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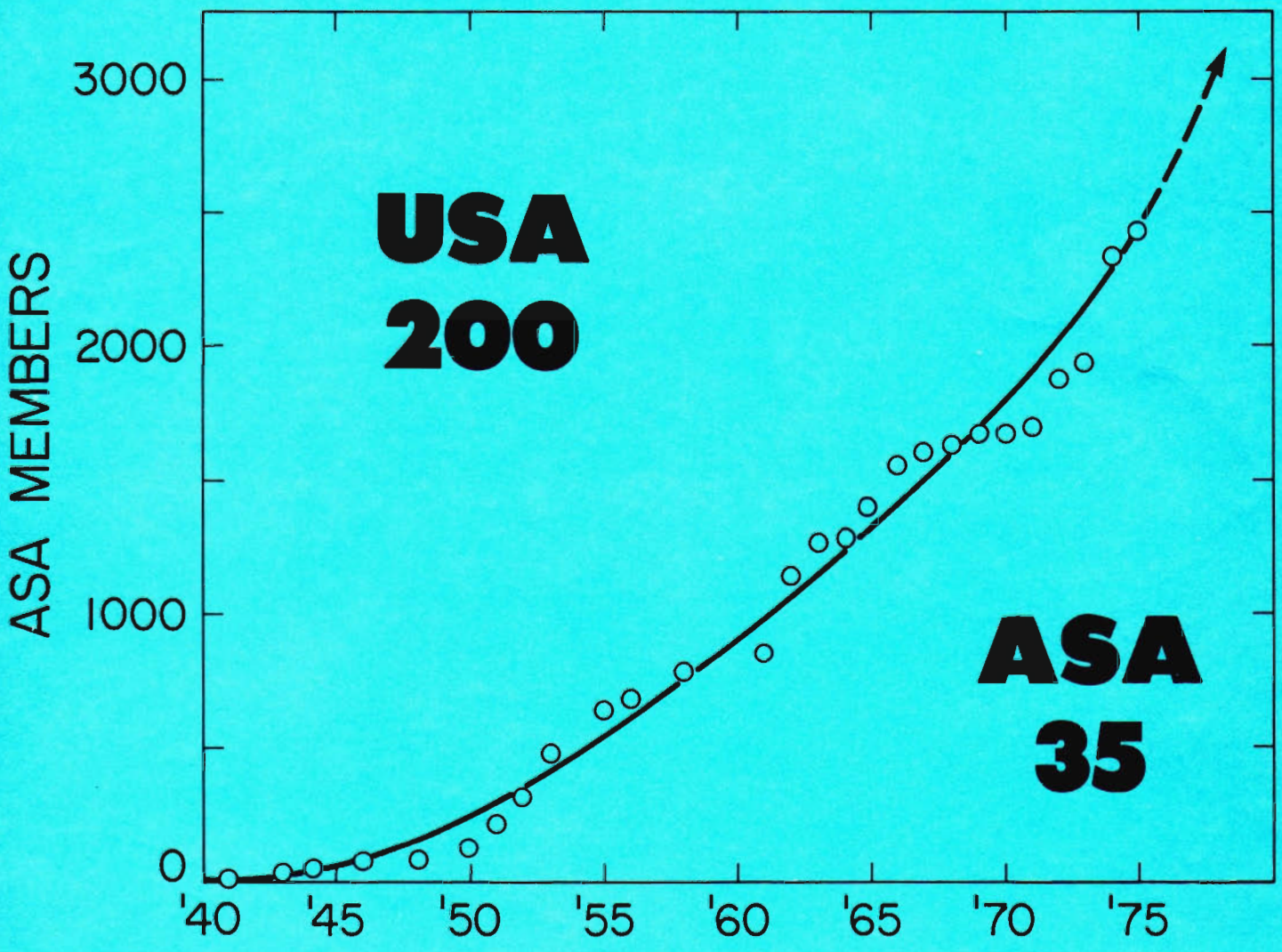

"The fear of the Lord is the beginning of Wisdom." Psalm 111:10

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"Upholding the Universe by His word of power." Hebrews 1:3

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The Relevance of Science

SIR GEORGE PORTER

Nobel Laureate in Chemistry

When Michael Faraday was asked the question, so tiresome to a scientist, "What is the relevance of your work?" he could give his well-known reply, "Madam, what use is a newborn baby?" Or, when asked the question by the Prime Minister, Robert Peel, about his magnetic induction, he could reply, "I know not, Sir, but I'll wager one day you'll tax it." And in the golden age of Victorian progress, the point was taken and later proved to be correct.

It is not so easy to satisfy the questioner today. The baby is grown into a man of great achievement and power. It has almost won its battle against disease and the miseries of hard labour; Michael Faraday and James Watt released more men from slavery than did Abraham Lincoln. "Yes," says the man of relevance to the man of science, "I accept this, and I really am grateful. But now I've had enough. I need time to adjust to what I've got already. So will you please find a cure for cancer and then stop."

In some ways the man has a point. I should like to mention one of his anxieties because I share it and because it is urgent. It is nuclear power—not weapons, which are another problem, but reactors. When that first baby reactor was born in Chicago in 1942, scientists saw it growing into a benefactor of mankind. It was also good for science, and billions of dollars have flowed into research of all kinds because of this hope. Today, I don't think I am using emotional terms when I say the baby has grown into a monster. The world is as near to anarchy as it has ever been, and yet we are about to put nuclear reactors all over the earth—in Northern Ireland and Southern Ireland, in India and Pakistan, in Israel and Egypt, in Turkey and Cyprus, in Vietnam and in Chile. We haven't the remotest idea how to destroy the radioactive wastes, but soon everybody will know how to use them for war, sabotage, or blackmail. If we are making a mistake, then it is—unlike other mistakes we must make from time to time—irrevocable and irreversible because the radioactive products will be with our children and theirs for more generations than have passed since the beginning of civilization. What chance is there of man surviving in a plutonium economy, even as long as one half-life of plutonium, 24,000 years? Yet the momentum, the investment in nuclear power, is now so great that it seems already too late to stop the proliferation.

What do we say now to our man of relevance? I would say the following: Man, being what he is, will demand his megawatts today even if he dies tomorrow. We have made a terrible mistake in offering nuclear power as a solution too soon. We admit it. Now our only way out is to find an alternative which is cheaper; nothing else will be accepted. What is more, we believe we can do this—by using solar energy, for example. But this means more research, more science, more knowledge, not less.

So our man of relevance will probably agree to add energy, and a few other things, to cancer in his list of things still to be done. But he will maintain that we are bound, soon, to reach a limit where we have everything we want. "Then," he will say, "you scientists will just be doing it for your own amusement. I have no objection to this as long as it's safe, and I understand that it's fun and compulsive, like playing chess, but why should I pay for your game?"

I believe that there is a very good reason, though I don't expect it to appeal to every man. So far, we have answered the man of relevance entirely in material terms. This has less and less appeal as material needs are satisfied and spiritual needs assume greater importance. Science has increased our health and wealth; now what about our happiness?

To answer this question we have to ask deeper ones which are at the basis of our philosophy, our religion, and our ethics. What is it that we want of ourselves, of man, of our earth, of the universe? In the past, these questions have been answered by the theologians, and the answer—being rather pleasant—was readily accepted. But man's reason does not permit him to think happy thoughts which are irrational, and many have had to discard the old religions on these grounds. Our great dilemma is that science has not yet helped man to find a new religion which in any way replaces the old ones. There are philosophies of life, such as humanism, which provide a modus vivendi but do little to solve the basic questions answered so confidently by the old religions.

Most of our anxieties, problems, and unhappiness today stem from a lack of purpose which was rare a century ago and which can fairly be blamed on the consequences of scientific enquiry. It is well known how the leaders of the established religions resisted the Age of Reason, sometimes literally to the death. By the middle of the 19th century, when it became clear that the establishment had lost the argument, a truce was called. The matter was resolved by the proposition that religion and science were quite separate activities, so there could be no conflict. Religion was concerned with the spirit of man whilst science dealt with the material and physical world.

This compromise and division of territory never rang true and probably deceived nobody. Things had already gone too far, and it was already clear not only that religions had always interpreted the physical world, as Judeo-Christianity does from the first verse of Gen-

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esis, but also that the greater understanding provided by science had a profound effect on man's philosophy, ethics, and spiritual beliefs.

The discoveries of Copernicus, Darwin, and the molecular biologists have irrevocably changed our beliefs about our place in the world, but the new understanding has been negative in the sense of destroying old conceptions and religious views and much that goes with them without providing a new positive philosophy and purpose.

If then, we have changed our traditional faiths through increased knowledge of ourselves and our universe, is it not possible that our way to a new faith, a new purpose for life, is through further knowledge and understanding of nature?

This is the true relevance of science.

It is, of course, quite possible that we can never understand, never discover a purpose, but we shall not succeed if we do not try. Time and time again in science some artificial barrier has been proposed beyond which science could not pass, and many of those barriers are now behind us. There is absolutely no evidence that the great reasoning power with which mankind is endowed has *any* limitations, and until evidence to the contrary is discovered, we shall be wise not to give up the search. We have nothing to lose and everything to gain.

Once this "ethic of knowledge," as Monod calls it, is accepted, life becomes more meaningful again. The fatalistic mood is tempered with hope. Survival of the species once again becomes important because our search is likely to span many generations, and if we destroy ourselves by some self-inflicted catastrophe, man will never know what his destiny might have been.

It might be argued that it is impossible for us to imagine any conceivable purpose in the universe and therefore what we pursue is a mirage. But not many years ago, it was impossible to imagine any solution to the chicken and egg problem of the origin of life; yet a simple solution, understandable to all, has been found. When the earth was thought to be flat, it was impossible to imagine any solution to the problem: Where does the earth end? But a spherical earth is now so obvious that we hardly need to employ our imagination at all. Could it be that man's purpose will one day be as obvious as the spherical earth?

The ultimate relevance of science is to try to discover man's purpose by every means in our power.

What areas of science are likely to be most fruitful in this quest? Until the glimmer of an idea appears, a hypothesis to be pursued, it is impossible to know; and it is probably wise to pursue most actively those areas where progress seems to be possible at the time. So-called relevant research does not always lead to relevant discovery, and—if the proper study of mankind is man—it may be equally true that the proper study of man at this time is through physics, chemistry, and biology.

If the problem seems insuperable, we should continue to remind ourselves that modern science started only about 400 years ago and has already transformed our lives and our understanding. What may we not achieve in the four billion years which remain before the earth becomes uninhabitable?

What is it that we want man to achieve? Is it merely the greatest happiness of the greatest number? How many men should there be on earth anyway, and how many birds? How important is an individual compared with the survival and progress of the species? Until we have a better understanding, all our ambitions for a better world are at best short term and, at worst, may be quite wrongly conceived. Our ethics and morals must ultimately be derived from this better understanding.

There is, then, one great purpose for man and for us today, and that is to try to *discover* man's purpose by every means in our power. That is the ultimate relevance of science, and not only of science but of every branch of learning which can improve our understanding.

In the words of Tolstoy, "The highest wisdom has but one science, the science of the whole, the science explaining the Creation and man's place in it."

Consulting Editors Respond . . .

Man Without God, Groping for a Purpose

George Porter makes some interesting observations I would agree with, e.g., humanism and materialism fail to provide answers to ultimate questions, and "so-called relevant research does not always lead to relevant discovery." However, I disagree with his thesis that science can provide such ultimate answers. He appears frustrated in trying to state a purpose for science, in order to keep science relevant and to maintain its public support. I have always understood that science is unconcerned and even unable to deal with teleology. Purpose, as well as other ultimates, is outside the scope of science. Science can have or can be given a purpose, but science itself is incapable of leading to or discovering ultimate purpose for anything.

Porter is right when he identifies the root of the problems of our generation as purposelessness and meaninglessness. In his essay Porter himself exemplifies man without God, groping for a purpose. For me this problem is solved in a personal relationship (won for me by Jesus Christ) with the Creator, Who gave me the purpose of glorifying Him by serving others. The purpose of my science is to serve fellow humans by understanding the world and learning how to control it for the benefit of all.

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Not Science, but Scientism

An inscription in the Building of the National Academy of Sciences reads as follows:

> TO SCIENCE: PILOT OF INDUSTRY,
> CONQUEROR OF DISEASE,
> MULTIPLIER OF THE HARVEST,
> EXPLORER OF THE UNIVERSE,
> REVEALER OF NATURE'S LAWS,
> ETERNAL GUIDE TO THE TRUTH.

Christians, whether or not they are of scientific bent, are more likely to associate most of these functions with the creative and redemptive activity of God in Christ, and to view science as a useful human activity, but not as a source of values. It is one of the naivetés of our day to hold that science has somehow "changed our beliefs about our place in the world" and that traditional religious ideas of faith and purpose are to be replaced by those found by a scientific quest for "further knowledge and understanding of nature". The quotations are from Sir George Porter, who would presumably approve heartily of the inscription.

Although Sir George is to be accorded every bit of deference due to a Nobel Laureate, we must recognize from this article that his expertise in chemistry does not extend to theology and philosophy. In these he is quite superficial and he shares a common misconception of the role of science. The main idea of his article is nothing more than that if we keep on doing science, we may discover a purpose for human existence. This is not science, it is Scientism. It loses sight of the fact that science is just one of many human activities for which the significance does not emerge from latent factors, but comes from the religious and/or philosophical outlook which is brought *to* the human activities.

To say that we must look to science to find purpose in life because science has changed some of the conditions of our lives is no more sensible than to say that we must look to football to find purpose since it has changed the conditions of life on weekends for most Americans. To say that science (or football) is important is to say something which is true but trivial. To say that science (or football) can be the source of purpose is idolatrous.

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Beyond Science to the Bible

Several years ago a group of psychologists gathered for a conference to discuss the state of their discipline. They debated the strengths, weaknesses, and relevance of psychology and ended their conference with the conclusion that "Psychology's only hope is science."

I was reminded of this when I read Sir George Porter's paper. He summarizes the strengths, capabilities, weaknesses and limitations of science and then seems to conclude weakly that the only hope for science is more science. It is true that the author talks about discovering "man's purpose by every means in our power" including the use of "every branch of learning," but he clearly rules out religion and divine revelation as one of these branches of learning. He assumes, a priori, that religion is "irrational" and apparently is unaware of apologetical and other data which support the truths of Christianity. He acknowledges that we have a lack of purpose which he blames on scientific inquiry, but then he proposes more science to pull us out of the existential vacuum that science has helped to create. He suggests that physics, chemistry, and biology may be the best way for man to understand himself, but then he raises questions (e.g., what is man's purpose on earth? what is it that we want man to achieve?) that neither the natural nor the social sciences can answer.

I agree with Sir George that we should use "every means in our power" to discover man's purpose, but this means that we must be willing to go beyond science to the Bible which addresses itself to these kinds of questions. The Bible does not claim to have all of the answers to man's questions, but then neither does science and the other academic disciplines. But the Bible does give us answers to the kinds of questions that are raised in this paper, and it may be that scientists such as those in the ASA should be speaking and writing about this. When science is set into God's creation and is seen as a way of understanding with clarity what a Holy God has created and sustains, science takes on a greater meaning and relevance; the kind of relevance that Sir George seems to he seeking.

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No Straight Path from Fact to Value

Sir George Porter's piece on the relevance of science contains a splendid variety of perceptive insights. Nevertheless, I believe it is curiously flawed by an implicit internal contradition. Porter paints an anxious world near anarchy, with a nuclear Sword of Damocles suspended over it. Yet he seems to subscribe to a future "ethic of knowledge" whereby this contradictory, anarchistic mankind can ultimately hope to find life's meaning—some optimistic, illdefined salvation through science.

So far science has given us an impressive understanding of, and increased control over, nature. Yet so far it has given us little basis for extrapolating to a system of ethics and morals derived from science, despite such valiant attempts as Jacob Bronowski's *Science and Human Values.*

At about the same time that Cal Tech's *Engineering and Science* printed Porter's article, MIT's *Technology Review* published a partly similar essay by Dr. Laurence Gould ("Science in Our Seamless Web," Jan. 1975), but a piece with which I am far more sympathetic. Gould writes that "sometimes analysis deludes us into thinking that we know all about things whose inner reality we miss." In contrast to Porter, he says, "Today the problem is what *should* be done amongst all the things that *can* be done. This involves value judgments by the scientific community; and this in turn makes it important to say that the choice of extrinsic goals cannot be determined purely by the methodology of science. There is no straight path from fact to value, and

if we rely on science alone, questions of purpose will not be answered."

While reflecting on Porter's essay, I came across an interesting quotation from Clifford Geertz: "In order to make up our minds, we must know how we feel about things; and to know how we feel about things we need the public images of sentiment that only ritual, myth, and art can provide." To me this statement addresses itself to something profound that Porter has (perhaps deliberately) overlooked.

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Mechanistic Description Breeds Despair

Porter in searching for "a new faith, a new purpose for life, through further knowledge and understanding of nature" should listen to what some of his contemporaries are saying about modern science. Theodore Roszak (*Daedalus*, Summer, 1974) views science as dominating the age with a doctrine of despair, i.e., with knowledge and an approach to understanding that leads inexorably from phenomena of great substance and human meaning—the beauties of sunrise and sunset, the incredible potential in the human personality—to models and explanations which reduce these and all other phenomena to meaningless descriptions of an inhuman universe out of which man emerged only by chance, and in which his living mind, with its concepts of good and evil, of hope and beauty, is estranged and inharmonious. He contends that the reduction of things of value and beauty to meaningless mechanistic description breeds despair; and despair is a secret destroyer of the human spirit.

Steven Weinberg in the same volume says "the laws of nature are as impersonal and free of human values as the rules of arithmetic . . . the whole system of the visible stars stands revealed as only a small part of the spiral arm of one of a huge number of galaxies extending away from us in all directions. Nowhere do we see human value or human meaning."

Jacques Monod, whom Porter quotes approvingly at one point, states, "Science wrote an end to the ancient animist covenant between man and nature, leaving nothing in place of that precious bond but an anxious quest in a frozen universe of solitude." Clearly the Christian is not alone in his contention that science is neither a means nor an end in the search for the highest wisdom.

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Purpose to be Accepted, Not Discovered

There is no question that modern man is trapped; his technological success requires technological progress. The physical and natural sciences provide the key to solve the technological problems they cause today. Thus, the relevance of science centers about the judicious use of physical and natural resources to allow for man's survival.

There are several apparent weaknesses in Sir Porter's suggestion that "our way to a new faith, a new purpose for life, is through further knowledge and understanding of nature." First, it is not a valid statement for that segment of the population which has not changed its traditional faith. If science is to be a religion, the masses would be faithless and Sir Porter would be the high priest.

Further, it is doubtful that "if the proper study of mankind is man," this study can be limited to the physical and natural sciences. Certainly the social sciences and humanities would have a place in all of this. As the product of the physical and natural sciences, technology is not generally recognized as the revealer of truth and purpose. Rather, technology may be more rightly seen as a screen which has been inserted between man and nature. That screen may filter out some truth for the scientist but it leaves mass man searching for the hidden light.

Can the physical and natural sciences have any purpose outside of the plan of God? Apparently not, for such purpose would, at best, be a distortion of truth. Science can only rightly perceive that which has been provided by God.

For this reason, we could conclude that man's purpose needs to be accepted, not discovered. Science has little to offer in this regard. The proper objective of mankind is to accept God's purpose for man and live it. At that point, science may gain its highest purpose of helping man to know God and enjoy Him forever.

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Significance Lies in Problems Exposed

Sir George Porter is absolutely right—so long as the appropriate riders are added. In the broadest sense of the term, "science" includes theology, the queen of the sciences; man rightly rejects the thought that he's a meaningless being in a purposeless universe; and he must discover his purpose with all available data, data which include the curious fact of reliance on a presumably-valid rationality, an uneasy awareness of right and wrong, and the Christian claim that the Resurrection was attested by concrete evidence. If, then, science must deploy all available means to uncover the meaning of man, we must also ask that *all* the evidence be given an unprejudiced hearing.

However, "science" is also a word with a sharper connotation, and this commentator must confess he is frankly nonplussed at the claim that deeper delving into physics, chemistry and biology may disclose the meaning of man. Of course we agree that the data discovered by scientific methods will prove *consistent* with purpose, but that's not to say that the purpose of man can be read from any of the mechanisms involved. That's a bit too reminiscent of Descartes' idea that the mind might be bound up with the pineal gland, or of the chemist who analysed the paint he scraped from the painting to discover the source of its beauty. It simply belongs to a different *level* of interpretation, and the postulate that different levels—aesthetic as well

as scientific—are essential to comprehension is just plain common sense. Without conceding the particular spiritual/physical dichotomy that Sir George thinks was defensively affirmed by a crumbling religious establishment, we fail to see how science, as science, can pronounce on questions of value. Presumably science may one day be able to predict the destruction of Hollywood by an earthquake, but how could science determine whether that event were bane or blessing? And how can we equate the solutions that flowed from recognition of the earth's sphericity with questions on the meaning of man—surely questions of a very different order? Admittedly, science has indeed broken through many a barrier that was externally imposed, but are these to be equated with inherent limitations which are intrinsic to the very nature of science? Some very significant distinctions seem to be blurred by such parallels.

Perhaps, however, the real significance of Sir George's argument lies in the problems it exposes rather than the solution it seeks. It underscores the problems posed by the nihilism that flows from purposeless science and the psychologically-inevitable search for an alternative faith. It also highlights our problems of communication. We may know that Christian faith is not cancelled out by Copernicus and Co., but how many in academia will agree? We may see that it is not Christianity but faith in supposedly boundless human reason which is based on wishful thinking, but how many of our colleagues see Christian faith as rooted in objective truth? We may realize that it is scientism, not science, which imperils faith, and know also that Christianity has no stake in the application of special pleading to scientific issues. But is that clear in church and campus? As Sir George's viewpoint implies, we members of the ASA have our work cut out!

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An Example of Forbidden Activity

Assume that God created the universe. Add the idea that man can understand some things about the universe—about what its parts are, how those parts fit together, and how those parts function.

These assumptions are Biblical ideas. When God made man in His image, He associated this image with the dominion man would have (Gen. 1:26, 28). But having dominion in the universe surely includes investigation of that universe, i.e., scientific activity.

Is Porter correct when he states that the ultimate relevance of scientific activity is to discover man's purpose? If he is correct, we could restate his thesis, using Biblical terms, by saying that man bears God's image partially because man can discover man's purpose. But that conclusion is contrary to what the Bible says. The instruction to man to have dominion is the means God has used to tell us to carry out scientific activity. Therefore, the purpose of scientific activity is that man have dominion in the universe.

The Bible also teaches that man has dominion, partly by means of scientific activity, in order that God may be glorified and enjoyed. In fact, man's whole purpose is to glorify God and enjoy Him. Therefore, scientific activity that is not God-glorifying or aimed at enjoying Him is forbidden. Scientific activity that is designed to discover man's purpose, a purpose that is already known because the Bible teaches that we are to glorify God and enjoy Him, seems to be activity designed with a spirit of questioning the Bible. Such activity is thus an example of forbidden scientific activity.

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Would that Porter had More Respect for Scripture

The Relevance of Science is to cooperate with revealed religion to discover man's purpose. Science has already revealed many details of man's physiological and psychological nature—we are DNA plus and so are viruses. How come? When God breathed the breath of life, we came alive, animated molecular biology. But Sir George Porter does not accept the idea that God has revealed Himself and ourselves; to him we have to search to find meaning. So the crucial question is still one of life's greatest questions, "Is the Bible the real word of God?" Once that is agreed to, scientist and theologian work together to find the meaning in both Scripture and science. The idea that they cooperate was expressed long ago by Galileo who said God had two revelations, the Book and Nature. They are interlocking circles with the who and why answered by the Bible and the how and what and when delved into by men of science.

In trying "to discover man's purpose by every means in our power" Sir George Porter is right—would that he had more respect for "all scripture . . . profitable for teaching . . . that the man of God may be complete. . . ."

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Man Still in Center of Universe

Implicit in the article *The Relevance of Science* by Sir George Porter is the tacit presupposition that the scientific revolutions of the last 300 years have greatly altered man's view of himself. The Copernican revolution displaced man from the center of the universe; the Darwinian revolution brought man down to the level of animal; the Freudian revolution showed that man's thinking processes are marked by irrationality; and finally, modern molecular biology and neurology have seemingly shown that man is only a complex, physiochemical machine.

If this basic presupposition can be shown to be invalid, part of Sir G. Porter's basic argument is tenuous: the belief that the advance of science has made irrelevant and outdated the biblical world-view as it deals with man and nature. In particular, man's ability to give and receive love, and his artistic and moral urges must be explained ultimately only at the level of physics and chemistry. The pioneering studies on how people actually do science by M. Polanyi, G. Holton, and S. Jaki have clearly shown that man with unique human values (derived in part from a common Judaic-

Christian heritage) and artistic creativity is still very much in the "center" of the on-going scientific revolution. The writings of these men must be studied in detail in order to appreciate the scholarly soundness of their basic conclusions; brief quotes from these men that summarize their results are now given:

> *Gerald Holton*: The more we peer at the 'faces' of our meters, therefore, the more we see the reflection of our own faces . . . Even in the most up-to-date physical concepts the anthropomorphic burden is very large. Particles still attract or repel one another, rather as do people; they 'experience' forces, are captured or escape. They live and decay. Circuits 'reject' some signals and 'accept' others; and so forth.[1]

> *M. Polanyi*: Thus, when we claim greater objectivity for the Copernican theory, we do imply that its excellence is not a matter of personal taste on our part, but an inherent quality deserving universal acceptance by rational creatures. We abandon the cruder anthropocentrism of our senses—but only in favor of a more ambitious anthropocentrism of our reason. In doing so, we claim the capacity to formulate ideas which command respect in their own right, by their own rationality, and which have in this sense an objective standing.[2]

> *S. Jaki*: Physics, like the countless other projects man pursues, is not cultivated for its own sake but for man's sake. The cultivation of physics is a human act, and as any human act, physics too will retain its full beauty and meaning only insofar as its cultivation is properly coordinated to the wholeness of human reality. For physics does not lack intellectual vistas of arresting beauty, and Boltzmann's comparison of Maxwell's equations to a symphony was far more than an exercise in rhetoric . . . Yet, great as the beauty of physics is and deep as its meaning ought to be, beauty and meaning can exist only in the coordination of the part to the whole, of particular experiences to the totality and universality of human reality . . . Undoubtedly this universality is also the only key to one culture, because culture is harmony, or the coordination of the parts in an all-pervading unity.[3]

The work of these men clearly indicates that man is still very much in the "center" of the universe, physical, intellectual, and moral (scientists must be honest as their own work depends on the honesty of others in reporting results of research). This finding is very much in accord with the biblical theme that man bears the image of God, though marred by sin, and has been made steward of God-created physical reality, with the God-given capacity to rationally explore God's created order (which is not a chaos, but a cosmos). The true relevance of science was expressed very clearly by Kepler; man has, in his exploration of nature, been given the opportunity to think God's "thoughts" after Him.

