues that a historical study of the development of science will be of great help to scientist and humanist alike. His book is admirable proof of this supposition.

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THE CRIME OF PUNISHMENT by Karl Menninger, Viking Press (1969).

"The Crime of Punishment" is an enlargement of three lectures by Dr. Menninger after he received the Isaac Ray Award, which is presented annually to a physician or a jurist whose concerns are of interest to students and teachers of both medicine and law. Menninger has given years of his life to the study of criminals (and judges and prosecutors and defense attorneys), so making the award—a distinguished one—to him was a logical move. The book is not a shrill one, and its argument is not a reckless one. The author marshals reason against irrationality, compassion against the spirit of vengeance, and pragmatism against what I suppose can be called legalism and a sort of moral-

istic absolutism. He reminds us that there are crimes and crimes, criminals and criminals. In 1967, a billion dollars was embezzled by employees so deftly that no one could even be accused, and "one hotel in New York lost over seventy-five thousand finger bowls, demitasse spoons, and other objects in its first ten months of operation." Then, there are income-tax statements that don't include everything. And "the Claims Bureau of the American Insurance Association estimates that seventy-five per cent of all claims are dishonest in some respect, and the amount of overpayment [is] more than three hundred and fifty million dollars a year." Many of us go about our transgressions unnoticed, but most of those who are accused of crime are quickly convicted and punished. Ninety per cent of all defendants plead guilty without a trial; of the other ten per cent, more than half are convicted. People who worry about coddling and about "law and order" simply do not know those percentages. Nor do many of us know what prisons are like. Dr. Menninger presents an unnerving description of prison life in this country, though he has no hope that yet another account will bring an end to the awful things a twentieth-century democracy still permits, because exposés and investigations have not substantially changed conditions. We still put young first offenders beside hardened criminals. We still fail to sort out the dangerous and brutal and bloodthirsty from the confused and mentally retarded. We still mix ignorant and thoughtless men with confidence men. The "recidivists" are soon back in court, to be sentenced by judges who have little more choice than the prisoners:

> The judge undoubtedly hopes that the prisoner whom he is sentencing will undergo a change in his personality. But from what influences? No judge wants him changed in the direction of the features of prison life. How will the character structure of the offender, his particular strengths and weaknesses, be ascertained? And were this possible, let us say by some diagnostic setup, to what agencies will the judge refer the man for carrying out a program of induced change? Some judges do strive to accomplish these things in spite of the lack of facilities, the lack of time available to them, the lack of precedent in many jurisdictions.

The director of the federal Bureau of Prisons, Myrl E. Alexander, remarked in an interview recently:

> Simply removing an offender to an institution as punishment often only compounds the problem of reintegrating him into the community as a law-abiding citizen. All too frequently it costs him his job, severs his family ties and pins on him a label that makes all of his problems more difficult to overcome. So, as a means of punishment and as an instrument with which to change criminal behavior, imprisonment is still a failure.

We persist in our ways, though. Mr. Alexander says that two-thirds of our prisoners could be paroled at once without making our streets any more dangerous. Dr. Menninger says that a prison brands a man as hopeless, as a leper, and destroys what good judgment and common sense and sanity he may have. Mr. Alexander says that prisons do not offer the education and training so many convicts need to become law-abiding. Dr. Menninger points out what prisons *do* offer: bitterness, loneliness, hate, vengeance, sexual frustration, sexual perversion, futility. But we build larger prisons; we continue to believe that we will secure order and justice by locking up more of the poor, the marginal,

> *I have been thinking out an alternative penal system on the principle of making the punishment fit the crime; e.g., for absence without leave, the cancelling of leave; for unauthorized wearing of medals, longer service at the front; for robbing other soldiers, the temporary labelling of a man as a thief; for dealing in the black market, a reduction of rations; and so on.* ***Why does the Old Testament law never punish anyone by depriving him of his freedom?***
>
> Dietrich Bonhoeffer
> *Letters and Papers from Prison*, Revised Edition edited by Eberhard Bethge, Macmillan (1967), p. 78

the badly educated, the sick, the weak and bewildered human beings—the majority of those who are caught and imprisoned. Meanwhile, crime flourishes, and will flourish if we build five hundred jails a year and fill them: "And while an army of men across the country tries to serve our interests and safety by turning the wheels of this infernal machine for the grinding up of a minority of the easily caught offenders and administering to them the futile ritual of punishment, a horde of known but immune predatory criminals grows fat and famous in front of our eyes." Those are the criminals—Menninger's "professional" ones—who have lawyers, who have money to spend on politicians, sheriffs, legislators, judges, and jurors. If such criminals ever go to jail, they go to the few "good" prisons, where they are still privileged and are soon released on parole or pardoned. Money influences the law, and so do the psychiatric experts who advise judges and juries about insanity, "mental status" and "motives." Dr. Menninger says that some of his colleagues use "obscurantist, pejorative designations" and "pompous fraternity jargon," and that the American Psychiatric Association holds "eighteenth- and nineteenth-century notions." He will have none of their labels. Psychiatrists, he declares, can be—to use an old-fashioned word—disedifying. They wrangle with one another, and use words like "sick" or "pathological" or "abnormal" with flagrant imprecision, with condescension, with malice; any disagreement with their findings is evidence of "sickness," for which, of course, the dissenter needs something called "treatment." In a way, psychiatrists can become bulwarks for the evils, the caprices, the irrationality of the law. There is always the psychiatric "out": the prisoner is "ill," therefore he must be sent for "observation." Some psychoanalysts, Dr. Menninger points out, have even come up with this kind of thinking: People "need" to see a certain number of criminals severely and arbitrarily punished; inside us, Nemesis lives and will not be denied; we believe in an eye for an eye. So psychiatric and psychoanalytic theory can be used to defend the status quo: What exists in a society expresses what is emotionally "needed.' Implacable instinct is everything, and all the social, political, economic, cultural, and historical forces that shape our ideas and desires are mere reflections of the one great given, however variously and confusingly it is interpreted, that goes under the name of "human nature." But to Menninger people respond enormously to the world they live in. If they are poor and hungry, they turn on themselves, or they strike out at others and try to take things away from them. If they have been brutalized at home and at school and in their neighborhood, they

feel brutal toward themselves and they go after others brutally. None of which means that crime and violence are inevitable. We learn by example, and Menninger says that the two great examples of violence are a nation's willingness to wage war abroad and at the same time to herd many of its own citizens together, give them wretched food, beat them, flog them, set up conditions that encourage them to assault, rape, kill.

