Journal of the American Scientific Affiliation

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

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JOURNAL OF THE AMERICAN SCIENTIFIC AFFILIATION

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The God of the Gaps

R. LAIRD HARRIS*

All admit that there are gaps in the explanation of the phenomena of nature. But with the advance of science many gaps have disappeared. Some suggest that to find God revealed in non-understood phenomena is dangerous, for tomorrow the phenomena may be explained. Better to emphasize that God is revealed in regular natural processes!

True, God is providentially active in nature. But certain gaps are not understandable by physical-chemical approaches. Miracles, prophecy, and angelic visitants are examples. Life itself may well be such a gap, and human life involving the soul surely is. These gaps and this God will not disappear.

The expression, "the God of the gaps," has been used rather frequently in our circles. As I understand the thought back of the phrase, it is this: In a former age some of the processes of nature were understood, and the rest of such processes were called miracles and ascribed to God's direct activity. As knowledge of natural processes increased, the gaps in understood phenomena narrowed, and to God was ascribed less activity in nature. At present, at least, the outline of the operation of most natural processes is understood. Only the life process itself had, up to recent days, defied analysis. There, God was assumed by some to be in control. Now, however, this gap also has been narrowed. It is confidently asserted that it will soon be eliminated altogether. Life will be chemically explained. At that time, those who trust in the God of the gaps will suffer a further defeat. Presumably they should give up such a deity altogether. The phrase, "God of the gaps," seems intended to expose the fallacy of believing in a God who works in the field of mystery.

The expression has been used, I believe, more in informal discussion than in published statements. It was referred to by Hearn (2, p. 41) in a popular symposium. The view has been cited by Sinclair and questioned. The quotation he gives runs thus: "In the past the more we have learned, the more we have been able to explain; so we believe that we could explain it all if we knew enough" (3, p. 72). The thought is implied that we could explain the universe on scientific grounds, i.e., according to physico-chemical principles, if we knew enough. Sinclair rightly denies this conclusion because mind, soul, etc. cannot be experimented with without destroying them. This allows that there necessarily are gaps in scientific knowledge. Those gaps may be larger than most scientists tend to allow.

God in Natural Processes

An alternative view is alleged to be one which presents God as the One who is behind the known processes of nature and about whose activity there needs to be no mystery. God works through second causes. It was never true that God caused rain without natural causation. Likewise the more mysterious processes of life are merely biochemical processes analyzable and repeatable even to the extent of the formation of life in the laboratory. This view may be and often is extended to many fields. The phenomena of mind may be duplicated, it is claimed, in an electronic computer. The so-called miracles of the Bible are also said to be subject to rational explanation. Creation is by natural process. The universe is entirely rational and understandable in physical-chemical terms.

It is not to be denied that there is error in the view that God is recognizable only in the mysterious and some truth in the latter view that God works always by law. Aboriginal man indeed assigned a special spirit to each natural function. The Norse mythology said Thor threw his hammer when it thundered. We know better. The thunder is caused by electric discharge which is caused by condensation which is caused by wind currents which are caused by solar radiation which is caused by hydrogen fusion which is caused by—but we have no time for more. At least we know now that thunder is a physical-chemical phenomenon.

But the Bible and Christian creeds do not deny this. True, the Bible ascribes thunder to God as it ascribes all natural process to God. But the Bible does not deny second causes in ordinary natural phenomena. Christ declared that the weather is to an extent predictable. The round of days and seasons and years was set in Genesis 1 and reconfirmed at the flood. The Bible is not animistic or mythological.

Even the free acts of men are specifically attributed

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in the Bible both to men and also to God (cf. Isaiah 10 concerning the action of the Assyrian invader). Sickness also, which must have been quite mysterious to the ancients, is in the Bible ascribed to God only as a primary cause. Job's illness was no more the direct act of God, Satan, or spirits than was the killing of his children. The Bible does not take time to explain what causes unknown natural phenomena. It assumes that God's ordaining of the universe covers all such matters. But it also assumes that God, the one God, is back of all natural phenomena, known and unknown. God does indeed work through second causes. The major creeds of the Christian Church clearly say this. I therefore believe the phrase, "God of the gaps," embodies a somewhat novel thought. Individual students may have expressed themselves unfortunately, but Christianity never believed in such a concept as that God is God of the gaps *only*.

On the other hand, the view that all the universe runs the way of second causes is not a Biblical view either. This view is akin to that of English Deism. Deism allowed for God to start the processes of the universe which ever after have carried on of their own accord. Some would deny that this view is deistic because, they say, God may be conceived as immanent in the space-time universe directing all second causes just as the Bible indicates. Indeed the modern Heisenberg uncertainty principle—that atomic phenomena are not all mechanically determined—has made some feel easier about God's method of directing second causes. This principle is thought to preserve God's freedom to act through second causes.

What objection can we then offer to this view of God's relation to the universe? Is it not totally physical-chemical with God watching over and directing it all?

Gaps in Science

In answering these questions we must begin by insisting that the total universe of essences is not all physical-chemical. To affirm this, would be to deny the existence of God who is on any theory not physical-chemical. Also the Bible makes it quite plain that there are angelic beings and demons who, though not physical-chemical, are real. It is fashionable today to make fun of the old scholastic theologians who argued over how many angels could dance on the point of a pin. Actually I have never heard a very good answer to that query. It concerns the relation of spirits to the space-time world, a subject which is not easily defined. I fear the modern mind caricatures the scholastics' question because of a deep scepticism about the existence of any spirit world at all. In this, the modern mind is directly at variance with Biblical truth.

But it is true that the scientific method gives us no information about angels. None have been seen in any laboratory. Their mass is zero, their refractive index nil, their speed may exceed 186,000 miles per second. They are not subjects of laboratory analysis. To science, the knowledge of angels is a gap. We simply mention the case of angels to show that to the Christian it is axiomatic that the scientific method does not apply to all truth or all reality or all being.

There are other gaps in such a knowledge of the universe as is gained by the scientific method. It is difficult to establish a scale of beauty. While there are scientific principles applicable to art, it is hard to describe scientifically what is so remarkable about the Mona Lisa smile. Likewise it is difficult to measure love with a micrometer. The fact is that the most noble things in life (love, beauty, goodness, justice, value, etc.) are not subject to physical-chemical analysis. They are gaps in scientific understanding of our universe, and these gaps cannot be filled by scientific method.

I think we can go further. These items are gaps in science because they are related to a mysterious thing called self-consciousness. I, at least, cannot define this, but I am acutely conscious of it. When somebody steps on my pedal digits, self-consciousness comes into play at once with the appropriate response; there is pain. Pain has been measured by scientists, i.e., one pain has been compared with another, in a scale of "dolors." I once knew of a chemist who in fun had set up a scale of millioscules for measuring enjoyable taste. But these are merely manipulations, and hardly scientific ones, of what we all are conscious of. Feeling, self-consciousness, thought—these are not in the physical-chemical domain.

There should be and there is a reason for this situation. Science does not apply in the realm of spirits. But man is a spiritual being as well as physical. This is denied on every side today. It is denied by many a scientist. It is denied by communistic theory. It was denied in principle by Hitler in his genocide. But we deny so elemental a truth at our peril. The whole Biblical revelation assures us that we have a non-material existence now and beyond the grave. In a way it merely assumes this. It spends more time speaking of the quality of that spiritual life now and the condition of that spiritual life hereafter. This is all a gap in scientific theory. But it is also and especially in these gaps that we meet God! For God is not a space-time Being, and the physical universe, though as His handiwork it may reveal Him, does not mediate God directly. I am glad my own children know me directly and not merely through the clothes I supply them with.

This would perhaps be enough argument to show that there are real gaps in which we can see God work. But there are two more things I should mention and they are more difficult. I refer to prophecy and miracle.

Prophecy, Miracles, and Life

I am aware that prophesying is now said to be forthtelling rather than foretelling. This is a handy cliché. But a forthtelling of what? What is the difference between the prophet of Judah and the oracle of Delphi? Let Isaiah 41:26 answer. God claims to foretell the future in a way the heathen prophets cannot do, and thereby God's prophet is accredited. This is a test of a prophet as given in Deuteronomy 18:22. The prophets

of Israel repeatedly foretold future events on a distant horizon and in amazing detail. Modernistic Bible students are concerned to evade this phenomenon. This they do by questioning the translation or by denying the date of the writing of the prediction. No true prediction is allowed to stand. To enter this argument would require a semester's course. Dr. Allis adverts to the question in his *Unity of Isaiah* (1, p. 38). For our purposes it is enough here to insist that a peculiar group of men in a peculiar ancient nation had this inexplicable forevision. How could it be? Not by natural means. It cannot be duplicated in a laboratory. It is a gap in scientific knowledge. But it demands explanation. Micaiah insisted that the only explanation is that he spoke as a spirit in touch with the spirit world of God (I Kings 22:28). Christ re-echoes the claim (John 14:2a). How can this be? It cannot be in a merely physical-chemical world. But it has occurred. Our conclusion is that the idea that all reality is delineated by physical-chemical relations is pitifully fallacious. The fact of prophecy is a revelation from God.

The same applies to miracle. Miracles are widely denied. This is not new. People were very sceptical of them in Jesus' own day (John 3:32). Nevertheless their reality convinced many of the most hard-headed and hard-hearted, from Paul the Pharisee to Sergius Paulus, the Roman deputy of Cyprus. We can here agree that they have occurred.

Our problem, more likely, is to define them. If real, they were, of course, events in the physical world. I pass over the so-called miracle of conversion, which although real and of infinite importance is not always so visible and definite an evidence. I refer to those occurrences of the seemingly impossible in the natural world. What happened when Christ walked upon the water? Did Christ and Peter simply put to use certain unusual natural laws which would enable us all so to walk if we knew them? If natural law buoyed up Christ and Peter, why did Peter sink when faith failed him? Or take the multiplication of the loaves. Was this so wonderful? At least it hasn't happened since! Of course, wheat grows every day. But loaves don't multiply even in years of time. Nor does water change to wine by any recondite law of nature. No nuclear reactor operated in Cana to transmute elements. No, in Cana there was a power on that wedding day transcending the force of hydrogen fusion.

A miracle is an event in the external world impossible of accomplishment by man or through God's ordinary methods of working in nature, but brought about by the immediate activity of God. In short, the area of miracle is another area of gaps in the physical-chemical structure of things. But here again we meet God. The miraculous facts of the Bible are not to be explained away as due to ancient ignorance of scientific truths.

Some indeed have objected to miracles because they are the immediate activity of God. What kind of creator needs to patch up his work, they ask. The answer is not found in the weakness of the Creator, but in the declension of man. Miracles and prophecy are redemptive. Even Jesus did not do miracles just for fun. He did them "That ye may know that the Son of Man hath power on earth to forgive sins" (Mark 6:10). God has torn a great gap in the fabric of this universe that He might show Himself to man in fatherly redemptive disclosure. The God of this gap I believe in. A further question: was creation a miracle, or was it by natural process? We cannot know by intuition. God could have created either way. It is a question of fact. Creation could have been instantaneous. But the Bible says that some of God's acts in forming the world were of the nature of miracle, and some were of the nature of second causes. God is in both, but we must not deny either. Hearn asks, "Why shudder, then, at the idea that processes were involved in bringing Adam into existence?" (2, p. 42) The answer is that the suggestion appears to contradict, not theistic theory, but Biblical expression. The creation of man is presented in the Bible as one of those gaps not to be explained by natural law.

Is there another gap? There certainly is. It is in man himself. As I have said, man is also a spirit. As such, he may be studied physiologically or even psychologically, but can never be defined by such means. His spirit nature eludes scientific definition. Can his bodily nature as a living being be explained in materialistic terms?

And how about the plant and animal worlds? Does life include a gap in the physical-chemical world? I am inclined to think so. Animal states of consciousness seem to have such affinities with our own that I feel that here, too, is such a gap. I wish scientists and Christian scientists would not so quickly assume that this gap is unreal. Much can still be said for vitalism, it appears to me. But in any case, the Christian cannot afford to deny that the temporal universe is full of "gaps" of various kinds not tractable to the scientific approach. God is revealed in his handiwork. Life is partly a physical-chemical process. But it is not to be assumed that life is purely physical-chemical. Human life, at least, is not.

Conclusion

The expression, "God of the Gaps," contains a real truth. It is erroneous if it is taken to mean that God is not immanent in natural law but is only to be observed in mysteries unexplained by law. No significant Christian group has believed this view. It is true, however, if it be taken to emphasize that God is not only immanent in natural law but also is active in the numerous phenomena associated with the supernatural and the spiritual. There are gaps in a physical-chemical explanation of this world, and there always will be. Because science has learned many marvelous secrets of nature, it cannot be concluded that it can explain all phenomena. Meaning, soul, spirits, and life are subjects incapable of physical-chemical explanation or formation.

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Religion and the Limits of Science

CARL S. KEENER*

Science is a human mental creation. It is limited by the source of its data, the logical operations which analyze them, and its incomplete model of the universe. It can never yield an answer to the basic question of human existence, "Why are we here?" Religion, however, deals with that question and provides a metaphysical framework to clarify the normative and teleological areas of man's existence. Christianity needs creative thinkers who are bridge-builders mastering the insights from various disciplines and bringing them to bear on problems, like evolutionary theory, faced by the Christian community.

The purpose of this paper is to examine candidly some of the inherent weaknesses of science and to suggest how religion meets these limitations and goes beyond them. I do not aim to be definitive and above all, I do not mean to imply that those who disagree are, by definition, wrong.