References

[1]Holton, G.: *Science and New Styles of Thought. The Graduate Journal.* The University of Texas, 7, 399-422 (1967). Also *Thematic Origins of Scientific Thought,* Harvard University Press, Cambridge, Massachusetts (1973).

[2]Polanyi, M.: *Personal Knowledge,* Harper Torchbooks, New York, 4-5 (1964).

[3]Jaki, S.: *The Relevance of Physics,* University of Chicago Press, Chicago, Illinois, 532-533 (1966).

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Out of Touch with Reality

This article is anachronistic today in a society that no longer looks upon scientists as saviors of the world. The Modern Age of Man was the 18th and 19th centuries. Imbued with the empirical rationalism of Berkeley, Locke, and Hume, the Modern Man saw the world as reasonable and logical as a well-oiled grandfather clock. The mysteries of life would yield and unlock by the ineluctable process of empirical inquiry. Science in the age of Modern Man was handmaiden of rationalism.

But we are not in the Modern Age of Man. The 20th century is of distinctly different mood and ideology—we live in the Post-Modern Age. Our philosophers are Wittgenstein, Camus, and Sartre. Their existential philosophy is one of pessimism and ennui, for rationalism is irrational. Our theater is the drama of the absurd. Science is a game played by those who create an "as if" world of structure. The revisionist historians of science concur in finding that the neat constructs of the scientific method never were a reality but an artifice of the scientist's mind. Science explains precious little. Claude Levi-Strauss, the French anthropologist, succinctly demonstrates how the "primitive" man can explain more of his universe than can the learned scientist.

Sir George Porter also seems out of touch with reality when he claims munificent achievements for science. He claims science has almost won its battle with disease and eliminated the miseries of hard labor. Who is he kidding? Science prolongs life but has not gained an inch on death. Witness the popularity of courses on death and dying—1800 courses in our colleges. We are painfully aware that science cannot win the battle of disease. As for hard labor, the majority of the world population farms by hand today. In our own society our workers toil on monotonous dehumanized assembly lines of technological beauty and human brutality. Science has robbed work of its personal value.

Finally, Porter argues for an "ethic of knowledge". But since when did knowledge provide goodness, or knowledge create virtue? Science would create a new religion, and Porter is the apostle. The rationalist assumes there is meaning to be discovered in the world. The religionist assumes that one's faith creates and gives meaning to the world. Science as the creator and sustainer of value and meaning is a puny religion. I have profound respect for science as a discipline, but I find it passe to exhume the dead body of science as the 19th century religion of rationalism.

References

Fuchs, V. R. *WHO SHALL LIVE? Health, Economics, and Social choice.* New York: Basic Books, 1974.

Levi-Strauss, C. *The Savage Mind.* Chicago: University of Chicago Press, 1966.

Wheelis, A. *The End of the Modern Age.* New York: Basic Books, 1971.

Brush, S. G. *Should the History of Science be Rated X? Science* 183:1164-1172, 1974.

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Science Would Need a Heart Transplant

First of all Sir George's thesis is not new. Linberg, a sociologist at the University of Washington, wrote a book called *Can Science Save Us?* with the implication that it could. That was in the 1930's.

The good news is that scientists may be awakening to the realization that without some genuine sense of meaning or transcendence in life even science itself can be a drab task.

The bad news is that science needs a heart transplant if it is to do what Sir George has defined it to do.

Such as: science must go from the "is" of science ("facts") to the "ought" of ethics (purpose). At present both ethicists and scientists deny that one can go from the is to the ought. It will be a new science that will reverse this.

Such as: Bacon tossed out final causes as not at all useful in the work of science. But purpose and final causes are closely connected. Science has followed Bacon and therefore it will be another reversal to bring final causes back into science.

Such as: science is not permitted (when it is "axiomatized") to import into the explanation something not found in the axioms. To jump from scientific theory or law to purpose will mean something must be introduced that is not possible by the character of the axioms.

In short, science as we now know it contains a powerful rejection serum towards such concepts as purpose or meaning. If Sir George thinks we can neutralize it, blessings on him.

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Can Man-made Processes Explain Man?

I have serious problems with Porter's thesis that the ultimate relevance of science is to try to discover man's purpose. Since he relates the change in traditional faiths to increased knowledge of ourselves and the universe, Porter believes that the way to a new faith and a new purpose for life is through further knowledge and understanding of nature. I will comment on two facets of the problem: the nature of science and religion, and different levels of discovery and understanding.

The nature of science is very different from that of religion. Scientific research is an eternal striving for truth. Since the purpose of science is to constantly raise questions rather than to be convinced that truth has been attained, it is by nature dynamic, ever-growing and ever-disturbing. Porter states that "a simple solution, understandable to all" has been found for the origin of life. But can we be certain that scientists have the *final* explanation for the origin of life which will not be replaced in the future with a different explanation? On the other hand, a major characteristic of religion is the basic understanding and meaning which it supplies for man. The crucial axiom for religious experience is "he who would know must first believe," and those beliefs are used by man to interpret the world and his place in it. Although Porter seems to believe that science can eventually articulate a comprehensive world-view, is not such a world-view antithetical to the ever-questioning nature of the scientific endeavor?

I would argue that when Porter equates the discovery that the earth is spherical rather than flat with discovering the purpose of man, he is confusing levels of discovery and understanding. Success in the former has no logical relationship to success in the latter. In a lecture at the 1972 Wisconsin Anthropological Society Student Conference, John T. Robinson suggested that there are three major levels of organization in nature: the physico-chemical, the eugenetic (lower animals). and the psycho-genetic (man). He stated that science has been quite successful in discovery on the physico-chemical and eugenetic levels, but since behavior is the most important factor on the psycho-genetic level, science has little success there. The facets of man which are actually human—such as purpose and meaning—cannot be discovered by science, and Robinson questioned whether man-made dissecting processes could ever be used to explain man.

I cannot see how science could ever discover the purpose of man by obtaining further knowledge and understanding of nature.

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In all the questions that may be asked about the moral life, the Christian is driven back to God for the answers. The meaning of goodness *is to be found in God's character. The only adequate* guide to right and wrong *is to be found in His law, correctly interpreted and applied. The most compelling* motive *in the moral life is the desire to please Him in sheer gratitude for His love. The fullest* pleasure *is to be gained in doing His will. And the necessary* moral power *to turn obligation into action is supplied by His Spirit.*

David Field

Free to To Right, InterVarsity Press, Downers Grove, Illinois (1973), p. 111

Christ and Science

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At the expense of the dignity of both science and Scripture, discussions of "science and faith" are often reduced to infinitesimal debates over footprints in the mud, or carbon dating reliability, or the meaning of the Hebrew word for "day." Noticeably missing is any extended acknowledgment of the basic framework in which one attempts to relate science and faith. And yet these overlooked frameworks may be the most essential elements leading to resolution of some of the science and faith controversies.

H. R. Niebuhr has done Evangelicals a great service by suggesting some presuppositional frameworks from which Christians approach culture. In *Christ and Culture* Niebuhr describes five models that represent some of the major attempts at relating faith and learning.

Similar models can be proposed for categorizing the many themes in the debates between science and faith. In this article, six models are proposed, with the ones of Niebuhr being obvious to the reader of his book. As with any such models, there are overlapping and fuzzy edges. Most likely, there are additional models for other themes.

The Committed Anti-Science Christian. The Committed Anti-scientist rejects science in its totality. In this tradition belong the Anabaptists, Pietists, and modern Separatists.

To such groups, the Fall of man is total, and unredeemed mankind is completely incapable of doing anything of merit. Sin is identified with the material world. It is a person's material body and his senses that represent sin. Knowledge gained through such senses is illustory. In this scheme of priorities, effort should be concentrated on the spiritual world, the world of the mind.

In the Committed Anti-science group belong those who eschew the products of modern technology. They avoid the automobile and television and modern communications. In the extreme, they retire to a monastery or some primeval forest.

Anti-scientists believe that science is some grand machination of the Devil designed to keep men from faith. Thus they claim that the theory and data of modern science are guided by nonbelievers and demonic forces in such a way as to destroy or prevent the salvation of the weaker soul.

In education, then, the Anti-scientist fears the power of the non-Christian scientist. The further his education is removed from science, the better.

The Anti-science Christian is an isolationist—from sensory experience, from secular science, from modern technology.

The Scientific Anti-Science Christian. The Scientific Anti-scientist accepts those elements of science that corroborate his predetermined religious system, at the same time rejecting the opposing findings and models of science. In spirit, he believes that he is combatting science; nevertheless, he uses some of the established methods of science.

This Christian usually has a strong salvationist emphasis. To, him, science as practiced and taught in the secular world is one of the major stumblingblocks to saving faith. In reaction, he proposes a "true science," which agrees with his interpretation of Scripture, thereby making salvation an easier matter.

The Scientific Anti-science Christian suspects the same diabolic scheme as his Committed brother. The most obvious symbol of this threatening scheme is evolution. Many of the Christian writers on the creation-evolution controversy have belonged to this group. Given a pre-conceived notion of what Genesis says, they then select those data and reasonings of science that support their viewpoint, such as interpretations of the Second Law of Thermodynamics. All else is pronounced unscientific, ridiculous, and/or unbiblical.

The Scientific Anti-scientist is selective. Science is his enemy, but he will use science in an attempt to defeat science. Similarly, he does not retreat from technology. Radio, television, films, busses, and modern advertising methods are acceptable if they lead to the higher goals of converting souls and guarding the faith.

The Scientific Anti-scientist and the Committed Anti-scientist share in their rejection of science. To the

The Christian concerned about science must be prepared to approach both science and Scripture holistically.

Anti-scientists, there are two worlds: the spiritual world, commanded by God, and the world of science and technology, ruled by Satan. The Committed Anti-scientists have retreated from all culture, choosing thereby to enhance the life of spiritual purity. The Scientific Anti-scientist remains on the battlefield.

The Secular Christian. For the Secular Christian, authority rests in human culture rather than in the Bible or the church. If angels can't be seen and miracles are not repeatable, then this Christian, with his non-religious friends, rejects them.

Modernists and liberals are prime examples of Secularists. But the Secular frame of mind influences us all. The Secularist tends to relegate miracles to a subjective, nontestable, "spiritual" realm. As science advances, Scripture is reinterpeted or disclaimed. There is always the urge to "explain" the sun's standing still, the Red Sea's parting, and even the Resurrection, on the level of completely naturalistic causation. The Secularist is servant to the latest in current science.

Scripture is interpreted figuratively. Events in Scripture are viewed much like Aesop's fables—with a moral and a grain of truth, but not as potentially verifiable, accurate, historical realities.

The Secularist feels little tension between science and faith. The former is hard, concrete fact; the latter is mystical and relative. Such was the case with the Deists of the eighteenth century. To them, Nature was an abandoned machine, created by some sort of perfect spirit-being somewhere. The Deists' real world was the physical machine. Any faith that came by reason and experience was acceptable. Faith that came by revelation and submission to a higher authority did not meet the Deists' criteria for truth.

The Secularist minimizes the influence of sin on man's culture. Man is basically good; nature might be a little bad. Man's problem is not himself; it is his environment. Man's reason and his senses are to be trusted with little reservation. The world as it really is can be explained and managed by human effort.

The Secularist Christian accepts the scientific way of knowing as the reliable way of knowing. There is not really a "faith-way" of knowing that can be applied to the real world.

The Synthesist. The Synthesist Christian is the Christian Aristotle. He has a neatly structured system that has an answer for almost any question.

One of Niebuhr's examples of a Synthesist is St. Thomas, of the thirteenth century. An important feature of his system was its hierarchical nature. The world is filled with purpose. Human culture and earthly existence serve as schoolmasters to lead us to higher realms of faith. In this scheme, it would seem that science has little value in itself.

To the Synthesist, there is little conflict between science and faith. Science exists in a lower sphere which has little in common with the higher sphere of faith.

Synthesist Christianity is institutionalized religion. The church sets the groundrules for interpretations of Scripture and of scientific data. Such is the church that brought Galileo to trial in the seventeenth century, but normally such conflict does not arise for the Synthesist.

For the Synthesist, science is morally neutral. Nature and science are not overwhelmed by sin. The Synthesist does good science by Christian standards whenever he does the best possible science as judged by secular methods. As a science teacher, he needs no Christian overtones for his class—he just performs at the highest possible level in his profession. The science and faith realms are widely separated. The Bible, he claims, is not a scientific textbook. Science alone cannot lead us to God.

In his quest for a complete system, the Synthesist leaves few gaps in his science or in his faith. Every question must have an answer, and we are not prepared to postpone some questions for future answers. Synthesists of the Middle Ages had the angels flapping their wings to keep the planets in motion. The Synthesist of today calls upon God as agent when he cannot fully explain how the nucleus coheres.

The Synthesist group has few scientists in its membership. Perhaps this results from the view that theology is so much higher and more important and more authoritative than science. Perhaps it also comes about because faith is not allowed to invade the science realm.

The Dualist. The Dualist Christian stands midway between the two groups of Anti-scientists and the Secularist. The Anti-scientists confess the authority of Scripture, but reject science as authoritative. The Secularist opts for the authority of science over Scripture. The Dualist recognizes a type of authority in each.

To the Dualist, authority raises the issue in interpretation. The battle is not between God's revelation and the world of nature: God created both. The actual tension arises because of controversies between religion and science. These are two human institutions, marked by the imperfections of such undertakings.

Niebuhr cites Martin Luther as an example of a Dualist who attempted to relate faith and culture. Luther recognized the negative influences of man's sin on all human institutions, including the church.

There arises a continual tension between science and theology. Sin has corrupted man as scientist, and thus science must be forever scrutinized by faith and moral principles. But religious institutions tend to become authoritarian and non-progressive, and these must be forever checked by the eyes of reason and experience—tools of science.

For the Dualist, man cannot become pure in the faith by retreating from culture and material things. Sin arises from within the person. There are some benefits to be reaped from science. Science alleviates suffering and helps control sin's effects on man. The Dualist must live and serve in a non-Christian culture, even in un-Christian religious institutions.

The Dualist somehow accepts human authority in these two spheres of science and religion.

The Transformer. The Transformational Christian, like the Anti-scientists and the Dualist, recognizes the prevalence of sin in culture. More strongly than the others, the Transformer believes that something can and should be done to change the world.

Niebuhr cites John Calvin as a Transformer. Calvin saw that culture is distorted by sin. But he also affirmed that man is made in the image of God. The Fall of man affects everything he does, but it dose not make man a zero. The Creation and the Incarnation serve as indications that the material world is basically good.

As the Transformer looks at science, he faces a challenge. Starting from basic Christian presuppositions,

he attempts to develop a Christian worldview which will permeate all areas of culture, including science.

Christians are called to be scientists and engineers as well as missionaries and evangelists. Whatever he does, the Christian can do to the glory of God. Unlike the Synthesist, the Transformer does not view the world below as so widely separated from a spiritual sphere. There is no sacred-secular dichotomy.

The Transformer is socially concerned. He is an activist. Science should be transformed so that it is better helping man and serving God.

CONCLUSIONS

1. There are many cultural factors, in addition to Biblical and scientific factors, that influence which model one adopts to relate science and faith. For example, if at a given time in history, a society rejects science, the Christian may also do so, simply due to the influence that society has on his thought patterns.

2. There is not a one-to-one correspondence between Christian commitment and the choice of a particular model. Most of the above models presume an authentic relationship of the scientist with Christ and a concern for pleasing the Master. On the other hand, failure to adopt a particular model does not necessarily indicate some sinful rebellion on the part of the scientist-believer, but more likely would suggest ignorance or inadequate thinking.

3. The greatest difficulty in choosing the "best" model is to separate the Biblical position from theological systems which quite often add to, or otherwise modify, what the Scriptures are saying. Our thinking is very much conditioned by a cultural-theological framework, parts of which may make the system appear to be more "consistent" but not necessarily more Biblical. In the science-faith interaction it is ever so important to learn what the Bible says, rather than what scholars say the Bible says.

4. If one is seriously attempting to relate science and faith, he must believe that at least some of the statements of science are correct. After that, he must choose to accept all of the statements of science as correct or he must struggle with why some are not: is it because scientists are sinful? is it because nature is corrupt? is it because scientists are finite? is it because God is trying to deceive us? The answers to these questions are important as we seek the "best" model for relating Christ and science.

Whatever the approach he adopts, the Christian concerned about science must be prepared to approach both science and Scripture holistically. In life, he is not just a scientist or a theologian, or even both of these—he is a whole person. Scripture is not just a few prooftexts, but a living message to whole persons about a God-created, purpose-filled, historically directed world of events. Science is much more than a collection of facts. As the holistic picture begins to develop, perhaps some further relationships between Christ and science will begin to come into focus.

The Prayer Test

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The early 1870s were good years for science. Not spectacular years, like 1543 or 1905, when revolutionary theories were published, but a time when scientists could proudly observe the consolidation of major achievements of preceding decades. James Clerk Maxwell's *Treatise on Electricity and Magnetism* (1873) provided an impressive synthesis of the discoveries and concepts of Oersted, Ampere, Faraday, and Kelvin, capped by his own interpretation of the physical nature of light and the prediction that electromagnetic waves could exist at any frequency. The molecular-kinetic theory of matter, founded on the ideas which Clausius and Maxwell developed around 1860, was cast into powerful and useful forms in major works of Ludwig Boltzmann (1872) and Johannes Diderik van der Waals (1873). And the biological sciences had at last found a persuasive explanatory scheme: Charles Darwin's *Descent of Man* (1871) provided the inevitable application of his theory of evolution by natural selection to the crucial problem of how the human body and mind have developed to their present state. Before the end of the decade Boltzmann[1] was to predict that the nineteenth would be known as "Darwin's Century."

The self-confidence furnished by such triumphs prompted a few Victorian scientists to issue a bold challenge. To those religious persons who believed in the effectiveness of prayer, they proposed a crucial experi-

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ment: let us see if the prayers of an entire country, directed toward a single desired outcome, can yield a measurable effect. Thus began the "prayer-test" debate of 1872-73, a remarkable but long-forgotten skirmish in the centuries-old warfare between science and religion.[2]

The Debate Begins

The first shot was fired by John Tyndall, known in scientific circles for his researches on radiant heat and acoustics, and to a larger public as an exponent of "scientific materialism," the view that all natural phenomena can eventually be explained by the laws of physics and chemistry. Tyndall sent to the *Contemporary Review*, with his own brief note of introduction, an anonymous article later attributed to a London surgeon, Sir Henry Thompson. As Tyndall said, the ostensible purpose of the article, entitled "The 'Prayer for the Sick,'" was "to confer quantitative precision on the action of the supernatural in Nature." He made little attempt to conceal his hope that the clerics who claim "the habitual intrusion of supernatural power in answer to the petitions of men" could now be made to put up or shut up.

The author of "The 'Prayer for the Sick'" asserted that if we are "in contact with a source of power available for human ends (or affirmed to be so on high authority)" we have a duty "to estimate its value." The reader will recall that quantitative determination of the energy-value of the various forces of nature had been a fruitful scientific activity since the experiments of James Prescott Joule and others in the 1840s.

Of the several purposes for which prayer is recommended, the gentleman continued, there is one whose consequences can now be objectively evaluated—the prayer that particular persons recover from sickness. Why should we not test the efficacy of prayer in the same way we test that of any other proposed remedy for a disease: select a group of patients suffering from the disease, administer the remedy in carefully measured amounts, and observe the effects. The crucial feature of any such test is not only that we have accumulated evidence on what happens to patients who *have* been treated with this remedy, but that we set up a "control group" of patients suffering from the disease, this group being as similar as possible to the experimental group in all respects and subjected to exactly the same conditions for the same period of time, except that it is not given the remedy being tested.

The test, then, would be to designate a particular hospital containing patients with diseases whose mortality rates are well established by past experience and to recommend that these patients be made "the object of special prayer by the whole body of the faithful" for a period of not less than three to five years. At the end of this time, the mortality rates in this group would be compared with those in groups suffering from the same diseases in other hospitals "similarly well managed." Those who really believe that they are not wasting their time praying to God should welcome such an opportunity of "demonstrating to the faithless an imperishable record of the real power of prayer."

That was certainly not the response of the representatives of organized religion who published their comments on the proposed test in the following months. An editorial writer for the *Spectator* called it "revolting to the spirit of Christian prayer" and professed to approach the subject only with "reluctance and disgust." As it turned out, he could not resist the opportunity to flail the "arrogant physicists" for their contempt of religion. The editorialist pointed out that God is hardly likely to cooperate in an experiment whose real purpose is not to heal the sick but to provide a "scientific" measure of His power. In fact the biblical admonition "Thou shall not tempt the Lord thy God" would seem to be designed specifically for this situation—Tyndall's anonymous friend being thus cast in the role of the Devil.

The Reverend Richard Frederick Littledale, in an article on "The Rationale of Prayer" published in the *Contemporary Review*, promised to discuss the prayer-test but instead devoted most of his space to a lengthy attack on Tyndall's "crusade against prayer," conducted in earlier speeches and articles. He went on to denounce the whole tribe of physicists who "seem unable to rise out of the plane of material conceptions into broad moral and spiritual views, or even to look at phenomena belonging to other spheres of knowledge with scientific eyes." The longevity of Christianity, and the persistence of the practice of prayer, are "facts" about the world which narrow-minded physicists choose to ignore, he complained.

But Reverend Littledale at last succumbed to the idea of a "scientific test" of the value of prayer. Instead of the one proposed by Tyndall's friend, he suggested that "a tabular comparison of the results severally attained by nurses who work for God"—such as the "sisters of conventual societies, who are moved by piety in their labor of love, and sustained in it by prayer"—and "nurses who work for money" should be made. There is no indication that such a test was ever made or that theologians' belief in the power of prayer would have been affected in any way by its outcome.

Reinforcement for the physicists soon arrived from another quarter. Francis Galton, already well known as the author of *Hereditary Genius* and *English Men of Science*, revealed that he had for several years been collecting statistical data on the efficacy of prayer. Tables of the average life span of various classes of persons show that kings and queens, who are usually the object of public prayer by their subjects, die earlier than lawyers, gentry, and military officers. Members of the clergy, presumably a prayerful class of men, do not live significantly longer than lawyers and physicians. Missionaries, whose effectiveness in spreading the gospel is crucially dependent on their living as long as possible after learning the language and habits of the country to which they are sent, frequently die shortly after arrival in spite of the many prayers that accompany them. The proportion of still-births suffered by praying and nonpraying classes of parents appears to be identical, though there can be no doubt that if a person ever prays at all, it will certainly be for the health of an expected child.

Tyndall came out fighting at the beginning of the next round. He recalled some of the points on which religion had previously given way to science: the existence of the antipodes, the motion of the earth, the age of the world, and the theory of evolution. Abandoning belief in the physical value of prayer might well be the next "act of purification" by which religion would free itself from dependence on superstition, now that science

had developed methods for analyzing forms of energy and could thus examine the claim that prayer "produces the precise effects caused by physical energy in the ordinary course of things."

But Tyndall did not want to be accused of flatly denying the value of prayer, though no one was in much doubt as to his opinion. Instead he insisted that he was willing to admit "the theory that the system of nature is under the control of a Being who changes phenomena in compliance with the prayers of men" as a "perfectly legitimate" theory—provided that it was to be considered subject to experimental test like any theory in science. Just as Newton's theory of light was abandoned when his prediction that light travels faster in water than in air turned out to be wrong, so the theologians should be willing to agree to a crucial experiment on the value of prayer and to abandon their theory if the result is unfavorable. Yet the theologians seem to resent the suggestion of such a test, either because they enjoy the very act of praying regardless of the results or because they are still under the sway of medieval mysticism.

The Controversy Spreads

James McCosh, a Scottish theologian who had gone to America to become president of Princeton College, now entered the battle. He criticized Tyndall for confusing the methods of the physical sciences with those appropriate to religion and moral philosophy and for misconstruing the type of "answer" God may give to prayers. The notion of a "control group" of sick persons, for whom one deliberately does *not* pray, is so repugnant to the true Christian as to cast doubt on the sanity of the enterprise. What if a skeptical young man, instructed by his father to be virtuous in order to enjoy ultimate happiness, were to propose an experiment with the boys of a poorhouse, "one-half of whom are allowed every indulgence, while the other half are exposed to restraint"? Would that be considered a reasonable "test" of moral philosophy, or would the father be justified in rejecting it with the assertion "that virtue is a thing binding on us, that by its very nature . . . is fitted to lead to happiness, and by pointing to the issues of virtue and vice seen in common life"?

As for the "effectiveness" of prayer, McCosh noted that there are many cases in which, as *later* becomes evident, it is the wisdom of God to answer the prayer by denying what the petitioner thinks he wants in order to lead him on to a better path. There are enough of these cases to show that one cannot simply tabulate the results of prayers as "answered" or "not answered." For example, McCosh continued, when Prince Albert was sick with a raging fever a few years ago, hundreds of thousands prayed for his recovery, apparently to no avail. Shortly after his death, Queen Victoria's advisers urged her to declare war on America. The Queen refused, however, "because her departed husband was always opposed to such a fratricidal proceeding." Yet one might suppose that if the Prince had been still alive his influence would not have been strong enough to stop the war. So in refusing to follow the wishes of those who prayed for Albert's recovery, God was really acting in their best interests. In the same way, for reasons we cannot now imagine, God might refuse to give preference to the patients in the ward being prayed for.

Of course it was just this kind of haggling about individual cases that Galton wanted to avoid when he proposed to treat the whole question statistically. Throughout the course of the debate, which continued in the *Spectator* and *Contemporary Review* for several months, hardly anyone attempted to refute his evidence, though other examples were brought forward in which the prayers of large numbers of people over long periods of time allegedly *had* been effective—for example, in promoting the spread of Christianity and the longevity of the Papacy. A more effective tactic was to admit that the primary purpose of prayer is not to request specific physical actions but rather to gain spiritual strength that may be employed in ways that have little to do with the subject of the prayer. This viewpoint would make Galton's statistics irrelevant and set aside the possibility of any kind of scientific test of the efficacy of prayer. Yet the theologians of the 1870s were reluctant to stick to this line; it would have looked too much like a retreat in the eyes of congregations accustomed to being urged to pray for specific acts of divine providence.

The proposal of a "scientific" experiment to determine the power of prayer kindled a raging debate between Victorian men of science and theologians.

The scientists came out of this debate with their self-confidence intact, even though they do not seem to have deprived anyone of his faith in the value of prayer. The theologians effectively pressed the argument that religious beliefs cannot be tested by scientific experiment, though at some cost to their status in a century that was according increasing prestige to the scientific worldview. At least their position was more tenable than that of the spiritualists who did perform experiments on psychic phenomena but claimed that it was in the nature of these phenomena to disappear when a skeptical observer was in the room.