We seem haunted by "crime on the streets," and many of us believe in longer sentences and more prisoners; so, in a sense, Dr. Menninger's timing is poor. A large number of us don't want to hear his sane voice asking its unsettling questions, its tone of reason and compassion and forgiveness, of concern for both the violated and the violent, whose own sense of violation will not disappear, however solid and dark and bare and cold our dungeons are. What we presumably want to know, he says, is "how to identify, detect, and detain potentially dangerous citizens." Yet the best of our doctors can't be sure which of today's troubled (or, to all appearances, untroubled) children will be tomorrow's killers or thieves. Psychiatrists—and I am one of them—can offer a coherent and reasonable explanation of why a person is driven to break the law, but we cannot always do much to change him. There are only a few of us, and a good amount of our time is given over to (purchased by) people whose crimes are often imaginary. Moreover, as we keep saying in all those journals, even the most intact of personalities respond uncertainly to the best of psychiatric care. But the matter of crime does not give us reason only for gloom and despair. Prisoners (among others) do not have to be psychoanalyzed to be rehabilitated. The Bureau of Prisons, which runs far better programs than most of our state prisons, has achieved many notable successes. Myrl Alexander told his interviewer:

> Correction is a continuous and closely interwoven process, no one element of which can be successfully isolated from the others. Juvenile detention, the jail, the court, probation, halfway houses, juvenile institutions, penitentiaries, parole, work-release and pre-release programs, academic education, vocational training, group therapy--all are inseparable in their total impact on delinquent and criminal behavior.

We still do not know why one man falls sick and another stays reasonably well, why one person's violence becomes a disaster for all of us and another's can be channeled into useful forms of expression. In fact, the very way we define what is "normal" and "abnormal" and "good" and "bad" will continue to trouble us. (In the British psychoanalyst R. D. Laing's unforgettable words, "A man who prefers to be dead rather than Red is normal. A man who says he has lost his soul is mad. A man who says that men are machines may be a great scientist. A man who says he *is* a machine is 'depersonalized,' in psychiatric jargon.") What matters is that, despite all those riddles and dilemmas, men have always shown themselves capable of transformation, of growth, for reasons no social scientist may ever be able to specify. The ironic title of Dr. Menninger's book brings to mind Dostoevski. Raskolnikov and Sonia would hardly be considered good "treatment risks" by many of our psychiatrists, nor would many of us find much mercy in our hearts for them. To Dostoevski, however, punishment is absurd and worthless unless it leads to a new beginning:

> They wanted to speak, but could not; tears stood in their eyes. They were both pale and thin; but those sick, pale faces were bright with the dawn of a new future, of a full resurrection into a new life. They were renewed by love; the heart of each held infinite sources of life for the heart of the other.

I suppose such words can be dismissed as embarrassing sentiment, the prerogative of soft, muddle-headed visionaries—which brings to mind an added embarrassment. We are fast approaching the year 2000, which will again remind us how long ago it was a child was born whom others eventually scorned, arraigned, and punished with the harshest penalty, only to find the man revealed as God Himself.

POLLUTION AND THE DEATH OF MAN: THE CHRISTIAN VIEW OF ECOLOGY by Francis A. Schaeffer, Tyndale, Wheaton, Illinois (1970). Paperback, 125 pp. Connoisseurs of Schaeffer, who know in detail *Escape from Reason* and *The God Who is There*, will find in this new book not so much additional material and additional insight, as a powerful application of these basic ideas to the question of man's relationship to nature. Actually only 93 pages represent the text by Schaeffer, the remainder of the book bringing reprints of Lynn White's paper on "The Historical Roots of our Ecologic Crisis" from *Science* (see also *Journal ASA* 21, 42 (1969)), and Richard L. Means' paper on "Why Worry About Nature?" from the *Saturday Review*. Both of these propose solutions to the problem of man's relationship to nature which Schaeffer rejects. The book as a whole gives evidence of having been written in haste with needless repetition and a complete absence of sub-headings within chapters, almost as though spoken talks had been transcribed with little editing. No matter. What Schaeffer has to say is worth reading. There is no answer to the present ecology crisis except in an understanding of the Christian's relationship to the created order.

As always, Schaeffer's prose is worth quoting. A few examples must suffice:

> The death of "joy" in nature is leading to the death of nature itself.
>
> Men *do* what they *think*.
>
> Created things have an existence in themselves. They are really there. . . . It is the biblical view of nature that gives nature a value in *itself*.
>
> Christians should be able to exhibit individually and corporately that . . . they can produce something that the world has tried, but failed, to produce.
>
> We can love a man for his own sake, for we know who the man is—he is made in the image of God; and we can care for the animal, the tree, and even the machine portion of the universe, each thing in its own order—for we know it to be a fellow creature with ourselves, both made by the same God.

Schaeffer demolishes both the solution of pantheism and the solution of romanticizing nature as effective bases for a view of ecology. He is no less quick to reject the "other-worldly" brand of Christianity which acts as though the only valuable things were heavenly. Pantheism is to be rejected because it eventually gives no meaning to any particulars, provides no answer for the fact that nature has two faces (both benevolent and malevolent), and will finally result in lowering man to a place in impersonal nature rather than elevating nature. Romanticizing nature is to be

rejected because it again cannot account for the two faces of nature, and because it provides no basis for ever utilizing nature for the benefit of man. "Otherworldly" Christian forms must be rejected because their allegiance to a dichotomy between the material and spiritual deprives them of any opportunity to speak meaningfully about the material.

By contrast, Reformation Christianity sees the key to man's relationship to nature in the doctrine of creation. Although man is separated from nature in an upward dimension in that he is created for fellowship with God, yet he is one with nature in his creaturehood in a downward dimension. In terms of God's creation and our own creaturehood, it can truly be said that "we *are* one with the tree. . . . While we should not romanticize the tree, we must realize God made it and it deserves respect because He made it *as a tree*." The Christian is delivered from any false concepts of dichotomy by the Incarnation, in which it pleased God to take on the material form of a human body.

In view of this relationship between man and nature, the Christian is called upon to contribute a "substantial healing" to the wounded and suffering universe. As God made it possible for man to be received back into forgiven fellowship and thus to bridge the gap of separation between man and God, so the Christian is called upon to heal in Christ's power the separations between men and men, between man and nature, and even between nature and nature. Thus he carries out here and now the firstfruits of Christ's redemptive victory, to be fulfilled and completed when He returns. Schaeffer likens the Christian community to a "pilot plant" in which the life and power of the Kingdom is to be manifest here and now. To be thus successful, it is necessary for Christians to understand the nature of their creation-ordained relationship to nature, to transcend the cultural and economic constraints of modern society, and to be willing to heal the wounds of nature even when it causes wounds in our own pocket books. Preservation is not to be sacrificed to Profit. Nature is not to be treated well because we can get the most out of it that way, but rather because we are responding to the love of God, the Creator.

> When we have learned this—the Christian view of nature—then there can be a real ecology; beauty will flow, psychological freedom will come, and the world will cease to be turned into a desert. Because it is right, on the basis of the whole Christian system—which is strong enough to stand it all, because it is true—as I stand and face the buttercup, I say, "Fellow creature, fellow *creature*, I won't walk on you. We are both creatures together."

With these words Schaeffer ends his brief statement on ecology. We can hardly do better.

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HEREDITY: A STUDY OF SCIENCE AND THE BIBLE by William J. Tinkle, St. Thomas Press, Houston. 1967. 180 pp.