Modern science began when men crashed through the stuffy dogmatism of the Medieval scholastics who in turn had tried to stand on the shoulders of ancient Greek and Roman giants, such as Plato, Aristotle, and Galen. The scientific knowledge explosion goes back to the time when Renaissance intellectuals discovered that looking at Nature could be more exciting than merely reading Aristotle. Since then we have had a tremendous knowledge explosion which today is virtually getting out of hand.

Glass and others have stated that scientific knowledge is growing so fast that the amount of significant knowledge doubles approximately every 10 to 15 years (3). During the past 200 years the number of scientific journals has been doubling every 15 years until at present we have roughly 100,000 journals in science alone (6). Even though this unmanageable growth of knowledge has numerous ill side-effects which I shall not go into here, one result of this growth is to make the public aware of the large scope and high status of science. One reason for this is that 90 percent of all scientists who ever lived are living today (7, p. 96).

While some persons may regard science as a sacred cow, most people probably see it as some large insatiable monster blasting away at all the bedrocks of ingrown security and creedalism. The scientist is seen as a precision automaton in a white coat or a stoop-shouldered fuddy-duddy in baggy pants with a forgetful mind. While these caricatures are worth their usual quota of jokes, they do not illuminate the task and scope of science.

Despite the impossibility of formulating *the* definition of science, I personally like the one offered by Simpson: "Science is an exploration of the material universe that seeks natural, orderly relationships among observed phenomena and that is self-testing" (11). Science, therefore, is concerned with more than description and fact-finding. It moves beyond these levels and is concerned with relationships and generalizations that supposedly exist between and among the observed phenomena. It is concerned with the literally material and objectively physical aspects of our universe; insofar as our discussions relate themselves to the nonmaterial our treatments are metaphysical. Science must also be a self-testing cybernetic system in which generalizations and principles are always more or less oriented toward the material universe.

Into what kind of world did Newton, Galileo, Darwin, Einstein, Heisenberg and others lead us? The world shaped by these men's minds is a world of excitement, sweep, and incompleteness. To discover things for oneself, to listen to first-rate minds clash over an idea, to partake in the thrill of helping push back the frontiers of knowledge can be fun and loaded with excitement. Science is sweeping in its scope for it tackles many problems, utilizes many approaches and techniques, and has far reaching effects piercing into virtually every nook and cranny of our existence. I choose to expand a bit in the least understood facet of science, its limitations or incompleteness.

Limitations of Science

A widespread idea is that science is precise and exact; indeed, about as perfect as anything could be. Many people still feel that science is perfect and the most complete and certain of any human mental creation. Philosophy, theology, and metaphysics might be fuzzy, marred by imprecisions, and scarred by endless and trivial debates such as the number of angels that can dance on a needle point. But science never! It does not get sidetracked by such vagaries, but is straightforward, precise and certain. But wait! While it once appeared as though our descriptions of nature could be complete, orderly and precise, we are not at all cocksure now. Scientists and philosophers are reappraising the nature of science; they now remark that while

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science is good and can do much, it is by no means perfect. But this does not make science any less desirable, for as Warren Weaver maintains, who wants to marry a woman who is totally predictable and completely perfect? (12)

Just in what way is science imperfect and incomplete? First, science is essentially a statistical study of the natural world about us. This statement points to several problems. Scientists work with empirical data based on observations which are then reduced to factual propositions. Now defining a fact is not easy as Hanson points out (5, p. 31). Yet our scientific laws are based on these so-called facts, i.e., the observations we make of certain natural phenomena. Because we cannot observe and analyze everything, we study samples. The meticulous analysis of our sample is then supposed to tell us about all the other unmeasured and unobserved members of the set from which our sample was drawn.

Not only do we sample but we also perform measurements of various kinds. No measurement is ever completely accurate simply because our gadgets cannot perform the measurements with an absolute degree of refinement. Therefore, because our measurements lack perfect accuracy, and because ideas or laws derived from a study of a sample may not reflect the true characteristics of an entire population, we must conclude that perfect accuracy either of a conclusion about a whole population or of a prediction based on our past analyses is impossible of attainment. For these and other reasons, Scriven would say that the only thing we can now say for the so-called laws of nature, e.g., the law of gravity, is that they are inaccurate. Scriven has ". . . called inaccuracy the key property of physical laws because its almost universal presence is a kind of unadmitted shocking fact like the Emperor's nakedness, and needs to be pointed out if we are to get a true picture of the role of laws" (9, p. 104). Gordon H. Clark would go even further; he would say that the laws of nature are false, i.e., they are a possible approximation of the truth, but never the absolute and final truth (2, p. 209). And Hanson adds, ". . . there is no such thing as *the* law of inertia, *the* law of force, *the* law of gravitation" (5, p. 94).

Because we choose our laws instead of discovering them, the laws of nature may be as illusory as the universal ether. Since our chosen laws or statements are approximations, they can never be true in an absolute sense. Confusion arises when we take our view of nature for the final (correct) one. We assume too much when we say we think God's thoughts after Him. We approximate the truth, but we never arrive at it—our "laws" are incomplete.

Secondly, our formulations of natural phenomena are seemingly dominated by logical operations. Yet in these operations inherent defects are apparent. By its construction, deductive logic cannot create new truths because all of the residual information is contained in the premisses. The work of the brilliant metamathema-tician, Kurt Gödel, showed that any deductive logical system is essentially incomplete, for it is possible to ask questions which cannot be fully answered within the axiomatic framework of that system. The question of whether or not there is an inner logical flaw in a given deductive system is a question which is simply unanswerable. Percy Bridgman states that " . . . logical certainty is unobtainable and in hoping for it we are deceived by a mirage of our own creation" (1, p. 481).

If deductive logic is powerless to create new truths, inductive logic is powerless to absolutize the truths it can create, for these truths are of an inferential kind. They are at best probability statements. The problem here is to justify our inductive inferences. Either we must postulate an a priori, in which case our logic winds up being a philosophical assertion, or else we are forced into an endless round of question-begging statistical statements. Let me illustrate one facet of the problem. If we would pick out a piece of wire from a box and find out that it conducts a current we would confidently predict that other similar pieces of wire would also conduct electricity. But suppose we would go to Mars, find a native, and learn that he calls himself Wormaldia. Are we then willing to predict that all Martians are called Wormaldia? What is it that makes us sure in one case and hesitant in the other? Logic, as Goodman asserts, is in a state of confusion (4).

To what does all this lead? No matter how thoroughly a scientist tries to describe the physical world in terms of information derived from sense experience, he can never be sure that he has accurately and completely mapped it. Analysis of our universe appears to be an unending task. Simpson puts it succinctly: "It has become increasingly evident in our century that science is uncertain in its very nature . . . Indeed one thing of which scientists can be quite certain is that they will not achieve a *complete* solution of any worthwhile problem" (10, p. 5).

The final limitation is the biggest one of all. Science does not furnish us with any really ultimate, satisfying, or certain explanation of anything. Except on trivial levels, scientists do not seem to be unanimous on any basic question. Two illustrations must suffice to show this point. Philosophers of science do not agree on the relationships between our factual observations and theoretical formulations. Some with Kemeny consider that the main task of the scientist is to gather facts. Out of a vast assemblage of facts we then formulate our theories. Others like Popper say that a scientist gets his theories by sudden flashes of creative insight. His task then is to try to disprove his "guesses" via empirical tests. The question of how scientists get their theories is partially answered by both the inductive and the hypothetico-deductive approach.

Another difficulty scientists face is the problem of the complexity of their theoretical formulations. If several theories attempt to explain similar phenomena, most scientists are inclined to choose the simplest on the assumption that a good law of nature is a simple one. But how can we say that one law is simpler than another?

Nobody knows just what constitutes a good test for simplicity in science. Goodman (4) emphatically asserts that the problem of simplicity needs a lot of hard work and that " . . . the problem is not only one of the most important in the philosophy of science but also one of the newest to be tackled seriously."

We would like to be certain about our pronouncements of natural phenomena, but about all that remains is uncertainty and incompleteness. It is no wonder, as Anne Roe observed, that scientists must tolerate a high degree of frustration in their work (10). Popper looks to religion and philosophy for certainty, firmness of faith, and absoluteness of conviction, but not to science:

> . . . the old scientific ideal of episteme—of absolutely certain, demonstrable knowledge—has proved to be an idol. The demand for scientific objectivity makes it inevitable that every scientific statement must remain *tentative forever.* It may indeed be corroborated, but every corroboration is relative to other statements which, again, are tentative. Only in our subjective experiences of conviction, in our subjective faith, can we be 'absolutely certain' (8, p. 280).

Whatever the public may think of science, scientists see it as an exciting and sweeping undertaking, yet one which will never yield true and final answers to any worthwhile problem. Science can give us an imperfect (i.e., essentially incomplete) model of the world. It can attempt to explain how things work, but it cannot tell us the answer to the deep cry of human existence, "Why are we here?"

Function of Religion

The function of religion as an ordered metaphysical framework is to clarify the normative and teleological areas of man's existence. Religion helps man to find meaning and beauty in life as against the mood so well reflected by Holderlin's words, "To us has been no resting place. Mortal men plunge and fall, like water tossed from rock, down into the unknown forever." Religion attempts to find a rationale for existence by answering three basic questions concerning man's humanness: Why am I here? What does it mean to exist? Where am I going? The Christian religion in terms of God's revelation adds a fourth: What does God think of me? Christianity does not see a god of cyclic recurrence in a world of total immanence. Nor does it see an eternal world full of gods. But it meets God in history in the person of Jesus Christ.

The concept of "religious truth" implies a finality and an absoluteness in that religious truths involve neither objective tests nor corrections. Scientific truths are thus quite special; they imply nothing eternal and final but establish only a relative degree of confidence by means of adequate empirical corroborative tests which aim to falsify the original hypothesis. Thus scientific truths are realistically and directly related to the material universe, whereas religious truths are not so related. It is helpful to distinguish between different kinds of truth by the methods used for establishing truth. Because religious truths speak to the problems of man's existence, they become qualitatively more important for mankind than the probabilistic truths of science, since these can never be absolute and final. Thus one function of religion is to go beyond science and touch vital areas of man's life which are closed to empirical methods.

Individuals must choose the options of Christianity or else reject them. They cannot be forced willy-nilly on anyone. If a person rejects the claims of Christianity, that must be his decision and his alone. But he does not decide because science tells him it is the intellectually respectable thing to do. I am a Christian *now* because the claims of Christianity make sense to me. It matters terribly for me to know what the God I worship thinks of me. And I see the answer at Calvary in Christ who can heal the broken heart and give a meaningful existence to a sin-shattered history. But I cannot prove this. I can only witness—which is all the Master asks us to do.

A Challenge

It seems to me that college campuses have enough critics. We need more than critics. We need creative thinkers who are willing to engage their intellects in an analysis of the issues that confront us. Just as a biological population will die out unless it can meet the pressures of a changing environment, so Christianity also will loose its influence unless it can adapt to a changing cultural and social environment. We therefore need Christian scholars with a highly disciplined intellect and a liberalized mind who are eager to tackle the problems beset by an ever-changing environment. We need thinkers who will provide us with intellectual mutations—fresh and perhaps fantastic ideas. We need boundless imagination in many fields, for as Disraeli once wrote, " . . . prevailing opinions are generally the opinions of the generation that is passing." We must have teachers and thinkers who realize that the transmission of knowledge involves selection and ordering of materials. All of this calls for a high degree of creativity, particularly if the cultural gap between the humanities and the sciences is to be bridged.

Not only should we master our own fields of interest, but we should become bridge-builders, learning what men are saying in other disciplines besides our own. This is the only way to avoid the cultural psychosis which so plagues our generation. Creative conversation can arise only by bridge-building, by scholars reacting vigorously with the insights afforded by another field. For example, specialists in religion must converse with the sciences, with psychology, and with art, for these and other disciplines have insights that will help not only to understand better the pressures of our times but also to serve as a feedback to religion, helping to sharpen its focus on the critical issues of the 1960's.

To illustrate, evolutionary theories pose one of the continual challenges for the evangelical thinker. I am not sure why Christians exhibit so much emotion when evolution is discussed. At any rate, I think it is time for Christians who ought to know better to stop writing nonsense about evolution and treat it as they would any

other theoretical formulation in science—an explanation of natural phenomena that is neither final nor absolute. It is not sufficient simply to reject evolution. What must be done is to go beyond mere feelings of conviction about one's perceptions to the formulation of an assertion which contradicts the empirical premisses of evolutionary mechanics and which includes instructions for testing the new formulation in an empirical manner. We need Christian scholars who will master the literature of evolutionary mechanics, do some research in evolutionary theory, and then let their insights speak to the hermeneutical problems in Genesis. This is only one field; there are many others.

Conclusion

We have indicated that science is an engaging human mental creation attempting to explore the natural universe, which is held to be orderly and self-testing. However, it is limited in what it can accomplish; it can never arrive at any final and absolute truths. Weaver's comments sum up my ideas:

> To those who expect science to be perfect, who expect it to be irresistibly all-powerful, who think of it as being infinitely precise and logically impeccable, who see science marching relentlessly forward 'explaining' one thing after another in cold and mechanical terms, who even feel that science squeezes the beauty and mystery out of all that it touches—to all such persons it is necessary to say: "My friends you are mistaken" (12).

Religion furnishes us with the necessary absolutes to grant meaning to one's existence. The Christian accepts God's revelation as normative for his life. Acceptance of such options is not subject to any demonstrable proof of superiority, but these options become meaningful only as they speak to the real problems of man's existence.