Perhaps the net effect of the debate was merely to widen the chasm between the scientific and religious viewpoints. No one pointed out that the "crucial experiment" is almost as rare in science as it is in religion. For example, contrary to Tyndall's statement, physicists had already abandoned Newton's theory of light for a combination of other reasons two decades before the experiment on the speed of light in water. One does not have to accept the extreme conclusion that some observers have drawn from Thomas Kuhn's theory of scientific revolutions—that changing from one scientific paradigm to another is like a religious conversion experience—to realize that Tyndall's view of the role of experiments in theory-testing is unrealistic. A scientist always interprets experimental data within some theoretical framework and necessarily hesitates to abandon that framework without compelling reasons going beyond the mere numerical discordance of a few observations. It is amusing to speculate on what Tyndall and Galton would have done if the test had been performed and had yielded positive results.

Conversely, people do change their religious beliefs, in part because of personal experience and observation, and such behavior is not qualitatively different from that of a scientist who changes his theory as he acquires

new experimental data. The theologian who fears the spread of the scientific attitude is just as foolish as the scientist who denies the existence of dogmatism in scientific thought.

REFERENCES

[1]Ludwig Boltzmann, 1886. Der zweite Hauptsatz der mechanischen Wärmetheorie. *Almanach der K. Akad. Wiss., Wien* 36:225-59.

[2]The main sources for this debate are articles published in the *Contemporary Review*, July, August, and October 1872 and January and March 1873; a few brief notes on the subject also appeared in the *Spectator* and other periodicals during this period. Many of these articles are reprinted in *The Prayer-Gauge Debate*, by John O. Means, Boston: Congregational Publishing Society, 1876. [See also Frank M. Turner, "Rainfall, Plagues, and the Prince of Wales: A Chapter in the Conflict of Religion and Science," *The Journal of British Studies*, 13:46-65 (May 1974).]

EPILOGUE

After the publication of my article on "The Prayer Test" (*Am. Sci.* 62: 561-63, Sept. 1974), two readers pointed out that the test was actually performed about ten years ago. I am grateful to Dr. Michael B. Shimkin (University of California School of Medicine at San Diego) and Dean B. G. Greenberg (University of North Carolina School of Public Health at Chapel Hill) for calling to my attention of the paper "The Objective Efficacy of Prayer: A Double-Blind Clinical Trial" (*J. Chron. Dis.* 18: 367-77, 1965) by C. R. B. Joyce and R. M. C. Welldon.

Joyce and Welldon studied the effects of prayer on patients "suffering from chronic stationary or progressively deteriorating psychological or rheumatic disease" using the experimental method proposed by 19th-century scientists. They selected 38 patients matched in 19 pairs "as closely as possible for sex, age, and primary clinical diagnosis" and (in more than half of the pairs) for marital status and religious faith. One patient in each pair was prayed for, the other (as a "control") was not. The physicians who treated these patients were asked to evaluate their clinical state at the beginning and end of a trial period (from 8 to 18 months), not knowing which patient was being prayed for. The patients themselves were not aware of the experiment.

The results were somewhat inconclusive. Out of 12 pairs of patients for which it was definitely established that one patient did better than the other, the prayed-for patient showed greater improvement in 7 cases, the control patient in 5. By itself this result is not statistically significant. But the sequence of individual results suggested that prayer helped patients whose clinical state was evaluated after a short time, while it hindered those who for various reasons were not evaluated until several months after the end of the original trial period. Since "it was not known" whether the prayer groups continued their efforts after this period, one does not know how to interpret the fact that in each of the first six pairs for which the evaluation was completed the prayed-for patient did better, while in five of the remaining six the control patient did better.

The Joyce-Welldon experiment did not settle the question of the efficacy of prayer but should stimulate further research.

Meteoritic Influx and the Age of the Earth

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The argument that the rate of meteoritic influx should give a young age for the earth is examined and shown to be fallacious. Recent measurements of influx show that no increase in nickel should result in ocean floor sediments. Lunar measurements of infall rates are consistent with the terrestrial value. Possible explanations which could be proposed by young earth creationists are shown to be inadequate.

Introduction

One of the arguments which has been advanced in favor of a young earth (a few thousand years old) has been the rate of accumulation of meteoritic dust. A measured accretion rate has been used to show that the present rate could not extend over 4.5×10^9 years without adding an enormous amount of nickel to the surface of the earth. Since the additional nickel has not been found, it is concluded that meteoritic material has accreted upon the earth for only a few thousand years.

Statement of the argument

A precise statement of the argument runs as follows:[1,2] In 1957 the Swedish geologist Pettersson[3] estimated that the total influx of meteoritic dust upon the earth's surface was 14.3 x 10^6 tons/year (3.92 x 10^4 tons/day). His measurement was made by determining the amount of nickel in airborne dust which had been collected at 11,000 feet near the summit of Mauna Loa, Hawaii, and at 10,000 feet on Mt. Haleakala on the island of Maui.

The component of nickel averaged over all kinds of retrievable material is 2.5 per cent, whereas terrestrial material contains only 0.008 per cent nickel. Assuming that all of the nickel collected by Pettersson upon the mountain tops originated with extra-terrestrial matter, one need only multiply the measured quantity of nickel by 40 to obtain the total amount of dust from meteoritic sources. This comes to 14.3 x 10^6 tons/year. In five billion years, there would be a layer of dust 54 feet thick upon the surface of the earth if it were undisturbed. Clearly, this has not been the case. Hence, either a crustal mixing process has diluted this dust with enough terrestrial material to bring its concentration down to 0.008 per cent, or the added nickel has been swept into the oceans, thereby greatly increasing the amount of nickel in ocean floor sediments.

Morris and Whitcomb reject the crustal mixing hypothesis:

> For example, the average nickel content of meteorites is of the order of 2.5 percent, whereas nickel constitutes only about 0.008 percent of the rocks of the earth's crust. Thus, about 312 times as much nickel per unit volume occurs in meteorites as in the earth's crust. This means that the 54 ft. thickness of meteorite dust would have to have been dispersed through a crustal thickness of at least 312 x 54 ft., or more than three miles, to yield the present crustal nickel component percentage, even under the impossible assumption that there was no nickel in the crust to begin with! Similar calculations could be made for cobalt and other important constituents of meteorites, all testifying that there simply *cannot* have been meteoric dust falling on the earth at present rates throughout any five billion years of geologic time![1] (p. 380)

Slusher dismisses the possibility that the extra-terrestrial nickel could have been swept into the oceans:

> Nickel, on the other hand, is acutally a rare element in terrestrial rocks and continental sediments and is nearly nonexistent in ocean water and ocean sediments. This seems to indicate a very short age for oceans. Taking the amount of nickel in the ocean water and ocean sediments and using the rate at which nickel is being added to the water from meteoritic material, the length of time of accumulation turns out to be *several thousand years* rather than a few billion years.[2] (p. 56)

Discussion

The above arguments hinge upon the correctness of Pettersson's value for the influx. Actually, many influx measurements have been made. Techniques vary from the use of high altitude rockets with collecting grids to deep-sea core samples. Accretion rates obtained by different methods vary from 10^2 to 10^9 tons/year. Results from identical methods also differ because of the range of sizes of the measured particles.[4,5] One, therefore, looks for methods which strive to measure all of the cosmic material regardless of size.

It is now up to young earth creationists to explain the accord between the accepted age of the earth and the rate of meteoritic infall.

Terrestrial Influx Measurements

Non-selective terrestrial influx methods center around chemical analysis of various elements in ocean floor sediments. Core samples are taken from the ocean floor and the concentration of various elements is measured. Quantities which are in excess of terrestrial abundances are assumed to be extraterrestrial. Nickel, iridium and osmium have been used as indicators. These elements indicate infall rates from 8 x 10^4 (iridium) to 4 x 10^7 (nickel) tons/year. The 4 x 10^7 measurement, however, is suspect since it is not clear that the excess nickel was of cosmic origin.[6] Excluding this value leaves a more realistic range for meteoritic infall rates, between 8 x 10^4 (iridium) tons/year to 3 x 10^6 (nickel) tons/year.

Even Pettersson feels that his measurement of 14.3 x 10^6 tons/year is high, and he prefers a figure of 5 x10^6 tons/year.[7] This seems to have heen overlooked by Whitcomb, Morris and Slusher.

Nevertheless, the iridium and osmium measurements disagree with the nickel measurements for ocean floor sediments. The former indicate an influx of approximately 10^5 tons/year, or a factor of 30 lower than the nickel value. On the other hand, the value from the iridium and osmium measurements are in agreement with determinations of the flux from nickel found in Antarctic ice where the probability of pollution by terrestrial nickel is much less than at other locations.[8]

Since iridium and osmium are ten-times less abundant in the earth's surface than nickel, they are more sensitive indicators of the influx of cosmic matter. It seems to indicate, therefore, that the mean accretion rate is about 10^5 tons/year.

Lunar Influx Measurements

In addition to terrestrial measurements, two lunar measurements have also been made of the influx of cosmic matter.[9,10] The concentrations of a number of trace elements from core samples of the lunar surface reveal an excess of rare-earth elements when compared to their value in lunar rocks. The enrichment of these trace elements on the lunar surface can be accounted for by a 1.5 to 1.9 per cent addition of carbonaceous chondrite-like material. The total addition of this matter corresponds to an influx rate of 2.9 x 10^{-9} gram per square centimeter per year (gm/cm^2yr) to 3.8 x 10^{-9} gm/cm^2yr. These values compare favorably with the analogous estimate for the earth. (10^5 tons/year corresponds to 1.2 x 10^{-8} gm/cm^2yr).

Conclusion

The value for the meteoritic infall rate used by Whitcomb, Morris and Slusher is too large by a factor of 140. The lunar results of Keays *et al* and Ganapathy

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et al indicate that carbonaceous chondrite-like material is the major contributor to the accreted matter. The nickel content of carbonaceous chrondrites is 1.03 per cent, or a factor of 2.5 less than the figure computed from retrievable meteorites.[11] Since the total cosmic infall is 140 times less than Pettersson's value, the depth of crustal mixing required to disperse the excess nickel is 2.5 x 140 = 350 times less than the value given by Whitcomb and Morris, or 48 feet! Driving down a highway that has been cut through a small hill will reveal more crustal mixing than this!

The increase of nickel in ocean floor sediments also presents no problem. The total amount of weathered material carried into the oceans by the major rivers of the world has been estimated as 30×10^{15} grams/year, or 3.26×10^{10} tons/year.[12] Since the nickel content of crustal material is 0.008 per cent, 2.6×10^{6} tons of terrestrial nickel is carried into the oceans each year. The total amount of extraterrestrial nickel is 10^{3} tons/year, which is insignificant when compared to the terrestrial value. Contrary to Slusher's claim, no appreciable increase in the nickel content of the oceans is expected from cosmic matter.

Possible Objections

The rate of infall was determined by assuming a 4.5×10^{9} year age for the earth, which is rejected by young earth creationists. They may accept the above value for the total influx of cosmic material, but they may argue that it has been falling at a constant rate for only the past 10,000 years. Such an assumption necessitates an increase in the infall rate by a factor of 4.5×10^{5}, or 4.5×10^{10} tons/year (1.2×10^{8} tons/day).

Direct measurement of airborne particles and lunar micrometeoroid flux, however, give influx values which are five orders of magnitude below this figure.[13,14] Hence, the assumption of a constant influx over such a short period of time must be rejected.

Another possible explanation would be that the entire amount of material was dumped upon the earth and the moon at one time either before or during the Flood. The Flood could then have distributed the cosmic matter throughout the earth's crust and ocean floor sediments.

But this is nothing more than *ad hoc* speculation. If the Flood distributed the iridium and the osmium uniformly throughout the ocean floor sediments, then it should have similarly distributed other elements as well. But this is not the case.

For example, thorium-230 and proactinium-231 are two radioactive elements with similar chemical properties. Thorium-230 has a half-life of 75,000 years and proactinium-231 has a half-life of 34,300 years. Both elements form insoluble phosphates which precipitate in the oceans. Hence, both thorium-230 and proactinium-231 are removed from ocean water and deposited upon the ocean floor.

Now, suppose all of the thorium-230 and the proactinium-231 found in ocean floor sediments had been deposited over the course of one year by the Flood. One should expect either the same concentration of thorium-230 and proactinium-231 throughout all the sedimentary layers; or, one would expect that the insoluble thorium-230 and proactinium-231 phosphates remained suspended in the turbulent Flood waters and were then deposited upon the surface of the ocean floor as the turbulence subsided. In the latter case, one would expect a heavy concentration of thorium-230 and proactinium-231 near the top of the ocean floor covered by a few centimeters of sediment corresponding to the deposition of material since the Flood.

On the other hand, if the thorium-230 and the proactinium-231 have been deposited at a constant rate for a time which is long compared to their half-lives, then one would expect a logarithmic decrease in the concentration of these elements with increasing sedimentary depth. This is characteristic of radioactive decay. And this is exactly what is found to a depth of ten meters in a Caribbean core![15] A similar analysis for sedimentary depths up to 140 meters using potassium-argon decay also gives the characteristic logarithmic decrease.

Notice that I have not relied upon radioactive techniques for the purpose of establishing the absolute ages of ocean floor sediments. I have shown only that the logarithmic decrease in the concentration of radioactive elements as a function of increasing sedimentary depth argues strongly against rapid deposition of these sediments. Hence, one should reject any attempt to explain either the accumulation of ocean floor sediments or of meteoric material during the time of the Flood.

One concludes that the meteoritic influx argument of Whitcomb, Morris and Slusher is invalid. In fact, it is now up to young earth creationists to explain the accord between the accepted age of the earth and the rate of meteoritic infall.

Acknowledgements

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REFERENCES

[1]John C. Whitcomb, Jr. and Henry M. Morris, *The Genesis Flood* (Philadelphia: Presbyterian and Reformed, 1961; Baker, 1969), pp. 378-380.

[2]Harold S. Slusher, "Some Astronomical Evidences for a Youthful Solar System," *Creation Research Society Quarterly* (June 1971): 55-57.

[3]H. Pettersson, "Cosmic Spherules and Meteoritic Dust," *Scientific American* 202 (February 1960): 132.

[4]D. W. Parkin and D. Tilles, "Influx measurements of Extraterrestial Material," *Science* 159 (March 1968): 936-946.

[5]John L. Baker, Jr. and Edward Anders, "Accretion Rate of Cosmic Matter from Iridium and Osmium Contents of Deep-Sea Sediments," *Geochimica et Cosmochimica Acta* 32 (1968): 627-645.

[6]Barker and Anders, *Geochim et Cosmochim. Acta*, pp. 642-643.

[7]Pettersson, *Sci. Am.*, p. 132.

[8]Barker and Anders, *Geochim et Cosmochim. Acta*, p. 643.

[9]Reid R. Keays, *et al.* "Trace Elements and Radioactivity in Lunar Rocks: Implications for Meteorite Infall, Solar-Wind Flux and Formation Conditions of Moon," *Science* 167 (January 1970): 490-493.

[10]R. Ganapathy, Reid R. Keays and Edward Anders, "Apollo 12 Lunar Samples: Trace Element Analysis of a Core and the Uniformity of the Regolith," *Science* 170 (October 1970): 533-535.

[11]Barker and Anders, *Geochim et Cosmochim. Acta*, p. 642.

[12]Karl K. Turekian, *Oceans*. Foundations of Earth Science Series, ed. A. Lee McAlester (Englewood Cliffs: Prentice-Hall, 1968), p. 27.

[13]Parkin and Tilles, *Science*, p. 944.

[14]Leonard D. Jaffe, "Lunar Surface: Changes in 31 Months and Micrometeroid Flux," *Science* 170 (December 1970), 1092-1094.

[15]Turekian, *Oceans*, pp. 61-72.

UFOs — Food for Thought

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After years of study, I am certain that there is more than ample high quality observational evidence from highly trained reliable witnesses to indicate that there are machine-like objects under intelligent control operating in our atmosphere. The aerodynamic performance and characteristics of the true UFO rule out man-made or natural phenomena. Such observational evidence has been well supported in many instances by reliable instruments such as cameras, radar and geiger counters as well as by electrical interference, physical indentations in soil and scorching at landing sights.
I am reasonably sure that if qualified civilian scientists and investigators are able to come to this conclusion, the United States Air Force, supported by the tremendous facilities at its disposal, has come to the same conclusion long ago. However, present official policy deliberately attempts to discredit the validity of UFOs and a wealth of data and facts are not being released to the public. It is high time that the real facts about UFOs are released. A public information program should be inaugurated that presents facts.

Personal testimony [1]
Armed Services Committee
UFO Hearings

The above statement and my complete report on the classical Exeter, New Hampshire, UFO sightings were unanimously voted into the Congressional Record during the first open congressional hearings on UFOs. Prior to these hearings, all such sessions had been closed and classified.[2] Why?

I, like most of the public at large, had been both puzzled and frustrated over the controversy surrounding UFOs. Years of study had convinced me that UFOs were real and that a definite need existed for thorough documentation of UFO events. It became apparent to me that the United States Air Force was not conducting serious investigations into *civilian* UFO sightings unless public pressure demanded it. This procedure may have aided Pentagon policy, but it certainly was not contributing to realistic public information on UFOs nor to a thorough civilian scientific study of the problem. It was with this in mind that I decided to become a UFO investigator in order that some of the data being overlooked might be recorded properly for present and future UFO research.

Personal Involvement

I was barely a teenager when Kenneth Arnold, an experienced mountain pilot, sighted nine large, flat, shiny objects flying in line over Mount Rainier, Washington, on June 24, 1947. During the months that followed, flying silvery discs were being reported from all over the world. At that time, I believed that either people were imagining things or else the United States was testing a new weapon. However, the phenomena continued, year after year. Intrigued, I collected and read everything that I could find on the subject. This interest continued through high school and college, as well as during an overseas tour with the *top secret* United States Air Force Security Service. Later, I became a

The subject of UFO's continues to be a highly controversial one, with dedicated believers and disbelievers among Christians as well as non-Christians. But if the question of the reality of UFO's is an area of controversy, no less so is the question of the meaning of UFO's among Christians who accept their reality. The present author suggests that UFO's contain angelic visitors, but Dr. Clifford Wilson, author of Crash Go the Chariots *and a principal Christian respondent to Erich von Däniken's* The Chariots of the Gods, *is no less convinced in* Gods in Chariots and Other Fantasies *that the passengers on UFO's are "messengers of Satan."* (pp. 87, 88) . . . (*Editor*)

member of a civilian UFO research group based in Kensington, Maryland, called the National Investigations Committee on Aerial Phenomena (NICAP). In 1964, I was appointed chairman of a technical investigating team for NICAP. This, in turn, led to my being selected to serve as an "early warning coordinator" for the Air Force Colorado University UFO Study. Early in 1974 I was made a scientific associate to the Center for UFO Studies directed by Dr. J. Allen Hynek of Northwestern University. It is incredible to look back over the past decade of involvement in UFO investigations. Personally directed on-site enquiries have documented well over two hundred reported events that fall into the category of unidentified flying objects as defined by Dr. Hynek.[3]

First Sightings

Ever since the first *modern* UFO sightings reported by allied and axis pilots during World War II (they called them *foo-fighters* then), UFOs have been with us. The strange reports are global in nature and appear to be a *wave phenomena*. UFO *waves* are abrupt increases in the *number* of UFO reports. They come in addition to a smaller but constant flow of similar reports.

The first of many global UFO waves peaked in June and July of 1947. Frantic attempts by our Air Force to identify the objects in those early days proved futile. Formerly classified papers state that—"The phenomenon reported is something real and not visionary or fictitious . . . The description (i.e., of the objects) is metallic . . . circular or elliptical in shape, flat on bottom and domed on top."[4] This letter, sent to the Commander of the then Army Air Force in the Fall of 1947 resulted in the formation of the first secret Air Force UFO project on December 30, 1947.

The new project was dubbed "Sign" and continued until December 27, 1948, when the Air Force made a public announcement to the effect that flying saucers did not exist and that it was terminating Project "Sign". However, it opened again secretly as Project "Grudge" in February of 1949 and surfaced again publicly in March of 1952 with a new code-name—"Bluebook". This project continued until December 17, 1969, when the Secretary of the Air Force repeated history in announcing that the Air Force UFO project was being terminated. Although most civilian reports are being largely ignored by the Air Force, it may be noteworthy to mention that the intelligence services of the Aerospace Defense Command continue to investigate UFO sightings reported by airline pilots, merchant mariners and all government-controlled military and civilian sources under the auspices of Joint Army-Navy-Air Force Order Number 146E. Such information is considered vital to national security and is restricted by two espionage laws. A recent sighting by airline pilots who made a confidential report to NICAP bears this out.

An airline captain and his co-pilot were flying an unscheduled charter cargo flight from St. Louis, Missouri to Dallas, Texas. Their aircraft was a DC-8 cargo jet. The date was 14 February 1973 and the time was 2:30 AM CST. Their approximate location was 40 miles due east of McAlester, Oklahoma. At the time the object was sighted, their approximate bearing was 195 degrees. Their airspeed was 510 mph and they had just started a descent from 21,000 feet. The co-pilot nudged the captain and pointed to their right out of the cockpit. There, just below the leading edge of their right wing, about 5000 feet away, was what first appeared to be another commercial aircraft on the same course and travelling at their speed. However, this idea was quickly abandoned, when within just a few seconds, the object suddenly arose straight up and slid sideways toward them and paced them from an estimated 300 yards.

It was unlike any conventional aircraft they had ever seen. They radioed it but received no answer. They then switched on their airborne radar. The object appeared on the edge of the scope and simultaneously seemed to react by abruptly rising straight up and sliding sideways to a position just above the DC-8 and temporarily out of the witnesses' sight. Then, it appeared to the left of them and dropped just below the leading edge of their left wing for several minutes before dropping below and behind them and out of sight. Several minutes later it suddenly appeared again and sped 30 feet below them and rose up in front of them performing an "up-and-down" motion. It then slid sideways and sped out of sight. The pilots tracked it for 50 miles before it went off their radar scope.

The captain stated that the object was bright silver and was almost perfectly round. It had unconventional amber lights and strange fin-like protrusions located on its sides and trailing edge. On the top center was a transparent dome which contained two or three moving figures. They were urged by their supervisor to report the object to the Air Force. An Air Force officer interrogated them and they filled out questionnaires several times. One day, a civilian met with them at the airport and showed credentials indicating that he worked for a certain government agency. They were told that the investigation was over and that they were not to discuss their sighting with anyone except authorized personnel. JANAP 146E has effectively kept most airline pilot UFO reports from the public eye since its promulgation in 1954. This particular sighting was forerunner to a new UFO wave.

The 1973 Wave

What started as a local spurt of sightings in Georgia during the summer of 1973 soon escalated into the first massive UFO wave in North America since 1967. NICAP's records indicate that the onslaught began in late September as UFO sightings spread like brushfire throughout the Southeast. Observations were being reported faster than police and other authorities could follow them up, some involving dozens or hundreds of witnesses in a single community. When Piedmont, Missouri skies were invaded by strange erratically-moving multi-colored lights, a team of investigators led by Dr. Harley D. Rutledge, chairman of the physics department at Southeast Missouri State University conducted a scientific investigation. Linked by radio, the team, using surveying instruments, telescopes, spectroscopes and rangefinders documented over 100 sightings. The physicist and his colleagues concluded that the objects maneuvered at speeds estimated at thousands of miles an hour, were able to make right-angle turns at speeds that would crush conventional aircraft, appeared to be under intelligent control and propelled by a power not

yet harnessed by man.

The wave peaked in October and November. On October 3, a truck driver and his wife reported that they were chased by a large low-flying egg-shaped object encircled by large bright red and yellow lights at Jackson, Missouri. Sticking his head out of the truck window for a better look, the driver was temporarily blinded by a bright flash of light but managed to bring his truck to a halt. His wife drove him directly to a hospital for treatment and the police had his damaged eyeglasses analyzed. The warped eyeglass frames were found to have been "heated internally".

On October 11th, two shipyard workers fishing on a pier at the Pascagoula River in Mississippi were terrified to observe a blue-glowing object hover at the shore-end of the pier and three creatures emerge from it and float toward them. They claimed to have been taken aboard the craft and given some sort of examination. I phoned astronomer Dr. J. Allen Hynek, former chief scientific consultant to the Air Force UFO projects, who had investigated this case personally. He told me that he was absolutely convinced that both men had undergone a terrifying experience. Hypnosis, polygraph and personal stress evaluation tests as well as the moral character of both witnesses indicated that the men were telling the truth as they believed it to be. One of the witnesses suffered a nervous relapse. There were many UFO/occupant cases reported in 1973. Many of them turned out to be hoaxes but many remain unexplained, including two which I personally investigated at Goffstown, New Hampshire.

On October 18th, 18-year veteran U.S. Army Reserve Captain Lawrence Coyne, Commanding Officer of the 316th Medical Attachment and his three-man crew were approached by a domed UFO over Mansfield, Ohio. To avoid collision, Coyne put the helicopter into a steep dive. The UFO paced the copter overhead, barely missing its whirring blades. Inexplicably their radio would not function and the helicopter, although set for a dive, began ascending 1000 feet per minute until the unknown wingless vehicle accelerated away and out of sight. Interestingly enough, Coyne and his crewmen were not silenced and were allowed to make their encounter public by their superiors.

Still Unexplained

The government claims that UFOs do not exist are not easily accepted by UFO witnesses nor by researchers such as myself who have investigated similar cases in our own respective areas. In spite of such official claims, one fact is certain—UFO *reports* exist. I received over 100 reports from the New England area in 1973 and over 20% could not be explained. Most reports can be explained away in terms of misinterpretation of natural phenomena or misidentification of man-made objects. Relatively few hoaxes are perpetrated. Most reports are made by sincere individuals who believe they have witnessed something unusual. In some cases, the witnesses' observational data are supplemented by supporting evidence such as electrical interference with automobile ignitions, lights and communications equipment; radar; photographs and physical traces left behind by the reported UFO. The Air Force-sponsored University of Colorado UFO Study could not explain 30% of the sightings investigated by their teams of

Mysticism, hallucinations, hoaxes, conventional objects, natural phenomena and secret weapons all fall short of explaining what is being reported by witnesses from all walks of life from all over the world.

scientists. Some of these involved Radar-Visual sightings:

> This is the most puzzling and unusual case in the radar-visual files. The apparently rational, intelligent behavior of the UFO suggests a mechanical device of unknown origin.[5]

and unexplained photographs:

> All factors investigated, geometric, psychological, and physical appear to be consistent with the assertion that an extraordinary flying object, silvery, metallic, disk-shaped, tens of meters in diameter, and evidently artificial flew within sight of two witnesses.[6]

None of these cases provided proof as to what UFOs were but they were, needless to say, puzzling to the analysts performing their evaluation of the data. Dr. Hynek is aware of over 300 "physical trace" cases. These have occurred both in the U.S. and abroad and are startlingly similar. One such case he investigated with others took place on November 2, 1971 at Delphos, Kansas.

At 6:20 p.m., Alton Smith, school principal, reported seeing a streak of light descending into the general direction of the Durel Johnson farm. Then, sometime after 7:00 p.m., reserve police officer, Lester Ernsbarger observed a bright light ascending from the same area. These reports proved to be significant because the Johnson farm had a strange visitor during this time-frame and it left its calling card behind.