This very interesting volume contains twelve brief, but fully packed chapters. The information is presented in a simple, clear and well-organized style. Thus it helps to fill the "tremendous gap between the specialist and other intelligent persons" which is the declared purpose of the author.

Following a brief history of genetics, the author deals with classic topics and states that the findings support creation, not evolution. Early in the book it is emphasized that to accept evolution as the final word on the origin of life and the cause mechanism of present forms of life is so to bias science that essential truth may never be brought to light. He suggests that the faith needed to believe the evolutionary theory is no more scientific than the faith needed in Christianity. A part of the conflict lies in the attitudes on the origin of life. Also science which claims to be objective is not. Another problem is the lack of rules to determine the validity of data collected by science. He further states that science must not cast

Very often, it is only after others have brought it into the open that Christians become aware of a problem, and then they climb on the bandwagon of parties or doctrines.
Plunged into a situation of social injustice, exploitation, and alienation, Christians soon discover movements led by others and enthusiastically join them. The same thing happened a century ago, when Christians fought in wars for the defense of their country. If I wanted to be mischievous, I would say that a century ago nationalism was the ideological fashion, and Christians went along with it, adducing every imaginable Christian motif to justify their stand. Today social revolution, etc., are the fashion. To say so may seem wicked, for I am told, in scandalized accents, that this is not a question of fashion, that all the truth of Jesus is at stake in this social conflict. But I answer that the Christian nationalists of the nineteenth century also killed each other in the conviction that Jesus had established nations and that love of country was part of love of God. We find that stupid nowadays. But can we be sure that, fifty years hence, today's prorevolutionary position will not also seem stupid?

What troubles me is not that the opinions of Christians change, nor that their opinions are shaped by the problems of the times; on the contrary, that is good. What troubles me is that Christians conform to the trend of the moment without introducing into it *anything* specifically Christian. Their convictions are determined by their social milieu, not by faith in the revelation; they lack the uniqueness which ought to be the expression of that faith. Thus theologies become mechanical exercises that justify the positions adopted, and justify them on grounds that are absolutely not Christian.

Jacques Ellul
Violence: Reflections from a Christian Perspective, Seabury, N.Y. (1969), pp. 27, 28.

away supernatural acts of God as a possible cause of the universe.

Dr. Tinkle describes the difficult problem of accounting for genes by the process of evolution. He makes much of the fact that Darwin's ideas were framed in a mind not yet enlightened by the genetic findings of Gregor Mendel. He concludes also that since evolutionists cannot agree among themselves that "they should allow other scholars to believe that a wise and intelligent Creator planned and formed the intricate structure of living things".

This book contains practical and helpful information in integrating science and faith. The author stresses that man is not simply controlled by genes and environment but that he is a free moral agent made in God's image. However, genes would seem to offer stability from biological change as seen in the fossil record. He feels that the creation of genes rather than their gradual evolution is favored by the Hardy-Weinberg law.

Spontaneous generation is vividly presented with past, present and future implications. A vital point projected is that if man does succeed in producing life in a test tube it will deserve great acclaim, but will in no sense prove that such took place in the beginning. He writes, "The controlled conditions in a modern laboratory are a far cry from the soup in a primeval, lonely sea." Dr. Tinkle also gives a panoramic view of the theory of the inheritance of acquired characteristics, and states that, "it cannot be denied that he (Darwin) relied upon this theory especially in his mature life." The author reasons that since Darwin was in error by accepting this theory he could have wrong in some of his other ideas.

There is much genetics condensed into the 180 pages of this book, ranging from the nature of the gene to advice to young people contemplating marriage. He suggests two problems: Who will play God when it becomes possible to alter the pattern of DNA? Who will decide what characteristics are the most valuable? Sterilization and segregation are pointed out as negative eugenic methods while low cost housing, tax relief, reduced medical cost are positive eugenic measures.

The theory of heterozygous creation is presented. This is the theory that the original kinds of Genesis were created heterozygous and therefore crossing and mutations were not necessary to get many new smaller groups variously called genera, species, breeds and varieties. In other words, God created various kinds with potentialities for change to meet new conditions.

Natural selection is discussed rather fully in this book. The author maintains that natural selection can not account for the evolution of amoeba to man. He presents his view of natural selection in these words, "Like genetic drift, natural selection also has a function to perform in nature, to eliminate abnormal individuals and so maintain a lower limit."

In his discussion of human progress, he believes that early man did not evolve from a lower life form but was specially created by God in his present form. He further states that original man was capable in his world, had innate ideas, facility of mind and skill of hand. In other words, he was not ignorant. A very suggestive account is given of prehistoric man, and it is made clear that progress of the human race is not synonymous with evolution. The author declares, "Human progress is of the nature of accretion rather than biological growth, and so adds nothing to the argument for a universal material development of living things."

Since embryology, paleontology and comparative anatomy are used as strong support for the theory of evolution, Dr. Tinkle discusses these topics. The recapitulation theory is stated, and some vital and interesting points are made concerning the gills and the heart. Concerning paleontology, the author dwells on its greatest weakness—unproved assumptions. He also declares that uniformitarianism cannot answer some of the basic problems. He mentions that there has been some move back to catastrophism, but a catastrophism without God. In his judgment the fossil record is not a record of misfits, but a record of animals well suited to their environment.

The author points out that if evolution as taught by such men as G. G. Simpson, is fully accepted it ultimately leads to the rejection of God. He believes that the real conflict is not between the Bible and science, but between the Bible and a group of scientists who reject the Bible as the authoritative Word of God. He reminds the reader that unrealistic ideas such as man being created in 4004 B.C. and the fixity of species, have helped give rise to this rejection of the Bible. Regarding this second idea Dr. Tinkle writes, "This over-zealous claim of no change has done harm to the creationist cause. . . ."

The last chapter deals with the essential nature of man. This chapter declares man to be unique for he uses words as symbols of ideas; he also uses fire, makes and uses tools, loves, cares, worships, possesses a conscience and has a freedom of choice. The author emphatically states that evolution cannot account for this unique nature of man. Religious groups, as well as the government, recognize this essential nature and expect man to regulate his conduct. As the author writes, "Animals and machines never are summoned to court to give account for their conduct."

The ideas found in this book are not new, but the skill of the author lies in presenting these ideas with zeal and conviction. The data given are not new, but are framed in provocative arguments. These arguments may not convince the saturated evolutionist, but may give food for thought to the person who has left room for new thinking. It is a valuable book for anyone who enjoys scientific thinking. It should rank as a shelf companion to Bernard Ramm's book *The Christian View of Science and Scripture* and the book *Evolution and Christian Thought Today* edited by Russell L. Mixter.

Reviewed by Harold E. Snyder, Chairman, Division of Natural Science, Bethel College, Mishawaka, Indiana

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A second review of "Heredity: A Study in Science and the Bible"

This book is essentially a series of twelve anti-evolution sermons, using various aspects of heredity as a text. The author has been both a minister and a teacher of biology, and is apparently now retired. Although it contains a large amount of genetics, and this is almost entirely free of error, the book is not a genetics text.