Finally, the essential task of the Christian scholar is one of bridge-building, of mastering the insights afforded by various disciplines and then bringing these insights to bear on problems faced by the Christian community. For the dedicated and committed Christian, I think exciting days lie ahead of us in terms of creative bridge-building—bridge-building in terms of the fulfilled life that is found only on the other side of losing life.

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Job and the Ostrich: A Case Study in Biblical Accuracy

GEORGE F. HOWE*

Critics have questioned the accuracy of statements about the ostrich in Job 39. A study of ostrich life history, mating habits, nesting behavior, and care of the young reveals that the Bible account is completely reliable in every detail.

God made some precise statements concerning the habits of the ostrich when He answered Job:

The wings of the ostrich wave proudly:
But are they the pinions and plumage of love?

For she leaveth her eggs on the earth,
And warmeth them in the dust,

And forgetteth that the foot may crush them,
Or that the wild beast may trample them.

She dealeth hardly with her young ones, as if they were not hers:
Though her labor be in vain, she is without fear:

Because God hath deprived her of wisdom,
Neither hath he imparted to her understanding.

What time she lifteth up herself on high,
She scorneth the horse and his rider (Job 39:13-18, ASV).

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Contradictions of Scripture

Certain ornithologists and anthropologists have denied the scientific accuracy of verses 14-16 of this passage. Alice Parmelee has stated that Job is not fair to the ostriches when he judges their behavior by human standards and accuses them of treating their young cruelly:

> . . . As parents they are outstanding. "Cruel, like the ostriches in the wilderness" (Lamentations 4:3) is as mistaken a statement of their paternal behavior as is the statement that they hide their heads in sand to avoid danger. (11, pp. 204 and 207).

She accepts the validity of some portions of the narrative, but rejects the statement concerning ostrich cruelty and attempts to prove the point by a subsequent discussion of ostrich nesting habits.

Although Schreiner accepts the accuracy of the Bible account, he believes that Job 39:14 refers only to an

aberrant or abnormal phase of the ostrich story and is not representative (14, p .291). Without definitely mentioning Job's errors, Beebe (2, p. 212) believes this passage is incorrect. Laufer discusses the Job citation and assumes that the Bible account is erroneous: "The observation made in the book of Job that the ostrich treats her offspring harshly does not conform with the real facts" (8, p. 12).

In an attempt to clarify the basis of these criticisms and to establish the validity of Job 39:13-18, an analysis of the ostrich life history has been made. Since little work is presently being done with this bird, citations come mainly from the writings of zoologists and agriculturalists of a previous generation. Theological publications are consulted concerning Biblical aspects of the problem.

Ostrich Folly

The Scripture states (Job 39:17) that the ostrich has been deprived of wisdom and understanding. Since these words were written to laymen of all generations, no apologies need be made for their simplicity and teleological character. All that is necessary to prove their truth is to demonstrate that the ostrich does in some cases act in an unwise manner.

The ostrich in Africa consumes prickley pear to its own peril (9, p. 54). In eating such fruits, the head, neck, throat, and eyes of the ostrich become lined with the fruit-thorns.

The foolish running of the ostrich frequently leads to broken legs. "But his mad scamper will almost probably end a few miles off with a tumble into a wire fence, and a broken leg" (9, p. 107). Martin summarizes this apparent lack of wisdom on the part of the ostrich by stating that

> —to revert again to the Book of Job—their character could not possibly have been more perfectly summed up than it is in the words: "because God hath deprived her of wisdom, neither hath He imparted to her understanding" (9, p. 146).

While describing these birds in an historical novel, Robinson comments on their apparent lack of wisdom; they have the "brains of a maggot and strength of a mule" (13, p. 1). Pickrell mentions their violent reaction to dogs, which frequently leads to their death (12, p. 406), and Schreiner (14) tells of cock fights that also frequently prove fatal. He attributes the preponderance of females over males to the cockfights. The male birds kick at each other through wire fences, thus breaking legs. He also says that cocks frequently die when, from behind their fences, they attempt to attack people.

The adult birds seem to manifest a "will to die." Hayden (7) observes that when illness strikes, the bird makes up its mind to die and seems to resolutely carry out that intention. Martin (9, p. 54) mentions this "will to die" in birds whose necks have been pierced by cactus needles. Her efforts to force-feed such injured birds were always futile.

Another ostrich mentioned by Martin stuck its head through the mesh of a fence to eat a quince. After swallowing the quince, the bird's neck would no longer pull back through the fence. She describes his plight thus:

> . . . there was no one at hand to help, and the more he tugged and jumped in the frenzied manner of ostriches when held by the head, the more firmly he stuck. And he was found at last, with his neck broken, and his head, to all intents and purposes, pulled off (9, p. 150).

While discussing the apparently foolish behavior of the birds, the "head in the sand" myth should be mentioned. The Job account, of course, does not contain this erroneous idea. Although strictly a fable, this notion may have its basis in observable fact, as Beebe explains:

> Lastly, the fable of hiding their heads in the sand to avoid detection has some foundation in their habit of crouching as closely as possible to the ground, when they think they are observed; a great eight-foot creature thus transforming itself into an inconspicuous ant hill, or mound of earth . . . (2, p. 212).

The ostrich's lack of wisdom is further demonstrated by items it snatches and swallows unexpectedly. Martin speaks of some ostriches in a zoo that died of poisoning from pennies fed to them (9, p. 155). She also recalls that one ostrich tried to swallow her earring, while yet another bird swallowed a farm manager's lighted pipe and was none the worse for wear (9, p. 153). In his story Robinson tells of ostriches swallowing such bizarre items as scarf pins, hat pins, lighted cigars, and chatelaine watches (13, p. 66). Robinson also mentions birds pulling the handkerchief from the cook's rear pocket and one particular ostrich which drank coffee (13, p. 66).

On the basis of these observations, the Bible's statement that ostriches have been deprived of wisdom is fully vindicated.

Speed and Ferocity

Job 38:18 refers to the speed of the adult birds and to their ability to cope with mounted hunters. An analysis of the literature confirms these statements and demonstrates the ferocity of the adult birds.

Ostriches are a great hazard to horseback riders. While riding, Schreiner (14) had a hole kicked through his riding breeches at the knee by an ostrich. He also knew of a boy who was kicked out of the saddle by one of these birds. Schreiner tells of their ability to leap five-foot fences and to swim in rivers. Martin tells of an ostrich that chased and kicked a horse and rider (9, p. 113), and Crandall (3) says an ostrich can easily outdistance the swiftest horse.

Citations from ostrich literature also bear out the Biblical indication (Lamentations 4:3) that the ostrich can be a ferocious bird. Ostrich farmers used a "bush" or stick to control the birds. Douglass refers to these bushes, their use, and the ferocity of the ostrich:

> If men are allowed to enter the camps with bad bushes, and the birds get fighting with them, or, worse still, if they go with none at all, and then dodge about, the quietest bird will in a week or two be made perfectly rampant. But if good bushes are taken the bird gets to know that he can do nothing, and seldom attempts any nonsense (5, p. 100).

Douglass also mentions that the birds become ferocious upon hearing the squeak of the chicks in

the shell (5, pp. 109-110).

Martin tells an amusing story of a newcomer to the Karroo of South Africa who was skeptical of the prowess of ostriches but soon found that they are to be respected. An ostrich held him prisoner for hours in the sun atop a hot ironstone boulder (9, p. 114).

Pickrell (12, p. 405) also confirms the violent nature of the ostrich. A fatal encounter of a man with an ostrich is described by Robinson in his historical novel (13, pp. 142 and 242). The adult birds establish definite territorial boundaries and will defend these boundaries ferociously (9, p. 112).

Mating Habits

Conflict in the literature arises over whether the cock is naturally polygamous or monogamous. It is believed that the birds are naturally monogamous. Whatever their natural inclinations may be, however, the cock frequently finds himself with more than one hen. Mosenthal stresses their polygamous nature:

> Each cock-bird associates with three or four hens, all of which lay their eggs in one large nest scooped out in the sand and relieve each other by turns at incubation (10, p. 41).

Douglass (5, p. 120) insists that the monogamous condition is the most favorable for the production of young birds since polygamy results in fighting and broken eggs. Schreiner maintains that the cocks are actually monogamous and that polygamy is in a sense forced upon them due to the habits of the females and the ratio of males to females. Schreiner's statement confirms Job 39:14-16 about the laying of eggs in sand and female cruelty:

> Such hens generally attach themselves to the cock whose attentions they have attracted (often by intruding into his nest and remaining in the immediate neighborhood), and lay regularly at any rate for a time, in his nest. If they cannot lay in the nest because it is already occupied, they will not go at once to another nest, but will deposit their eggs just outside the nest; but if there are many hens to one nest so much bother ensues that some of them betake themselves to other nests. Others lay in any nest indiscriminately, and are a great nuisance to the farmer. Some keep to one nest until they have laid about a sitting, and then begin to brood; but in such hens the brooding fit does not generally last long, as they can only get on the nest occasionally, and are much disturbed by other hens (14, p. 291).

Schreiner then misrepresents the Bible by stating that it teaches that the sun's heat hatches the eggs. The Bible does not imply that the sand or the heat of the sand hatches the eggs, unaided by the hens. Scripture simply asserts that the ostrich lays its eggs in the sand and then warms them in the dust—an extremely accurate description of their sand nests and brooding habits! Barnes attests to the fact that the Hebrew text does not carry the idea of the sun's heat hatching the eggs (1, p. 229). To the contrary, the evidence which Schreiner and Douglass present argues clearly for Biblical accuracy. The eggs laid outside the nest and the confusion of the polygamous nest confirm Job 39:14-16.

Nesting Habits

Certain additional aspects of ostrich nesting habits bear out the truth of Job 39:14-16. Anxious habits of ostriches during egg laying endanger the eggs themselves:

> One occupies the nest, the other broody hens lying or standing about close at hand, thus betraying its presence. When she arises, whichever of the other hens is quickest, perhaps a laying hen, takes her place. Under these conditions a great many eggs are broken both before sitting begins and afterwards. The hens do not sit by turns; there is no plan in their proceedings at all (14, p. 293).
>
> The laying of eggs goes on from day to day by some of the hens even after others have ceased. The consequence of this is that the same lot of eggs are never in the nest together for more than a few days at a time. (This I have frequently proved by marking the eggs.) Some are rolled out, new ones are laid, or old ones are rolled in, for the nest becomes trampled almost out of shape by the traffic about it. Thus there are no chicks; the eggs become broken or addled, and the nest is eventually abandoned. Under such conditions it not infrequently happens that the cock (and perhaps some of the hens) abandons the nest in disgust before the full period of incubation is completed (14, p. 293).

Gibson (6, p. 215) reaffirms the dropping of eggs in the sand outside the nest. Douglass (5, p. 122) attributes such scattered eggs to young and unpaired hens.

Both birds participate in the care of the eggs. Martin emphasizes the faithfulness of the cock in nesting (9, p. 116), and Schreiner (14), Wetzstein (15), Crandall (3), and Mosenthal (10) each stress the role of the male in incubating the eggs. In fact, Pickrell (12) asserts that the cock helps the female become oriented to the nest. At first the female lays eggs on the ground, but the male will roll a few of them into the nest. After the cock has done this, the hen will then lay her others in the nest.

In justice to the ostrich, it has been demonstrated that in some respects they are faithful parents, defending their nests, and even cooling the eggs. But there is another side to their nesting behavior—a side which underscores the natural history of Job (an apparent cruelty and lack of concern for the eggs and young.)

The hens may desert the nest if they are overfed (9, p. 121). The impatience of these birds jeopardizes the nest as Douglass observes:

> Some birds get very impatient, especially if there are many days between the hatching of the first and the last chick, and are apt to leave the nest before all are hatched . . . (5, p. 108).

Hens sometimes forget their own nest and invade the nests of others (1, p. 229). Because of this, Barnes mentions, the bird has been used in Arabic fables as being foolish and not loving its own young:

> Damir, an Arabic writer, says, "When the ostrich goes forth from her nest, that she may find food, if she finds the egg of another ostrich, she sits on that and forgets her own . . . " (1, p. 229).

Martin tells of a cock that trampled his own nest after one of the hens was removed to stop the fighting (9, p. 128), and Delitzsch (4, pp. 338-339) reports that wild ostriches are known to trample their nests if the nests are disturbed by humans.

The nest is always in danger of attack from jackals, wildcats, and other animals (4). Martin (9) reports that whiteneck crows drop stones which break the eggs, and later the bird descends to eat the broken egg.

She also gives an account of jackals preying upon the eggs.

During the hatching stage the chicks are in danger because of the erratic behavior of the parents. The hatching period lasts about 4 days, some of the eggs hatching earlier than others. Pickrell (12) recommends that after hatching begins, unhatched eggs should be removed to an incubator, because they are liable to injury from the parents.

As the Bible has indicated, the adults are sometimes very incompetent in care of the chicks. Martin (9, p. 119) tells of one overzealous cock that literally ran his chicks to death, taking them across the veldt on a continual search for fresher pastures. One hen on the Martin farm that had faithfully reared several broods of chicks lost one batch as follows:

> . . . one day the idiotic ostrich-nature asserted itself; she took a sudden and senseless fright—probably at nothing —lost her wits, bolted right away, leaving the chicks to get dispersed about the veldt, where only a few were found; and was herself never heard of again (9, p. 137).

Older birds are spiteful of chicks that are not their own. Parents know their own chicks and will kick and peck at those of other nests (14).