At approximately 7:00 p.m., Ronald Johnson, age 16, was out at a shed tending sheep with his dog. His mother called him for supper and a few minutes later, he left the shed. Suddenly a strange rumbling sound filled the air. The area behind the shed suddenly became illuminated. There, about 75 feet away was a strange oval object capped with a rounded dome. It glowed blue, red and orange as it hovered momentarily just a few feet above the ground before taking off at an angle with a high-pitched whining sound, barely clearing the shed roof. Ronald, stunned and temporarily blinded, ran to tell his parents. They came out and witnessed a large light as bright as an arc-welder moving away in the air above their farm. Running to the area, they found a large 8-foot ring marking on the ground. They phoned the sheriff and the state police who conducted an official investigation and photographed the ring-marking on the following morning. Dr. J. Allen Hynek, Chairman of the department of astronomy at Northwestern University alerted investigator Ted Phillipps who conducted a further on-site investigation. A summary of the results of this investigation is as follows.

The object had crushed a dead tree to the ground and from all appearances had also broken a limb of a

live tree when it had landed. The broken limb would break as if it were dead, yet, it was green under the bark and the upper area still had green leaves. The lower end, however, was blistered and had a whitish cast. Laboratory tests showed that although plants grew in normal soil five feet away from the ring, nothing would grow in soil taken from the ring. The soil was not radioactive but it would not absorb water and contained dehydrated plant roots and a whitish substance. This is what one would expect from rapid, intense heating of a mineral solution which would drive off the water and leave a saltish precipitate behind.

The depth of the baked ring of soil extended about 14 inches downward. Various tests suggested that a very intense radio-frequency heating source could cause this effect. It took a temperature of 1500 degrees Fahrenheit to make normal soil similar to the ring soil. It was concluded that one could vary the temperature, radiation time and volume of wet soil, but, that in any event, the power level of the proposed radio-frequency energy would have had to have been somewhere between 2-20 million watts!

Multiple Hypotheses

In my book, *UFOs: Interplanetary Visitors,*[7] I apply Chamberlain's method of multiple hypotheses in the seeking of proposed solutions to the UFO problem. Those theories that have been advanced over the course of modern UFO history are examined in the light of the hard core UFO evidence. Mysticism, hallucinations, hoaxes, conventional objects, natural phenomena and secret weapons all fall short of explaining what is being reported by witnesses from all walks of life from all over the world. I propose, with the use of fully documented evidence, that only the *extraterrestrial visitors hypothesis* best accounts for what is being described *if* the best unexplained reports are taken at face value. This hypothesis, in turn, raises the obvious questions of *how, why* and *where,* which if taken in the context of our present technology and understanding of the laws of physics leave us beyond the pale.

Religious Implications

When faced with a *possible* extraterrestrial threat against which there was no practical defense, multitudes would probably turn to their religious beliefs for help and comfort. It is probably very fitting that in the final scenes of the movie version of H. G. Well's *War of the Worlds,* we find helpless people huddled in churches seeking divine help against the invading Martians. Help does come in a most dramatic way. The Martians succumb to the very disease-carrying microbes that man had built up immunity against during the course of his evolution.

We might also consider that some would turn from one religion to another in feverish desperation if no divine help appeared in answer to their petitions. Some awestruck cultures might turn from their traditional religions to worship the aliens themselves. The Aztecs mistook Cortez for a god and Vietnamese peasants in a remote village offered sacrifices to the crewmen of a downed U.S. helicopter.

Indeed, much of the initial exploration of our own planet was motivated by Christian missionary zeal. One might wonder if this motivation exists on an interstellar scale! Both Judaism and Christianity are based upon written records concerning superhuman manlike beings who brought religious teachings from the sky. Could, for example, the *angels* (messengers) mentioned in the Bible actually have been extraterrestrial evangelical missionaries? I have pondered this possibility in the pages of *Christian Life* [8] and in more detail in my book.

In conclusion, I would like to leave the following challenge to Christian theologians, scientists and laymen alike. It is imperative that the whole question of our own space efforts and the probable existence of extraterrestrial life be examined fully in the light of the impact that both could have upon contemporary theology and a traditional interpretation of Scripture. Geocentric theological concepts of the Resurrection and the Second Coming of Christ might have to be *expanded* to include other parts of our solar system or wherever man might colonize. The discovery or awareness of intelligent extraterrestrials would imply that the Incarnation may not have been an event unique to just this planet. Even the doctrine of Creation may be profoundly affected. How far will man himself spread life as he begins to visit other planets? It could very well be that the Creator has so ordered things that He employs perfect unfallen beings to spread and care for various forms of fallen and unfallen life throughout His creation.

In order to better appreciate and prepare for any such theological impact caused by revolutionary discoveries as postulated above, it would be good to study in depth the Church's reaction to a similar situation in the past, namely, the Copernican revolution. Prior to the discoveries of men like Copernicus and Galileo, theology and scriptural interpretation were firmly wedded to an Artistotelian concept of the universe—that the earth held a privileged central position in the universe; for the moon, planets, sun and stars supposedly moved around it in perfect circles. The outmoding of this erroneous concept revealed the need for vast and sweeping changes in both science and Christian theology. At first the Church fought these new concepts. Even Martin Luther called the Copernican system antiscriptural, and yet today Christians the world over accept such a system as common everyday knowledge. The important thing to remember is that throughout the history of the Church, theology and scriptural interpretation have had to be *expanded* again and again in the light of new knowledge. Although such changes were distasteful and alarming to the generation in which they occurred, they in no way changed the basic message of the Christian Gospel.

As Christians face the serious implications posed by the ushering in of the space age and the UFO problem, they should not lose sight of the fact that the foundational truths of the Bible have always triumphed in the face of new knowledge. Christians and adherents of all faiths should come to this realization: Increased knowledge of the universe, coupled with a possible contact with intelligent extraterrestrial beings, may well enrich man's understanding of his particular place and purpose in the universe as related to God and His unfathomable creation.

REFERENCES

[1]U.S. Congress, House Document No. 55, UFO Hearing by Committee on Armed Services, 89th Congress, 2nd Session, April 5, 1966.

[2]"Congressional investigations are being held on the problem of Unidentified Flying Objects. Since most of the material is classified, the hearings are never printed." (Letter on file at NICAP from Congressman W. Ayres, Ohio, January 28, 1958.)

[3]Hyneck, J. Allen, *The UFO Experience, A Scientific Enquiry*, Chicago, Henry Regenery Co., 1972, p. 10
"The reported perception of an object or light seen in the sky or on the land, the appearance, trajectory and general dynamic and luminescent behavior of which do *not* suggest a logical, conventional explanation, and which is not only mystifying to the original percipient but remains unidentified after close scrutiny of all available evidence by persons who are technically capable of making a common sense identification, if one is possible."

[4]Condon, Edward U., *Scientific Study of Unidentified Flying Objects*, New York, Bantam Books, pp. 894, 895

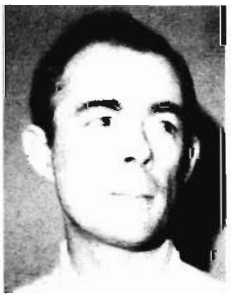
[5]*Ibid.* p. 164

[6]*ibid.* p. 407

[7]Fowler, Raymond E., *UFOs: Interplanetary Visitors*, New York, Exposition Press, Inc. pp. 256-272

[8]Fowler, Raymond E., *Christian Life*, "The Bible and the UFO", (November 1966) and "Whatever happened to UFOs", (July 1972).

Look Down the Ringing Grooves



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Change touches all created things. Living species can change from place to place and with the passage of generations as the result of natural processes which alter the genetic composition of populations.

This view of life need force no one to deny God a role in the origin of life. Although biological change has a vital place in the plan of God for all Creation, it is definitely, a limited place. Observed patterns of change in populations do not suffice to initiate the rise of new life forms with a capacity for development. The eye of reason can see the hand of God in direct control at this point, just as clearly as the eye of faith.

"Education," wrote Aldo Leopold, "is learning to see one thing by going blind to another." [1] That kind of education helps to account for the rancor between Christians and scientists in their endless wranglings over the origins of life. Blind arguments from both sides belie their claims to enlightenment. Both sides discredit themselves in the process of arguing. It appears to one with vital interests on both sides that one side might at least begin to resolve the issues by using the insights of the other. I proceed on the premise that neither Christians nor scientists need let themselves be forced into either/or extremes. My own experience is that a Christian who is a scientist has an incomparable insight into the dimensions of space, time, and truth. I propose to illustrate this by sharing a geologist's perspective into the prickly subject of organic evolution.

Evolution means simply a process of growth and development. Within the provocative context that we are interested in, organic evolution is the hypothesis that all existing life originated from inanimate matter in the remote past and developed into successively more complex forms by natural processes including mutation, selection, and adaptation.

The evolutionary hypothesis owes its widespread acceptance to its ability to satisfy our questions about why life has not always been just as we see it today. The answers appeal to nothing more mysterious than the familiar biological mechanisms that we apply in plant and animal breeding. Objections to the hypothesis center on the fact that one may use it to infer that life arose without divine intervention or control. Pioneers of the evolutionary hypothesis recognized the materialistic side of this conclusion, and earnestly disavowed it. It remains with us, nonetheless, because enemies of our faith have made it their own.

The Fact of Change

We may eliminate the false conclusion and its corollaries by taking another look at the fact of change, the basic premise in evolutionary thought. This much bears examination, because not even the everlasting hills are changeless or forever and always fixed and immutable. The whole of the known universe is in a state of motion and dynamic change which is anything else but mere decay or running down. Instead of quibbling about that, "Let the great world spin for ever down the

ringing grooves of change," in the words of Alfred Tennyson.[2]

Looking more closely at the grooves, we discover that change is a genuine characteristic of life. Change is itself the expression of two primary attributes of all living things: diversity and individuality. Reproduction without diversity and individuality would be vegetative replication in mechanical conformity to a single mold. Diversity preserves individuality. Therein reside the biological prerequisites for human personality and freedom, two essentials of the nature of God, his image and his purpose.

From this point of view, the bare fact of change in living things does not constitute adequate grounds for denying God a role in the origin of life. The error of any such denial shows forth plainly in a review of the nature and extent of biological change in the present and in the past.

What we can observe in living species is change from one generation to another. The array of genetic characteristics possessed by one generation is never uniformly carried over into the next. This is, first, because no one individual can possess each and every possible character of the species. Second, only a part of each generation shares in the procreation of the next, and unequally at that. This is the result of numerous different processes ranging from involuntary to deliberate, random to selective, natural to cultural, and geographic to sociological. These processes combine to determine which part of one generation engenders the next. They act to subdivide a species into small, loosely linked populations within which interbreeding is more active than between groups. The breeding populations are continually subject to fractionation and differential recombination, which preserve and intensify the genetic combinations determining some characteristics while repressing or removing others. A given species would have to maintain random free breeding within a large, homogeneous population in order to keep from becoming inconstant in some features from one place to another. In time, a species can actually undergo collective modification in some gene combinations. Variation between individuals at any time and place is always so great that statistical comparison of groups of individuals is needed to make objectively perceptible any temporal trend of change in any characteristic.

Authenticated changes of this limited and subtle extent lead to the subdivision of a species, with the gradual divergence of new taxonomic units at the lowest levels—race, variety, subspecies, or species. The new forms can be differentiated from the old by subjective or statistical details of form and size or by differences in adaptation to habitat. The two often prove to be still capable of interbreeding in zoo or laboratory conditions. Change of this limited scope is not the same thing as the emergence of new life forms. Darwin's finches, the textbook prototypes of speciation by adaptive radiation in geographic isolation, are no more than finches. We do not witness the emergence of new taxonomic units at the generic level or above. The processes leading to speciation end up in specialization at the expense of the potential for development in new directions. None of Darwin's finches have taken up the habits of kingfishers or cuckoos, shrikes or hummingbirds. Monkeys could never develop into anything but monkeys.

If we have not actually observed the natural emergence of significantly different new life forms, we are assured that is due to the brevity of our observation. Time and mutation account for the evolutionary advance. Genetic mutation has been pictured as the fuel of evolution, that is, as the source of new inheritable characteristics or modifications in existing characteristics.[3] The natural action of adaptive and selective processes in time gives rise to new genera. Yet observed mutations simply do not happen systematically according to the schemes that would usefully advance the development of new characteristics and so transmute a species. Instead, natural mutations, which occur spontaneously with measurable frequencies, are random in the characteristics they affect and their effects are quite the opposite of advances. They constitute genetic aberrations that result in unfortunate if not predominantly pathological manifestations such as dwarfism and albinism. Extreme aberrations are more or less non-inheritable and, in any case, natural reproductive patterns further act to eliminate even non-lethal mutations in both dominant and recessive genes. Laboratory mutations, induced by chemical, thermal, and radiogenic means, are consistently lethal.

But time is again invoked, together with the probability that some mutations are eventually beneficial and capable of being shared, preserved, and developed. You may accept that if you regard time as the domain of random probability. The geological record of time and life has its own witness in this connection.

The Geological Record

The record of the rocks, selective and fragmentary though it is, contains an orderly succession of fossil species. That they are actual organic remains and not diabolical counterfeits is known from their structural and biochemical affinity or identity with life today, as well as from evidences of their life associations and habits. The fossil remains are related to living species in some way, and successively younger strata contain an increasing proportion of extant genera and species. Not even seemingly-bizarre extinct forms are alien or unrelated to life today.

Within the fourth dimension which parallels the vertical dimension of the geological record, it is possible to confirm that a species is not forever fixed and frozen in all its anatomical characteristics. Transformation in response to time and environment is traceable. The temporal descent of one chronological species from another was first traced meticulously in Silurian corals of the genus *Zaphrentis* by the Englishman Carruthers,[4] and has been repeated in species representing other animal and plant orders.

Changes in some forms were accompanied by the disappearance of other forms of life. The old ones left quietly, usually slowly, although abruptly on occasion. Repeated extinctions did not come about as the suppression of spurious or defective creations. The extinctions were a part of the long continuing processes which shaped the earth as it is today, a living and fertile blue planet with no known habitable neighbor at hand in the lifeless reaches of cosmic space. The former existence of now-vanished species changed the earth in numerous subtle and unobtrusive ways that prepared it for their successors and for eventual human habitation.

Biological Laws

Four propositions have been advanced as biological laws that govern the evolution of new generic stocks. They are Dacque's principle, Williston's law, and Cope's laws.[5] Dacque's principle asserts the parallelism of adaptive radiation in related stocks, Williston's law is based on his observation that the specialized development of some organs or faculties is accompanied by a reduction in the number and the importance of others. Cope's laws are his conclusions derived from observations that the most durable species in the stratigraphic record are those least specialized in structure and adaptation to habitat, and that the development of generic stocks is accompanied by increase in size. The second law is also known as Deperet's principle.[6] Still more basic than these conjectural principles are certain characteristics of the way each new stock appears. First, their initial appearance is lost to the geological record, as if in accordance with Teilhard de Chardin's opinion that the "peduncles" of phyla are naturally suppressed.[7] Secondly, when fossil evidence is first detectable, new generic stocks have already begun to progress and diversify in distinctive directions because they are already endowed with an enormous genetic potential for development and radiation. Thirdly, the new stocks are already equipped with sets of novel characteristics or novel forms of existing characteristics. The new equipment is functional and has positive survival value from the start: that is, organisms do not have to either inherit acquired characteristics or wait until new organs or faculties are completely developed before they are usable.

The Mark of Purpose

These three characteristics of generic development bear the hallmark of purpose, not chance. They affirm the divine creation and introduction of high taxonomic units at discrete and chosen times in accordance with a divine plan. The biological advances recorded in the fossil succession were brought about by the active direction of God. Change lies within his control as a tool in his continuing creative activities. Biological and other natural sources cannot explain the appearance of the characteristics that distinguish new life forms. Active mechanisms for speciation are one-way processes that lead to irreversible specialization rather than toward generalization or innovation. Neither adaptation nor selection initiate the appearance of new characteristics. Mutation generates useless aberrations in a few characteristics. That leaves the creative activity of God as the only plausible source of entire suites of viable genetic potentialities for biological advance.

The creative activity of God is the only plausible source of entire suites of viable genetic potentialities for biological advance.

Theories of organic evolution fail to explain man or much else. Nothing plus inanimate chaos plus impersonal chance or necessity plus time simply do not add up to man or even to life in general. The only correct element in the equation is time. Add God plus purpose plus order, and the sum is man.

By his wisdom, the Lord founded the earth (Proverbs 3: 19). If the earth and all created things are changing and changeable, the fact of a changing creation does not deny the fact of an unchanging Creator. He laid down the ringing grooves of change also. The very changeability of the universe and all living things, and the geologic record of changes stand as further examples of how all creation joins with the starry firmament in proclaiming the glory of God, our Lord, the one Creator of all things visible and invisible.

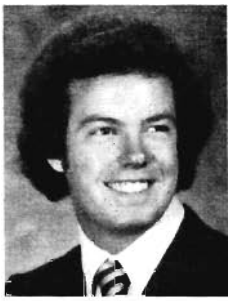
REFERENCES

[1]Aldo Leopold, *A Sand County Almanac*, New York (Oxford Univ. Press), 1949, p. 158.
[2]Alfred Tennyson, "Locksley Hall."
[3]Ledyard Stebbins, Processes of Organic Evolution, New Jersey (Prentice-Hall), 1966, p. 3.
[4]R. G. Carruthers, Evolution of *Zaphrentis delanouei*, Quarterly Journal Geological Society (London), v. 66, 1910, p. 523.
[5]E. D. Cope, *Primary Factors of Organic Evolution*, Chicago, 1896. E. Dacque, *Organische Morphologie und Palaontologie*, Berlin, 1935. S. W. Williston, *The Osteology of the Reptiles*, Cambridge (Harvard Univ. Press), 1925, 300 p.
[6]C. Deperet, *Les transformations du monde animal*, Paris, 1970.
[7]Pierre Teilhard de Chardin, *The Phenomenon of Man*, New York (Harper and Row), 1959, p. 119.

Vast educational and industrial revisions will be the key movers of society in facing the environmental crisis. The eventual target of both these efforts is man. What needs to be understood is that our own nature *is what really stands in our way as we try to salvage our surroundings. This is the aim of our efforts to change—that men might begin to think unselfishly, and individually sacrifice, so that all could benefit. When we realize this nature of our goal, our hope of success becomes undeniably dimmer. For men have always been selfish, and forcing them* not *to be is a venture with doubtful promise. Men may be educated, but simply not care; they may be coerced into social action, but rarely without motives of personal gain. The ecological problem, like so many others, is really a much bigger and deeper one than we can handle. Rooted in the very central nature of man, its solution requires more than just personal or group conservation. It requires a change of heart, a turning away from self to something higher. In short, all the plans and all the effort in the world might not be enough to change man and save the environment. As to what* is *enough—well that would take a whole* book *to tell . . . . .*
Thank God it's already been written!

John Tupper, Undergraduate student, Stanford University, Stanford, California. From a paper, "How to Save the Environment in Two Easy Steps (and one *Haarrd* One)."

Psychiatry and Religion: A Miscible Solution



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Champions of science and religion have gone round and round over the relevance of the laboratory versus the pulpit. Although such intellectual discussions are frequently divorced from daily experience, the subject of medical care, specifically psychiatry, is an endeavor requiring vital decisions. Since we live in a world historically rooted in religion and continually challenged by the discoveries of modern science, how can two seemingly antagonistic disciplines simultaneously work for man's edification?

Although the distinctions between humans and other creatures in any specific area may appear nebulous, the totality of human existence consisting of biological, social, psychological, and spiritual components distinguishes man from the rest of creation. For centuries, the authority of the Church permeated all aspects of thought. Man was considered primarily from a spiritual standpoint, neglecting both psychological and social needs. Although psychiatry had its roots in the nineteenth century, it was not until the revolutionary postulations of Sigmund Freud that the world took notice.[1]

Freud hypothesized that the human psyche is composed of instincts(*id*), conscience(*superego*), and that which integrates these two with reality(*ego*). Conflict in any one of these areas leads to emotional illness.[2] Since man is instinctively hostile to society, religion was created in order to make life tolerable.[3] Freud hoped that science would ultimately replace the illusion of religion enabling individuals to reason intelligently.[4]

Religion as Psychic Creation

Although eminent psychologists have deviated somewhat from Freud's original proposals, they generally reenforce his supposition that religion is a psychic creation enabling individuals to better cope with the environment. Adler asserted that religion is an expression of man's yearning for the highest ideal. Contemplation of a deity is simply a manifestation of a desire for perfection and superiority.[6] Humanists such as Rogers and Fromm accuse religion, and society in general, of corrupting the innate goodness of man. Only through liberating individuals from such maladies will moral men eventually create a synergistic society.[8]

Deviating somewhat from his colleagues, Jung concluded that Freud's gravest mistake was to view behavior as resulting merely from sexual drives. Since man is also a religious creature, Jung believed that the ineffable thoughts of the collective unconscious must be expressed through spiritual symbols in order to harmoniously integrate the external and internal needs of man.[5]

The Christian position tends to be more pessimistic towards man's condition. *Homo sapiens* by nature is alienated from a righteous God. The division between self and sacred can only be remedied through an individual's reestablishment of a spiritual relationship with the divine Trinity (God-Father, Jesus Christ, Holy Spirit). God is not a psychic phenomena, but the foundation of existence.

Psychiatry

Several decades heretofore, a vast majority of society considered psychiatry and religion to be antagonistic disciplines. Today, the fear of both social stigma and contamination of one's spiritual life discourage many from seeking psychiatric consultation. However, pure psychiatric visits should not deal with the nature of religious beliefs, but with how freely they are expressed.

Psychiatry is concerned with the phenomena of religious experience as an activity of the human psyche. The processes through which thoughts are formulated and then externalized are the concerns of the physician. The latter strives to clear up the distortions of one's emotional life, enabling the patient to select the values he/she desires. The therapist should not interject moral issues, but allow a person to respond freely to personal ambitions. Successful analysis will lead to the emergence of a patient's genuine attitudes and, subsequently, a more fulfilled individual.[10]

Critics from circles outside of psychiatry have frequently censured its limited view of man. Some consider psychoanalysis to foster egoism, individual

Based on a Term Paper written while an undergraduate at Stanford University in 1974.

ethics, and morality based on self-indulgence.[14] Freudians assume that self-analysis alone will lead to the resolution of one's problems. However, this method sometimes may lead not only to greater self-doubt, but the externalization of unconscious attitudes which are unhealthy or distorted in themselves will not lead to greater fulfillment, only more frustration. Although the analyst often prefers to deal strictly with emotional problems, personal involvement demands humanity. The therapist needs to depart from the neutrality of object-orientation characteristic of the scientific method, and temporarily adopt values similar to all partakers in personal interaction.[15]

Religious Counseling

The inadequacies of religious counseling have been exposed when dealing with mental illness. The aim of pastoral counseling is to remedy an individual's condition through new religious insights. The counselor and patient are considered to be in an emotional relationship with God as a third party. Mental illness is redressed through a better understanding of self in relationship to others and God.[16] According to a survey of ministers concerning their own work, major criticisms were: ineffectiveness of the minister himself (41%); inconsistencies between actual and ideal religious values (33%); ineffectiveness of religion in helping parishioners with emotional problems (15%); and inconsistencies between religious and scientific values (11%).[17] Ministers lack the appropriate training to deal adequately with unconscious disorders. An individual's preoccupation with mystical experiences may not be interpreted as symptoms of schizophrenia. Nor may one's reliance on church dogma be perceived as an indication of an individual's distrust of his own ability to think. Although the origin of a problem may be spiritual, neglect of the psychological realm may lead to undue frustration.[18]

Students of human behavior have contributed much to the enrichment of man's spiritual life. Although some claim that religion has neurotic followers tending to be more anxious, less liberal, more authoritarian, less sociable, more concerned with status and appearance, and less concerned with social issues than a non-religious person, these challenges, if nothing else, have instigated a necessary reevaluation of Christian thought and behavior.[19] Arnaldo Apolito encourages this "mature religion" which is man-fostering, not limiting; concerned with ultimate worth, not original sin; ethics that are deed-centered, not creed-centered; realistic morality towards sexual behavior; progressionistic, not perfectionistic; centrifugal, not centripetal; and emphasizing man's existence in this world.[20] Discoveries concerning human behavior are challenging those religious sects which tend to reduce everything to metaphysical terms. The pulpit is finding it ever more difficult to refute the discoveries of the laboratory.

Science and Religion

Scientists have encouraged ministers to consider other dimensions of the human psyche. Conscious verbalization alone is not sufficient, for man is not just a cognitive being. Both the conscious and unconscious minds create images and symbols. Reason, a product of conscious processes, is an inadequate tool for understanding man completely. Individuals arrive at knowledge through rational choices, and through certain "moments of truth" whose genuine meanings rest deep within the unconscious mind.[25] Psychiatry assists in the externalization of thoughts which are frequently inaccessible through religious channels alone.

Although the origin of a problem may be spiritual, neglect of the psychological realm may lead to undue frustration.

The prevalence of heated discussions concerning science and religion indicate that their distinctions are not as apparent as those elucidated herein. Disputes will continue to arise as long as both disciplines are assumed to be of similar natures. However from a teleological standpoint, religion seeks to define purpose . . . or to explain why. Science, including psychiatry, merely explicates the development of processes. Since the terms science and psychiatry connote ends in themselves to some individuals, I prefer to describe these endeavors as the "scientific" and "psychiatric" methods which explicitly refer to processes. Science is neither pro nor con religion. Whenever a psychiatrist communicates spiritually with a patient, he/she is outside the realm of the psychiatric method.

Psychiatrists should acknowledge the reality of spiritual experience in order to deal justly with mental disorders. Freud attempted to reduce religious faith to a psychological creation in *Future of an Illusion*. However it was not a necessary outcome based on unrefutable "facts", but an epistemological decision. Psychotherapy cannot be substituted for religious faith except through a metaphysical choice.[25]

Psychiatry and religion are both concerned with unconscious motives and conflicts, character formation, integrity, and the transformation of destructive impulses into drives that are beneficial to all.[26] Psychiatry deals with the intermediate processes which ultimately lead to the formation of concepts. This scientific endeavor assists individuals in realigning mental faculties, thereby facilitating both social and spiritual communication.

Conclusion

This discussion has attempted to clarify the roles of psychiatry and religion, their relationship, and the contributions of each to the study of human behavior. Characteristic of our world of specialists, fragmented and often futile attempts have been made at cooperation as the wounds of the past continue to plague the memories of today's actors. However, as psychiatrists and ministers begin to recognize the need for more synergistic efforts, the result will not only produce a more realistic appraisal of mental illness, but (more importantly) happier and healthier human beings.

FOOTNOTES

[1]Dana L. Farnsworth and Francis J. Braceland, *Psychiatry, the Clergy, and Pastoral Counseling*, p. 3.

[2]Graham B. Blaine, Jr., "Schools of Psychotherapy," in *Ibid.*, p. 324.

[3]Thomas B. Kirsch, "Psychiatry and Religion," *Journal of Religion and Health*, vol. 6(1), Jan. 1967, p. 75.