I share a conservative (fundamentalist) bias with

the author. Therefore, I am happy that Dr. Tinkle points out that harmony between the Bible and scientific belief is less important than eternal truth (p. 7), and that an understanding of the possible origin of DNA doesn't really provide an understanding of the origin of life, since apparently DNA doesn't do anything by itself (p. 52-3). However, he has already weakened his case by casting doubt on the presence of messenger RNA, citing Chargaff. Apparently Tinkle is unfamiliar with the work of Nirenberg and many others, during the early 60's. Our present concept of DNA function, involving all the complexities of sigma factors, ribosomal proteins, etc., casts further doubt on the origin of life being equivalent to the origin of DNA.

Another argument which might have been introduced is that the origin of any single DNA is mathematically unlikely. This has been stated most compellingly by Salisbury (*Nature*, Oct. 25, 1969).

Tinkle is treading on good ground when he indicts many scientists and others for confusing secular changes with phylogenetic changes, and treating hypothetical examples (fast rabbits evolved from slow ones, etc.) as if they were proven. The fact that belief in evolution relies on faith is also pointed out.

Unfortunately, Tinkle makes some serious errors of logic in this work. One that he shares with many is the claim that since most mutations are bad, mutation cannot produce any beneficial changes. This statement is probably true in the case of an organism which has become well adjusted to its environment by selection. However, when the environment changes, formerly detrimental mutations may be beneficial. Also, there is experimental evidence indicating that an increase in the number of mutations (For examples, see *Science* 162: 1456-7, Dec. 27, 1968; *Science* 169: 686-688, Aug. 14, 1970) does benefit organisms in experimental conditions.

Another error of logic is the claim that changes wrought by human selection have not benefitted the organisms involved. Certainly they *have*, as measured by the biomass of pigs, peas, or what-have-you, compared to what it would be if these animals and their environment, were in their pristine state. It is true that present-day pigs, etc., are not as well fit to live in the wild as their ancestors. Neither is Tinkle! So what? The question of present benefit must be asked and answered on the basis of present conditions. Even grapes are better off for being seedless under present conditions.

Dr. Tinkle asserts (p. 91) that creation is finished, and has been since Genesis; hence genes, and other things, have only changed due to a few mutations. This is supposed to show that genes, or organisms, cannot have improved since this creation. Perhaps not, but what does Genesis 2:1 mean? Surely not that matter cannot be rearranged in many ways, from the "creation" of new islands (Surtsey, for instance) to the alteration of nuclei by the fusion reactions of stars. Thus it does not follow that at least some organisms cannot have improved.

There are a number of places where Tinkle claims that more people are coming to believe in creation all the time. I wish I thought he was correct. (See Davidheiser's quote of Cassel, *Journal ASA*, p. 120, September, 1970).

In summary, I wish this were a better book. The author's intentions were good. However, neither heredity nor anything else can prove or disprove evolution. It is a matter of faith.

Reviewed by Martin LaBar, Chairman of the Division of Science and Mathematics, Central Wesleyan College, Central, South Carolina.

CONFLICT AND HARMONY IN SCIENCE AND THE BIBLE by Jack Wood Sears, Baker Book House, Grand Rapids, Michigan. 1969. 97 pp. Paperback. $1.95.

This book is based on a series of lectures presented by Professor Jack Wood Sears (Ph.D. from University of Texas), Head of the Biology Department, Harding College, Searcy, Arkansas, at the University Christian Student Center of the University of Mississippi on the subject, "Science, the Bible, and Evolution." In the course of the book the author discusses general considerations relating science and Christian faith, the authority and reliability of the Bible, and the nature of the evidence advanced for the general theory of evolution. Dr. Sears presents one of the better available treatments of these topics from an anti-evolutionary point of view.

The author successfully avoids most of the subjective, emotional and polemical characteristics that such discussions often take on. In the Preface he emphasizes that he is presenting the summary of his present thinking, and that he is open to changes on the basis of new facts or understanding. He sets as his goal a "rational, unemotional presentation of the 'facts'" and sticks with it. He recognizes the importance of interpretation in conflicts between science and Christianity on both sides. He acknowledges that the Genesis account "has not satisfied our scientific desire to understand the mechanism involved," and does not tell us *how* God made man: "Really the emphasis of this passage is not the *how* but the *fact* that God made man."

The author refers to the American Scientific Affiliation in two places, once linking it with the Evolution Protest Movement in England and the Creation Research Society as examples of organizations of scientists to oppose openly the theory of evolution, and once to illustrate the fact that scientists can believe the Bible to be "the inspired Word of God," in the words of the ASA statement of faith, which he quotes. The latter is certainly true, whereas the former constitutes a misrepresentation of the purpose of the ASA, which has never been to oppose or defend evolution.

Dr. Sears confirms his intentions to "examine the evidences" with respect to evolution "upon their own merit and not from a religious or Biblical point of view." He recognizes that "the Theory of Evolution . . . is not necessarily atheistic or materialistic." He proceeds from the seven assumptions that Kerkut (*Implications of Evolution*) sees as implicit in the general theory of evolution and examines each in turn. He concludes that none of them have received what can be called experimental verification. Although investigations do "demonstrate the fact that Darwin and those following him had some truth," "the general theory of evolution is not satisfactory," and "the evidence presented and available from paleontology is generally

antagonistic to the general theory of evolution."

Having indicated his conclusion that the theory of evolution is unsatisfactory, the reader might then have expected Dr. Sears to analyze the available data from some different perspective that would be satisfactory. After arguing that a scientist today can believe the Bible and making the claims that he believes "the Bible to be accurate when it makes a statement of fact, be it historical, geographical, scientific, psychological or spiritual," however, Dr. Sears offers no alternative position either from science or the Bible, but counsels instead that "since I hold science to be a valid approach to reality, and since I have concluded, upon much and sufficient evidence, that the Bible is inspired and therefore true, the only rational recourse, it seems to me, is to withhold judgment about a seeming contradiction."

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

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A second review of "Conflict and Harmony in Science and the Bible"

The concern of this book is an old one: the compatibility of scientific fact and Biblical revelation. Of course, exponents of science and theology have exchanged thoughts on this topic for centuries. When discussion has become debate, the scientist has usually emerged victorious among the intellectual public of his time. The implications of this victory for their religious faith, however, have spurred some scholars to resist a scientific sell-out. Dr. Jack Wood Sears, head of the Biology Department at Harding College, Searcy, Arkansas, joins them with this book, a series of lectures sponsored by the University Christian Student Center at the University of Mississippi.

Sears' thesis is that any "conflict" between science and scripture is apparent rather than real, resulting from ignorance and prejudice on the part of both scientists and theologians. That there is essential agreement between natural and supernatural modes of God's revelation is an assumption which must be made by all consistent Christians. An effort to establish this crucial assumption logically is indeed noble, but unfortunately Sears' attempt is unsatisfying.