Conclusion

It is hoped that this review of ostrich habits, reproduction, and care of young will demonstrate that the Biblical record (while making no claim at being exhaustive) is accurate in each detail of natural history which it contains. It is noteworthy that a book written thousands of years before the rise of experimental biology has such amazing authenticity. This veracity of Job 39 should challenge serious consideration of all the words in this ancient book.

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God's World: Fifth Biennial Joint Meeting of the ETS and the ASA

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The fifth joint meeting of the Evangelical Theological Society and the American Scientific Affiliation was held June 19-21, 1963, at Asbury College and Theological Seminary, Wilmore, Kentucky. From the opening welcome by Dr. Cecil B. Hamann to the closing paper by Dr. John R. Howitt, the attendants were continually made aware of the theme of the convention, "God's World."

Asbury College is a Christian school located in a beautiful setting in rural Kentucky. The college, through its staff members and administrative personnel, went all out to make each person feel at home. A special vote of thanks needs to be given to Dr. Johnson, its president, and Dr. Hamann, chairman of the Science Division.

There is great value in having theologians and scientists get together to discuss their common problems. This was evidenced again at the meeting in Kentucky. Many of those present think that this type of meeting should continue. In fact, only with the help of theologians can the ASA adequately carry on its task.

The following resolution was drawn up by the Executive Committee of the ETS, December 27, 1962:

> The Executive Committee of the Evangelical Theological Society expresses its regret at the suggestion that the joint meetings of ETS and ASA are held too frequently. The ETS has felt these meetings to be profitable, and would be happy to see them continued on a biennial basis. It is felt by the Society that the meetings have been of mutual benefit to both groups. The ETS, on its part, has greatly appreciated the opportunity provided by these meetings for evangelical theologians to follow the progress of recent scientific thought. It is the desire of the Society that these meetings be continued with the hope that they might take on an even more meaningful character.

Some persons present were disappointed that very few officers of the sponsoring organizations were in

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attendance. It is hoped that this difficulty can be overcome at the next joint biennial meeting. There was a meeting of minds from different viewpoints with a resultant discussion which was quite stimulating. May God grant that these meetings may continue in the future.

The following abstracts of papers presented at the conference give but a small glimpse into the heart of the program. They were collected through the generous cooperation of Dr. William J. Tinkle, program chairman, and the authors.

VALUES AND LIMITATION OF NATURAL THEOLOGY

Natural theology is the witness which we receive about God by looking at nature. We see that the world is very intricate, it is very large, the minute parts of plants and animals are nicely adjusted to each other, and there is much harmony in the world. A world which suggests purpose and design must have had a Designer.

Job and the Psalms contain a great deal of natural theology. Not only the heavens declare the glory of God, but also the mighty beasts and even storms. Paul told the people at Lystra that God witnessed to all people by giving them rain and fruitful seasons (Acts 14:17). He writes also that God's eternal power is clearly seen in the things which he has made, so that they who do not recognize God are without excuse (Romans 1:20).

It seems, therefore, that God's revealing of Himself in nature is very inclusive, but it also is only preliminary. If one should stop with these observations, he might become a deist. Furthermore, such a view of Deity is not very exacting in the requirements it makes for one's loyalty to God.

The heart of God's revelation was the definite and personal act of sending His own Son into the world. This act clarified the fact that while God has power and knowledge, His true nature is personal, a fact which we may overlook in the study of nature. A recognition of God's love in sending His Son makes man responsible for accepting this Son as Savior and Lord.

G. Douglas Young, Dean
Trinity Theological Seminary

PRESUPPOSITIONS AND ASSUMPTIONS OF SCIENCE

Forty years ago very little was said about scientists starting with ideas which they assumed to be correct. Even now some scientists do not recognize that assumptions have been made, while others see clearly that certain ideas are taken to be self-evident and need no proof.

A scientist starts with a conviction that the material world has an actual existence. On the other hand, many philosophers have doubted its reality. Scientists believe also that the human mind is able to observe correctly by means of the senses and to interpret sense data in such a way that correct conclusions are formulated. While it is true that false observations are made sometimes even by normal individuals, these are corrected by the use of instruments and by the checking of results by other scientists.

Faith in other workers is manifested by trusting the labels on bottles and by trusting that the image of an object under a microscope truly represents that object, although a lens requires special grinding to keep it from distorting; for instance, chromatic aberration surrounds the object with a ring of rainbow colors.

One of the deepest assumptions is that the world is regular; if certain causes give certain results today, they will do the same tomorrow. This conviction is based only partly upon observation, for it is manifestly impossible to observe events before they occur.

The more certain we are that our assumptions are true, the less we mention them. We certainly do not need to give them up because of their lack of proof, but we should admit that scientific principles are not on a pedestal of veracity, looking down upon other disciplines.

Robert Fischer, Prof of Chemistry
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FOLLOWING TRUTH WHEREVER IT LEADS

This title sounds very good, but it is understood in an interpreted sense. Truth does not actually do any leading. We follow people, and they may lead us rightly or may lead us astray.

As a young man, the author was at a camp where a path up a ravine crossed a stream a number of times; at these places stepping stones had been provided. Following the path at night, each camper trained his flashlight on these stones to ensure a safe step. The author was wearing boots and did not find it necessary to step on every stone, but behind him were boys shod with tennis shoes. If they followed his steps they were led astray, although he did not intend to mislead. It was necessary that they throw the light on each stepping stone for themselves.

A certain commentator has said that mankind is like a mountain climber half-way up a steep cliff. Religion urges him to make an upward spurt, but he can not see his way and is likely to fall. He had better hold on to a rock until science finds a safe way to the top. This plan might lead to starvation.

A better figure is of the climber equipped with a walkie-talkie and a friend at a distance of a few rods with similar equipment. The friend can see that the way to the left leads to a sheer vertical cliff, but he informs the climber that if he takes the right climb he can reach the summit in safety. Our Friend is Christ, who reveals the way to go. The way to follow truth is to follow Him who said, "I am the way, the truth, and the life."

Allan A. MacRae, President
Faith Theological Seminary

THE IMPORTANCE OF CREATION STUDY

The teachings of Scripture form a unit. Creation, the fall, redemption, and eternal life are all linked together. Man was created perfect, fell into sin, and needs a Redeemer from that sin. The doctrine of creation is mentioned repeatedly in Scripture. There are over 65 passages in the Old and New Testaments which refer to creation. Some go into great detail; others are general, but even these are written against the background of Genesis 1 and 2. We owe God honor, worship, and obedience because He created us.

The doctrine of Creation is intimately related to the supernaturalism of the Bible. The Bible proclaims an all-powerful God who has created every material thing and who has established all the natural laws which govern the universe. This God is a personal God. He is both immanent and transcendent. The scientist does not deal with the supernatural. He has deliberately limited himself to the things which can be touched, felt, and handled. But science *per se* does not deny the reality of the supernatural. The doctrine of Creation postulates an absolute God. Ours is an age of relativity. Christians are committed to the idea of absolutes, at least so far as God is concerned.

The New Testament accepts the Genesis account literally and builds on it. Jesus refers to the Creation account in Matthew 19 and Mark 10. In Romans 5 and I Corinthians 15, St. Paul speaks of one Adam and one Christ. Here we have powerful testimony to the historicity of Adam. St. Paul refers to the details of man's creation in I Timothy 2 and I Corinthians 11.

The philosophy of evolution runs counter to Christianity. In the struggle for existence and the survival of the fittest there is no place for Christian love. Nazism was definitely Darwinian in its orientation. Christianity emphasizes the importance of the individual; evolution implies that society is more important than the individuals that make it up.

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THE WORLD AND GOD

It is sometimes alleged that the Biblical picture of the World is quite outmoded. The Bible's cosmology is said to involve a flat earth with subterranean waters and a solid firmament or sky through whose windows rain comes (see Hasting's *Encyclopedia of Religion and Ethics,* on "Hebrew Cosmology"). This view has been considered by the author in the *ETS Bulletin,* 5: 11-17, 1962.

The misconception arises from poor interpretation which literalizes poetic expressions and brings them together in a weird construction. The "ends of the earth" are the extremities of a particular area. The "four corners of the earth" are merely directions. "Waters under the earth" are seen from Deut. 4:18 to be lakes, rivers, and seas below the shore line; fish dwell there. The "firmament" is used for the air where birds fly (and is therefore not rigid) and also for the place of stars and the abode of God. "Windows of heaven" are figurative, as Mal. 3:10 shows. The Bible clearly states the obvious fact that rain comes from clouds. The "pillars of earth" are likewise a figure; God hangs the earth on nothing (Job 26:7).

Actually in New Testament times a common view was that the earth was round. A mosaic from Pompeii in the Museum in Naples shows the earth pictured as round in 79 A. D. A coin of Augustus does likewise. In 280 B. C. Eratosthenes calculated the circumference of the earth to within 10% (*Encyclopedia Brittanica* on "Eratosthenes"). Even heliocentrism preceded the Ptolemaic theories. Copernicus and Galileo rediscovered the ancients (and were not as persecuted as some would allege. In discussion, Dr. John W. Klotz pointed out that the Copernican theories were first published by a Lutheran in very good standing).

The weird cosmology sometimes attributed to the Bible more often comes from false parallels to Babylonian thought.

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COPERNICUS AND GALILEO

The heliocentric theory of the universe, which seems so logical to us, was lacking in objective support when espoused by Copernicus. The beautiful theoretical structure of Aristotle was far more closely related to observation than is generally conceded today. It was said that if the earth were moving, an object dropped from a great height would seem to move horizontally because the earth would move from under it. Another objection was the absence of stellar parallax; stars should appear in different positions as the earth moves through its orbit of 186 million miles. Observations provided no evidence whatsoever of stellar parallax for nearly 200 years; the only possible defense for Copernicus was the nonempirical assertion that the stars must be at such an enormous distance that parallax is negligible.

Galileo proved by experiment that a moving body continues to move until impeded, and thus the dictum of Aristotle that movement requires a mover was disproved. Galileo's observation of the movement of the satellites of Jupiter gave examples of movement which was not geocentric. The success of these men was not due to their empirical observations so much as to their simplifying of the astronomical system.

Being aware of the opposition, Copernicus delayed publication until the year of his death. Galileo was opposed, tried, and forced to recant; but this opposition arose, not in the Church, but among other scientists.

The popular idea that the Bible opposes the heliocentric theory and modern progress is not borne out by history. The geocentric theory rested upon philosophy rather than the Bible.

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UPHEAVAL IN THE NINETEENTH CENTURY

At the beginning of the nineteenth century there was widespread belief that the "kinds" mentioned in Genesis are the same as the "species" of the taxonomist and that the Bible states that these species cannot change. Had they read more carefully, they would have seen that the Genesis "kinds" may have been large categories which have split into smaller groups. But when Charles Darwin and others made observations which did not agree with their *idea* of scripture, the upheaval started.

J. B. Lamarck at first believed in fixity of species, but about 1800 he wrote of changes as a direct result of the environment and as a result of use and disuse. Darwin agreed with Lamarck, although he did not always claim to do so. Among the few followers of Lamarck today we find a group of Russian scientists.

The first twenty years of the nineteenth century were dominated by Baron Cuvier, Louis Agassiz, William Buckland and William Paley, whose science supported the Bible. This harmony was broken in 1830 by publication of the *Principles of Geology* by Sir Charles Lyell. Strangely enough, Lyell did not deny Cuvier's arguments but turned attention from them by claiming that all geologic forces in the past have acted at the same rate as at present.

Charles Darwin, after studying medicine and theology at Cambridge, spent five years in exploration and made observations which did not agree with extreme fixity of species. During the twenty years when he was adding to his data, materialism was at its height and there was drastic competition in manufacturing and trade. *The Origin of Species,* published in 1859, reflects these conditions. Darwin advocated change without limit and mentioned the Creator in only its first edition.

Irwin A. Wills, Chairman
Div. of Natural Sci., John Brown Univ.

THE SPIRIT OF COMPROMISE

Always there have been those among the community of saints who seek to ease tension by yielding up some of the distinctiveness of the Bible-founded separatism to which they were called. It is not surprising that the same spirit of compromise is moving strongly today among erstwhile Bible-centered Christians.

Biblical history records many instances of God's people compromising with evil, always to their own weakening. On the other hand, the heroes of faith, men like Elijah, Josiah, Jeremiah and David, firmly believed and acted upon the Word of God.

It is certain that no one can know anything of the prehistoric past or of the eschatological future with any certainty unless these matters are revealed by God. Science can measure, correlate, and evaluate *present processes* but has no way of knowing that these have always been the same or that they always will be the same. The *principle of uniformity,* which assumes this, is not a scientific law but rather an act of faith. Modern intellectuals, using this principle, say that science has disproved the Bible. Some Christians try to regain worldly respectability by modifying their own interpretation of Scripture. This compromise always has been the prelude to apostacy.

Examples of these accommodations are (1) a gap between the first two verses of Genesis, in which an unrecorded creation took place; (2) the day-age theory of creation; (3) gradual development of all living things from the first organism, the whole process being guided by God; (4) an allegorical interpretation of Genesis which rejects it as valid history.

None of these compromises is accepted by atheistic scientists, and none is needed to explain actual facts.