[4]Arnaldo Apolito, "Psychoanalysis and Religion," *American Journal of Psychoanalysis*, vol. 30(2), 1970, p. 117.

[5]Martha Deed, "Attitudes of Four Religiously-Oriented Psychotherapists," *Pastoral Psychology*, vol. 20(193), 1969, pp. 39-40.

[6]Alfred Bronner, "Psychotherapy with Religious Patients," *American Journal of Psychotherapy*, vol. 18, 1964, p. 475.
[7]Deed, *op. cit.*, p. 41.
[8]*Ibid.*, pp. 41-42.
[9]Samuel Z. Klausner, *Psychiatry and Religion*, p. 155.
[10]Glenn E. Whitlock, "Psychotherapy and a Christian Understanding of Man," *Pastoral Psychology*, Feb. 1967, vol. 18(171), p. 13.
[11]Klausner, *op. cit.*, p. 29.
[12]"What are the Effects of the Physician's View of Human Nature upon his patients?" *The Place of Value Systems in Medical Education: A Symposium of the Academy of Religion and Mental Health*, November, 1960, p. 143.
[13]Apolito, *op. cit.*, p. 120.
[14]*Ibid.*, p. 117.
[15]*Ibid.*, p. 118.
[16]Farnsworth and Braceland, *op. cit.*, p. 5.
[17]Klausner, *op. cit.*, p. 23.
[18]Farnsworth and Braceland, *op. cit.*, p. 5.
[19]Jack L. Rubins, "Religion, Mental health, and the Psychoanalyst," *American Journal of Psychoanalysis*, vol. 30(2), 1970, p. 128.
[20]Apolito, *op. cit.*, p. 124.
[21]Whitlock, *op. cit.*, p. 9.
[22]*Ibid.*, p. 11.
[23]*Ibid.*, p. 12.
[24]*Ibid.*, p. 10.
[25]*Ibid.*
[26]Farnsworth and Braceland, *op. cit.*, p. 4.
[27]Henry Enoch Kagen, "God and the Psychiatrist in Psychotherapy," in *Journal of Religion and Health*, vol. 6(1), Jan. 1967, p. 89.

BIBLIOGRAPHY

Apolito, Arnaldo, "Psychoanalysis and Religion," *American Journal of Psychoanalysis*, vol. 30(2), 1970.
Bronner, Alfred, "Psychotherapy with Religious Patients," *American Journal of Psychotherapy*, vol. 18, 1964.
Deed, Martha, "Attitudes of Four Religiously-Oriented Psychotherapists," *Pastoral Psychology*, vol. 20(193), 1969.
Farnsworth, Dana L., and Francis Braceland, *Psychiatry, the Clergy, and Pastoral Counseling*, Institute for Mental Health, St. John's University Press, Collegeville, Minnesota, 1969.
Gassert, Robert G., and Bernard H. Hall, *Psychiatry and Religious Faith*, The Viking Press, New York, 1964.
Kirsch, Thomas B., "Psychiatry and Religion," *Journal of Religion and Health*, vol. 6(1), January, 1967.
Klausner, Samuel Z., *Psychiatry and Religion*, The Free Press of Glencoe, Collier-MacMillan Ltd., London, 1964.
Liebman, Joshua Loth, *Psychiatry and Religion*, The Beacon Press, Boston, 1948.
Mowrer, O. Hobart, *The Crisis in Psychiatry and Religion*, D. Van Nostrand Company, Inc., Princeton, New Jersey, 1961.
Northridge, W. L., *Psychiatry in Pastoral Practice*, Epworth Press, London, 1968.
Rubins, Jack L., "Religion, Mental Health, and the Psychoanalyst, *American Journal of Psychoanalysis*, vol. 30(2), 1970.
The Place of Value Systems in Medical Education: A Symposium of the Academy of Religion and Mental Health, "What are the Effects of the Physician's View of Human Nature upon his patients?", November, 1960.
Whitlock, Glenn E., "Psychotherapy and a Christian Understanding of Man," *Pastoral Psychology*, February, vol. 18, (171), 1967.

Scriptures and Science with a Key to Health

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Health involves the whole person who is really all he can be when the obvious body and the influencing spiritual self are in harmony. Disease is an alteration of either aspect of his being, and healing is a restoration of the physical or psychological to its normal state of ideal functioning without hindrance from pain, deprivation or delusion. All healing is from God. He made us, He created us with all the processes that keep us normal; when they go wrong, it is His processes which slowly or rapidly restore to health. So whether illness is conquered by mesmerizers, spiritualists or faith healers, yet it is God-given abilities resident in the body that bring back the person to his healthy state.

The need for meaning in life is essential for good health. If you believed that "human beings are just bits of protoplasmic scum that for the time being coat the surface of one of the minor planets," you could doubt the worthwhileness of accomplishing anything, give up in despair, and take to your bed, or pill your way to a grave. But Christianity "amid the encircling gloom" restores hope for living; "to remain in the flesh is more necessary on your account" as Paul wrote in Phil. 1:24. Christian faith certainly gives the ultimate hope, as Paul also said, "My desire is to depart and be with Christ which is far better."

But people live with other persons. Health is in part a relationship to ones neighbors: friends, fellow believers, and enemies, if he is fortunate to have any.

Recall the quip, "With the kind of friends I have, I don't need any enemies." Healing can be a change in interpersonal relationships, a removal of a stressful situation, or one may finally forgive an injustice and find relief.

Convocation on Medicine and Theology

This emphasis on the wholeness of the human being in his total relationships caused the United Methodist Church to hold a Convocation on Medicine and Theology at Mayo Clinic and Rochester Methodist Hospital in April, 1967. The sharing of ideas in both medicine and theology resulted in a stimulating volume [1], edited by Dale White. I summarize the emphases that were especially impressive to me, some of which have already appeared in previous paragraphs.

There was no attempt to deny faith healing; in fact there was testimony to recovery from disease apart from medical benefit. But the conference brought together the influences of both the religious and the scientific in their effects upon man, for it is the healthy mind in the healthy body that is desired. Health, however, was not a goal in itself—as a modern TV commercial has it, "If you have your health, you have just about everything," for health exists to enable a person to live profitably in usefulness, "get on with the obedient response to God's vocation, thorn or not."

In God's mind health leading to longevity may not be the most desirable aim. If you consider only health when planning your life, and avoid stress and involvement, you may live to a hundred, but look what you miss. On the other hand the Bible never favors neglect of health, so the check ups and the avoidances (may I insert smoking here?) are favored. "Health is to enable. It is not in itself the object of the enablement."

The Bible is in favor of any procedure that leads to health but does not guarantee immediate relief to everyone. "Further the presence of faith does not necessarily guarantee healing, and its absence does not necessarily prevent healing." Sickness may be the result of sin, but often not.

My final selection in this dialogue is on the right to die. Was it right to keep Mrs. Wrigley alive for five years even though she had no consciousness during that time? The decision is a personal matter. Euthanasia was not justified, but no objection was raised to removing the extreme measures used to maintain life, as long as the patient was kept comfortable.

I digress here to mention a case in our own family. My wife's sister came to live with us, had a stroke, received proper treatment, and recovered a measure of activity. But later a second stroke rendered her unconscious. The doctor said there was no hope of recovery, so we agreed to remove the oxygen in excess of that needed to prevent pain and she died comfortably. As someone remarked, "Someday the right to die may be our most precious possession." This concludes comments on the Methodist dialogue.

Faith Healing

An excellent evaluation of "faith healing" is in an unpublished thesis by Brewster Porcella.[2] His reasoning follows. Healing enthusiasts claiming marvelous healings are matched by Mormons, Spiritualists, Roman Catholics, Mesmerizers and others, so the important consideration in deciding about miraculous cures is what Scripture says and not what experience shows.

Whether illness is conquered by mesmerizers, spiritualists or faith healers, it is God-given abilities resident in the body that bring back the person to his healthy state.

Genesis relates that death is the result of sin and Romans 5:12 repeats it, but "as in Adam all die, so also in Christ shall all be made alive" (I Cor. 15:22). "Ultimately, then, the Atonement does make complete provision for the needs of the whole body." But Porcella believes that Isaiah's statement in Chapter 53 "bearing our sickness" (griefs) was fulfilled in Christ's lifetime, before the cross, and the atonement was only for sin. There is a "vast silence in the Gospels and Epistles regarding the idea that Christ in like manner died for sickness." He quotes Bingham[3] as follows, "If these Apostles had a commission to proclaim to the whole of sick and suffering humanity that the Christ who died for their sins in order that all might be saved died equally for their sicknesses that all might be healed, why, oh why, were they so silent about it?" In fact, some of them were ill on occasion, including Paul, who also suggested that Timothy take a remedy (I Tim. 5:23), and who left Trophimus ill in Miletus (II Tim. 4:20). We wait for our adoption, the redemption of our body (Rom. 8:23). ". . . God desires health for His children, and thus it is proper that a Christian should trust in the Lord for health and bodily strength. But that the Christian can *always* claim healing and be assured that *in each* case it is God's will for him to be whole, is an erroneous view and contradicted in several places in the Bible." Christians should follow James' injunction in the event of sickness ". . . and by prayer and faith, and as it is in accordance with God's will, the Christian will be healed." Thank you, Mr. Porcella for these thoughts. He is now librarian at Trinity Divinity School in Deerfield, Illinois.

Turn now to the thinking of those who have confidence in the atonement as a foundation for faith in bodily healing. In his volume *The Ministry of Healing* [4], A. J. Gordon has assembled witnesses to divine healing from as far back as Tertullian and Origen and through the centuries to the present age. Considerable detail is given to remove doubts about the genuineness of the illustrations. Gordon writes,

> Experience is the surest touch-stone of truth. It is not always infallible, indeed; especially when it deals with our spiritual states and conditions. For these are often deceptive and difficult to interpret. But certainly one ought to know when an infirmity which has long oppressed the body has been removed, or when a pain that has incessantly tortured the nerves has ceased. This is the kind of testimony which is not easily ruled out of court.

Gordon is confident that "In the atonement of Christ there seems to be a foundation laid for faith in bodily healing."

Christ's ministry affected both the souls and the bodies of men. Gordon adds that the apostles carried on this same kind of ministry, and the final passage in

the gospel of Mark promises overcoming abilities to those who believe. Finally the apostle James exhorted the elders to anoint and pray for the sick "and the prayer of faith shall save the sick." Because everything else that the Lord did in his ministry continues, baptism and the Lord's supper as examples, as well as the gospel message of salvation, therefore if miracles of healing should cease "they would form quite a distinct exception to everything else which the Lord introduced by his ministry."

The volume continues in marshalling the witness of theologians such as Augustine and Luther and more recent writers to the continuance of divine providence in producing healing, and adds chapters on the testimony of missions and even of the adversary. If the working of Satan has "power and signs and lying wonders", then, Gordon reasons, "false miracles are a testimony to the existence somewhere of the true, and that we ought to be very careful lest in our revolt from the caricature, we swing over to a denial of the genuine."

Gordon concludes by giving the three conditions for getting what we ask in prayer; abiding in Christ, doing His will, and asking according to His will. (John 15:7, I John 3:22 and I John 5:14).

Because Gordon has appealed to experience, we should be aware of tragedies resulting from a too literal acceptance of the promises in Mark. *Newsweek*, Sept. 10, 1973, reports that Wesley Parker, age 11, died of diabetes when insulin was withdrawn from him because his father, influenced by a sermon by Daniel Badella of an Assembly of God church, believed that anointing was all that was necessary. Soon the boy developed nausea, stomach cramps, coma and died the third day after insulin was thrown away. The parents permitted him to be embalmed but expected him to be resurrected, an event which has not yet occurred. Another situation involved two persons who drank strychnine, holding to the promise in Mark "if they drink any deadly thing it shall not hurt them." These two died, according to the report in *Time*, May 11, 1973. I believe these two illustrations support the conclusion that where natural remedies, such as insulin, are available, no one should discard this known method of relief, nor should he take a known poison, presuming that he has been granted immunity. This does not rule out God's helping someone who in ignorance or by accident happens to receive poison. Witness Paul's being bitten by a viper (Acts 28:3-6).

Let me say that while not all spectacular healings can be attributed to the release of inhibitions as the result of a renewed confidence in the ability to do what one has not done for a long time, yet some "miracles" can be explained in this way. In a discussion service I mentioned healing as a sudden occurrence after renewed faith. Later a friend said to me, "When I was young, I had a stroke." Rather unusual, I thought, for such age. "Well," he said, "I was a boxer and took a punch on the nose. For twelve weeks the doctor assigned me to stay in bed with no walking at all. Finally we changed doctors. The new one asked if I could walk. I replied that I did not know because I had not tried. He said to try. I did and I could walk." My friend implied that some sudden healings could be similarly explained. The stimulus of a dynamic faith healer in some cases may be all that is necessary to make someone get up and walk who just did not know before that he could.

At this same service a lady said, "Just in the last few days the Lord has been healing me in a way that has not happened before." Being a mother of five she hardly has time to let her feelings dampen her physiology—here is a clear example of divine intervention in her behalf.

Healing and Redemption

Let me add here a resume of a book *Healing and Redemption*[5] by Martin H. Scharlemann, who in January 1974 was appointed acting president of Concordia Seminary in St. Louis. If A. J. Gordon represents the more pietistic evangelicals, Scharlemann can be considered a follower of a more staid and ritualistic group of Christians.

"If men are to be healed, they must be treated in their totality . . . there cannot properly be a sharp distinction between matter and spirit." When Christ was on earth he showed us that "health is wholeness." Now ". . . it is God's presence in His grace which provides whatever degree of health and hope the individual may have" in order to give "a further opportunity to serve that Lord who is the God not of the dead but of the living. Because health is more than the absence of sickness ". . . a man to be whole . . . must live in fellowship with other men and women." The church is the ideal community in which to have complete health for in the church "the members both heal and receive healing by such tasks as carrying each other's burdens and interceding for each other at the throne of grace." But Scharlemann does not hesitate to mention a healing of rheumatoid arthritis when complete faith was put in God. On the other hand he attributes much good to modern medicine. "All of us recognize that science has used the reason with which God has endowed men and achieved blessings undreamed of by men of other generations." But again the medical man contributes only part of healing—for real health is wholeness of body, mind, and spirit. Yet the Christian medical man will not be a mere technician but will deal with his patients as individual persons knowing that "he is privileged to implement the will of that God who is the Source and Sustainer of life." God decides who will be healed and who may sustain suffering.

"The anointing with oil, spoken of by the apostle, may find its contemporary counterpart in such services as the injection of penicillin, the purchase and application of medical prescriptions, and cleaning up after the patient." Scharlemann believes with Luther that "there is no independent order of healers in the church" but it is the responsibility of the members to intercede to assume the burden of healing.

Acupuncture

The theory behind acupuncture claims that life is maintained by a vital force called *Qi* which uses respiration and digestion to supply organs with their energy. The positive force of *Qi* is *Yang* and the disorganizing force is *Yin*; health appears to be a proper balance between these poles. There are points connected by lines on the body which are related to specific organs. If certain points are sensitive, there is an imbalance so that needles inserted in the proper places relieve pain or stimulate the organ to proper functioning. To explain the effect theorists offer various ideas such as a

special conduction system, or neural transmission, or even a stimulating effect upon the adrenal gland to produce cortisone. I am indebted to one of our students, Anthony Capps, for this information abstracted from his seminar paper.

Advocates of acupuncture make striking claims for its effectiveness in relief or cure. Out of 10 treated for deafness, 5 were cured and 3 improved.[6] It has helped withdrawal symptoms but not removed the craving for drugs. Anesthesia can be produced in operations for hernia, tumor removals and abortion. F. F. Kao, M.D. of Brooklyn's Downstate Medical Center is quoted in *Today's Health* as follows, "Acupuncture is not quack-apuncture, it is not panacea, and it is not a substitute for Western medicine. We are trying to demonstrate its potential use as a supplement to Western medicine."[6]

But Arthur Freese writing in *Science Digest*[7] says, "It's true it can kill pain, but then so do placebos (sugar pills) and faith healing." It has proved fatal for many, he claims, and it did not help Mao, George Wallace, or Frank Leahy. The needles do hurt. Given over 2 or 3 months acupuncture may heal but time itself heals. So Freese concludes, "Perhaps you should think twice before spending your money to get needled." Those most likely to be helped are the hypnotizable.

Christian Science

A critical view, yet sympathetic, of Christian Science has been made by J. Stillson Judah. He considers Christian Science to be one of the metaphysical movements in America. "Christian Science has its own view of Christ's atonement which includes man's redemption from sin (and sickness)." Mary Baker Eddy is said to have had a weakness in her spine causing spasms and nervous prostration so she was in bed much of the time. She visited a healer, Phineas P. Quimby, and although assisted into his office, was able to return well to her home. Later she fell but had a "miraculous cure on the third day" after reading about Jesus healing the palsied man.

"Although Mrs. Eddy believed that Christian Science healed in the same way Jesus healed, she said in *Science and Health* that Jesus Christ 'left no definite rule for demonstrating this Principle of healing and preventing disease. This rule remained to be discovered in Christian Science.' "

A distinction is made between immortal man, "God's man, made in his image, and the sinning race of Adam" (*Science and Health*, p. 345). Judah summarizes healing by writing, "Christian Science reasons that if God is all-in-all and good, and man is God's perfect image, it naturally follows that mortal man, evil, sickness, and death are only errors of man's mortal mind, which, beclouded by sin or error, is ignorant of immortal man's true condition." Hence dispel the erroneous belief and be in health.

I lived for a year with a Christian Science family. The husband would mention on occasion that Mrs. I. was ill and would not be at meals that day. A clue to their actual belief came from an article in the *Sunday School Times* many years ago. A converted Christian Scientist wrote that instead of denying the reality of sickness and death, it is held that God and mind are so real that sickness and death, by comparison, are unreal or unimportant, that by dwelling on the real, the valueless will disappear. Sort of believing it isn't so, so it won't be.

But many instances of healing are presented as testimonies in *A Century of Christian Science Healing*. The foreword claims it ". . . presents the phenomena of spiritual healing not under the category of miracle but at the level of a reasoned understanding of spiritual law." It emphasizes that spiritual wholeness is a greater concern than bodily healing and that healings are not all rapid but may take "years of prayer and regeneration." Mrs. Baker herself visited a child sick with brain fever, talked with her a few minutes, dressed her, took her for a walk, and the little girl was well from then on. Other instances of healing are not testimonies of practitioners but written testimonies of those who have been cured, such as the woman who had tumors and discoloration on her neck and was told by her doctor that she might choke to death at any moment. After she visited a practitioneer, she was healed. Many dozen other witnesses, who sign their names and addresses, are included in the chapter, "*The Tide of Healing.*" "The real change, as Christian Scientists understand it, is from material mindedness to spiritual mindedness, from self-centered to God-centered healing."

The Church of Christ, Scientist has "two sanatoriums and certifies others which are privately run" to provide nursing care, "but without medication". The Church seeks to restore man to his wholeness. "Wholeness and holiness are etymologically related, and in Christian Science they are understood as synonymous."

Christianity Today on Healing

Two accounts in 1973 issues of *Christianity Today* are encouraging to those putting trust in faith healing. The March 16 and December 21 issues relate the successes of Julio Cesar Ruibal in both evangelizing and healing in Latin American countries. After presenting the Gospel and asking for hearers to "raise their hands and pray to accept Christ, then he asked them to pray with him for the healing of the sick. A 32-year-old man who had been paralyzed for seven years stood up, took two steps, and abandoned his wheelchair." A 19-year-old, mute from birth, began to shout, "Jesus." Rubail himself insisted, "It is God, not I, who does the miracles." Rubail is a Catholic.

You will read an interview in *Christianity Today*[10] with Kathryn Kuhlman with sympathetic interest. She says that physical healing is important but spiritual healing is far greater. "I am not the healer . . . but the power of the Holy Spirit." She has seen healing when the healed one had no faith, but thinks no one can receive physical healing without also receiving a spiritual healing. She takes no medication for herself and believes in doing everything she can to keep in good health. God gave men brains. She asks physicians to talk with those who are healed. One doctor thought the healings of arthritis were the greatest miracles.

She is going to ask in heaven why everyone was not healed. A reporter had an attorney friend who came to her service, but died of cancer soon after. However, he had been saved in the meeting, so the reporter told Miss Kuhlman not to weep if some are not healed. She was asked, "Why do so few people have the gift of healing?" and replied, "Let's not take just one gift. Let's get the overall picture of what Paul is saying in First Corinthians twelve."

Conclusion

The body and spirit are God's creation. No matter how they are made whole, it is the result of resident forces God has put in the person, or by sudden impartations of these forces by whatever kind of stimulus (faith, recognition of error, hypnotism) brings them into play. The healing results from what God has done, no matter who gets the credit. Only the Bible can give proper credit and it all goes to the Creator. The "healer" is merely instrumental in being able to bring God's forces into play. The Bible justifies only the philosophy or theology consistent with itself. Christian Science, for example, may have some techniques which release God-given curatives, but its Christology is correct only if it harmonizes with reasonable interpretations of God's word.

REFERENCES

[1]White, Dale, editor. 1967. *Dialogue in Medicine and Theology.* Abingdon Press, Nashville and New York. 176 p.

[2]Porcella, Brewster. 1952. *The Teaching of Scripture on Healing in Relation to the Atonement.* Graduate School. Wheaton College. 74 p.

[3]Bingham, Rowland V. 1939. *The Bible and the Body.* Marshall, Morgan & Scott, Ltd. London.

[4]Gordon, A. J. 1961. *The Ministry of Healing.* Christian Publications, Inc. Harrisburg, Penna. 249 p.

[5]Scharlemann, Martin H. 1965. *Healing and Redemption.* Concordia Publishing House, St. Louis, Missouri. 122 p.

[6]Gwynne, P. *Acupuncture Update.* Today's Health. 52:16-19. Jan. 1974.

[7]Freese, Arthur. *What Acupuncture Won't Do.* Science Digest. 74:10-15, Dec. 1973.

[8]Judah, J. Stillson. 1967. *The History and Philosophy of the Metaphysical Movements in America.* The Westminster Press. Philadelphia. 317 p.

[9]The Christian Science Board of Directors. 1966. *A Century of Christian Science Healing.* The Christian Science Publishing Society. Boston. 256 p.

[10]Kuhlman, Kathryn. *Healing in the Spirit,* an interview. Christianity Today, July 20, 1973.

Markovian Simulation and the Church Growth Process

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Many churches today are experiencing major increases in the number of regular attenders. Examples abound of congregations recording a 100 percent growth in just a few years. In order to plan for adequate facilities and for programs to accommodate the increased numbers of future regular attenders, those involved in managing such churches would welcome a tool to aid in membership projections. Failure to anticipate, with sufficient lead time, a congregation's growth rate will tend to overcrowd existing, and in some cases planned, facilities. In order to expand, funds must be raised, plans laid, and construction carried out. All this consumes time. Similarly, church attendance goals must be reviewed, evaluated, and perhaps revised in light of experience. Besides being costly, miscalculations also cause inconvenience, disappointment, and lost opportunity.

The model described in this paper, GOCHURCH, was developed to serve the needs of church planners in projecting attendance. Specifically, the model uses non-overlapping descriptions of all personnel which will influence the situation to forecast the probable number of church attenders at some time in the future. The methodology of GOCHURCH is a computer-aided simulation. Simulated thus are the church growth processes in compressed time over a relatively long planning horizon.

The model has produced three important results. First, five states have been defined to describe all persons in the population studied, according to Markovian specifications. Second, a questionnaire was developed to elicit initial information germane to a church-related forecast. Third, an example forecast was computed, with a discussion concerning its relevance to the capacity issues.

The next section presents the background to a gen-

eral method of solving social process models using Markovian simulation.[1,2,3]

Markovian Simulation

The following three bases of the social process problem can be bound by stochastic, or probabilistic, models. *Class mobility,* the relaxation of the restriction of having "kind follow after its own kind," is handled by the construction of mutually exclusive and collectively exhaustive categories of all subjects within the population of the study. A sample may then move from one category to another according to probabilistic laws. The system may be termed *closed* by the introduction of artificial categories from which new samples come and into which departing samples go. Finally, the measurement of social process changes in terms of generations, queue lengths, cumulations, etc., is appropriately expressed through discrete stages of *time* in the stochastic model. The mover-stayer model, developed by Blumen, Kogan, and McCarthy [2] to study the mobility of labor in American industry, is a fine illustration of these characteristics. The proportions of movers and stayers are determined for the end of a given time period for any industry category, along with the long-term equilibrium distribution of the proportion of members in each category.

The choice of the proper model to describe and study a certain social process is of utmost importance. Stochastic models have properties which adequately fulfil requirements for models of social behavior. The Markov process is a stochastic model that is very adaptable to the description of social phenomena, and considering the complexity of the problem, Markovian simulation is the methodology very often employed.

The Markov process concept can now be developed. Suppose some social process is divided into a number, say n, of different categories, or *states.* Furthermore, each member of the population of the process belongs to one, and only one, of the states. We shall assume that this process is closed and that there is the possibility of complete mobility of the members among the n states. Then by taking a sample of these persons and observing the records of their past histories, the movement of each member of the sample among the classes can be recorded. When these movements tend to a fairly regular trend, we can say that this is the probability associated with the transition of any person from one state to another within a designated time period (month, quarter-year, year, etc.). Since only some fraction of the members of a particular state may transfer to another state, and since all the members who leave one state must be classified in one of the other previously defined states, then each transition probability must have a value between 0 (zero) percent and 100 percent, and the sum of the transition probabilities of both staying in a particular state and entering any other state must equal 100 percent. The following of these probability laws insures a stochastic process.

A *Markov process* is a model of a stochastic system that is characterized by a sequence of trials or periods of observance in which the results of each trial are dependent only upon the immediately preceding trial. Once a state occupied at a certain time-period is known, the histories of the states before that period are not involved in computing any subsequent probabilities of transition. The n^2 transition probabilities can be concisely arranged into tabular form, called a *transition probability matrix.* The multiplication of this matrix with a vector containing the initial population proportions of each of the n states will yield the forecasted proportion of members in each state at the end of the time period.

The fact that a church is a non-profit organization makes skillful planning by competent evaluators imperative.

Problems involving four or more states and a large number of periods to be forecasted will necessarily entail much computational complexity. The use of computer simulation becomes very attractive in this case, and establishes Markovian simulation as a powerful method of stochastic process problem solving.

The GOCHURCH Model

The social process of church growth was modelled [4] and simulated in an employment of the Markovian simulation scheme as described in the previous section. A brief description of this model is presented next.

The word *church* is used as a general descriptor. Since the sanctuary is usually the first facility to be affected by overcrowding, and since the sanctuary is almost entirely used for church services in local church bodies, the model will count or project church attenders. Other facilities could be substituted.

