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

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A NEW DECADE

A New Period

It is probably not possible for a scientist to look ahead into the next years without being in some sense a prophet of gloom. What appears most certain is that we have passed into a new period when the increase of science and its public glamor are rapidly being braked to a standstill. Statistics alone demand this. If the world's participation in science were to continue at the present rate for several more decades, most of the people of the world would be practicing scientists, and most of the resources of the world would be used in scientific research by a small fraction of the total world population in a very small fraction of the earth.

To this intransigent fact must be added a basic disenchantment with science as a means to the good life. For almost a century the conviction has been growing that the insights of science have made the faith of religion impossible. Bereft of the traditional religious basis for moral values and for simple hope, men have turned against science because of the role it has played in turning the joy of life into apparent despair. This is not so much a conviction that people come to as the result of a long and careful search of the evidence; it is part and parcel of our cultural heritage today. Young people growing up never question the basic premise that science makes the supernatural impossible.

Add to this the growing evidence that man's careless use of scientific technology is beginning to backfire on a large scale all along the line. Environmental poisoning is a problem that grips most of the world. Even the beneficial results of science, such as improvements in health and the conquest of disease, have accentuated the population explosion, problems that arise simply because there are too many people for the world to feed, or to hold without drastic changes in habits and practices. The effect on students is evident in decreasing enrollment in the sciences, a situation further aggravated when a national physics journal reports that a large fraction of the PhD graduates in physics today already cannot find a job. In India I am told that tens of thousands of graduate engineers are without work in their field.

The Application Gap

The gap between basic and applied science grows wider as more scientists become involved in research. Most of the great public problems to which scientific solutions are applicable are not problems in knowledge; they are problems in how to apply knowledge already largely available to specific problems to gain specific results. Only a small fraction of the results of basic research are applicable to practical problems at any given time. Practical applications of science build up such an extensive technology that so much expense is invested and so much involvement of lives and training is involved that a change from this technology requires an improvement in a product not by a factor of two but by at least a factor of ten. Economic factors become intricately involved in such vast enterprises and the extent to which immediate economic considerations dictate longrange scientific or social goals is always a serious question.

This kind of statement is true not only of the physical sciences but they apply at least to some extent to the biological sciences as well. I am told that far more is known than is currently being used in medicine; the need is for a transfer of applied knowledge from the storehouse of basic research to the bedside. And in a situation where a growing population is one of the greatest concerns of the world, research that promises a variety of ingenious ways to contribute to this population growth by controlled aids to artificial life production must seem an anomaly to almost anyone who thinks about the question from a broad viewpoint. With all the promise of biological engineering to control and improve the condition of the human being, there is always the underlying fear that the concurrently increased possibilities for the inhuman control of man is also increased to an extent that makes wise men ponder.

Expected Trends

Concrete suggestions of the trends to be expected are fairly easy to make. But in the making of them there is the vague and general impression that they are perhaps not the important steps that will shape the future of the world. Science will

of course continue to be done, and man's conquest of nature and an achievement of an understanding of the natural world is an occupation that needs no apology. Computers will play an increasingly larger role in the management of functions and the performance of services. They will find their way into the homes of those able to afford them and may well revolutionize such practices as shopping, banking and politics. Life-saving through organ transplant will increase in use and advances will be made toward the production of a variety of artificial organs to increase the supply and to diminish the dilemma of the choice of donors. Practical substitutes for the internal combustion engine, at least for short-range travelling, will be developed in an effort to combat air pollution. Nourishing food substitutes will be developed to stem the hunger problem.

Some of the largest scientific enterprises, such as military defense, space travel and nuclear research will come up against an economic barrier that will force a change in policy regardless of the desires or intents of the participants. Unless investment in military defense is severely cut, and this must of necessity include some of the funds devoted to scientific development and technology involved in military defense, we may not even survive the ten years that we are here projecting into. Isolated successes in the space venture are to be expected, but also the growing realization that space *travel* by itself is a fruitless and non-productive waste of earth's resources; space efforts can be expected to concentrate on the terrestrial part of space with local space stations for weather and military purposes primarily. The next major breakthrough in nuclear research may require a "machine" so expensive that it is finally ruled out and the practical decision is enforced that this is as far as we can *afford* to go.