Henry Morris, Head, Civil Engineering Dept.
Virginia Polytechnic Institute

DISCOVERIES SINCE 1859

The various amino acids formed from water vapor, methane, ammonia and hydrogen by electric spark activation merely show that these compounds, like urea, may be made outside of the cell as well as inside. As George Wald says, organic chemists are also living organisms and therefore sooner or later should be able to make organic compounds from inorganic substances in the same way in which simpler organisms now make them. Without the chemist, i.e., either simple organisms or man, they would not spontaneously originate either now or in the past.

Natural selection is based on the concept that variation is continuous, each generation showing the same range and capability of variation as the one preceding. Modern genetic studies indicate that limits of variability are soon reached in any breeding program, after which either artificial or natural selection is powerless to effect any further change.

Mutations now appealed to by evolutionists as the basis for natural selection are mostly harmful. The occasional beneficial ones in unusual environments, such as penicillin-resistant bacteria, also have a lower metabolic ratio and so are at a disadvantage. There is no evidence that various resistant strains ever achieve metabolic or reproductive ratios superior to the original types.

The various experimentally produced amphi-diploid species are defective either in vigor or reproductive potential. Muntzing's Galeopis Artificial Tetrahit is shown to be more logically explained as a result of diploid merogony. The difficulties involved in attempting to infer homology by the degree of chromosome pairing are indicated. Though the various experiments designed to show that species with higher or lower chromosome numbers and amphi-diploids have failed to show the possibility of their natural or evolutionary origin, they do however indicate possible ways by which God may have adapted the originally created species to present

conditions of environmental stress resulting from the various curses and the flood.

Walter E. Lammerts, Director of Research
Horticultural Research Div., Germain's, Inc.

KARL MARX AS AN EVOLUTIONIST

Karl Marx (1818-1883) was one of the few persons who wanted to correct the cruel working conditions which followed the Industrial Revolution. The church missed a big opportunity to protest against child labor and kindred evils. The life of laboring people has been improved, but Marx's panacea, communism, has led to the enslavement of 900 million people.

Marx received ideas from Georg Hegel who died in 1831 and his popularizer, Ernst Engels who died in 1896. All three of these men believed in the natural growth of ideas; that concepts follow each other in a predetermined order, the last ones being the most useful. Thus, changes are desirable because new ideas and new orders of society are of a higher order than preceding ones.

In addition to this general idea of evolution, Marx postulated that systems of economic production follow each other in natural sequence: hunting, slavery, feudalism, capitalism, and lastly communism. Each of these systems over-throws its predecessor because it is naturally better, and thus the final success of communism is assured, resulting in a classless society.

Charles Darwin applied the same idea of progress through struggle to the organic world. Darwin's followers shook off all recognition of God in the origin and development of the universe. Charles Smith, former president of the American Association for the Advancement of Atheism, has said, "Evolution is atheism."

Free enterprise is not perfect; it has failed to solve distribution, but communism is based upon materialism and covetousness.

(In the discussion it was reported that Russian factory executives and scientists receive ten times as much wages as the workers, according to Klaus Mehnert, *Soviet Man and His World,* 1958. The dream of equality has faded.)

John R. Howitt, M. D.
Toronto, Canada

A BOOT CAMP FOR MISSIONARIES

A missionary must know how to care for himself and his family in a strange and inhospitable environment. If he does not stay in health, he cannot do the work for which his board is supporting him. Again, if the care of his own health takes all of his time, the missionary has no value as a worker.

Realizing these needs, Dr. Culley conducts a camp in the mountains where prospective missionaries are trained in the skills of simple living. They learn to build log cabins, make simple beds, boil drinking water, dress and cook wild animals, raise vegetables, and revive other skills which our mechanized civilization has allowed us to forget.

The American Scientific Affiliation can help in mission work. Among our 1,300 members should be a number of volunteers to do work for which they are trained. The Peace Corps now sends out many workers, and the Mennonite and Brethren Churches have been sending workers for a number of years. While most of these volunteers are young, there is a need for persons of more years and experience.

Paul G. Culley, M. D., Director
Grad. School of Missions,
Columbia Bible College

THE CHRISTIAN AND MENTAL HEALTH

The modern psychiatry movement had its origin in behaviorism and psychoanalysis, both of which are non-Christian. Therefore we should use caution in applying psychiatry. It is possible to suppress symptoms without curing the mental disease. A person is not cured until he is in right relationship to God.

Not a feeling of perfect felicity, but a certain amount of stress against the world is normal for most occasions.

We should have, not Christianity and psychiatry, but Christian psychiatrists.

Donald F. Tweedie, Jr.
Visiting Research Specialist
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Lexington, Ky.

NEWS AND NOTES

CREATION RESEARCH SOCIETY

A new organization concerned with relationships between science and the Scriptures, the Creation Research Society, has recently been formed. Its members subscribe to the following statement of belief:

1. The Bible is the written Word of God, and because it is inspired throughout, all its assertions are historically and scientifically true in all the original autographs. To the student of nature this means that the account of origins in Genesis is a factual presentation of simple historical truths.
2. All basic types of living things, including man, were made by direct creative acts of God during the Creation Week described in Genesis. Whatever biological changes have occurred since Creation Week have accomplished only changes within the original created kinds.
3. The great flood described in Genesis, commonly referred to as the Noachian Flood, was an historic event worldwide in its extent and effect.
4. We are an organization of Christian men of science who accept Jesus Christ as our Lord and Saviour. The account of the special creation of Adam and Eve as one man and woman and their subsequent fall into sin is the basis for our belief in the necessity of a Saviour for all mankind. Therefore, salvation can come only through accepting Jesus Christ as our Saviour.

Dr. Walter E. Lammerts, Director of Research for the Germain Seed Company of Livermore, California, is the president of the new society. He describes the nature and goals of the organization as follows: "Our steering committee of research scientists is committed to full belief in the Biblical record of creation and early history, and thus to a concept of dynamic special creation (as opposed to evolution), both of the universe and the earth with its complexity of living forms. We propose to re-evaluate science from this viewpoint.

"Beginning in 1964, we plan to publish an annual yearbook of articles by various members of the Society and thereafter a quarterly review of scientific literature. Our eventual goal is the realignment of science based on theistic creation concepts and the publication of textbooks for high school and college use."

Membership is limited to scientists having an M.S. (or equivalent in experience), Ph.D., D.Sc., Ed.D., or M.D. degree, and dues are $5.00 per year. Applications for membership may be sent to Wilbert H. Rusch, Treasurer, 4090 Geddes Road, Ann Arbor, Michigan.

The following persons are members of the steering committee: *Archeologist* R. Laird Harris; *Biochemist* Duane T. Gish; *Biologist* Frank L. Marsh, Edwin Y. Monsma, and Wilbert H. Rusch; *Chemist* Paul A. Zimmerman; *Geneticists* John W. Klotz, Walter E. Lammerts, and Wm. J. Tinkle; *Geologist* Clifford L. Burdick; *Geophysicist* Harold Slusher; *Hydrologist* Henry M. Morris; *Medical Doctor* Karl W. Linsenmann; *Meteorologist* Willis Webb; *Philosopher of Science* David A. Warriner; *Physicists* Thomas G. Barnes and John J. Grebe; *Science Educator* John N. Moore.

FACULTY CHRISTIAN FELLOWSHIP

For a decade the Faculty Christian Fellowship has been working toward the development of a Christian faculty movement in America, indigenous to the college and university, directed to the level of the learned vocations of higher education, and carrying on the church's own historic intellectual tradition. The child of concerned faculty Christians and the Protestant churches, it has engaged in a wide variety of activities within the strategic milieu of higher education. For 1964 its attention is focused upon a national faculty conference at the University of Chicago's Center for Continuing Education, August 23-28.

Seven objectives of FCF are (1) To help college and university faculty members increase their understanding of and commitment to the Christian faith, (2) To relate the insights of the Christian faith to the vocation of the teacher and to the subject matter of his teaching and writing, (3) To promote fellowship among Christian faculty members, (4) To help discover the teacher's responsibility in the academic community in cooperation with students, administrators, church leaders, and others, (5) To explore within a Christian context the responsibility of the academic community for human culture and contemporary society, (6) To encourage contact and conversation between all members of the academic community who take the university and their work seriously, and (7) To act as a liaison and service agency for denominations, foundations, and other agencies working with faculty on behalf of the concerns of religion in higher education.

The Faculty Christian Fellowship is no longer a membership organization, the decision having been made that membership implies a limited and parochial nature. On the contrary, its purpose is an ecumenical one, representing an inclusive Protestant faculty movement among Christian faculty members in this country. Two publications are especially representative of the concerns of the Faculty Christian Fellowship. THE CHRISTIAN SCHOLAR, a quarterly journal, is available at 475 Riverside Drive, Room 750, New York, New York 10027, and FACULTY FORUM, a more popular news and information foldover is prepared for the Protestant faculty movement by the Methodist Board of Education, P. O. Box 871, Nashville, Tennessee.

GREAT TEACHING AND RESEARCH

A dedicated and imaginative teacher makes a contribution . . . which transcends in results and importance at least a part of the advantages which derive from beautiful laboratories, a well-stocked library, a highly selective student group and time and money for research.

This can best be illustrated by a true story of such a teacher and such a department. The college is a very small one, located in a midwestern town, half a day's

drive to the nearest university library. During the six-year period studied (1947-48 through 1952-53), it graduated a total of 167 men.

The chemistry department at that time was a "one-man" department; in 1958 it added a second teacher. The "one-man" had an M.A. as her highest degree. Her average teaching load came to 26 contact hours. The department reported not a single dollar in support of either research or teaching from outside agencies. Its library had only the journals of the American Chemical Society and the Journal of Chemical Education. Its laboratories were reported as inadequate for present class needs and they lacked research laboratories for either the teacher or students. During the period studied the school also had lost its regional accreditation.

This college has none of the outward marks of a very productive college. But in spite of this, its chemistry graduates have gone to graduate school in relatively large numbers and have done extremely well. To do this, the undergraduate courses must have been well taught and in depth. If colleges were compared in terms of the per cent of Ph.D.'s based on the number of men graduates, this college would have ranked among the top five in the country. The chemistry department was responsible for as many Ph.D.'s from 1936-1956 as the rest of the entire faculty together. In spite of a lack of research space, research equipment and research money, the teacher and her students are "research minded." When asked how research might be initiated, she replied "Staff members interested in research, with time for it to a limited extent, will not have any difficulty in creating interest among students." Her department is no exception to the generalization that productivity and research go hand in hand in spite of a heavy teaching load, a lack of space, equipment, library, and money for research.—**Clifford E. Larson, Dean, Bethel College, St. Paul.** Reprinted by permission from *Faculty Journal* (Bethel College), vol. 4, no. 4, pp. 15-16, March 15, 1963.

SOCIAL RESPONSIBILITY

In March 1963 Eggenberger observed that the great increase of sociology papers in the JASA could probably be attributed to increased interest in the social responsibility of Christians. In the Analytical Index for Vol. 14, 1962, more articles appear under the general category of "Ethics" than any other. If we were to add the additional articles and letters written on questions of the Christian's responsibility in the areas of increasing population, cultural relativity, and capital punishment, the emphasis on social questions is formidable. Indeed, one listens for a clarion call summoning the physical scientist to do battle on the ramparts.

The statement of such a concern for social problems by the Christian is at once appropriate and threatening. The tendency is to view each problem as a unique case requiring appropriate treatment. Such an approach is inconsistent with science and Christianity and leads to a concern for piecemeal social action. It ignores the possibility that basic principles, which are repetitive in their functioning, are the cause of social problems. Science and Christianity transcend time and space, while policies of social action are limited to the specific environment.

That dean of sociologists, Pitirim Sorokin, has stated that sociology is a generalizing rather than an individualizing discipline (3). By this he means that the social scientist should not be concerned with a particular social phenomenon in a particular time and place unless, by so doing, he is able to point to those attributes which are characteristic of such phenomena in a more general range of time and place. If the Christian is to study social responsibility, he should do so with the expectation that his observation will be appropriate for all stages of the cultural time-space continuum.

Simply, then, the responsibility an individual feels toward others is based upon generalized norms. Such a view does not deny the possibility of cultural relativism. Societies must be expected to differ in the values and norms which they hold. The significant question here deals with the means used to arrive at the decision as to which norms are appropriate for them. If generalized principles are ignored in determining what one's ends are to be, then the justification of one's actions is seriously questioned.

There seems to be convergence in Christian and sociological literature on two guiding points of reference upon which ethical decisions should be made. These are value and exchange. In the economic sense, these terms refer to commodities which have value for the individual as a basis of exchange. These commodities may be of various types, but need not be of a material nature; thus a particular skill or social grace may have value. Once a person perceives the value of a commodity, its owner is similarly valued. To share the valued commodity he must enter into a relationship with the owner. Hence, relationships are based on the exchange of these valued articles, thereby building a mutual interdependence.

At the very root of Christian ethics lies the fact that what God has created is valuable. This value extends to men and things and is based upon the concept of scarcity. One need only note the way the original model of the world based upon abundance provided by God and maintained by man (Gen. 2:15-16) was changed by God to a world of scarcity in which man had to provide for his own needs (Gen. 3:19). Such an emphasis upon the scarcity of commodities can be found in classical economics.

From the viewpoint of cultural relativism, one could defend such a practice as cannibalism when there is a true scarcity of food. In such cases the human being is valued as a tasty morsel simply because other food is not available. The cannibal, however, does not usually eat his own kin because they have more value than an enemy, who has little value except as food. The principle of scarcity is, therefore, inadequate without an understanding of the principles of exchange involved. The cannibal views his kin differently from

his enemy because group membership provides a different basis for exchange.