There is some limit to the population size and to the geographical location of parishioners of interest to a given church. For example, a church in Chicago should definitely not expend resources in an attempt to obtain regular attenders from the Greater Chicago area, and especially not from, say, Cleveland. The *drawing area,* then, consists of the population tract(s) from which a church desires to obtain its attenders. A smaller, non-suburban town would most likely comprise the entire drawing area for every church in that town. Once the drawing area is established, its total growth must be forecasted with a high degree of care. Usually these forecasts are available from a city's public offices and/or from census figures. If a constant rate is known, it is incorporated into GOCHURCH. Otherwise a regression or an exponential smoothing extrapolation of previous population measurements must be made.

Five classes, or *states,* of residents within the drawing area are defined for the model. Each person under consideration must belong to one, and only one, of the states.

State 1 includes persons who attend the church regularly.
State 2 includes persons who attend irregularly and/or infrequently.
State 3 includes persons who do not visit the church at all and do not attend another church, but may visit with encouragement from the church or its attenders.
State 4 includes those who attend another church and do not visit your church at all.
State 5 includes those who are entirely disinterested in attending any church.

A major feature of the model is a questionnaire which has been formulated to elicit the initial information necessary to run GOCHURCH. Included in the completed form are the data that are needed to construct the probability transition matrix. The information requested by the questionnaire must be as accurate as possible, as every iteration in GOCHURCH is based upon the initial transition probabilities. It is recognized that data concerning the movements of persons among States 3, 4, and 5 may be difficult to obtain, since church records are generally not that exhaustive. Hence, some evaluative procedure may be required to quantify ambiguous or previously unrealized occurrences.

In the absence of any theoretically justifiable and relevant method for generating seemingly intangible values, expert judgments using the Delphi technique may be considered the best available method. The Delphi technique[5] is used as a method for eliciting, refining, and integrating the subjective opinions of a panel of experts without sacrificing or comprising any individual's suggestions. This approach is helpful in reaching a consensus via a series of voting rounds using anonymous feedback. It relies on experts who make rational analyses rather than merely guessing. The experts take into account new or discrepant information and construct logically sound deductions about the future based on a thorough and disciplined understanding of a particular phenomenon. The successive rounds of Delphi facilitate resolution of any controversies, ambiguities, or redundancies inherent in the nature of future events. This consensus of experts definitely enhances one's ability to make decisions upon which forecasts may be based.

The model assumes that such a technique has been applied in determining the initial transition probability data. At the initial period, each of the States 1 through 5 will contain a certain percentage of the drawing area. To determine the distribution of the members of the drawing area after their movements during the first time period, one must multiply the transition probability matrix with the vector containing the initial population proportions. In order to find the population proportions at the end of the second period, the same procedure is followed. The most recently calculated proportion vector is multiplied by the original transition probability matrix (since the probabilities are intended to represent regular trends of movement among the states) to yield the new proportion vector.

This iterative technique is continued for the desired number of forecasted periods, with the new population proportion values replacing the ones previously used. In other words, only the current distribution of the population is necessary and sufficient to predict the distribution for the next period.

Results

The author has performed the simulation for a hypothetical church named Monte Vista Chapel[4]. In this example the Chapel was anticipating expanding its facilities three years hence, but wanted to investigate the possibility of overcrowding within just two years.

Using the time unit of one simulated period to represent three months, the GOCHURCH program calculated the forecasts for 20 periods, or five years. The number of persons classified by each of the five states was determined by multiplying each component of the proportion vector by the forecasted drawing area population. The total attendance (States 1 and 2) after two years just exceeded the existing auditorium seating constraint, while the three year forecast was well in excess. The results of continuing with the effects of the current transition probabilities were now evident, and provided the church planners the forecasting information they needed. Such insight provides a more certain incentive for preparing adequate facilities for future church attenders, hence maintaining a high likelihood of their continuing to attend regularly.

The decision had been made to build in three years, or after 12 time periods. The primary additional cost of building one year earlier is the cost of securing the down-payment capital one year earlier. Suppose, however, the church planners choose to wait the three year interval before building, even though the attendance would exceed the seating capacity after two years. Since only a certain maximum number of attenders can be accommodated, gross growth will be zero for the one year interval. Besides losing possible revenue from potential attenders, the transition probabilities may be drastically altered, so that the growth rate after the construction of the building may be less than before. Church planners, then, must weigh the effects of this interrupted attendance growth in determining the church growth characteristics after the building is completed.

But what of church shrinkage? Any change in size of a church hinges upon the function of the number of people becoming attenders versus the number becoming non-attenders. GOCHURCH will effectively evaluate the transition probability matrix describing a certain church, indicating *decrements* in attendance as well. This prediction of decline should stimulate church planners to augment current attendance procedures, if they so desire, to increase the probability of persons becoming regular attenders. In effect, they must alter their attendance developing procedures to match the transition probability matrix which expresses their growth goals for the future.

Extensions of the Model

Occurrences which may accelerate or decelerate the rate of change of either the transition probabilities or the size of the drawing area should also be considered. Two methods may be followed to adapt GOCHURCH to handle dynamic probabilities of transition among the five states.

First, it would not be wise to allow the incorporation of a continuous change per period of each of the transition probabilities, because of the unreliability of such estimates by church planners. Such rates of change cannot be realistically calculated, especially concerning States 3, 4, and 5, since churches generally do not collect this type of data. Hence, revising one or more rows of the transition probability matrix after an appropriate number of periods is the suggested method of effecting dynamic probabilities of transition. The proportion values calculated at the period of change would become those for the new period zero, and GOCHURCH would be run again.

A second possibility concerns a drastic influx into the church's drawing area of any certain ethnic or

religious group of persons, coupled with a possible outflow of other categories of people. Since GOCHURCH is intended to be used as a middle-range forecasting instrument, these population movement trends may not affect the transition probability matrix for the length of the forecast. However, in the event one wishes to study the effects of such trends, the program can be suitably adapted. Instead of altering the 5 x 5 = 25 values of the matrix, only the 5 terms in the population proportion vector need be changed, according to a specification of the trend values.

Similarly, a change in the rate of growth of the drawing area may be handled by running the simulation in sections. For the period during which the population rate change parameter must be altered, a new rate is substituted, the most recent population proportion vector is inputted, and the problem is simulated from the new time zero.

Conclusion

Several interesting results have thus been developed. First, it was possible to limit the size of the population with which a church is involved, and to categorize each person of this population according to one, and only one, of five distinct states. Second, a questionnaire was formulated to obtain the data required to describe the church growth problem as a Markov process. Although this process is valid as long as the transition probabilities remain static, certain refinement of the initial information, perhaps through a Delphi technique[5], may be necessary for a more accurate forecast. Third, the forecasts produced by the model may aid analysis and church planners in assessing capacity excesses of various facilities. Consequences of altering or of not altering future plans should then be considered, with much reliance given to the predictions by the model GOCHURCH.

The fact that a church is a non-profit organization makes skillful planning by competent exaluators imperative. This planning should incorporate all relevant tools which are available. GOCHURCH is but one such tool.

REFERENCES

[1]Bartholomew, D. J., *Stochastic Models for Social Processes*, John Wiley and Sons, London, 1967.

[2]Blumen, T., M.Kogan, and P. McCarthy, *The Industrial Mobility of Labor as a Probability Process*, Cornell University, Ithaca, New York, 1955.

[3]Pool, I., et al., *Candidates, Issues and Strategies*, MIT Press, Cambridge, 1965.

[4]Rasmussen, J., "GOCHURCH–A Simulation Model for Forecasting Church Growth," Technical Memorandum No. 305, Department of Operations Research, Case Western Reserve University, Cleveland, 1973.

[5]Reisman, A., *Managerial and Engineering Economics*, Allyn and Bacon, Boston, 1971.

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

***Part* 1**

Science Isn't Everything

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In view of all the changes in thinking that have occurred since the first hippie picked his first flower and urged others to "make love, not war," in the early '60's, it is somewhat surprising to find that so many young people who have grown up in that period still have a definite mindset toward scientism. This is, not surprisingly, particularly true of those with scientific ability who are looking forward to a career in science. By "scientism" I mean that view of life which starts from the assumption that the scientific method is the only reliable guide to knowledge, that scientific truth is the only truth available. The education of these young people is also frequently characterized by two other presuppositions: that religion is at best a matter of personal choice like aesthetics, and that the only source for moral judgments is the consensus of the local society. We consider these latter positions more fully in subsequent installments. Here we consider the position of "scientism" and the weaknesses of this position that have become increasingly obvious to many people in recent years.

A serial presentation of notes based on Freshman Seminars at Stanford University in 1974 *and* 1975, *and a course given at Fuller Theological Seminary in* 1974.

Not Internally Consistent

One day a bright student in my seminar remarked, "I don't see how it's possible to say that you can know something if you can't establish it scientifically." Several others nodded in approval. The response needed is simple but devastating.

"Tell me, then, how you know that it's not possible to know something that you can't establish scientifically?"

Can that basic presupposition of scientism be established scientifically? The student was taken by surprise. He was caught on the horns of a dilemma, with some similarities to the kind of dilemma Charles Darwin commented on when he wrote,

> But then with me the horrid doubt always arises whether the convictions of man's mind, which has been developed from the mind of lower animals, are of any value or at all trustworthy. Would any one trust in the convictions of a monkey's mind, if there are any convictions in such a mind?[1]

Or to the kind of dilemma faced by those who believe that everything about man is completely determined with no room for exercise of his free choice or will, of whom C. S. Lewis has written,

> But at the same time the Myth asks me to believe that reason is simply the unforeseen and unintended by-product of a mindless process at one stage of the endless and aimless becoming. The content of the Myth thus knocks from under me the only ground on which I could possibly believe the Myth to be true. If my own mind is a product of the irrational—if what seem my clearest reasonings are only the way in which a creature conditioned as I am is bound to feel—how shall I trust my mind when it tells me about Evolution?[2]

Having arrived at the intellectual conclusion that the human mind is only a highly developed monkey's mind, Darwin was forced by his conclusion to question it! The thorough-going determinist cannot escape the judgment that he is determined to be a determinist, and that therefore his arguments to support his convictions are irrelevant. So my student, and the many others like him, seek to develop an approach to life which is wholly scientific—but at the first step they find themselves cut off. They canot scientifically choose an approach to life. Seeking to live a life based on reason and not on faith, they must make a faith commitment as the very first step.

Any choice of an approach to life, a worldview, an ultimate perspective—a *Weltanschauung*, must be an act of faith. Nothing can be done until the faith commitment is made. Attempts to argue that some approaches to life are objective and scientific whereas others are subjective and unscientific must all fail.

The claim that the scientific method is the *only* reliable guide to knowledge is therefore not something that our modern scientific understanding demands. Indeed, if one accepts the presupposition that the scientific method is the *only* reliable guide to knowledge, he is involved in an inconsistent activity. By his own standard, the acceptance of this presupposition must be a subjective commitment with no more objective claim to truth than one's commitment to standards of artistic beauty or taste in foods.

Impersonal vs. Personal

Rocks and trees do not have personality, but human beings do. Among animals there is a gradation of personality, those with the most personality being most suited as companions for human beings, but no animal except the human being has what we recognize as a human personality. By the human personality we mean such characteristics as rational thought, God-consciousness, appreciation of beauty, self-consciousness, the desire for understanding, insight, duty, faith, love, conscience—and most of all the ability to *relate* to other persons, including the most profound personal relationship to God.

Attempts to argue that some approaches to life are objective and scientific whereas others are subjective and unscientific must all fail.

This crucial distinction between the interaction of a human being with a thing and with another human being is developed at some length in Martin Buber's *I and Thou*. There he distinguishes between what he calls an *I-It* relationship, a relationship between a person and a thing, and an *I-Thou* relationship, a relationship between two persons. Buber writes,

> Hence the I of man is also twofold. For the *I* of the primary word *I-Thou* is a different *I* from that of the primary word *I-It*. . . . The primary word *I-Thou* can only be spoken with the whole being. The primary word *I-It* can never be spoken with the whole being. . . . As experience, the world belongs to the primary world *I-It*. The primary word *I-Thou* establishes the world of relation.[3]

An *I-It* relationship has only one subject, the *I*; an *I-Thou* relationship has two subjects, both I and Thou. Although many of the activities of a human being involve *I-It* relationships, those which characterize the *human* state most often involve *I-Thou* relationships. It is science's necessary limitation to the realm of *I-It* that makes it unsuitable for an exclusive description of the life of the whole man.

In a scientific investigation there is only one subject: the I of the investigator. All else is object: the It of the investigated. This is obviously true when the physicist deals with the electron, but it is no less true when the sociologist deals with society. The It is to be observed, measured, manipulated, tested, described and controlled. The scientist succeeds *as scientist* to the degree that he maintains the *I-It* relationship, to the degree that he abstracts himself from the matter under investigation. It is of course impossible for the scientist to prevent all interaction between himself and his problem, and this necessary interaction forms one of the limitations of science, but it is the constant goal of science to minimize this interaction. Science is not faulty or "bad" *because* it is limited to the *I-It* relationship. The difficulty arises only when it is assumed that the scientific perspective is the only perspective, implying that *I-It* relationships are the only kind that are possible or meaningful.

One of the distinct capabilities of the human being is the ability to enter into *I-Thou* relationships. This is a relationship in which two subjects meet, each giving and receiving through mutual sharing and involvement. It is a relationship based upon faith, for rejection and betrayal are pitfalls of *I-Thou* relationships, and to commit oneself to an *I-Thou* relationship is to reach out in trust. It is only within the context of *I-Thou* relationships that the truly human aspects of life can be experienced. I cannot love an It; I can love only a Thou.

The necessary and desirable restriction of science to the impersonal, to the realm of *I-It* relationships, makes it intrinsically unable to deal fully with the personal, with the realm of *I-Thou* relationships. One of the saddest and most disastrous consequences of scientism is the attempt to reduce the richness of the *I-Thou* to the limited scope of the *I-It*. In this process, usually known as reductionism, the reality of the whole being is stripped down to the reality of the things that make up a whole being. The fatal error is made of equating events in the It-realm with events in the Thou-realm, concluding that Thou-statements are only coverups for ignorance about the *real* It-statements. Because a particular pattern of biochemical reactions and brain potentials may be measured when a person is experiencing love, it is concluded that "love" is only a coverup word for what is really *only* biochemical reactions and brain potentials.

It has become increasingly realized that scientific reductionism does not produce the real person or the truth about a human being exclusively. Rather reductionism strips one of his personhood and leaves him only an animal or only a complex organic machine, depending on how far this reductionism is carried. Given the opportunity, the scientific reductionist will "solve" human problems by making the human into the non-human. In a kind of self-fulfilling prophecy, the belief of scientific reductionism that the whole person is no more than physical, chemical, biological, psychological or sociological causes the treatment of the whole person in such a way that he becomes no more than these—that he becomes an It. Reaction against this trend by those who have recognized the importance and validity of the whole person as more than the sum of his mechanistic parts has formed a valuable modern critique of scientific reductionism.

Given the opportunity, the scientific reductionist will "solve" human problems by making the human into the non-human.

Scientific Ambivalence

Advocates of scientism almost always take for granted that the acquisition of knowledge must produce good results. Ignorance and lack of knowledge are assumed to be the causes of all problems and troubles. Since science provides a reliable basis for increasing knowledge, it is assumed that science must therefore be capable of ultimately solving all human problems. There are several reasons why this line of reasoning is not correct.

Knowledge is not self-motivating for good. To know the good is not to do the good. It is not enough to know what is right to do; it is necessary also to will to do it. Ignorance compounds the human dilemma, but does not cause it. In a world freed from ignorance, freed from limitations of energy, would people be more or less free to live humanly? Although we might be quick to answer, "More free," we would be speaking about only external limitations and would still be neglecting the internal limitations of human nature. If we ask instead, "Would people live more humanly?" we have no way to answer except on the basis of our presuppositions about human nature, none of which can be provided to us by science alone.

In fact all knowledge is dangerous. Every time that we increase our capability for good by increasing our knowledge, we simultaneously increase our capability for evil. Do we now have the promise of unlimited supplies of energy through our ability to tap the power of the atom? So we also have the threat of civilization's destruction through the use of this same power. Can we now see in the invisible infrared portion of the spectrum so that we can aid medical diagnosis and analysis? So we also have the ability to see in the dark in order to kill more effectively. Do we have now vastly expanded abilities for mass communication through television and the media? So we also have the ability for controlling public thought and action in ways never before possible.

But even further—as a human endeavor, scientific developments produce problems even with their successes, even when the motivation for the research and the motivation for the utilization are good. How well we know that we produce pollution along with enhanced travel and communication possibilities. We accentuate the population explosion by our successes in medicine. It is not only when scientists fail to act out of good motives that undesirable consequences result. Even when scientists act from the best of motives and are successful in achieving their goals—even then the ambivalence of all human activity asserts itself. These failures result because of the complexity of the universe in which we live; they are aggravated when we claim that the universe imposes no constraints upon our unlimited progress.

Many of these questions have been considered by C. F. von Weizsäcker in his book, *The Relevance of Science*. He questions whether the attempt to govern the world scientifically is at all compatible with human freedom. "Planning is inevitable in a scientific world like ours. . . . Servitude is more easily planned than freedom."[4] He asks, "What does science know about man?" and then goes on to point out that "Science cannot select the order in which it wants to treat its subjects according to their importance for human life."[5] Science is guided by its abilities. A great deal of scientific time has been spent on astronomy, not because such knowledge plays a large role in bettering human life on earth, but because such knowledge is scientifically obtainable.

> A man is found at night searching every inch of the street in the light-cone of a street lamp. He explains, "I have lost my doorkey." "Are you sure you have lost it under the lamp?" "No." "Why, then, do you look for it there?' "Because here at least I can see." . . . But the key we seem to have lost is just the key to human nature. Religion has at all times claimed to possess this key.[6]

The ideal of perpetual progress has been at least temporarily brought to an abrupt halt by the impact of the energy crisis. For the first time we are forced to realize that there are many things we might do that we cannot afford to do. We cannot build larger and larger nuclear research installations. If, in spite of the evidence that the secret of the universe is not going to be found in terms of some ultimate "particle," we should desire to continue the quest, we are forced to come to a halt because of the finite resources at our earthly disposal. We cannot invest larger and larger sums in the exploration of outer space. There is so much that we would like to know, but we cannot afford to find out. This kind of realization has had a shattering effect on a civilization that has never before thought it.

The growing realization of the ambivalence or ambiguity of scientific power has also contributed considerably, therefore, to a decrease in faith in scientism. Even science's attempts to understand the human being are fraught with the same pattern of difficulties. Freud's psychological insights become the masterplan for evil when put into practice by a Goebbels. Pavlov's study of conditioned reflexes seems to have become the basis for the practice of ideological brainwashing. Science has power, but human beings acting with this power are not purified by their possession of it.

No Scientific Basis for Ethics

Not only, however, does science not provide the motivation and the ability for doing good, but also science has no way of defining what *is* good. A large part of a person's concerns are with what *ought* to be done, especially by others as far as he is concerned. It sometimes comes as a shock to realize that this "ought" cannot be scientifically derived.

Here again von Weizsäcker speaks meaningfully.

> That scientific knowledge would supply us with the ethical greatness needed to bear this responsibility is a hope not warranted by the facts. I think it can be stated bluntly that scientism, if it rests its trust on the expectation that science by its own nature is enabled to give us sufficient guidance in human affairs, is a false religion. Its faith if going so far, is superstition; the role of the priest does not become the scientist, and good scientists know that; the scientific code of behavior needs a background of an ethics which science has not been able to provide.[7]

Science has not been able to provide this basis for ethics for the simple reason that at its best science is capable of providing us with a description of the way things are. Science tells us what is, not what ought to be. There is absolutely no way to go from a description of what is to a formulation of what ought to be except by the non-scientific route of declaring what is to be identical with what ought to be. This, in fact, is what every attempt at establishing a scientific basis for ethics amounts to. A scientific description can inform and guide intelligent exercise of the "oughts" of life, but can never form the basis for their initial formulation by any legitimate means.

The acceptance of what is as the guide to what ought to be is a faith commitment of the same type as the acceptance of scientism itself. It is no more objective than any other presupposition chosen as the guide to what ought to be, as for example the revealed law of God. It is an attempt to form ethics by a kind of popular vote, a kind of importation of democracy into ethics, a result of the conviction that all moral judgments are settled by local consensus. Science can tell us that a certain fraction of college students smoke pot or have premarital intercourse; it can tell us very little indeed that will bear in any way at all on the question of whether college students ought to smoke pot or have premarital intercourse. One way in which a link is attempted between the scientific understanding and the formulation of ethics is to apply the criterion, "If it doesn't hurt someone else, it's acceptable." But even this limited criterion, with all its obvious shortcomings (how about hurt to oneself or to God?), is not a scientifically derived criterion.

Science has power, but human beings acting with this power are not purified by their possession of it.

One of the most popular ways to attempt to import ethics from a scientific description is to interpret the evolutionary process as a guide to ethics. If an action advances evolution, it's good. In view of our comments above, it should be clear that this is really another case of identifying what is with what ought to be, without a scientific basis. It is assumed that human survival is the goal and theme of the evolutionary process, and that therefore human survival is the highest "good." But what really fosters human survival? Is it the elimination of the weak and sickly so that the human gene pool is fortified? Or is it the careful care of the weak and sickly because they also are human and deserve to survive? Is it any more scientific to assume that "human survival" is the basis for ethics than to choose some alternate basis?

Perhaps the ethical impotence of science is most critical for the dedicated Humanist. He claims an approach to life with scientific justification, but in which the human being transcends the reductionistic view of scientism. Unable to derive the kind of ethics he desires from a purely scientific basis, he feels the need for a religious context that he has in principle already strongly rejected. The result is often a mode of speech which assumes scientific form but not scientific content, a form of speech which in subtle ways becomes divinized without recognizing God. Particularly in dealing with evolution, the evolutionary process tends to become capitalized into Evolution with a mind and will of its own. Purposes and goals are attributed to nature, which likewise often takes on a capitalized N to become Nature. A typical example might be cited.

> The human family dare not defy the dictates of the evolutionary process—that increasing differentiation (specialization) be accompanied by corresponding integration (cooperation) for the good of the *whole* human family. The goal of the evolutionary process is the total cooperation of the whole human family, in all areas of concern and enterprise.[8]

Here we see the evolutionary process dictating what is to happen, and having rather specific ethical goals. But such teleological expressions are alien to science and

typical of religion. In many such ways attempts are made to compensate for the ethical impotence of science.

Summary

Scientism is the worldview that is based on the assumption that the scientific method is the only way to obtain knowledge or truth. The scientific method is a way of describing the natural world through the interpretation of publically available sense data acquired through contact with the world. There are at least four basic reasons why scientism has come increasingly under attack as an exclusive worldview.

1. It is based on the *assumption* that the scientific method is the only way to obtain knowledge or truth. But since this assumption cannot be derived scientifically, it cannot be considered to be universally true. Philosophically the view cannot be internally consistent, but must start with an act of faith.

2. Having an essentially impersonal orientation, scientism is unable to deal with the intrinsically personal aspects of human life. If it attempts to deal with them in its own terms, it reduces them to impersonal mechanisms and thus deprives the human being of his personhood.

3. Scientism does not carry within itself the power to deliver human beings from their problems, but is at the mercy of the human choices of those scientists and non-scientists alike who must decide how to apply the findings of science. Even when the motives of scientists and appliers of science are pure, the application of technology in an imperfect and complex world generates imperfections while solving others.

4. Human choices are driven by a decision as to what ought to be done. Science is incapable of providing the basis for this ought, but can only describe what is. Once again the driving power for human living must be provided from a source outside science itself. Attempts to provide a scientific basis for ethics, as for example considering evolution as the source of such ethics, are always a case of unscientifically declaring what is to be the measure of what ought to be.

Footnotes

[1]Charles Darwin. Letter to William Graham, July 2. 181. Down in *Life and Letters I*, 285.
[2]C. S. Lewis, *Christian Reflections*, Bles 1967, p. 82.
[3]Martin Buber, *I and Thou*, Scribner's 1958, 2nd Edition, pp. 3 and 6
[4]C. F. von Weizsäcker, *The Relevance of Science*, Collins (London) 1964, p. 20
[5]*Ibid.* p. 22
[6]*Ibid.* p. 22
[7]*Ibid.* p. 23
[8]Pearle F. Stone Wood, *Evolution, Psychology and the Biblical Ideal of Love*, Exposition Press, N.Y., 1973, p. 27.

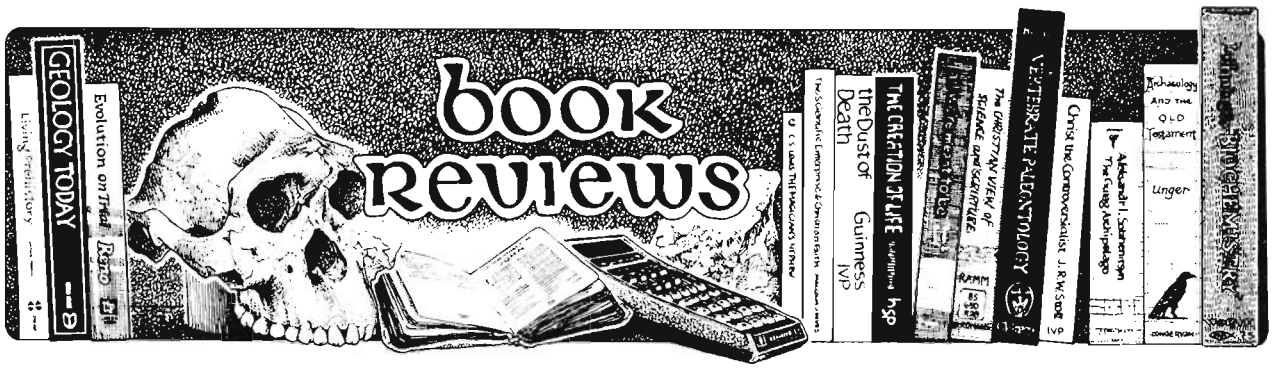
Perhaps the ethical impotence of science is most critical for the dedicated Humanist.