This dissatisfaction results partly from Sears' pervasive preoccupation with generalities. First, he is vague in setting the stage for his discussion. He quotes several sources alluding to a "conflict between science and the Bible," but he never explicates what the conflicts are. He never posits *a* teaching of science against *a* teaching of the Bible. While half the Book deals explicitly with the problem of evolution, Sears never states what he believes the *Genesis* record of creation means. As a result of this vagueness, the reader must himself decide what the "conflict" under discussion is.

In addition to this ambiguous statement of the problem, the text dealing with evolution is a conglomeration of general words and phrases throughout; page 28: "the issues," "the crucial evidence from fossils," "other areas of study," "certain places," "certain elements in the scientific community," and "the doctrine." The appearance of such generalities in the introductory pages of a chapter (as this page is) is understandable if their generality is later specified. Further into the book, however, the reader continues to encounter only non-committal phrases such as "complex chemical reactions," "taxonomic, morphologic, and biochemical relationships," and "the evidence from morphology, embryology, and paleontology."

Hollow language even permeates the author's promise to present evidence relevant to the theory of evolution and to then evaluate (or re-evaluate) this evidence as an objective scientist. Instead of naked evidence, the reader is given a succession of summarized statements *about* the evidence. Instead of discussing specific biological ceases, Sears simply asserts that "the evidence is that . . ." or "this is not supported by the evidence," etc.

Sears' thoughts on evolution revolve around two concepts which he derived from G. A. Kerkut's *Implications of Evolution*. They are the "general theory of evolution", or the theory that "all living forms in the world have arisen from a single source which itself came from an inorganic form," and the "special theory" of evolution which states that "many living animals can be observed over the course of time to undergo changes so that new species are formed." Sears, though somewhat hesitant to state his own position, apparently agrees with Kerkut that the special theory is realistic while the general theory is not.

The portions of Sears' book dealing with evolution center around seven "assumptions" which Kerkut says all exponents of the general theory must make: (1) spontaneous generation of "life" from inorganic elements has occurred; (2) this origin of life was a unique event; (3) all living things are genetically interrelated; (4) the metazoans arose from the protozoans; (5) all the invertebrate phyla are interrelated; (6) the vertebrates arose from the invertebrates; (7) the sequence of appearance of vertebrates was fish, then amphibians, then reptiles, then birds and mammals. The first two statements relate to the origin of life, a historical event, while the last five, in general, concern the course of evolution, a historical phenomenon.

Any knowledge of these historical problems must necessarily be inferential. This necessity does not, however, condemn knowledge so obtained to be *a priori* false, as Sears seems to imply. There is general agreement among evolutionists that available empirical and historical evidence pertinent to the solution of some of these problems is meager indeed. But the fact that little is known about invertebrate phylogeny, for example, does not necessarily mean that the invertebrates have not evolved from a common ancestor.

Sears' argument concerning the validity of the general theory of evolution may be summarized: an incomplete understanding of the origin and sequence of appearance of life forms upon the earth, using the concept of evolution as a guiding principle, requires honest scientists to re-evaluate that concept as a logical explanation of that origin and sequence of appearance. Now emphasizing this uncertainty does have the merit of pinpointing where research efforts should be concentrated. But the author's surveillance of what is *not* known about the historical appearance of life upon earth can unfairly discredit the theory of evolution, especially to the uninformed. What is wrong with Sears' approach is that it implicitly denies the existence of, and explicitly fails to consider those innumerable observations which convincingly uphold the general theory of evolution.

Sears' use of general language, mentioned earlier, is simply one expression of his almost complete neglect

of primary issues. For example, he altogether avoids any significant consideration of ecological and genetical forces such as natural selection, geographic isolation, mutation, recombination, and genetic "drift," of which the evolutionary influence upon populations of plants and animals has been empirically verified. Such a deletion is almost unbelievable considering the centrality of such forces to the modern theory of evolution. The term "mutation" appears but once in the entire book; "natural selection" is used three times, twice in quotations. In a discussion of the peppered moth in England, Sears concedes that "variation does occur and natural selection works to cause variations to be established in populations . . ." and that "Darwin . . . had some truth." But he then assertively denies that selection and other forces operating through time could account for the various life forms found upon earth. Forceful assertion is not consistent with an objective treatment of the evolutionary problem.

The author is nearly as shallow in his coverage of the inferential evidence of evolution (paleontology; biogeography, and comparative anatomy, physiology, embryology, biochemistry, and behavior) as he is of the empirical evidence. Only paleontology is even mentioned, and then less than four pages on human and horse evolution constitute the sum total of text discussing specific animals. Although he does not present and evaluate any fossil evidence, Sears claims that the cases for human and horse evolution are very weak. And he implies that only uncritical scientific puppets could believe otherwise.

Such a superficial treatment of a problem can result in absurd conclusions. This is exemplified by Sears' comments on the Cambrian fossils. He argues that since fossils of all the major animal phyla in existence today appear abruptly in the Cambrian rocks, the record therefore gives no hint of an adaptive radiation of these phyla from a common ancestral stock. He urges that innumerable discontinuities in the fossil representations of related groups discredits the idea of gradual evolutionary transition, and he suggests that all the fossil record demonstrates is that there has been limited "variation and change" within the phyla through time.

These considerations are logical only if one forgets a number of very important facts. For example, the occurrence of Pre-cambrian (the 2,400,000,000 year period preceding the Cambrian) fossils, however sparse they are relative to the Cambrian fossils, is well-known. The appearance of the Cambrian animal phyla was *not* simultaneous, but was staggered throughout its 100,000,000 year history. The fossil record shows innumerable individual species, genera, and classes within the phyla appearing and/or becoming extinct through time. And there are a number of quite reasonable explanations of why Pre-cambrian fossils are scarce, why broad levels of biological organization such as the phyla should persist through time, and why some discontinuities of the fossil record exist. These observations alone disrepute Sears' claim that since nearly all the animal phyla are represented in the earliest fossils, the inhabitants of earth today are essentially the same as they always have been. But the singular fact that not one vertebrate fossil has ever been found in the Cambrian rocks alone leaves his argument anemic, to say the least. Yet after this omission of known facts and a castigation of the interpreters of the fossil record for being of "strong philosophical bias," Sears astonishingly concludes that paleontological evidence is "generally antagonistic to the general theory of evolution."

Several brief criticisms of the book should be made: (1) Misrepresentative, out-of-context quotations are common. For example, the contextual implication of one quotation of J. T. Bonner is that biologists have without sufficient reason posited the truth of evolution. A poor knowledge of invertebrate phylogeny, in fact, was the object of Bonner's comment. (2) The majority of quotations, whether validly included or not, are merely inserted without prior or subsequent critical comment by Sears. (3) Too much of the book was written from research in secondary rather than primary sources. One scientist's view on the elemental composition of the primitive atmosphere was even extracted from the Arkansas Gazette! (4) There are factual errors in the book. ATP and ADP are not enzymes, and "Bryophyta" is a taxonomic division of plants, not a geologic time period. (5) The book's sixteen diagrams, fifteen of which are phylogenetic trees, are not self-explanatory and are largely useless for elucidating the text. Despite the profusion of impressive taxonomic names, the diagrams certainly convey no profound meaning for the evolutionary question, as an uncritical reader may naively assume. (6) There is at least one gross publishing error—the subtitle for Figure 9, p. 69, is obviously misplaced.