In a recent sociology text a section entitled "The Mechanisms of Exchange" includes the following passage:

> Any given member of a group gets what he needs by giving to someone else what the latter needs and the former possesses. Interaction within the group consists of exchange among its members. If one needs love, he must love in return. If he needs inviolability, he must not violate others. If he needs goods and services, he must provide them for others. These exchanges are part of the rights and obligations of his status in the group (1, p. 48).

Surely this statement is the essence of the Golden Rule. The authors go further by stating the methods used to attain such a balanced relationship. Such means of exchange vary from the least institutionalized form of mutual cathexis (a sentiment of positive and emotional mutual attachment between people), duty or obligation, and bargaining as the most institutionalized form (2, pp. 48-49). Hence people exchange either because they want to or feel that they have to.

Obviously, the means of exchange most appropriate for the Christian falls into the category of mutual cathexis. When one employs methods at the bargaining end of the continuum, there is a need for contracts and the legal protection characteristically found in a secular society. The responsibility of a social relationship is threatened by the precarious nature of legal interpretation.

Our friend the cannibal, therefore, kills an enemy and eats him because he has a greater love for, and responsibility to, his family. Further, since his enemy lives in the same harsh environment, he expects his enemy similarly to "serve" him if the opportunity should arise. The practice of leaving the aged and infirm behind the band to die in order to provide better for the young also underlines the primitive's understanding of the concepts of value and exchange. The living similarly expect such a fate when they are older and accept it in deference to the superior value of the group.

Apparently the value principle takes precedence over the exchange principle. (The cannibal may kill his enemy because he sees him as food.) It is important for the Christian, however, to note that the basis for definition of value can differ. The Christian "cannibal" loves his enemy because he sees him as a human soul. Such a perception is difficult to make, however, unless there is a more abundant food supply.

Recently an observer criticized the sociologist for his refusal to justify norms which are used (2). It has been suggested in this article that the bases for norms are implied in that interpretation of the social world which recognizes the relative scarcity and exchange of goods as fundamental to social interaction. Further, these norms are rooted in Christianity. A more significant question at this point would be whether the sociologist is cognizant of his normative bases and employs them.

The model of our present world stresses abundance. As a result, much of human relations loses its values, causing exchange to develop a bargaining rather than a cathectic nature. The sociologist is too often a product of our world and reflects this model in his thought. As the Christian, the sociologist has the same problem of being in the world and yet not of it. This duality makes it difficult for him to perceive his norms and abide by them.—**Russell Heddendorf**

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SCIENCE—NO "CONTINUING CITY" (HEB. 13:14)

For 150 years after evidence contradicting it was known, the phlogiston theory of oxidation was useful, for the significance of oxygen had not been recognized.

> Does [this] argue for the stupidity of the experimental philosophers of that day? Not at all; it merely demonstrates that in complex affairs of science one is concerned with trying to account for a variety of facts and with welding them into a conceptual scheme; one fact is by itself not sufficient to wreck the scheme. A conceptual scheme is never discarded because of a few stubborn facts with which it cannot be reconciled; a conceptual scheme is either modified or replaced by a better one, never abandoned with nothing left to take its place. (James B. Conant, *Science and Common Sense.* New Haven: Yale University Press, 1951, p. 173.)

SCIENCE, TECHNOLOGY, AND FAITH

An intellectual revolution has indeed begun; but it is far from complete. The best minds of the [Roman Catholic] Church have yet to provide modern answers to a vast array of questions posed by the world of 1963. There is, for example, no Catholic theology of space (nor, for that matter, a Protestant or Jewish one). There is only a handful of first-rate Catholic scientists —and even fewer Catholic theologians—who have seriously come to grips with the difficulties that nuclear physics or biochemistry present to a faith formulated largely in an era when men thought that the world was flat . . . On the implications for Christians of such social issues as nuclear war, the Church speaks with divided voice, or not at all.—**John T. Elson,** "The Catholic Church Battles Its Old Guard," *Life,* vol. 55, no. 16, p. 122, Oct. 18, 1963.

BOOK REVIEWS

Should book reviews in JASA be considered as scientific reviews or as literary reviews?

In a letter to *Science, 141,* No. 3578, 312 (26 July 1963), the distinguished anthropologist Margaret Mead points out that different rules apply to the two kinds of reviewing. Dr. Mead describes a case in which a mountain of moral indignation grew out of a molehill of misunderstanding when the ethics of scientific reviewing were scrupulously followed—but for the wrong kind of journal. *Saturday Review* asked Theodosius Dobzhansky to write a review of Carleton Coon's book, *The Origin of Races.* Dobzhansky wrote a critical review and sent a copy of the manuscript to Coon, who asked for the right to reply; both of these actions were in accordance with scientific courtesy. When publication of the review was delayed, friends of Dobzhansky felt that the critical content of his review was responsible and wrote letters of protest to the editor, who eventually rejected the review entirely. It was subsequently published in *Scientific American, 208,* No. 2, 169 (1963) under the title "A Debatable Account of the Origin of Races." Undoubtedly the fact that Coon's book dealt with an emotionally-charged subject helped to magnify the misunderstanding, but the basic question of differences in ethics and styles of reviewing would remain even if this were not so.

In the case of a literary (meaning "non-scientific") review, it is incorrect to send a copy of the manuscript anywhere else before the review has actually been published. Literary journals wish to protect themselves against premature quotation by other publishers, partly because last-minute changes in makeup may mean that an accepted review is not run at all. *Saturday Review* devotes considerable attention to scientific matters but is certainly not a scientific journal.

What kind of journal is JASA? Should book reviews submitted for publication in JASA be edited? No changes except minor corrections in spelling, punctuation, etc., are *ever* made in a scientific paper without the author's written consent. In literary journals, however, the editor may make even major changes he feels necessary to maintain the magazine's standards of style. The book review editor of JASA has generally felt free to make changes in style whenever he felt he could improve a review without changing its point of view, but never without sending a copy of the revised manuscript to the author before publication so the author could protest or withdraw his review if he wished. Unfortunately, this correspondence has sometimes been carried on under pressure of deadlines, and some authors, used to dealing with editors of scientific journals, may have felt that they—and their reviews—have been mistreated. (So far no reviewer has registered a complaint.)

Until a different policy is recommended by the editorial board, the editor of this section will assume he has freedom to make editorial changes in book review manuscripts, but will make every effort to have full discussion of proposed changes with the author before publication. Perhaps a significant way to distinguish one's literary writing from scientific writing is to ask, "Would I list this review in my bibliography of *scientific* papers?" Correspondence on this point would be welcomed by either the book review editor or the editor of JASA.

* * *

We have intended for a whole year to publish an extensive review of *The Genesis Flood* by Henry M. Morris (a Fellow of the ASA) and John C. Whitcomb, Jr. This highly controversial book published in 1961 by the Presbyterian and Reformed Publishing Company has sold many thousands of copies and has been the subject of heated discussion among ASA members. Although the book has ardent supporters, many geologists object to the treatment of various technical questions in it; others object strongly to the philosophical outlook and polemic style of the authors. It has been hard to find a reviewer to do the book justice, partly because both scientific and philosophical questions are involved. However, we have at last been promised a thorough-going review which we expect to publish in the next issue. In the same issue we would also like to publish either a list of other reviews which have been printed elsewhere or a "review of reviews." Readers who have access to a review of *The Genesis Flood* published in a scientific, religious, or other periodical are urged to send either the review itself or its full citation to the book review editor by December 31. If inexpensive copying facilities are available, a reproduction of the published review would be appreciated.

—**W. R. H.**

The Inspiration of Scripture, by Dewey M. Beegle. Westminster Press, Philadelphia, 1963. 223 pp., $4.50

The first statement of the preface of Dr. Beegle's book expresses a basic truth: "There are few areas of Christian life and thought that do not lead eventually to the issue of the inspiration of Scripture." By this he does not refer to the question of *whether or not* the Scriptures are inspired, but rather what it means to make the Christian affirmation that the Scriptures *are* inspired. Certainly in the area of the encounter between Christianity and science, every approach and every consideration refers back ultimately and immediately to one's basic attitude toward the proper interpretation of the Scriptural record.

Upon its publication earlier this year, Dr. Beegle's book was widely hailed in conservative Christian circles as a significant contribution to this consideration, and just as widely condemned as a radical surrender of some of the most precious aspects of the doctrine of inspira-

tion. This reviewer finds the book a useful and provocative presentation of the issues and problems confronting the conservative Christian today, a book which every thoughtful Christian, regardless of his position, should have on his reading list.

It is Dr. Beegle's principal thesis that it is the revelational content of the Scriptures to which the basic concepts of inspiration, inerrancy and infallibility apply, and not to every word and phrase of the Scriptures as they might be considered apart from the main thrust of the purpose behind the giving of the revelation. In arriving at and developing this main thesis, Dr. Beegle presents a challenging array of arguments in a form which makes them readily understandable to the lay reader. He proposes several ramifications of his main theme with which this reviewer would be in hearty agreement, and also several others, probably those principally responsible for the book's radical reputation, which give some cause for hesitation.

Dr. Beegle's first main point concerns the unique position which conservative theologians have tended to attribute to the original autographs of the Scriptures, insisting that these autographs were inerrant, whereas later translations and copies were not necessarily inerrant. He points out that the Bible makes no essential distinction between the autographs, copies of the autographs, and translations of the autographs. "All three are considered as trustworthy and authoritative because they derive ultimately from God." (p. 41) He emphasizes that the practical work of the Church and of the Kingdom has always depended on the reliability of errant copies; that even granting that God purposed to deliver inerrant autographs, it is evident that He did not purpose to preserve this hypothetical inerrancy in transmission; that it has been generally conceded that inspiration does not correct scribal errors in material used for their source of information by writers of the autographs; and that the Scriptures widely referred to in the New Testament were nothing else than the errant Septuagint translation of the Old Testament.

He next turns his attention to certain classic Biblical problems, such as Jude's attributing of a passage from the apocryphal Book of Enoch to Enoch, the seventh from Adam; the lengths of the reigns of Pekah and Hezekiah; the meaning of the genealogy of Genesis 5; deviations between Stephen's speech in Acts 7 and the Old Testament record; Paul's giving of 430 years as the period between the giving of the covenant to Abraham and the giving of the law to Moses in Galatians 3:17, which would be consistent with the Septuagint version of Exodus 12:40 but not with the Hebrew; generally larger numbers in Chronicles than the corresponding figures for parallel accounts in Samuel-Kings; and discrepancies between gospel accounts of the same event in the life of Christ. He concludes with the following statement:

> The question is, What are we to make of these findings? The evidence can be viewed from three possible points of view: (1) Scripture teaches the doctrine of inerrancy, but the phenomena of Scripture disprove this claim; (2) Scripture teaches the doctrine of inerrancy, therefore any contradictions or errors are in appearance only; and (3) Scripture does not teach the doctrine of inerrancy, therefore the phenomena of Scripture are to be accepted as an important factor in determining a Biblical view of inspiration. (p. 60)

Dr. Beegle champions the third possibility, meaning by "the doctrine of inerrancy" that position which proposes the Scriptures as inerrant with respect to any arbitrary criterion which may be applied to test this inerrancy.

This reviewer has sought to preserve the concept of Scriptural inerrancy by insisting that this inerrancy can be judged only by the application of proper criteria which take full account of the purpose behind the giving of the revelation (R. H. Bube, "A Perspective on Scriptural Inerrancy," JASA, September, 1963). Dr. Beegle regards this position as only a stopgap and says,

> Ultimately, therefore, truth must be defined in terms of reality or facts. Aside from this absolute formulation of truth, the doctrine of inerrancy is pointless . . . it is far better to speak in terms of the essential accuracy and trustworthiness of Scripture. For a person in the period of transition there may be some psychological value in clinging to the term 'inerrancy' while filling it with new meaning, but eventually this contradiction will have to be given up. (p. 81)

Some of the more controversial propositions advanced by Dr. Beegle are the following: Inspiration of revelational content requires only inspiration of key words, not of every word; every passage in the canonical Scriptures need not have revelational content; the inspiration of the writers of the Bible was not of a different kind from that of God's servants throughout the history of the church, the content of their revelation being what made their contribution unique, not the uniqueness of their inspiration experience; there are degrees of inspiration evident in the works of the writers of the Bible; evidence can be cited to support the contention that doctrinal error in areas of detail is present in the Bible, "All Biblical doctrine is not infallible, but it is sufficiently accurate as a whole to achieve the goal that God desires." (p. 174) Many or all of these propositions may sound like indefensible departures from the faith, but the reader is recommended to have a good hard look at them in the context of their presentation in Dr. Beegle's book before taking up the cry of heresy.

Whatever one's conclusion, it must be granted that it has been Dr. Beegle's purpose to strengthen, not to destroy. In this spirit, this review ends with a quotation from p. 164, which summarizes Dr. Beegle's overall attitude.

> Notwithstanding all the problems associated with Scripture, the only Christ the church knows is the Christ of the New Testament, the Christ seen through the eyes of the apostles. At all costs we must steer a course between two extremes. In one instance the church has stressed the inerrancy of the Bible to such an extent that some people have limited salvation to those who first hold correct views with respect to the teachings of Scripture. Yet it is plainly evident from the history of the church that a correct understanding of the objective truth in Scripture can never guarantee an experience of personal, subjective truth. Submission to Christ is primarily a matter of decision, an exercise of our will, not knowledge.
>
> The other extreme to be avoided is the belief that a person can maintain genuine faith in Christ while doubt-

ing the truth and relevance of much that Scripture declares. The will to believe cannot be effective for long when it reckons much of the objective truth of Scripture as untrue. The power of the Holy Spirit does not become a reality until one responds to the Christ of Scripture. As in the case of Biblical events, so in the matter of interpretation, where churches discount the essential teachings of Scripture, leanness of soul is sure to follow. If the church is to experience the revelation and inspiration of God, it must return with a spirit of humility and obedience to God's record of revelation in the Bible.