Topics for Discussion

1. Consider a question like the propriety of abortion. Without entering into a debate on whether or not abortion should be permitted under any or all circumstances, decide what the *basis* each person has for making his decision. How does scientific understanding enter these bases? Can a basis be derived from scientific descriptions only?
2. Do you believe that people who wilfully commit crimes to harm others should be punished in any way? Why or why not? If you held a strictly deterministic view of man, what kind of view would you be determined to have?
3. If one of the troubles with our impersonalized modern world is that we have become too oriented toward *I-It* relationships and not enough toward *I-Thou* relationships, would a helpful solution be to seek the same kind of relationship with a tree as with another human being? How then do you react to the bumper sticker, "Have you thanked a green plant lately?" Is thanking plants a meaningful activity?
4. Why do the children of child psychologists so often seem to have difficulty? Is it advisable for a psychologist to practice with members of his own family? Why or why not?
5. Scientists have shown that the phenomenon of "anticipation" can be described in terms of a characteristic and reproducible variation of brain potential with time. Does this mean that anticipation is only a particular time dependence of brain potential? Are "anticipation" and "brain potential" the same kinds of language?
6. Which should we strive to maintain: a person with the freedom to choose responsibility even though he may often choose to do evil, or a person chemically and environmentally conditioned not to do evil without the freedom to choose?
7. What is the basic assumption about human nature underlying the belief that all human evil is the result of ignorance? Is there any real evidence that increasing knowledge produces decreasing evil? Are our universities the center of moral leadership for the nation?
8. In view of the potentialities for evil associated with scientific technology developed in the last 30 years, would you advocate the obliteration of all results of science during that period? Can you think of possible consequences (e.g., in medicine, pesticides) of such an action?
9. Every year until recently power companies have called for the annual expansion of power production and consumption by residents of the USA. Can this continue forever? Why didn't we ever realize this earlier? What kind of steps are called for to meet the changing conditions?
10. Attempts to produce an ethic from evolution start with the assumption that evolution is good, that therefore it must be allowed to proceed, and that human beings must take the process of evolution forward. Is this a scientific procedure? Are the second and third parts of the above statement consistent? What are the consequences of accepting these assumptions as far as one's attitude toward change vs. stability, progress vs. steady state, and constantly altering belief systems vs. a pattern of accepted truth are concerned? Can the assumption bear the weight of these consequences?
11. In *Mechanical Man*, Dean Wooldridge says, "There is obviously no room for a personal God in a world that is rigidly obedient to inexorable physical laws." McGraw-Hill, N.Y. (1968), p. 190. Is this a scientific statement? Dean Wooldridge also believes that "every detail of the behavior of each individual is determined by the physical facts of his heredity and environment." Does this second statement affect your response to the first? On Wooldridge's terms can one know whether there is a personal God or not? What is the function of the words "rigidly" and "inexorable"?

Other Readings

D. Alexander, *Beyond Science*, A. J. Holman, N.Y. (1972)
I. Barbour, *Issues in Science and Religion*, Prentice-Hall, N.J. (1966)
R. H. Bube, *The Human Quest: A New Look at Science and Christian Faith*, Word, Texas (1971)
"Whatever Happened to Scientific Prestige?" Journal of the American Scientific Affiliation 23, 7 (1971)
"A Proper View of Science Corrects Extremist Attitudes," Universitas 1, No. 6, 3 (1973)
D. L. Dye, *Faith and the Physical World*, Eerdmans, Michigan (1966)
M. A. Jeeves, *The Scientific Enterprise and Christian Faith*, Tyndale (London) (1969)
J. R. Ravetz, *Scientific Knowledge and its Social Problems*, Oxford Univ. Press, N.Y. (1971)
H. K. Schilling, *Science and Religion*, Scribners, N.Y. (1962)
R. Schlegel, *Inquiry into Science*, Doubleday, N.Y. (1972)
C. F. von Weizsäcker, *The Relevance of Science*, Collins (London) (1964)



THE NEW CONSCIOUSNESS IN SCIENCE AND RELIGION, by Harold Schilling, Pilgrim Press, Philadelphia, 1973. 288 pp. $7.95.

In this book Harold Schilling, now emeritus professor of physics and Dean of the Graduate School at Pennsylvania State University, presents what he describes as "a message of hope for our time and the future." Modestly characterized as a book written for general readers of modest competence, not a "scholarly treatise," Schilling's book treads through difficult subject matter in a clear, sometimes almost consciously pedagogical style, with Schilling illuminating his points by citing with equal ease popular writers, technical scientific writers, philosophers and theologians.

In Schilling's view science has entered a qualitatively new era in the contemporary period; it is post-modern, as opposed to modern, science. The scientific developments characteristic of post-modern science in turn have led to a new consciousness. The discoveries of post-modern science "represent not only additions to what man knows, but changes in the way he knows, and in the way he feels about, responds and relates to the known and unknown." The major scientific features of these changes are that matter is now conceived of as fundamentaly relational (rather than having an intrinsic essence or substantiality); the material world is historically developmental and evolutionary; matter is transmutable into energy, and matter-energy is intrinsically creative. While this creativity is ambiguous, filled with "prodigal wastefulness, ugly perversions, stark brutality, . . . evolutionary dead ends," it also exhibits "process realities that are transformative and remedial." The revolutionary changes in the scientific vision that have accompanied twentieth-century discoveries have highlighted an often overlooked reality: science is "intensely human and personal, in many respects like the arts, and that imagination, intuition, and creativity are extremely important in its life and thought." Post-modern science now reveals the world to be mysterious when deeply probed. In so doing it suggests interconnections with religion, which also is fundamentally mysterious.

Schilling continues with two sections. First, he sets out a "secular" section in which he explains in detail how post-modern science shapes the consciousness of the world and gives new understandings to fundamental concepts such as matter, energy, time, and determinism. Old notions of simplicity in nature have been exploded; reality recedes into mystery as it is pursued farther and farther from ordinary experience. Nature reveals both creativity and destructiveness. The analysis of nature helps to understand both. No longer able to distinguish between matter and mind or spirit, post-modern science posits that phenomena be interpreted as part of the continuum "matter-energy-life-mind-spirit."

In a second "religious" section Schilling suggests a way of conceiving Biblical theism consistent with the emerging post-modern consciousness. For this theological stance, he believes, post-modern science can provide an apologetic. Asserting that "it is in God's continuing creative activity that Biblical faith sees the ultimate continuing source of nature's existence and evolutionary development, and it is in his unceasing redemptive activity that it sees the ultimate continuing cause of the tranformative and remedial processes that operate in nature and history 'for good,'" Schilling advances a religious vision that accepts the insights of the post-modern consciousness but moves beyond the merely secular by affirming that "the ultimate Source, Guide, and Goal of nature, in all its scientifically discernible levels and aspects is creating and redeeming God." The language of process metaphysics most suitably expresses Schilling's vision of God by modifying "absolutist" features of traditional theism, emphasizing the imminence of God, and reminding us how mysterious even our traditional discourse about God really is. Schilling suggests a vision of the cosmic Christ: "an awareness that the remarkable mystery reality Christians call 'Christ'—which was so supremely and radiantly revealing of God in Jesus of Nazareth—is an eternal, all-pervading cosmic reality that is present creatively and remedially to all beings of the universe." Man is "come of age" in that his greatest temptation will be to draw back from shaping his destiny rather than to shape it creatively toward greater human unity and cooperation in balanced relationship to the cosmos. The traditional concept of God's grace suggests to Schilling an open future in which the cosmos can be creatively transformed "for good."

Schilling recognizes that his vision departs from traditional language that talks of a radically transcendent Triune God whose will overrides natural law, of a vicarious atonement, and of special revelation. But he argues the difference between his view and the traditional one is "not one of basic intentionality"; both "profess the same faith in one God who creates and redeems, though they employ different models or imagery."

No doubt responses to Schilling's religious vision will differ considerably, not only on the question of whether and how far it departs from traditional expressions of Biblical faith, but also on whether it pro-

vides a usable articulation of a vision of hope on which to ground human action. His description of the consciousness rising from post-modern science will be stimulating to most for whom the book is intended. Certainly the book demonstrates Schilling's contention: "No longer can it be said justifiably that religion finds man's basic sensibilities and sensitivities toward nature beng eroded and corroded by the scientific vision." Thus Schilling's work emphatically marks the considerable difference between contemporary views of the relations between science and religion and that expressed almost exactly a century ago by John Draper.

Reviewed by John C. Gienapp, Concordia Senior College, Ft. Wayne, Indiana. Reprinted by permission from The Cresset, *October* 1974.

INTRODUCTION TO FRANCIS SCHAEFFER by Francis Schaeffer, Downers Grove, Illinois: Intervarsity Press, 1974, 40 pp., $1.25.

This is a study guide to three of Francis Schaeffer's most widely circulated books: *The God Who Is There, Escape from Reason,* and *He Is There and He Is Not Silent.* These three books were chosen because they best convey the essence of his views. To understand them is to comprehend Schaeffer's basic approach.

In addition there is a brief essay entitled, "How I Have Come to Write My Books." In this essay Schaeffer tells of his early agnosticism, his conversion, Christian service,. early writings and the formation of L'Abri. His first book was *The God Who Is There,* published in 1968.

Francis Schaeffer is influencing many people through his writings (19 books) and this guide is intended to help readers grasp his salient ideas. The approach is to present twelve study guides, each containing four sections entitled purposes, interpretation, implications and summary. Each study highlights key terms and ideas. The study guide is designed for use by individuals or groups.

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

ALL WE'RE MEANT TO BE: *A Biblical Approach to Women's Liberation* by Letha Scanzoni and Nancy Hardesty, Word, 1974, $6.95.

Here is a book to challenge the analytic powers of the scientific community. Carefully researched, with attention to the minute details of Biblical and secular scholarship on the role of women in western society, authors Scanzoni and Hardesty challenge the tendencies and assumptions of the 20th century Church. Their book brings together under one cover for the first time the wide range of opinions, conceptions, misconceptions, and dogmas which together delineate the consensus of the Church in our day toward the female sex. Carefully refuting what they believe to be unacceptable and ill-grounded, these authors attempt to weave together a credible and Biblically grounded rationale for the liberation of women. They handle unflinchingly every pertinent Scripture text on the subject, even the most difficult and controversial ones, meeting every difficulty head-on.

The book uses two primary methods. It analyzes the attributes of women who exercised leadership in Biblical times, from Old Testament beginnings to the early Church, seeking parallels and principles within a historical perspective. It uses, too, a method of exegesis which places Jesus' statements and insights about women above those of Paul. Jesus, as the Son of God, would have a wider view of personhood, unhampered as he was by the cultural biases of his day. Christ's attitudes thus serve to temper the harder sayings of Paul, conclude these writers.

As to methodology, this second approach may prove difficult for those who wish to assert the reliability of Paul's statements within an inspired Scripture. The historical background which the authors give for their view is, nonetheless, compelling. In the first century, poorly educated as they were, women might only have brought confusion into a church meeting by their uninformed questions. Paul's directives to them were given in the context of that early restricted situation, just as his comments to Onesimus and Philemon on slavery must be understood. Paul's first concern was for the survival of the Church of God in a hostile world and within a secular and divisive, even backward, culture; God's Church must rise above all that. Readers need not conclude, however, that Scanzoni and Hardesty wish us to repudiate Paul's teachings; rather they seek informed interpretation, with full awareness of the Scriptural contexts.

Are there, nevertheless, certain principles that transcend the first century cultural setting? Certainly the authors affirm all the principles of full-personhood regardless of sex which the Bible affirms from cover to cover. But those principles of sex-differentiation which the Bible also suggests they dismiss as secondary, best resolved differently in our own day by a condition of complete role-interchangeability, male and female performing equally well any task within the family structure, or the social structure. The authors argue well, and perhaps they are right, that males can learn to be more expressive, females more purposive in living out their God-given potential. Perhaps each sex has for too long let a large part of its potential lie dormant and unrealized. Despite its troublesome exegetical premises, this book, like few others of its kind, leads a Christian readership convincingly to that conclusion.

Perhaps the scientific community should weigh

Books Received and Available for Review

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

Brown, R. E., *Biblical Reflections on Crises Facing the Church: Cathechetics, Ordination of Women, Ecumenism, etc.* Paulist Press, 1975

Leach, M., *I Know It When I See It: Pornography, Violence and Public Sensitivity,* Westminster Press, 1975

Penfield, W., *The Mystery of the Mind,* Princeton Univ. Press, 1975

Schaeffer, F.A., *No Final Conflict: The Bible Without Error in All It Affirms,* IVP, 1975

————, *Joshua and the Flow of Biblical History,* IVP, 1975

————, *Study Guide to Joshua,* IVP, 1975

Simon, A., *Bread for the World,* Paulist Press, 1975

Skoglund, Elizabeth, *Your Troubled Children: A Christian Counselor's View of the Family,* D. C. Cook, 1974

————, *Women Beyond Roleplay,* D. C. Cook, 1975

Spilsbury, R., *Providence Lost: A Critique of Darwinism,* Oxford, 1975

Stott, J. R. W., *Balanced Christianity,* IVP, 1975

ALL WE'RE MEANT TO BE: *A Biblical Approach to Women's Liberation*

Gal. 3:28	This is the key biblical passage concerning women. It is the only passage in a doctrinal setting in the whole New Testament. All others deal with practical matters.
Gen. 1:26-28	All persons, male and female, are created by God with rational self-awareness and also with the capacity for self-transcendence. The Bible speaks of no "separate spheres" or "different functions." Gen. 1:28 clearly states that God delegates authority to men and women.
Gen. 2:18	"I will make him a helper fit for him." The key Hebrew words are *ezer,* "help," and *neged,* "meet." *Neged* implies "suitable," "corresponding to," or "adequate" to meet all man's needs. Never is *ezer* used to indicate a subordinate helper.
Gen. 3:16ff.	The Bible simply records that man and woman both disobeyed God's command. In this passage God does not indicate what *must* be, but what *will* be; it is descriptive, not prescriptive.
John 20	Jesus' behavior with respect to women is extraordinary—he treated them like human beings. Even more, it was women who were the first to receive the central fact of the gospel and the instruction to tell it abroad.
Acts 5	The apostles did not excuse Sapphira on the grounds that she was only being obedient to her husband. On the contrary, wives are accountable to God.
Rom. 16:2; 1 *Tim.* 5:1, 2; 1 *Tim.* 5:17-22; *Titus* 2:3; *Rom.* 16:3; *Phil.* 4:2, 3; *Rom.* 16:7	A number of passages either explicitly include women among church officers, or in no way exclude them. Phoebe was a "ruler." Deacons were both male and female. Priscilla, Euodia and Syntyche are all named. And is not "Junia" of Rom. 16:7 a female "apostle?"
1 *Cor.* 11:3	The emphasis is on unity, not hierarchy. In Christ there is no chain of command, but a community founded and formed by self-giving love.
1 *Cor.* 11:2-16	This is the longest passage in the New Testament devoted solely to the issue of women in the church. In Jewish circles there was great aversion toward women praying with heads uncovered. Paul as a Jew considered unveiling a far more serious offense to public decency than speaking. The essential justification for the wearing of veils was social custom. Paul was concerned that no offense be given to Jews or Gentiles. 1 Cor. 11:2 starts by saying, "Maintain the traditions."
1 *Cor.* 11:8, 9	The theological leap from this interpretation of Genesis to woman's subordination is a traditional rabbinic understanding that is not supported by the text. After all, man was made from dust, but this does not make him subordinate to the earth.
1 *Cor.* 11:11, 12	In view of this fact, Paul goes on immediately to declare that in the Lord man and woman are not independent of one another, but are mutually dependent, and finally both on God alone. This remark can be interpreted as Paul's own reticence to accept the rabbinic interpretation of man's superiority over woman by creation.
1 *Cor.* 11:7	To be "the glory of" someone is to manifest, reveal or represent that person (Ezek. 1:26-28; Exod. 33:18; Isa. 40:5; John 1:14-18). Paul is not here making a major theological point but simply using what seems a curious rabbinic illustration.

carefully the conclusions, the evidence, and the process of the argument. Are there, one asks the biochemist, certain irrefutable principles of male-female differentiation? But then, if so, are they very important, or are they only minor—in the total picture? The philosophical difficulties implicit in moving from laboratory data to such judgments about that data are, like all philosophical difficulties, overwhelming. Granting basic differences in DNA structure, one is still faced with the uncertainty of the *meaning* of those facts. Some scientists run quickly to assert submissiveness, subordination, the primacy of the mothering instinct. Others question the

1 *Cor.* 14:34	To "speak" does not mean a formal lecture, exhortation or teaching, but simply idle talk or chatter (as used in 1 Tim. 5:13, idlers . . . gossips, busybodies). The direction is for decorum in the church meetings, not a universal dictum against the ministry of women.
1 *Cor.* 12	There is no possible reason to suppose that the gifts of the Spirit are limited to men and are not given equally to women.
Eph. 5:23, 24	The general principle (5:21) is that all Christians should submit to each other in the Lord (not all women to all men). Beginning with his readers' understanding of patriarchal marriage customs, Paul was working to a new understanding in Christ. What is unique in Eph. 5 (that wives should subject themselves to their husbands is part of many cultures including the Roman, Hindu and Confucian) is the groundwork for a new view of marriage as a picture of the relationship between Christ and the church. Requirements for the husband are dealt with to much greater length since the passage primarily presents the spiritual truth of Christ's love for the church. What is new in Eph. 5 is the *way* that husbands and wives are to relate to one another—marriage is an adventure of growth together, each submitting to one another in love.
Col. 2:9, 10	The word "head" in the Bible has nothing to do with either thinking or making intellectual decisions. "Head" means "source". We Christians have been made one with that source, not subject to it; what is in subjection is not "the body" but the world that is "under his feet."
1 *Tim.* 2	Is the *order* of creation of cosmic significance? Gen. 1 and 2 differ on the question of order. If beings created first are to have precedence, then the animals are clearly our betters. Adam is created prior to the animals in Gen. 2, but the culmination of God's creative activity is Eve. How does the order of creation relate to ability to teach anyway?—this point is left unexplained.
1 *Tim.* 2:8-15	Alhough Paul states that he permits no woman to teach, in the early church many members, including women, had this gift and exercised it. The primary concern here is not so much with the role of women as the possibility of false teaching. (The same interpretation must be given II Cor. 11:3.)
1 *Tim.* 2:12	The concern here is with maintaining the cultural status quo, for not transgressing marital social roles. Such passages must be interpreted for our time in the light of the doctrinal statement of Gal. 3:28, which maintains that all social distinctions between men and women should have been erased in the church.
1 *Tim.* 5:14; *Titus* 2:4, 5	Women, lacking education or emerging from paganism, needed to be taught what it meant to be Christian wives and mothers. Hence lists of household duties are set forth for husbands/wives, parents/children, slaves/masters etc. To interpret these verses to mean that God's will for all women in all times requires confinement to the home is quite unwarranted.
1 *Peter* 3:6, 7	This passage deals with the special situation in which wives of unbelieving husbands are urged to obedience as part of the pattern to win their husbands to Christ, rather than by preaching and nagging. It is counterbalanced by a message to Christian husbands to treat their wives considerately, recognizing them as "joint heirs of the grace of life."

This partial summary of the Biblical interpretation arguments of Letha Scanzoni and Nancy Hardesty in "All We're Meant to Be" (Word, 1974) was compiled, partially by quotation and partially by paraphrase, by Betty J. M. Bube, Stanford, California.

validity, or even more, the sense, of such assertions.

What we lack now, as we stand in the middle of the controversy, is perspective. Perhaps a brave humility, coupled with an understanding that God sees beyond our cultural limitations, will keep us in the meantime both firm in our affirmation of the soundness of written Revelation, and firm in our commitment to the kind of free, intelligent inquiry which this book represents.

Reviewed by Nancy Barcus, Department of English, Houghton College, Houghton, New York 14744.

THE BIBLE AND DRUG ABUSE, by Robert A. Morey, Grand Rapids, Michigan: Baker Book House, 1973, 110 pp., $1.45.

The Bible and Drug Abuse presents a perspective on drug abuse problems in light of the teachings of Scripture. The foreword and introduction indicate that the author, R. A. Morey, is qualified to explore Scriptural dimensions of the drug abuse scene in the 1970's.

The concepts to be examined are initially placed in perspective to Creation, Fall, and Redemption. After briefly discussing these Biblical concepts, a basic thesis is stated. All of the following presentations regarding drug abuse rest on this thesis that

> the use of any drug for the purposes of entertainment, escape, mind-control, religious worship, occult experiences, magic, or murder is a sin against God, the Creation, the Society, and the individual. (p. 29).

The basis for this thesis is presented in chapter 6 where the English term for sorcery as used in Galatians 5, Revelation 9, Revelation 18 and Revelation 21 is identified as being derived from the Greek word *pharmakos*. From the word *pharmakos* we derive the words "pharmacy," "pharmaceutical," and "pharmacists." Developing this concept the author concludes that "wherever the Bible mentions sorcery, it also refers to drug abuse, which was an integral part of ancient sorcery." From the scriptural references noted it can clearly be determined that sorcery was seen as evil and sinful. This is probably the best written chapter of the book.

Separate chapters then discuss drugs and relationships to God, to the earth, to society, and the individual. Those chapters looking at the earth and society seem to be particularly weak. Each is three or less pages in length and include extensive quotations.

One of the latter chapters presents suggestions for parents, pastors, and teachers. Some suggestions seem rather sound; yet others appear to be rather superficial. For example, several preventative aids are suggested against drug abuse. It is recommended that the Christian school and teacher can serve such a role. This may be true, but it doesn't relate to thousands of Christians who attend and teach in non-Christian educational institutions.

The book contains three appendices. Each presents data on marijuana, alcohol, and drug classifications. It is of interest to note that the conclusion is reached that the use of marijuana "is condemned by the Word of God" (p. 93) and that ". . . Scriptures condone the moderate use of alcohol," (p. 96). No doubt some would question and take exception with aspects of these conclusions.

There is a bibliography at the conclusion of the book and the book is adequately footnoted. Studies referred to in the appendix on marijuana are mentioned but not footnoted. Particularly since some of the findings of these studies are controversial, it seems that footnoting would be appropriate.

This book might be meaningful for reading by the general Christian public. It is doubtful whether the book would be useful as a Christian response to the drug scene for reading by the non-Christian, particularly college and university students.

Reviewed by Dean F. Miller, Associate Professor of Health Education, College of Education, The University of Toledo, Toledo, Ohio.

HEALING: *A Doctor in Search of a Miracle,* by Bill Nelson, Random House, 1974. $8.95.

What kind of people seek out a healer? Quite often they are desperately ill, such as a young black man whose bulging abdomen contained the hard lumps of metastatic cancer in his liver. Many others suffer from chronic disabilities, spinal cord injuries for example, in which the suffering is compounded by the slim hope of a medical cure. Others are loathe to undergo complex and frightening medical treatment for recently diagnosed illnesses such as heart disease; these people desire painless and reassuring cures. Bill Nolen, M.D. (author of *The Making of a Surgeon* and *Surgeon's World*) met many such refugees from his profession when he undertook to study spiritual healing objectively. His entertaining chronicle of the events of this very personal investigation contains many tidbits of insight concerning physicians, patients, and several colorful healers (i.e., those people claiming to cure illness outside of the recognized Western medical practice). His study focuses on three different practitioners of spiritual healing. Kathryn Kuhlman represents Christian faith healers, who generally claim to be vessels through which the Holy Spirit moves in His healing ministry. Norbu Chen practices a Tibetan healing art which has greatly impressed former astronaut Edgar Mitchell, head of Palo Alto's Institute of Noetic Sciences (noetic means the heightening of consciousness). Finally, a number of Filipinos, members of a Christian sect called the Espiritista Church, practice the sensational form of healing known as psychic surgery.

Writing in an informal, easily read style, Dr. Nolen presents Kathryn Kuhlman as a charismatic figure who creates an emotional atmosphere at her large services through exuberant gestures, radiant smiles, and glowing testimonies concerning the power of the Holy Spirit to heal the physically afflicted. Possessing a vague belief in God as creator, as well as chronic hypertension, the author found himself caught up in the groundswell of hope that rose in the heart of each person among the thousands of afflicted in the audience. Soon Ms. Kuhlman began encouraging those who believed themselves to be healed to come forward to the stage. One by one she introduced these people, asking them to demonstrate their "cure" by appropriate physical movements and praising the Lord for each one. In describing this meeting and evaluating the significance of the healings, Dr. Nolen sought to be as objective and open-minded as possible. His conclusions regarding Kathryn Kuhlman are generally applicable to the other healers and are also the most directly pertinent to understanding the proliferating claims of Christian healings, so I shall dwell on these observations.

Dr. Nolen had no doubt that Kathryn Kuhlman helped many people. However, he could not document one cure of a person with a serious organic disease such as cancer, tuberculosis, or severe head injury. People with such diseases might claim some temporary relief from symptoms, but the underlying disease process was not affected. Thus one woman rushed forward to exclaim that the pain from her stomach cancer was gone, but the next day she woke up writhing in pain from a collapsed cancerous vertebra. The patients which Dr. Nolen found to benefit from Ms. Kuhlman's

ministrations were those with diseases known to be psychosomatic or hysterical in origin (e.g., temporary loss of speech, hearing, or sight) or else the large category of diseases whose symptometology is known to be affected by attitudes and emotions. Functional disorders of the gastro-intestinal system including some types of constipation, diarrhea, indigestion, and ulcers are examples of the latter category. Other such ailments which might benefit from the healer's reassurance and positive suggestions include acne, asthma, impotence, migraine headaches, menstrual disorders and high blood pressure. The fervent belief in the historicity of the New Testament miracles that Kathryn Kuhlman and many of her audience share, coupled with the need of these people to observe the healings which many believe will precede the allegedly imminent Second Coming of Christ, predispose many listeners to great receptiveness to her suggestion that they are healed. Additionally, many ailments are self-limited (e.g., the common cold), naturally improving with time, and some diseases such as multiple sclerosis and arthritis are cyclic, with symptoms waxing and waning in response to physical and emotional factors. Although this is well known medically, should these symptoms of such an illness ameliorate soon after visiting a healing service, many Christians would ascribe the credit for their "cure" to the intervention of the Holy Spirit through the healer. Spontaneous regression of serious diseases such as cancer, a very rare but well documented phenomenon (see *Spontaneous Regression of Cancer,* Everson and Cole, 1966), might be similarly acclaimed if it occurred among a few of the many thousands of cancer victims seen by faith healers each year. Sum this physical ministry with the warm sympathy and comfort exuded by the spiritual healer, which contrasts strikingly with the professional, rather stiff manner of some physicians, and it is easy to understand why faith healers have created such strong, steadily growing followings across the world.

Acknowledging that faith healers deliver some benefits even without documenting healing miracles, Dr. Nolen was left profoundly troubled by these practices for three reasons. Following the healing services he watched the stream of sadly disabled people flow out of the hall—people whose hopes were just rudely dashed as the emotion from the service subsided and they realized that their bodies were still diseased. Heightened anguish and depression were their lot, and their Christian faith might well have been shaken to its roots. Secondly, people with organic diseases, whom Dr. Nolen found were not helped by healers, wasted large sums of their precious money on several kinds of practitioners, such as the Filipino psychic surgeons. Most disturbing of all is the fact that many people delay critically needed medical treatment because they believe, along with their friends and family, in the efficacy of spiritual or folk healers. For instance, one of Dr. Nolen's patients, a young woman with children, tragically delayed surgical removal of her cervical carcinoma for too long because she believed folk healing to be easier and safer. I think that the stakes of unwisely supporting the claims of spiritual healers, Christian or otherwise, may well be the continuation of such needless deaths. Therefore it certainly behooves us to be wary of the sensational claims of healing and mass miracles which circulate through many Christian circles. Dr. Nolen also points out that even the most intelligent and skeptical lay person may well be taken in by the mystery, emotion, and complexity associated with the healing process, providing additional grounds for caution. However, I believe Dr. Nolen's observations in no way preclude the possibility that the Lord may choose to manifest His power through individual healings, as recorded in the New Testament. Thus, the Christian is called to walk the narrow road between skepticism and belief in God's potential healing intervention when confronting claims of healing.