This review has dwelt, perhaps disproportionately, upon the topic of evolution as presented in this book. Portions of the text, however, are devoted to discussing the nature and limitations of science and the premises underlying the scientific method, the relation of science and scripture to history, and why enmity often exists between scientists and theologians. One chapter is a confession of why the author, as a scientist, unreservedly believes in the inspiration of the Bible. Several pages are also used to contrast how reality is viewed by an uncompromising naturalist as opposed to one who claims belief in the supernatural. While the arguments are not uniformly convincing, the comments made in these parts of the book may be of varying help to different individuals in their quest for a perspective on science and scripture.

In my opinion, most positive content in this book, however, is negated by the spurious treatment of the problem of evolution. On that topic this book is a skillful synthesis of biologic bombast, and it will have the unique effect of confirming the uninformed in their ignorance. An actually superficial and distorted presentation of specific data belie the author's humble claims to be objective. Of those understanding the foundation of the modern evolutionary theory, the non-Christians will be repelled from faith in Christ, and the Christians will be discouraged by the fundamental misrepresentations found in this book.

Reviewed by Eric Dyer, NSF Fellow in Department of Biology, University of Chicago, Chicago, Illinois 61637.

Journal Is "Too Good"

I find the Journal too good nowadays. I feel like a caged lion. Practically every article makes me want to respond or have a three day discussion on the problem.

From the firing line as a practicing physician trying to use every opportunity to influence men's beviour for Christ, I would like to add this experience to the articles by Collins and Moberg (*Journal ASA* 22, 8 and 14 (1970)). I used to feel that it would not be fair to talk to a very sick non-Christian about the Lord; it would be taking advantage of him. Then I read *The Battle of the Mind* by William Sargeant. He goes more fully into Pavlov's work and speaks of the experiments where Pavlov made the dogs sick or injured them, at which point he could usually get even the most resistant to change its behaviour. Further, he often found it impossible to change it back in these cases.

Since reading this book, I have been very open to any leading of the Spirit in speaking with a very sick person. I certainly do not think that we should make people sick, but God knows his own creature. If God makes (lets) a man become sick, I think we should be conscious that it could be a tremendous opportunity and responsibility to present Christ lovingly and positively.

I have seen this happen with one patient whom we were able to retrieve from a very debilitating disease. I have never seen a person so joyful after believing. This happened before I read the book. The second case was a man to whom I had been able to present the Gospel about once a year over a period of three or four years when his Christian wife would succeed in bringing him to our house for a meal. He always laughed at her afterward. One day he suddenly started caughing up blood. I could find nothing wrong on repeated exams and sent him to the local TB clinic. Their exam was also negative. Meanwhile I paid him two social visits about 15 days apart. I spoke to him about the Gospel each time and he seemed to be taking it in like a sponge. The second time I asked him whether he wanted to accept Christ, but warned him not to do it to please me. He said, "And why not" and prayed after me in front of his children who snickered at him. We prayed too of course, that he would get well. Immediately after this the bleeding stopped. (Medically, it seems to me to be a case of Divine Illness rather than Divine Healing) Though he can't read, he has remained firm in spite of the opposition of his Muslim friends.

In closing I would like to add that I don't think it is fair for Collins to abdicate with "Whether they (techniques of behaviour manipulation) can or should be used as a vehicle through which the Holy Spirit works, is a question which I leave for some theologian or Bible Scholar to answer." He teaches in a seminary and presumably gives his opinions to his students daily. Further I'll bet he is a very good Bible Scholar, especially in any verses that could bear on psychology. Let's have an applied article from both Collins and Moberg giving examples of what is good and what isn't and why. They are the specialists. If they can help us get more folk out of the first two kinds of soil and into the "good ground" class, I'm all for it.

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Rue Ibn Zeidoune
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Wanted: A Bibliography on Pedagogy

I received the recent copies of *The Journal of the American Scientific Affiliation* and have read enough in them to subscribe to them. Enclosed please find a money order for one year's subscription. This is the group and publication I have desired for several years. I am not a scientist but I might be classed as one who desires to be a scientific religious educator, using the word scientific in accordance with your definition of science on p. 262 of *Encounter Between Christianity and Science.* Also since I spent almost twenty years in the schoolroom, as a retired teacher I do substitute teaching in the Public Schools of Corpus Christi almost every school day.

I believe to get God back into the lives of the people is the same as before the Reformation when the Bible was carried into the homes of the people by the Lollards in England. This can be accomplished today by the re-establishment of the Family Altar. But how can this be done when there is to my knowledge no scientifically organized set of commentaries, Bible readings, or books of instructions for the parents or children in the home? What can be expected of the child who is instructed according to scientifically proved educational methods in the public schools and comes to study the Bible according to methods of the seventeenth century? And is expected to accept the theology of that same century which he knows will not stand scientific investigation and is not in keeping with the scientific information which he reads in his school books and the daily newspaper? The only encyclopedia which can be used is *The Living Bible Encyclopedia in Story and Pictures,* (1968) H. S. Stuttman Co. Inc., New York, N.Y. 10016 in 16 volumes and costs about $50.00.

My old Seminary professor, Dr. A. T. Robertson, Prof. of New Testament Greek and Life of Christ at that time, used to tell us that if we could not find a book we wanted we were to write one. That is what I feel led of the Lord to do. It will be in three books; one will be on pedagogy or *how* to teach based on modern scientific principles of pedagogy. The other will be on theology for modern man which will be in keeping with modern scientific facts. The third will be a set of

Bible Lessons for use by the individual or a corporate group in Bible study, as the Family Altar, Sunday School classes, Prayer Groups, and any type of Bible classes. These Bible lessons will not be to teach any particular creed of a Church or religious group but will be based on common Christian principles, scientifically oriented.

I have written the part on the Bible, and on God for the book on theology. I am collecting material for the creation of the cosmos as a chapter in theology and for my Bible lessons. I need a Bibliography by an educator in pedagogy to prepare the chapters for *how* to teach the different age groups. If there is a member of this Affiliation who has such a Bibliography I will appreciate a copy and his recommendation of a single volume for each age group as I do not have time to read his entire Bibliography.

I realize this is a tremendous undertaking but by the grace and help of God I can do it.

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How Does Modern Science Affect Christian Doctrine?