—Reviewed by Richard H. Bube, Associate Professor of Materials Science and Electrical Engineering, Stanford University, Stanford, California.

The Origin of Radar, by Robert Morris Page. Anchor Books (S26), Doubleday & Company, Inc., Garden City, New York, 1962. 196 pp., paper, $ .95.

Exploring the Secrets of the Sea, by William J. Cromie. Prentice-Hall, Inc., Englewood Cliffs, New Jersey, 1962. 300 pp., $5.95.

Dr. Robert M. Page is Director of Research at the U. S. Naval Research Laboratory in Washington, D. C., and one of the most distinguished members of ASA. His ability to bring complicated technical subject matter down to the level of a general audience in a fascinating way is well known to those of us who heard his lecture on space exploration at the 1958 Annual Convention of ASA. We learned from a modest statement in that lecture that he was the first man to communicate a message across the continent by bouncing a radio beam off the moon, and most of us gathered that he had "had something to do with radar." The story of what he did have to do with the development of radar, and what others were doing at the same time, is well told by him in this paperback of the Anchor Science Study Series.

The material dealt with often involves complex electronic theory but the author manages to get the main points across by apt analogy and illustration. ("Electrons are most unsociable creatures. It is as if they could smell each other and did not like the smell.") He suggests that some readers may want to skip Chapter 5 on "RC Circuit Magic" because of its technicalities, but Chapter 6 on "The Radar Duplexer" actually seems more difficult to follow. He did not suggest skipping *that* one undoubtedly because the duplexer (an electronic switch permitting both transmitter and receiver to use the same antenna) was one of the key inventions which Dr. Page, who holds 40 patents in the radar field, contributed to radar. It is primarily at the end of this chapter that the author expresses some of his personal religious convictions, in a mild but straight-forward manner which might serve as an example for the rest of us in our popular writings. After describing the problem, his invention, and the conviction he had that it would work, even though at the time he did not understand the theory, he concludes:

> But in all sincerity I can take no personal credit for it, because I did not create it. I only followed a 'hunch,' or, as I prefer to call it, an inspiration, in which the completed configuration appeared in my imagination without an understanding of how it worked, but with a feeling of great confidence that it would work. It was as if a source of knowledge out of this world had momentarily opened to me, and I was guided by it. This is but one of many such experiences that have marked my professional career. Do you wonder that my faith in Divine Providence is both profound and precious?

Others may not find themselves so personally involved in the book as does this reviewer, once a Navy electronics technician himself who sang of old ASB radar, "Oh, the spot grows bright/As the tubes begin to light;/There's trouble on the gear tonight." However, less nostalgic readers will still find this epic of modern technology enjoyable and informative; as evangelical Christians we can be pleased that "one of us" not only had such a great part in it but has also been able to tell the story of it so clearly. Good photographs, many line drawings, a final chapter on "The Exploits of Radar" (including peacetime uses), and a chronological table of developments all contribute to the value of Dr. Page's book.

Exploring the Secrets of the Sea is reviewed here partly because the author is a former staff member of the Lamont Geological Laboratory, with which many of our geo-scientists in ASA have at one time or another been associated. Cromie served as chief mate and scientist aboard Lamont's research schooner, *Vema,* in 1954; he also manned an Antarctic oceanographic station during the International Geophysical Year, and is presently Public Information Director of Project Mohole. This book about oceanography and oceanographers is one of the Prentice-Hall series of Science Books for the General Reader. It is up-to-date, with emphasis on the findings of the IGY, and illustrated with good photographs but only mediocre drawings.

Oceanography draws on all the sciences from astronomy to zoology and is furthermore intimately associated with geographical discovery and historical adventure, so it is well suited for popular treatment. The author maintains a good balance between the technical and the dramatic, and seems to use good judgment in distinguishing between facts and theories. He is fair in presenting all sides of controversial questions and only occasionally indulges in a misleading over-simplification. However, since some spots in the book show hasty writing or careless editing (on p. 195 the reference "see page ???" must have been overlooked in proofreading!), readers whose field is oceanography might find some flaws. At any rate the modern view of the origin and development of life in the oceans is presented accurately enough for a popular book. No reference is made to any science-religion controversy, but Christians may learn something about geochronology from Chapter 11, "The Book of Sediments," and perhaps some other important things, too, if they can get past the statement on p. 20: "Evolution is a scientific fact, not a theory. Darwin's theory of evolution refers to his idea of *how this evolution came about* by natural selection."

The two books reviewed above have several things in common. Both get by with tossing solid blocks of complicated scientific discussion at the non-scientist by interspersing these with items of personal, historical, or

general human interest. Both authors spice their writing with amusing or absorbing personal anecdotes, as when Page tells how he risked sneaking a photograph of a highly secret historic event (the first installation of an experimental radar on a Navy ship) only to discover afterwards that he had forgotten to remove the lens cover from the camera—or when Cromie pictures for us the *Vema* riding out a violent storm after a day of seismic sounding in the Red Sea. Illustrations are important assets of both books, although both could have been improved by more use of graphs, tables, and captioned drawings to make technical details easier to grasp and remember.

The ASA has a stake in the effective popularization of science. Presenting science to laymen in an interesting way without distortion is a difficult task. Perhaps writing in the first person of our own adventures in science is the best way to do the job; perhaps more of us should be doing this specifically for the evangelical Christian public. Don't forget to have some good pictures taken of yourself at work on today's problem—you may solve it someday and want to tell the story! The layman may not be able to identify with impersonal *science,* but he should be able to identify with scientists who are, like himself, first of all human beings and born-again Christians.

—*W. R. H.*

With Heart and Mind, by Kenneth L. Pike. Wm. B. Eerdmans Publishing Co., Grand Rapids, Mich., 1962. 140 pp., paper, $1.75.

Dr. Kenneth L. Pike is Professor of Linguistics at the University of Michigan, is President of the Summer Institute of Linguistics, Inc., and for 20 years has been associated with the Wycliffe Bible Translators. In this book he has given us, in the words of the subtitle, "A Personal Synthesis of Scholarship and Devotion" which places all of us in his debt. He speaks not only as one Christian scholar to another *about* devotion; he speaks devotionally as a scholar and the Word of God speaks through him to us.

Dr. Pike's book is a collection of essays—sermons, really—which have previously appeared separately in such evangelical periodicals as *His, Eternity,* and *The King's Business.* There are 25 of them, arranged somewhat arbitrarily under four headings: intellect, viewpoint, commitment, and outreach. Although only one or two fit the classical devotional format of meditation on a particular passage of scripture, the Biblical emphasis of each is clearly and effectively presented. Some of the longer essays contain analogies or illustrations from the author's background in linguistics; others are short commentaries on modern parables (for example, several stem from articles in *Scientific American*). The author maintains almost perfect balance between speaking to our minds and speaking to our hearts, exemplifying for us how to love God with all our heart and mind and soul and strength. He reminds us that our Puritan and Pietist ancestors were once able to combine evangelical fervor with sound scholarship, and exhorts us to bless science (by praying for our colleagues), to serve it (by making our own positive contributions to knowledge), and to witness to it (by being Christ-like, demonstrating love, joy, peace, and the other fruits of Galatians 5:22-23).

Sermons and other "devotional literature" seldom make much of an impact on me, but I found myself stirred in some way by every one of these essays. Devotional writers must choose between being general or personal in their illumination of scripture; their general comments too often seem commonplace, vague, or unrealistic. Personal experiences enrich our understanding of scripture if we know the person or can recognize familiar counterparts to our own experience. When Kenneth Pike speaks of the temptation to make ourselves look good by making our colleagues look bad, confesses to annoyance at students who give up too easily, or tells of his own early struggles to work out an air-tight apologetic, I can easily identify with him so that *his* message from God can reach *me,* also.

The thread running throughout these essays is the conviction that to win non-Christian scholars to Christ we must avoid a compromise or middle-of-the-road position between scholarship and devotion. In "Christianity and Science" he points out how opportunities to witness have opened up in the field of anthropology and linguistics since evangelicals began publishing extensively in this field. In "Why I Believe in God" he puts his finger on the first chink in the armor of intellectual non-believers—"There are certain kinds of truth which they find impossible to completely ignore, and which point in the direction of God: 'By this shall all men know that ye are my disciples, if ye have love one to another' (John 13:35). Christian kindness, gentleness, and thoughtfulness for others are a showcase of God's light which even an epistemology cannot entirely screen off." What a challenge to all of us in ASA, and how well it has been put for us by Dr. Pike!

—*W. R. H.*

LETTERS TO THE EDITOR

ORIGINAL SIN

I am glad that you opened up the question of original sin (March, p. 26). I have always contended that this idea smacked of lamarckianism. But maybe the biologists have been at fault here, for I do not think they have supplied the needed correctives. A good conversation is needed to clear up some of the semantic jungle.

Carl S. Keener
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Sociological studies may both attempt and seem to refute the theological concept of original sin. But there are several hurdles to overcome before any evangelicals should begin to waver and consider their seeming success a reality.

1. If the ASA accepts the Holy Scriptures as "the only unerring guide to faith," then the basic issue is: Do the Scriptures teach and support the doctrine of original sin? If so, all appearances and attempts of the social, biological, and behavioral sciences to the contrary are to be rejected confidently. Humanism in any form should not supercede revelation.

2. If Adam's sin resulted in a divine judgment (having certain infinite aspects) upon the entire human race because of its organic unity, body, soul, and spirit, a mystery transcending the natural, then original sin is not in the category of an environmentally acquired characteristic subject to natural laws of heredity.

3. . . . Can it be that the Scriptures were so cast intentionally as to make their correct understanding impossible until this late date in the progress of the sciences? If not, evangelical scientists would do well to take more time to study the Scriptures . . . comparing spiritual things with spiritual.

4. Is the communication of truth through the medium of language accompanied by the enlightening work of the Spirit less reliable than the communication coming through fallible man's ever-incomplete surveys and studies of creation apart from Scripture? Is the former to be tested and revised by the latter, or is it not to be the other way around? . . . Concentrated study of Scripture on a college level is becoming indispensable as a foundation upon which to base further secular studies for Christians who wish to be most effective and stable . . . without going off on a tangent . . . The real challenge of a scientist who is a Christian is first to know the Scriptures and then to search (research) God's creation to discover its harmony with the written Word. The unregenerate man is consciously and subconsciously disinterested in confirmations of Scripture; he overlooks and misinterprets much.

Edward T. Schellenberg
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One of the besetting sins of scientists is the ignoring of related fields of study . . . .

The "Pauline theologians" (p. 26, re: Dobzhansky) do not teach a doctrine of original sin which is in any way dependent upon the idea of inheritance of acquired characteristics. The key reference is Romans 5:12-21. Paul teaches that the original sin of Adam is logically parallel to the atonement of Christ. Competent theologians, Charles Hodge, e.g., understand this passage to imply a *representative principle* such as many of us recognize in all social, as well as individual, ethics.

I gave considerable space to the history of the doctrine of original sin in Vol. I of my *Systematics,* and there will be more in the second volume (related to the atonement) to be published this year. But Hodge's *Systematics* (1871), not my work, should have answered this question.

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. . . The quotation from Hyma equates "original sin" (a purely extra-biblical term) with "present sin." This is a most unfortunate position.

The statement of the Psalmist, "I was shapen in iniquity" (Ps. 51:5, KJV), has been subject to various interpretations. The dualist has said that this proves that sexual union is evil, a notion which God never intended (Gen. 1:27-28). The Catholic and the "evangelical" have said that man is born subject to eternal death. "Shapen in iniquity" implies a relationship which requires study of the entire Bible to understand. It involves the nature of man, eschatology, and the fall of man.

There are four references in the Bible that speak of a "second death" (Rev. 2:11; 20:6, 14; 21:8). The reader is asked to study these carefully. This second death is not so significant numerically as it is forensically. According to the Scriptures, the wicked are reserved for punishment until the end of time. So the second death is the final and complete eradication of the wicked in the lake of fire (Rev. 20:11-15).

Since there is a "second death," there must be a "first death." We find no mention of this in Scripture as such, but by deduction we ascertain that it must be natural human death. Many of the Jews, especially the Sadducees, believed that natural death was the end of everything—there was no hope beyond the grave. Jesus came to do away with that idea. He often referred to death as mere sleep (John 11:11), implying a resurrection.

If Adam had never sinned, mankind would never have been subject to death. But when he did sin, death was pronounced upon him, and apparently for him it was a twofold penalty. For not only was he to pass on

natural death to his offspring (a penalty that was never to be revoked), but he became subject to eternal death. God in His mercy provided a sacrifice, as promised in Gen. 3:15, but this Sacrifice was *never to atone for natural death.*

The vicarious death that Jesus died was the second death. Consequently, if He had lived on and died of old age this would not have been an atonement. The Christian need have no fear of death, for it is only a sleep and not a penalty at all, though a legacy from Adam. Furthermore, no amount of baptism or sacraments can remove this "penalty." On the other hand, the sinner has both natural death and eternal death to face. This eternal death is the penalty for one's own sin, else the justice of God's government is in question.