Reviewed by Robert McGrew, student, Stanford University School of Medicine, Stanford, California 94305.

THE PSYCHOBIOLOGY OF TRANSCENDENTAL MEDITATION: *A Literature Review,* by Demetri P. Kanellakos and Jerome S. Lukas, W. A. Benjamin, Inc., Menlo Park, California, 158 pp. 8″ x 11″ Paperback. 1974. $3.95.

Kanellakos, an electrical engineer, and Lukas, a psychologist, both currently at Stanford Research Institute, offer an attempt to present "scientific information so that it may be clearly understood by those readers not specifically qualified in the areas of biology and psychology." The book incorporates a Final Report of a research program carried out at SRI (1973), involving the preparation of a literature survey, a pilot plant study to determine the teachability of TM, and a replication of some of the findings previously claimed in the literature. The effects of TM are still uncertain, and the authors make it plain that the reported findings cannot be unambigiously interpreted since "their reliability is not fully established." The book is divided into four main portions: one on physiological correlates of TM, one on psychological correlates, one on possible deleterious effects of TM, and a variety of Appendices.

The physiological studies are directed toward answering the question: Is there a transcendental state that can be empirically distinguished from the states of wakefulness, deep sleep and dreaming? If it exists, the transcendental state is unique in that it alone combines a low relative sensitivity to internal stimuli, a high relative sensitivity to external stimuli, and a low level of physiological activity. The authors warn that the experiments reported often "lack conventional scientific rigor." They also imply that there is one "right" way to do TM, and warn on several occasions against attempting to learn TM by oneself.

The physiological correlates and a brief summary of conclusions are as follows: (1) electroencephalography—brain waves are a complicated subject to analyze, but both the "transcendental state" and early sleep stages have similar patterns; (2) electrooculograms (measure of eye movement)—unlike REM stage of sleep (associated with dreaming), no REM-like motion was observed in the "transcendental state;" (3) electromyograms (measure of relaxation)—some evidence that practitioners of TM showed greater reduction in the neck and shoulder muscle tension than a control group who simply rested for comparable periods; (4) respiration rate—marked decrease in the respiration rate is reported, but this also occurs prior to sleep; (5) heart rate—decrease in heart rate with TM is reported comparable to that observed in control

groups during their rest periods, but more experienced TM practitioners obtained more significant reductions; (6) blood pressure—no significant change during TM; (7) skin resistance—an increase upon TM but not distinguishable from the same effect produced by general relaxation; (8) metabolic rate—a decrease is reported during meditation, but some decrease is also believed present during sleep; (9) skin and body temperatures—same magnitude found during sleep; (10) blood pH—the pH of the blood changes more during several hours of sleep than during ½ hour of TM; (11) cardiac output—about the same order of magnitude in TM and sleep. A review of these physiological correlates seems to this reviewer to indicate evidence for physical relaxation accompanying TM, but not necessarily anything more unique.

The testing of psychological correlates is more difficult to control and the responses are more colored by uncontrollable features of the experiment. Practitioners of TM have been found at least under some circumstances to show improved ability to perform perceptual tasks, enhanced "habituation," and lowered perceptual thresholds. Personality profiling tests indicate that practitioners of TM "have greater psychological stability, are more harmonious and balanced and are more alert in activity than the norm." Initial reports indicate success in reducing the use of illicit drugs through TM, but "TM may only help to sustain the drug user's resolve to discontinue drugs."

Possible deleterious effects of TM practice can be a consequence of failure to understand the proper ways to handle the symptoms associated with "release of stress" during meditation; at least this is the way they are interpreted by supporters of TM. Such release of stress is hypothesized as the means by which the practice of TM leads to rejuvenation and "purification." (One cannot help but think of the "engrams" of Scientology as an analogous hypothesis.)

In a section of the Appendix on "Theory of TM and Altered States of Consciousness," it is curious to see the listing of *Phenomenon of Man* by Teilhard de Chardin, and Maslow's *Toward a Psychology of Being*.

The authors maintain an approach of scientific objectivity throughout; so it is even more striking to read in their description of how TM is taught,

> On the first convenient day following the second lecture, the instructor performs and the student is a witness to a brief private ceremony honoring the long tradition of masters who have kept the teachings intact to this day. This ceremony is performed in front of a picture of the latest of these teachers of TM, Guru Dev. After this ceremony, the instructor discloses the student's mantra. The selected mantra is one of several that have a resonant quality and that apparently have been found, after centuries of use, to be effective in directing perception and thinking inwardly. The mantra is a Sanskrit word whose quality is employed only—not its meaning.

What a curious way to introduce a scientific discipline! And what of this mysterious mantra that is so powerful that a control group "mimicking TM" by the same series of meditations but reciting an "English phrase" had only a 37 percent report of positive results compared to a 79 percent report for practicioners of authentic TM? Answers to many questions are still lacking.

HUMAN MEDICINE: ***Ethical Perspectives on New Medical Issues,*** by James B. Nelson, Augsburg, Minneapolis, Minnesota (1973). 207 pp. Paperback. $3.95

James B. Nelson is professor of Christian Ethics at United Theological Seminary of the Twin Cities. In this survey of the problems, options and Christian-informed solutions of a variety of pressing medical issues, he may not provide the last word on every subject, but he certainly seems to provide the first word for any future discussions. It is probably one of the best popular books written to cover this range of topics.

The thrust of the book is exemplified by the fact that the first and last chapters deal with "caring;" the first chapter with "Caring for Human Health," and the last with "Medical Care for a More Human Society." He sees caring as more important even than curing. He treats the problems related to abortion, artificial insemination, human experimentation, genetics and control of human development, humanizing the dying process, and the human dimensions of organ transplants.

Throughout this treatment he is concerned with the response of the whole person and comments that "for the Hebrew, body and spirit could not be divorced, and hence the notion of salvation of the soul or the spirit apart from the body was foreign." There are many dimensions to health and all must be kept in mind in attempting to serve through human medicine: the mechanical-physical, the chemical, the biological, the psychological, the social and historical, and the spiritual.

Nelson favors a "developmental" view of the human being in which all human life is viewed as valuable and as worthy of respect, but in which it is also imperative to discriminate between purely biological life and personal life. To mindlessly subject personal life to biological life at any stage, but particularly at the beginning and ending of life, can lead only to "biological idolatry."

Your doctor might enjoy receiving a copy.

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

GUIDE TO SEX, SINGLENESS AND MARRIAGE by C. Stephen Board, editor. Downers Grove, Illinois: Intervarsity Press, 1974. 130 pages. Paperback. $1.95.

This book is a collection of twelve articles that originally appeared in *HIS* magazine for the university student. Half of the articles are on sex, four on marriage and two on singleness. When these articles appeared in *HIS*, they drew a large volume of mail. Students are obviously interested in these topics.

The articles, by well-known Christian writers, are uncomplicated and easy reading. The first article, entitled "One Woman's Revolution" by V. Mary Stewart, is already being given a wider circulation via publication in booklet form under the title "Sexual Freedom."

The editor of *HIS* magazine and this book, C. Stephen Board, writes a philosophical defense of chastity and an attack on hedonism. Hope Warwick recounts the experience of a coed who had a premarital pregnancy with subsequent abortion. Thomas Howard

writes with grace about the meaning of the sex act. Kirk Farnsworth contests the idea of sex as a drive like hunger or thirst. Alice Fryling discusses some differences between men and women in the sexual relationship and the possibility of being single and happy. Barbara Sroka writes about interpersonal relationships. J. Richard Arndt gives a checklist of major areas in which marital tensions develop. C. Stephen Board has an interview with Walter Trobisch. Lars Granberg writes about the family and the church, the world's oldest commune.

These articles are thoughtful, candid and concise. They speak to timeless topics and will provide help in deciding one's place in the baffling world of sexuality.

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

DEVIANCE: ACTION, REACTION, INTERACTION by Frank R. Scarpitti and Paul T. McFarlane. Addison-Wesley: Reading, Mass. 1975. 448 pp., paper.

Here is a quiz question. What do the following people have in common? A dwarf, a chiropractor, a boy of five with an I.Q. of 180, a negro in a freedom march, a battered child, a swinging couple, a bum on skid-road, a lesbian, a serpent-handling minister, a Viet Nam draft protector, an ouija board enthusiast, a person with leprosy, an obese person who weighs 300 pounds, the relative of a patient in a mental hospital, the parent of a retarded child, a physician sued for malpractice?

The answer is: they are all social deviants. By this the authors mean: "those acts, attributes, and beliefs, which when performed or made known by an actor, elicit an evaluative social sanction or sanctions from an observer." Put simply, when we are different from "the average Bear," people will respond with either praise or censure, but they will likely not fail to notice our difference from the usual and expected.

We tend to think of social deviants solely in terms of those who deliberately violate the most extreme norms of society. But we fail to see that the bright kid in the classroom, the crippled neighbor, and the zealous evangelist are all social deviants. Some types of social deviance are inborn—such as the dwarf. Some deviance is the result of accident—such as the paralyzed athlete. Some deviance is chosen—such as a war protestor or freedom marcher. Some deviance is a complex product of multiple forces—the alcoholic, the priest who ordains women, the reporters who kept digging into Watergate.

All of us are to some extent deviant from social norms at one time or another, even if we tend not to see our deviancy. At other times our deviancy is painful and we hasten to return to the comfort of social acceptance. At other times we seek a deviant status and accept the consequences.

The authors point out that there is both positive deviance—such as a political or military hero who dares to speak out and lead in social reform, and negative deviance—those whose acts are destructive to society. And here's the rub. For different segments of society may give deviant behavior a positive or negative judgment.

The religious scene is a critical arena for the analysis of deviance. Religious groups have been at the center of social norming, that is, defining the socio-cultural patterns of life by which we gauge deviancy. At times the church, in its large sense, has maintained the social norms by proclaiming deviancy as immoral or heresy. Yet at other times the church has dared to lead in the most profound revolution of social norms.

This book does not tackle those larger issues of social deviancy. But it does provide an excellent introduction to the important functions of social labels and the profound implication of those labels. Although a few chapters are rather heavily larded with sociological jargon, in the main the articles are written in a popular style that make the point. Perhaps we are more aware of the psychology of our behavior than the sociology. Thus this book would make an excellent discussion guide for both scientists and lawman who seek to understand the judgment of deviancy in our society. The response and initiative of the church to social deviancy is in hot debate these days. This would make an excellent resource for church dialogue.

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

IMAGES OF MAN: *A Critique of the Contemporary Cinema* by Donald J. Drew, Downers Grove, Illinois: InterVarsity Press, 1974, 121 pp., $2.95.

Donald Drew lectures in English in Great Britain; in this study he has written a sort of "guide to the movies for Christian kids." As the publisher would lead one to suspect, Drew's ideas and vocabulary are strongly influenced by the work of Francis Schaeffer and his followers (Os Guinness, H. R. Rookmaaker, and others). Schaeffer is, I think, the source of both strengths and limitations in Drew's survey.

First of all, Drew's primary concern is not with cinema as such, but with cinema as a document of modern cultural premises. Four central chapters concern the modes in which "man's search for meaning" appears in recent films: sex, violence, "tripping," and religion (anti-, and non-). Here Drew's observations are up-to-date but superficial. He habitually reduces a film to its "moral," ignoring the fact that a film is a film and not an essay or legal deposition. He not only scants cinematic technique, but neglects to provide summaries of plot or content for those whose film-going is infrequent.

This concern with film as document rather than as art defines Drew's major foci and limits. His introduction to the aesthetics of film-making is alternately hip and confused. Later in the book, when discussing the politics of film—its latent uses as behavioral conditioning—and matters like censorship and criticism, Drew is much more often on target. But then these are matters not of art but of cultural consensus.

All in all, the book makes (though sometimes embarrassedly) one solid positive recommendation: Christians should by all means avail themselves of the resources for pleasure and learning in modern cinema. Drew urges us to go, to study, to discuss, and to involve ourselves in the cultural issues the cinema raises and expresses. His rationale for Christian involvement is perhaps the most adequate part of the book. But even this is, of course, not really about film.

Reviewed by Lionel Basney, Department of English, Houghton College, Houghton, New York

Every Article Significant

Congratulations on an absolutely outstanding issue of THE JOURNAL OF THE AMERICAN SCIENTIFIC AFFILIATION. Our September, 1975 copy arrived today. Every article is significant as are the smaller items including the Book Reviews and the conversation between Richard J. Coleman and Clark H. Pinnock.

John Stapert
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Happy to Correspond

We have now been in Salatiga, Java, Tengah, Indonesia fourteen months and are nearing completion of our Indonesian language studies. We hope to begin Javanese in January and to move from this location to a more evangelistically viable location in April. With the Christian University here and approximately eighteen churches in the city and many missionaries living here, Salatiga is a real Christian center.

We will be happy to correspond with any members interested in religious activity in Central Java. Our specialty work is church planting but some members might be interested to know that Universitas Kristen Satya-Watjana is frequently looking for Christian professors in many disciplines but particularly English language.

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Exalting Occam's Razor into a Law

I have just seen the letter from John A. Cramer in the June copy of the *Journal ASA*. It is headed, "Disappointed with MacKay". The chief ground of his disappointment is "his claim is a bald-faced denial of the law of parsimony (Occam's razor)." The problem here seems to be that Dr. Cramer has exalted Occam's razor into a law. In fact it is only a methodological assumption of the kind that we use and find generally useful in certain areas of thinking. Occam's razor never has been a law and never could be a law. It is often misleading, it may induce us to spend years trying to explain a phenomenon in terms of one or two principles when in fact we ought to be allowing three or four. If Occam's razor is made into a law then should it not be called the law of reductionism? That is to say if you can explain a phenomenon in terms of one set of concepts you are under intellectual obligation to deny that any other set of concepts is relevant. This of course is roughly the way Marxism tries to interpret the world, but everybody knows that it breaks down at least at the individual level when people try to be honest about the nature of reality. It is of course the dogmatic materialist starting point. But what MacKay was doing was to show that "logically" there is no ground for doing this. He gave a number of examples to show that a complete explanation "at one level" still leaves it an open question as to whether there are necessary explanations at other levels. In this sense MacKay's argument is fairly fresh and is a direct attack on what Dr. Cramer calls, "the *law* of parsimony" and what would better be called "reductionism".

MacKay shows that you do not have to prove the incompleteness of the scientific explanation in order to show that you need a different set of concepts to do justice to the phenomena. Traditional apologetics has often proceeded by trying to show that there are gaps in the scientific knowledge which allow us to introduce the idea of God. MacKay will have none of this and in this sense he allows the scientist to have his cake and eat it. He allows him to use Occam's razor as a scientific principle and to explain the scientific aspects of the phenomenon in terms of as few concepts as possible, ideally only one. He allows him to say that the whole of the phenomena are *on a scientific level* mechanical. But insists that if he does that he has still not solved the problem or even begun to address himself to the question as to whether there are other levels of reality needing other kinds of explanation. Presumably Dr. Cramer feels he must prove gaps in the scientific process. If that is not his approach it would be interesting to know how he himself meets the problem.

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On Being A Concerned Technologist

As professionals whose central tasks are intimately related to creative design, engineers and architects are very close to God's mandate to have thoughtful stewardship over *His* lovely design - His very own creation. And, not only has our creator-designer God "given" us His world, He has also made us in His image and thereby given us power and potential as creator-designers in our own modest, yet significant, fashion. This exciting ability to bring together previous experience and perception with new combinations to produce something innovative and original is a dynamic earmark of God's likeness in man. Thus man, properly viewed in this context, may himself be a creator-designer, under God, with sensitivity and responsibility.

And technologists do not design in a vacuum - they must attempt to wisely solve problems for their *society*; a real-life, immediate, here-and now society. These presumably "technical" problems have inherent philosophical, sociological, political, and economic facets. Therefore, to properly design for his society - for his neighbors if you will - the technologist must *know* his society. Sensitivity and responsibility will only be satisfied by creations and solutions which are fitting, germane, and congruent to his neighbors considered as individuals or as a group. To design appropriately one must have intimate knowledge of people and their needs - needs broadly considered - "needs" not just "wants".

But more than knowing is required of the Christian technologist; he must *love* that society. His must be a concerned and empathising action related to the long-range (not merely immediate) good of his neighbor. At this point the Christian serving his society in this role brings to bear his office as neighbor freighted with all its Biblical significance (Good Samaritan et al.). And here can be the occasion, through care-filled design, for liberating one's neighbor from the problems of hunger, fear, disease, poverty, ignorance, isolation, and the like; a healing, liberating ministry. Here too lies the perennial struggle of self versus un-self, because, as does all of life, so too technology illustrates man's natural propensity for introversion - witness our poisoned environment and plundered natural resources. We have frequently perverted our role as neighbor and sold out to a touch-and-feel philosophy that so easily goes along with working in a very real and immediate world. A Christian technology must be a positive, empathising expression of concern for one's neighbor - for his long-range, total-man good.

Thus technological growth should properly be cultural and spiritual growth as well. This area of human enterprise must be harnessed to the Kingdom and that's the challenge for Christian higher education involved with this slice of God-given reality.

And how does one go about responding to these concepts with respect to Christian higher education for engineers and architects? Let me try to indicate how one college approaches this task.

First, with respect to a *knowledge* of one's society, there is a real attempt to expand a student's awareness and sensitivity to his neighbor through courses such as economics, psychology, sociology, literature, history, and political science. Later on, this may be more explicit and immediate such as an exposure to anatomical mechanics, anthropometrics, market surveys, or environmental studies. Knowledge gained here is to insure that there is a real attempt at *harmony* between the solution-design

and its users - that the results are fitting and germane to the society.

Secondly, our creator-designer as God's man in this role, must have real insight into how he may, through his endeavor, be "neighbor" to his society. This is a logical extension of the cognitive aspect for knowledge of needs and problems should natively beget concern in God's children. Curricular offerings which speak to this emphathizing aspect are philosophy, literature, religion and theology, and engineering design. These courses, among other things, are related to life style and values, to moral decision making, and with explication of the concept of neighbor-hood and thus are most vital to the training of Christian professionals.

Engineering communication and design naturally fits into a curricular approach that wishes to provide put-it-all-together, problem-solving experiences on real-life projects under the tutelage of a service oriented faculty. At the freshman level this takes on the form of design projects in which the outcome is a report complete with text and drawings. "Answers" in this situation are at the concept level i.e., basic ideas which are carefully thought out possibilities for solution. These would have to be actually analyzed, evaluated, and tested to determine true feasibility. But the problems are deliberately selected to provide people-oriented, real-life situations such as the design of a kitchen for use by the blind (architect's) or the design of cabin plumbing for rapid winterization and dewinterization at an inner-city youth camp (engineer's). It is hoped that this initial involvement will, among other things, illustrate the neighborly potential of technology i.e., its potential as a healing, liberating ministry.

In addition to the freshman design experience, the sensitivity for and responsibility toward our society is also indicated in the formal engineering courses where it becomes natural and productive to do so. It might be in a materials science course where responsibility to structural integrity or resource management are intrinsic to the subject matter.

The final in-school experience is a team project undertaken at the third year level. This action involves a problem whose "solution" is researched, designed, built, and tested and is meant to focus the whole gamut of student knowledges, skills, and attitudes on an actual societal need and provide a viable, operational answer. Recent illustrations of this type of project would be a bottle-smasher for rapid densification of bottles in a resource recovery situation by municipalities or organizations or a combination can-smasher, de-labeler for similar use. Both of these items have been designed and built and are high-capacity, very low cost devices for every day use - and their plans are being shared all over North America.

Furthermore, in this particular instance, we have gone a step further. Distinct from the school, yet related to its people, we have set up a non-profit recycling effort which 1) uses the technology produced by our students, 2) provides a resource recovery action for our community 3) employs inner-city teenagers under the NYC program, 4) is managed by an engineering graduate and 5) employs Calvin students as supervisors - a good share of them engineering students. There are many "neighborly" aspects to this enterprise and we hope it may become somewhat of a pioneering instrument in this area.

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Can a Christian Be a Scientist?

In his book *The Relevance of Science: Creation and Cosmogony* (Harper and Row, N.Y., 1964) the German physicist and philosopher Carl Friedrich von Weizsäcker makes the statement that belief in science is the prevalent religion today. The author proves this assertion convincingly. This leads us to question whether belief in science can really replace a well-understood Christian faith. How are science and Christian faith related to each other?

At first let us recognize the fact that there have always been outstanding scientists who are confessing Christians. This indicates that science and Christian faith are not necessarily contradictory viewpoints.

Statements on the compatibility of faith and science often reveal themselves to be biased. Sometimes the methodological limitations of the scientific approach are not considered enough. Furthermore, a shallow understanding of Christian faith complicates the discussion. It seems to be necessary to resolve first the prejudices concerning science as well as Christian faith in order to be able to relate one to the other.

Let us first look at science. How can the work of a scientist be characterized? A physicist, chemist, biologist, geologist, phychologist or sociologist starts with observation of reality. In view of these facts he develops an hypothesis. By logical conclusion he reaches statements which then have to be verified or falsified by further observations of reality. In case a contradiction appears, an hypothesis must be modified or dropped. It is essential to distinguish between observation and hypothesis. Each hypothesis may be supported, modified or even dropped because of new observations.

Furthermore, let us consider that a scientist approaches reality on a purely rational level. For instance, his personal feelings or certain prejudices must not influence the result of his work. Note that we as human beings operate differently in our daily life. The relationship between friends or in a marriage is certainly not the result of merely rational considerations. Here the whole person is involved. However, the scientific approach to reality is essentially rational.

Moreover, a scientist considers only a well-defined part of reality which in general is rather small. All the other parts and interdependent relationships between them and the investigated part are neglected. Various sciences also look at the same section of reality from a different viewpoint. A physicist for instance will see a river, the sun or man in another way than a chemist. A chemist's view of man is different from that of a sociologist or psychologist. Each science develops pictures of certain sections of reality. However, there is no science able to combine these pictures. This is beyond the capability of the scientific approach.

The foregoing considerations show some methodological limitations of science which are sometimes overlooked. From this we can conclude that no science will be able to answer the following questions:

1. What is the meaning of the universe, of human history and of my own life in particular?
2. What is the basis for the hope and trust that everybody seems to need?
3. What kind of ethical standards shall we choose for our private and public life? Nuclear physics for instance does not provide us with standards on how to use it.
4. Does God exist? And if so, how does he relate to the universe and to man?

All these questions will not be answered by any kind of science, since the scientific approach is a limited tool useful for other purposes. This is a fact which Christians and non-Christians have to accept. What is left are essential questions that are pressing for an answer.

Various religions, ideologies and philosophies have tried to answer these questions. The Bible claims to have the true answers. But how can we verify the truth of biblical statements on God and man?

Christian faith does not result simply from the acceptance of certain dogma. On the other hand Christian faith does not come by intellectual effort only. According to the Bible, becoming a Christian involves the whole person. Christian faith is a continuous reaction of one's life to a great event about 2000 years ago when Jesus Christ died and was resurrected. His life shows me what I am supposed to be. Through his death he paid the penalty for my failures, and his death and resurrection enable me to live a new life.

The truth of biblical statements is revealed by a personal relationship to Jesus which is made possible by the grace of God. Observe that knowing God is described in the original language of the Bible by the same word that expresses the most intimate relationship between husband and wife.

According to the Bible, insights to the essential truth for our life are always connected with certain steps of obedience. Jesus says in John 7, 17: "If any man is *willing to do* His will, he shall *know* of the teaching whether it is of God or whether I speak from Myself."

In all our effort to verify biblical statements our initial view is crucial. Many people prevent themselves from getting insights to biblical truths because of their methodology: after having reached appearently solid ground in themselves they try to decide on God. In this way they follow Descartes' approach to reality. Another mathematician of the same age, Blaise Pascal, shows us a completely different way. He warns us not to search for a safe ground in ourselves. Pascal says that we know not only God but also ourselves only through Jesus Christ. Without Jesus we don't know who we are and who God is.

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Religion and the Rise of Modern Science: A Reply to D.M. MacKay

D.M. MacKay has made it quite clear (*Journal ASA*, Sept. 1975) that he disagrees with my reading (and thus my review) of R. Hooykaas, *Religion and the Rise of Modern Science* (*Journal ASA*, Dec. 1974). He thinks Hooykaas has pursued his subject with care and thoroughness and that the resulting book is an exemplary piece of scholarship. Fine! Disagreement is an inevitable feature of the quest for understanding, and it is entirely healthy.

May I reply simply by suggesting (1) that the cause of dialogue would be advanced if MacKay would address himself to the issues instead of denouncing those with whom he disagrees; and (2) that interested readers first inform themselves by plunging into the scholarly literature on the rise of modern science—then take Hooykaas's book in hand and judge for themselves whether, as MacKay asserts, it is "one of the most carefully documented and scholarly short treatments of his subject that have recently appeared," or whether, as I am firmly persuaded, it is more polemical than scholarly and represents a conception of the rise of modern science that is no longer tenable.

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Curious Appeal to Galileo

The curious appeal by Duane T. Gish to the acceptance of the Ptolemaic world view by scientists and the subsequent transition to Copernicanism as an analogy to the present acceptance of evolution by most scientists, presumably foretelling a similar coming transition (to the flood geology theory?) was well pointed out by Geoffrey Manley in a recent book review (*Journal ASA*, June 1975, 92). Reginald M. Daly, in his flood geology based *Earth's Most Challenging Mysteries* makes a like appeal (pp-381,382), envisioning a new "Galileo, man of destiny" appearing on the scene to "help rebuild a shattered discipline", namely evolutionary geology.

In the light of such comments one cannot but wonder how closely Gish and Daly have looked at the events of the Copernican Revolution. Galileo, for example, explicitly addresses himself to the relationship between science and scripture in several places. In his "Letter to the Grand Duchess Christina" the following statements appear within three consecutive paragraphs (quoted from Stillman Drake's *Discoveries and Opinions of Galileo*, Doubleday Anchor, 1957).

> These propositions uttered by the Holy Ghost were set down in that manner by the sacred scribes in order to accommodate them to the capacities of the common people, who are rude and unlearned. For the sake of those who deserve to be separated from the herd, it is necessary that wise expositors should produce the true senses of such passages, . . .
>
> This being granted, I think that in discussions of physical problems we ought to begin not from the authority of scriptural passages, but from sense-experiences and necessary demonstrations; . . .
>
> . . . nothing physical which sense-experience sets before our eyes, or which necessary demonstrations prove to us, ought to be called in question (much less condemned) upon the testimony of biblical passages which may have some different meaning beneath their words.

Somewhat farther along Galileo quotes with approval Pererius on Genesis.

> We must also take heed, in handling the doctrine of Moses, that we altogether avoid saying positively and confidently anything which contradicts manifest experiences and the reasoning of philosophy or the other sciences. For since every truth is in agreement with all other truth, the truth of Holy Writ cannot be contrary to the solid reasons and experiences of human knowledge.

Strange utterings indeed from a bedfellow of Gish and Daly!

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

William D. Sisterson, Executive Secretary

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

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