As a person who accepts in all essentials the picture of the universe revealed by modern science I enjoyed and appreciated the article by J. R. van de Fliert, "Fundamentalism and the Fundamentals of Geology" (*Journal* ASA 21, 69 (1969)). Yet, after now reading *The Genesis Flood* for myself and reading Morris' letter (*Journal ASA*, 22, 36 (1970)), I cannot help but feel that van de Fliert has indeed, as Morris states, missed the entire point. Van de Fliert discusses nothing that cannot also be found in standard geological texts. At just those points where enlightenment from an evangelical Christian is needed, namely, how do modern geological theories influence and affect basic Christian doctrines (creation, the Fall, the authority of the words of Christ, the relationship to the Second Coming, last things, etc.) van de Fliert is silent, and this is precisely Morris' point. Why are so many contributors to the *Journal* evidently so reluctant to speak out on these issues? At least Whitcomb and Morris recognize that something of importance is at stake, whatever one thinks of their theorizing. If the symposium on the Bible and science (*Journal ASA* 21, 97-124 (1969)) can be taken as evidence, many ASA members seem to be taking the position that Christianity and science can be completely isolated from each other (e.g. Albert's "There is no relationship between the Bible and science as we know it today."), in which case the ASA obviously has no reason to exist. As one who accepts the modern scientific view of the universe, I had hoped to find in the *Journal* articles that would help to relate this view to the basic doctrines of Christianity. Instead the general impression received is that this relationship is either non-existent or of trivial importance, yet many writers still insist that they are evangelical Christians. I find this situation, frankly, rather confusing.

(*Editor's Note: Stay with us Mr. Krause; we're trying!*)

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Pollard Anticipated by Kuyper

In recent years, William G. Pollard[1] has argued convincingly that modern science has added a new dimension to our understanding of the Biblical statement that man bears the image of God. Pollard, following the work of E. P. Wigner, points out the many occasions in the history of physics where a mathematical system, originally a pure product of the human mind, has been found remarkably applicable to an accurate description of nature. Pollard finally comes to the conclusion that,

> Now that we have discovered that systems spun out by the human brain, for no other purpose than our sheer delight with their beauty, correspond precisely with the intricate design of the natural order which predated man and his brain. That surely is to make the discovery that man is amazingly like the designer of that natural order. How better describe this discovery than to assert that man is indeed made in the image of God!

It is of some historical interest to note that over seventy years ago, the Calvinist theologian Abraham Kuyper came to quite a similar conclusion. This similarity is brought out toward the end of an extended discussion of the nature of science where Kuyper[2] states that,

> . . . By the imagination we create phenomena for our consciousness, and by our higher thinking we form relations. If these products of our imagination and of our higher thinking were without reality, we would have every reason to think that there is but one subjective process, which refuses to be more closely defined. But this is not so. The artist creates harmonies of tints, which presently are seen to be real in flowers that were unknown to him. And more striking than this, by our abstract thinking we constantly form conclusions which presently are seen to agree entirely with actual relations. In this way object (*all existing things*) and subject (*human consciousness*) stand over against each other as wholly allied, and the more deeply our human consciousness penetrates into the cosmos, the closer this alliance is seen to be, both as concerns the substance and morphology of the object, and the thoughts that lie expressed in the relations of the object. And since the object does not produce the subject, nor the subject the object, the power that binds the two organically (*as part of a structured whole*) together must of necessity be sought outside of each. And however much we speculate and ponder, no explanation can ever suggest itself to our sense, of the all-sufficient ground for this admirable correspondence and affinity between object and subject, on which the possibility and development of science wholly rests, until at the hand of the Holy Scripture we confess that the Author of the cosmos created man in the cosmos as microcosmos 'after his image and likeness' (*All parentheses mine*).

Thus Kuyper, writing before the development of modern quantum and relativity theory with their great reliance on the most abstract and beautiful mathematical reations of the human brain, anticipated Pollard in observing how man's growing understanding in science can be interpreted as resulting from him bearing the image of the creator God.

[1]William G. Pollard, *Man on a Spaceship*, The Claremont Colleges, Claremont, California, chapter 4, (1967)
William G. Pollard, *The Unreasonable Effectiveness of Mathematics in the Natural Sciences, Journal ASA* Vol. 21, No. 2, p. 62 (1969)

[2]Abraham Kuyper, *Principles of Sacred Theology*, Wm. B. Eerdmans Publishing Co. Grand Rapids, Michigan, p. 83 (1968)

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Very Few Are Doing God's Work

(This letter was written to the Editor, not directly in response to a Journal *publication, but with a message thought to be of general concern to* Journal *readers.)*

> *"To turn one's back on this responsibility with the exhortation to leave it in the hands of God while doing nothing, is to abdicate man's God-given role as caretaker of His creation."*

This letter comes to you from the other end of the world. The above statement of yours appearing in the *Eternity* magazine issue of Sept. 1970. It is a piece of literature on present-day Christianity. The world is running a mad race to destruction only. Everybody is turning one's back on his responsibility of serving God. They serve Mammon only.

Let me introduce myself to you. I am a Native of this place doing evangelistic work amongst the Hindus, Muslims and Communists of Southern India. You might be knowing about this country. Millions and millions of poor people are dying of starvation. The population of this country is 550 million. And out of this only 5 million are Protestant Christians. Out of this 5 million we cannot count even a couple of hundred as born-again Christians. Very few people are doing God's work. We have no churches nor Pastors in rural areas. We have no proper transport to reach the rural villages. We walk the distance. In certain places we cannot get even drinking water. If you wish I can send you pictures to show the situation here. Gospel message has not even reached to many unsaved. Millions are dying without hearing the Good News of Jesus Saves.

At this grave hour your country's leader one Dr. Carl McIntire is taking a Victory march spending several millions of dollars. He is asking youngsters to buy Victory sweat-shirts. Is this the way to propagate the Gospel of Christ? No concern for the people in the underdeveloped areas to tell about Christ. Certainly he is turning his back to us.

I read many people in America are sending money to "Conscience Money Account" in the U.S. Treasury. They realize their faults.

May God use this nice article of yours to turn unto the Lord. Pray for this poor country and the work we do to brings souls to Christ.

I am interested in your *Journal ASA*. May I have a copy for my edification and pass on the message contained therein to the unsaved here?

I learned English under British Missionary when the British ruled us. Excuse me if you find mistakes.

Crave your prayers and blessings.

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Private Interpretation Dangerous

Thomas Key's letter (*Journal ASA* 22, 35 (1970)) chides the geologists in the ASA for not speaking up regarding the matter of flood geology. Actually, there has been considerable response to Whitcomb and Morris' *The Genesis Flood* since the time it was first reviewed in the March 1964 Journal. About 30 pages have been devoted to discussions of the reviews and Professor van de Fliert's article last September. The problem is not that geologists are unwilling to discuss the relationships between their discipline and the Scriptures but the fact that some persons are willing to accept a discussion only if a certain interpretation of Scriptures is accepted. It is important for us to put the Scriptures in their proper place. The purpose of the Scriptures is summarized in John 20:31 "But these are written that ye might believe that Jesus is the Christ, the Son of God and that believing ye may have life in His name." John 5:39,40 "You search the scriptures because you think that in them you have eternal life; and these are they which bear witness of me; and ye would not come to me that ye may have life."

It is true many things are learned by accepting the instructions and admonitions of Scripture. However, the private interpretations of passages which are not vital to a person's belief in Christ can be dangerous. Professor Morris writes: "The real crux of the matter, however, is 'What saith Scripture?' In *The Genesis Flood*, as well as in other writings, Dr. Whitcomb and I have maintained, with a considerable number of straightforward Biblical arguments, that the Bible teaches a recent special Creation of all things and a world-wide Flood, and that there is no permissible interpretation of the Bible which can accommodate evolution and the geological ages. No one has answered these arguments to date."