So, "shapen in iniquity" means that a man is born into a sinful world, with tendencies toward, but not the responsibility for, sin. He reaches a point of responsibility in his late childhood. He *learns* to sin from parents and others.

> The soul that sinneth, it shall die. The son shall not bear the iniquity of the father, neither shall the father bear the iniquity of the son (Ezek. 18:20).

The great Sacrifice was given to atone for our personal sins. No amount of grace or faith can remove the penalty of that original sin—natural death.

This position is consistent with biological research and, of course, does away with infant baptism, the "immaculate conception," and anathema against birth control. Criticism and comments are invited.

James Hoffer
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THE GREAT COMMISSION AND THE INTELLECTUAL

A man once said, "In the USA if someone met a minister, he knew quite well what he was going to say, but if he met a layman he had no idea what the layman would discuss. So it is for the layman to spread abroad the good news of the gospel among his acquaintances, where he works, be it office or factory or workshop, wherever it may be." As intellectuals we need to become more dedicated to this proposition today, not only putting our talents to use here in our own country, but also considering prayerfully the possibility of taking the Gospel to foreign lands.

As a freshman in college four-and-one-half years ago, I read an article in *His Magazine* that changed my life. Briefly, the content of it was that while missionaries had been going into the bush country of Africa and converting the natives for many years, the strategic battle was being lost in the cities because there were not many intellectual Christians to witness to the growing number of non-Christian Africans. God spoke to me right then, and I committed my life to serving Him somewhere in Africa. Even though some countries are closing their doors to missionaries who wear the cloth, the lay missionary can never be excluded unless that country wants to shut out foreign business interests.

I have become increasingly aware of the problem of nationalism and its effect on the witness of many Christians through a series of Bible studies in the Book of Jonah. The pastor posed one particularly interesting question: What would you do if you felt led to go to Moscow, to preach the Gospel to them, and to tell them that if they did not repent, they would soon be destroyed? Are we sufficiently obedient to God, concerned for the lost in Russia, and free of nationalistic entanglements that we would be willing to go? Jonah didn't want to go because he wanted to see Assyria destroyed before she destroyed Israel. Even after God made him go, he still hated the Assyrians and was deeply angry with God for forgiving them. God had to go to considerable trouble to teach Jonah a lesson. How deep do our love and concern for the Russians go? "There is nothing love cannot face; there is no limit to its faith, its hope, its endurance" (I Cor. 13:7, NEB).

There is another aspect to this question of nationalism. . . . Mission boards and churches would be better off today if missionaries had left their white man's ways and civilized codes of ethics at home, rather than taking them with them. Granted, many of the natives' customs were scripturally wrong and had to be changed when they were converted, but a large number of their habits were wrong only by our standards, not by God's. For example, I find nothing in the Bible that says that we need to be clothed with anything other than humility and salvation; shirts and trousers are merely the dictates of society. The imposition of unnecessary requirements upon converts is one reason why Christianity is considered by many Africans and Chinese to be a "white man's religion."

I would like to suggest, therefore, that people who become missionaries be prepared to identify themselves completely with the people to whom they are sent (I Cor. 9:22). This identification would extend to personal habits, food, the national language, and citizenship. I have heard the argument advanced that since Paul retained his Roman citizenship, American Christians should retain their U. S. citizenship; the rebuttal to this is that Paul never left the Roman Empire; we should not only be willing to leave the U. S., but to die in our adopted country.

We need to consider three things: (1) It is quite unlikely that God has really called 94% of the world's Christian workers to work among 9% of the population (The Log, *His Magazine,* 1/63, p. 38). (2) In a day when the number of pagans is far outstripping the number of Christians, the burden of proof is upon each one to show why he should *not* go to the area of greatest need—the foreign field. (3) The last and oddest of these facts is that nearly two thousand years after the delivery of our Great Commission (probably one of the most widely known verses in the Bible), there are still many millions who have never heard the Gospel. Oddly enough, also, very few of us feel called to go abroad except on vacations. Either God has changed, or

else there is something wrong with us.

—An Anonymous Christian

EVOLUTION

Since the question of "chemical evolution" in a prebiologic earth is of importance to Christians in science, I would like to submit the following observation for evaluation and comment by other ASA members. I believe there has been one oversight, one hidden flaw, in the geochemical "story" which possibly invalidates uniformitarian schemes of origin.

Before stating the critical problem, the general plan must be reviewed. Most geochemists agree that the primeval atmosphere contained little or no oxygen or ozone. It is theorized that while the earth was cooling, the atmosphere was composed of carbon dioxide, nitrogen, and small amounts of hydrogen sulfide, methane, and ammonia. Theoretically the oceans contained in solution such substances as carbon dioxide, ammonia, hydrogen sulfide, and other substances in lesser amounts.

Accordingly, amino acids formed—as in Urey and Miller's experimental work (1)—from methane, ammonia, and water under the influence of lightning, ultraviolet radiation, or other forces. Next, it is assumed that, by the drying of amino acid pools and with the sun as an energy source, amino acids united, yielding the first protein molecules (2).

It is posited that other complex carbon-nitrogen compounds arose—e.g., DNA—by similar chance reactions. Later a primitive, protein-containing, cellular structure arose, and from this early cell and its descendants came the cells in which there later developed a mechanism of photosynthesis. Oxygen that was finally produced in photosynthesis changed the ancient atmosphere to the modern one. It is thought that oxygen, under the influence of radiation from space, subsequently yielded the ozone which now blankets our atmosphere.

The frequency distribution of solar radiation outside the ozone layer of the atmosphere must be considered in such schemes, however. In a recent work by David M. Gates (3, p. 332) it is seen that the extraterrestrial atmosphere receives much ultraviolet radiation in the region of 2700 to 3000 aongstroms (radiation which breaks C-O, C-H, or O-H bonds and others)! If oxygen came as a "biological product" after the evolution of life and photosynthesis, why weren't the early stages of amino acid, protein, and DNA production disrupted by the dissociation waves of ultra violet? These destructive rays had been hitting and penetrating the entire atmosphere and the early ocean all the time and would have hindered all the steps toward production of complex organic molecules necessary in the origin of life.

There is therefore a logical and physical flaw in the very foundation of recent geochemical ideas. Could this be an "Achilles heel" of chemical evolution? Whether or not this is actually the result, it can at least be said that any geochemical experiment is completely invalid (as an indicator of pre-biologic changes) unless the raw materials and end products have been subjected to solar doses of dissociation radiation throughout the entire "brew" experiment or protein synthesis.

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FREUDIANISM AND SOCIAL WORK

The recent article by Mr. Herje (March 1963) leaves much to be desired. Many of the opinions expressed by him and by those he quotes are expressive of a skepticism about the efficacy of psychoanalytic psychotherapy which I have felt and spoken about for some time. Skinner, Mowrer, and Eysenck have each provided new understanding of the weaknesses of Freud and his disciples. My main objection to the quotations from these men as included in the paper is that they actually do not, in my opinion, do justice to the authors. Mr. Herje recounts the weakness of Freud in philosophy and practice, thus implying that others have done better. I know of no hard data on the superior efficacy of any psychologic school, no matter whether the proponent be theist or humanist.

This brings me to my main criticism. The thesis of the paper, it seems to me, is made up of a series of logical fallacies. To illustrate I will use the following quotation, " . . . it would seem reasonable to argue that any doubt which might arise concerning the validity and/or usefulness of this tradition would likewise raise doubt concerning . . . the social profession . . . and . . . any state institution dominated by this profession." He seems to be trying to say that Freudianism (no further defined) has theoretical and practical weaknesses, therefore social work of today is not useful, therefore the belief in scientific naturalism is inadequate. Somehow this is related to the recent Supreme Court ruling on prescribed prayer.

This putting together of distantly and inconsistently related subjects reminded me of my early college days when I would go to the library and copy a few dozen note cards and then go home and try to shuffle them in such a way as to have a sequence which could be transcribed as a term paper. It sometimes took "long bridges" between thoughts.

In my opinion this paper darkens rather than illuminates both the cause of Christ and the search for methods of helping people to deal with being alive. My only suggestion for improvement would be to separate it into six papers and then present data rather than innuendo.

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Raymond R. Herje's article merits comment on both some old bogies again resurrected and some vitally fresh issues which were alluded to without receiving the attention they deserve.

The major thrust Herje apparently wishes to make is that the profession of social work is liable to imminent collapse because of its theoretical heritage of Freudian psychodynamics. This conclusion must be seriously questioned on two counts:

(1) That a profession in our complex society is threatened by disintegration just because a portion of its theoretical orientation is threatened. We can argue that social roles are functionally defined and maintained regardless of the alleged theoretical basis for that given social role. For example, the minister may see himself theoretically as a heavenly messenger or social organizer, but in either instance he may function identically so far as his function is sociologically defined. It appears that Herje might be unduly worried lest social workers find themselves disenfranchised by their society.

(2) That the Freudian foundation is actually in such a state of disintegration, disrepute, and chaos as is represented. Just why the author picks on Freudianism is not too clear since he comments several times that it is with "naturalistic scientism" where the basic conflict lies. Regardless of whether Herje's analysis of Freudian theory is correct or not, the basic problem would still face us, namely: How can we frame a program of social action which is true to Christian principles when the society operates in reference to the principles of naturalistic scientism? It is the solution to this problem which the author does not approach and which we need to examine carefully in many areas of social functioning.

The author alludes to the incursion of "secular ethics" into our educational system. The same may be said in regard to economics, political science (e.g., Harold Lasswell), criminology, etc. *(See A Reader's Guide to the Social Sciences,* B. F. Hoselitz, ed.) The vital issue which we really face is that of a Christian living and functioning in a non-Christian society. Can he professionally function in an arena where the operational values presuppose metaphysical values antithetical to his Christian ethos? Can a Christian attempt to change the metaphysical and operational values of his professional system, and if so, how?

Although the above corollaries are the most germane to the article's purpose, the author's discussion of Freudianism invites some comment. First of all, his discussion of Freudianism is irrelevant to the essential concern of his paper for the reasons discussed above. Secondly, the handling of sources and discussion thereof are not representative of the field for the following reasons:

1. "All human behavior . . . can be understood in terms of . . . instinctual needs" (p. 10). He then argues that this reduces all religion to illusion. Theoretically, he ignores the developments in ego psychology for the past 25 years. Practically, he ignores the contemporary discussion on values and religion. (e.g., Heinz Hartmann: *Moral Values and Psychoanalysis,* 1960).

2. In considering the scientific state of Freudianism he quotes extensively from S. Hook's symposium—one well known for its lopsided representation. Further, he misreads Rapoport and Kubie, both of whom plead for more rigorous development of mature methodology and do not mean to imply a denigration of their own scientific discipline!

Nevertheless, all the old bogies of scientific status are here again. This not only plagues psychoanalytic theory but all of the social sciences. There are numerous philosophic critics who demanded a quantitatively rigorous methodology of physics for all scientific endeavor. Actually, theorists of science are divided amongst the "unified science" methodologists and those who argue that the social scientist may be devising necessarily unique scientific methodologies (e.g., Talcott Parsons).

3. In the section on evaluation of psychotherapy Herje quotes all the notorious pessimists and nihilists of the last two decades. Many experimentalists do not argue that psychotherapy is "no good," but rather that our experimental procedures for specifying and measuring change are miserably inadequate to the complex organism we are studying (e.g., *Some Guidelines for Evaluative Research* by E. Herzog, 1959).

Overlooked is the fact that his evidence inveighs against not only Freudianism, but the totality of psychotherapeutic maneuvers, including social work. Optimistically, I think most of us feel that social workers and all psychotherapists are generally accomplishing something positive.

I do not think that the author has presented an adequate discussion of the whole field of psychodynamic theory. Rather, Freudianism has been the public whipping boy for a variety of ills, to which, as in this article, it is only tangentially related.

I appreciate the author's interest and attempt to explore an area which we all need to scrutinize more closely from our respective disciplines so that we can fruitfully collaborate in meaningful action.

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Mr. Herje's article contains some very provocative and debatable issues. He is to be commended for his painstaking efforts in amassing the great amount of research his article contains. However, I wonder if some of the material, particularly the quotes by those using psychoanalytic theory in their practice, might be understood somewhat differently in their full context. I have the impression social work is set up as a strawman and then demolished by the use of various authorities of differing viewpoints.

. . . the author had a limited view of what social work is and what bodies of knowledge are drawn on by the profession. Psychoanalysis is foundational in the

profession's understanding of human psychodynamics; however, sociology, anthropology, and physiology also serve as sources for social work's understanding of man.

The most serious question I would raise is this: If social work no longer relies upon psychoanalysis for a major part of its understanding of man, with what shall we replace it? The author not only finds fault with this theory as a basis for therapy but also would dismiss any form of psychotherapy as therapeutically helpful. He does this on the basis of psychological research which itself is still on a primitive level of sophistication and validity. The author does not state clearly what he conceives the goals of therapy to be. The lack of positive and constructive suggestions is a weakness of the article and leaves the reader wondering how the author practices social work himself. What we have presently is not the best, but it is better than nothing . . .

Finally, I sense a certain amount of fear in the article. The fear seems to be that when we accept parts of a theory we are also obliged to accept the theoretician's own philosophy of life as well, including his views of God, the Church, and Man. This, I believe, is an unfounded fear that only indicates our own sense of insecurity as Christians. What we need is a synthesis of that which is helpful in understanding human dynamics, so that we can treat emotional sickness, and our own personal Christ-centered philosophy of life. As one who has degrees in both social work and theology, I see this as my goal.

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