You will notice that he says he maintains "that the Bible teaches a recent special Creation of all things and a world-wide Flood, and that there is no permissible interpretation of the Bible which can accommodate evolution and the geological ages." This is Dr. Morris' interpretation. When he says that no one has answered this argument to date, he means that no one has answered it to his satisfaction, not that no one has answered to the satisfaction of many Christians. Dr. Key's account of Dr. Whitcomb's visit to Ball State indicates that the authors of *The Genesis Flood* are not interested in evidence because they already have their minds made up. Evidently some people at Ball State felt Dr. Whitcomb's arguments had been met.

Dr. Morris is also mistaken in putting evolution and the geologic ages together as if they were synonymous. It is quite possible for a person to believe in geologic ages and not believe in evolution, as well as it might be possible to believe in evolution and not in geologic ages.

It is interesting also to notice in the letter from Mr. Wheeless (*Journal ASA* 22, 37 (1970)), he criticizes van de Fliert because "his arguments are what you find in the average book on the subject". Again, there is a misconception in assuming the facts of the Scriptures and the facts of geology are contradictory.

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Source of Error In English Bible

In the discussion of the inerrancy of the Bible (*Journal ASA* 21, No. 4 (1969)) one possible source of error seems to have been overlooked. Some error could have crept in during the translations from the language in which the Scriptures were first written to the modern languages. The original authors were inspired but

the translators were not. The King James version of the Bible was translated in 1611. Many times the translators were confronted with a choice among three or four words in translating a given Hebrew or Greek word. Naturally they chose the synonym that agreed with their personal religious philosophy or understanding.

One word that many believe was wrongfully translated in many places in both The Old Testament and the New Testament is the word "soul." The American College Dictionary defines soul as follows:

> 1. The principle of life, feeling, thought, and action in man, regarded as a distinct entity separate from the body, and commonly held to be separate in existence from the body, the spiritual part of man as distinct from the physical. 2. The spiritual part of man regarded as the moral aspect or as believed to survive death and be subject to happiness or misery in a life to come. 3. A disembodied spirit of a deceased person.

The Bible defines soul in an entirely different way. Since the Bible writers were inspired by the Holy Ghost no one else has authority to define it any other way.

Genesis 2:7 is the only place in the Scriptures where a soul is defined. A living soul is nothing more than a living person. It is correctly used many times in the Bible; e.g. Acts 7:14, 27:37.

Matthew 16:26 is an illustration of where the word "soul" is used when it should have been "life." How do we know this should have been translated "life" instead of "soul?" The previous verse is talking about life. There is nothing to indicate a change in subject matter, so verse 26 is still talking about life. The revised Standard Version of the Bible caught this error. Unfortunately there are dozens of verses with similar errors where they have not been corrected.

Let us see how such errors happened. Back in prehistoric times the concept of soul as a disembodied spirit or an entity separate from the body, was invented. In some ways this concept has become almost universal. It is even believed in Christian churches today.

Recently I was reading an article in the National Geographic Magazine about the island of Bali. I ran across this quotation: "As one Balinese expressed it, 'We consider the body merely the basket of the soul, and once released that soul is free to ascend into higher worlds, awaiting reincarnation.' "[1]

A similar idea could probably be duplicated in almost any country of the world, civilized or uncivilized. The Hebrew word often translated "soul" is *nephesh*. Besides being translated soul 446 times, it was translated 101 times as life or lives, 24 times as person, 15 times as heart, 8 times as creature, 4 times as body, and 3 times as dead. The translators had to choose. In a large number of cases where they used soul it should have been life or some other choice. They believed in soul as defined by the dictionary so they used that word. This often made the verse suggest something that does not exist.

In the New Testament, soul is translated 57 times from the Greek word *psuchē*. But this same Greek word has been translated 41 times as life, 3 times as mind, and 1 time as heart.[2] If the context fits it, we have just as much right to translate *psuchē* life or mind as the original translators did to translate it soul. Translating it life does not suggest the non-Biblical entity called the soul.

Associated in the popular mind with the general concept of soul is the idea that the soul is immortal. When a man dies his soul is ordinarily thought to be able to leave the body. If it is righteous it is thought to go to heaven and if it is wicked it is supposed to burn eternally in hell.

This wild idea is so inconsistent with the character of God and Christ that we cannot countenance it for a minute. If God permitted a mild sinner to agonize forever in hell God would be a super cruel monster. Such an abhorrent thought is all the more terrible when we remember that "God is love." If souls went anywhere at death, they would have to be immortal. There are dozens of verses that preclude any immortal souls before the resurrection at Christ's second coming. (I Cor. 15:51-58.)

If a person reading the Bible comes across the word soul and it suggests the dictionary concept of soul, he can be sure that the word should not have been translated soul. Then he should see if one of the other possible synonyms makes sense without suggesting an immortal soul.

[1]*National Geographic Magazine*, November 1969.
[2]*Young's Analytical Concordance of the Bible*. Wm. B. Eerdman's Publishing Co.

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What Do You Think of THAT?!

Blood, Sweat and Polywater

Surely two of the most engaging footnotes to appear with a scientific article are those at the end of a paper in which D. L. Rousseau of the Bell Telephone Laboratories argues that polywater is the result of contamination from the investigator on the basis of his findings that polywater and human sweat have the same infrared absorption spectrum. In footnote 17, he likens the "aerosol cloud" surrounding every human being to the cloud surrounding Pigpen in "Peanuts." In footnote 18 he thanks two colleagues for contributing sweat samples. (*Science* 171, 170 (1971))

National Association for Christian Political Action

The first political congress of NACPA is to be held at Dordt College July 13-15, 1971 on the Theme: "The Foolishness (?) of a Christian Political Movement: Does It Make Sense?" Among the principles of the NACPA is the belief that God has ordained certain structures of society, such as home, state, industry, church and school, with unique authorities and tasks. One of the motivations is the "training of youth to reject apostasy and all compromise with apostasy, and to seek to understand and apply kingdom principles in every kingdom sphere."

Saucer Seeing

A study by D. I. Warren (*Science* 170, 599 (1970)) indicates that among American white males over 21, the highest proportion of UFO sightings were reported by men with a college education but with an employment which did not use their ability. The implication was that men who were trained to do better but were underachieving might be led to see UFO's as a kind of self-fulfillment. Later comments by others (*Science* 171, 956-959 (1971)) question the implied cause-and-effect relationship and suggest that the kind of people likely to sight UFO's are also the kind of people to underachieve.

In September, 1941, five scientists of deep Christian conviction met together in Chicago. They found that they shared mutual concerns in the relationship of science and Christian faith. The **American Scientific Affiliation** is an outgrowth of that meeting.

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LOCAL SECTIONS of the American Scientific Affiliation have been organized to hold meetings and provide an interchange of ideas at the regional level. Information may be obtained from the persons listed below or from the national office.

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