Social Upheaval

But behind and above all these isolated events on the scientific and medical scene, population pressures, famine, and social upheavals can be expected on a global level. In every part of the world there are people living who have never enjoyed the beneficial products of scientific technology that have characterized the life of the majority in this country. Still living in the ways of poverty and personal privation, they are becoming aware that the "good things" of the world may never be theirs, because these things are in the hands of men who appear determined (or helpless) to let the world be destroyed rather than face the major changes in practice and policy that are called for. It is small wonder that the lives of such people are constantly and inevitably involved in various outbreaks of violence and social upheaval in a determined effort to reverse the current of present affairs and preserve in their time at least some of the things and conditions that others have enjoyed before them. This common-place upheaval of peoples in every country, regardless of specific motive or local cause, is a world-wide phenomenon that cannot be ignored. It is an upheaval that, coupled with world-wide famine and disaster, may so dominate the future that the contributions of science and medicine may assume only a relatively small place. And even this would in many ways be preferable to the outcome of the "haves" of the world deciding (either deliberately or unconsciously) to use the power of science and technology to maintain their hold on the things to be enjoyed and to keep them out of the reaching hands of the "have nots."

Science and medicine treat a world of things, of impersonal objects. This is no slander or slur on these noble professions; it is a simple statement of the nature and scope of science. But when science assumes the all-important role that it has acquired in the last half-century, the concurrent emphasis on the value of things and a discounting of the personal and religious aspects of human life can have only a cumulative detrimental affect on society. The next ten years will be a period when men realize as seldom before that their very existence as *men* (and not as impersonal objects) requires more than the perspective of science, scientific progress and the economic and political systems compatible with these perspectives. They will reach out desperately for some way of validating their existence as men in a day when their humanity is daily more threatened. They will search for every -ism, for astrology and scientology, for mysticism and drugs, for sensitivity training and awareness stimulation, for freedom to "do their own thing" while the rest of the world goes on to hell if it must.

The Answer

What they seek is what every man seeks: the knowledge of who he is, and of what the meaning of his life is. There is an answer provided in the person of Jesus Christ and the God who is His Father. But how important it is today to know what the *questions* are. Answers given to questions that are not asked, seldom are accepted.

R. H. B.

A revised version of this article has also appeared in Eternity Magazine January, 1970.

Physics in the Future

Where Do We Go From Here?*

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Because all science feeds on unsolved problems, it is our privilege, from time to time, to make some forecast of the future. Naturally, the forecaster can do nothing about some great surprise that may come, with sudden force, to change the course of a whole science. Nevertheless, in a well developed science such as physics, one can see some invariant driving forces. There are tides in the affairs of physics that drive us onward without cease. The greatest tide of all appears to be explicit faith in the unity and consistency of natural behavior. This faith implies that parts of our subject that develop in relative isolation will come together to form a broader, more perfect structure.

A very striking feature of our times has been the extension of physical and chemical and biological studies to very small sizes and time intervals. I am talking about our ability to deal with atoms, nuclei and elementary particles. Again, there has been extension of our ability to learn about the large-scale features of this universe—this "bourne of space and time," as Tennyson said. These are intellectual and moral endeavors, in the sense that we have to deal with great uniformities in nature; with creation, evolution and final fate.

Here, my unifying thread of thought will be the increasing interaction between subatomic physics and the physics of the heavens. I shall consider some unsolved problems in these fields. The list is highly selective. I have excluded nearly all the things in the mainstream of current effort, in order to include others that now receive little attention but may be in the mainstream in years to come. Let us proceed, beginning with a few topics in fundamental physics.

THE VERY, VERY SMALL

We all know of the close relation between the relativity theory and the quantum theory. However, there are curiosities connected with this matter. Partly they arise because the field on which the game of quantum theory is played is a classical manifold, the field of space and time, or better spoken, "space-time." Let me indicate how these two theories are connected at their very roots.

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Quantum theory is a relativistic theory. The basic papers of Louis de Broglie and of Erwin Schrödinger already showed that the waves belonging to a particle of speed v have a phase speed c^2/v, where c is the speed of light. This formula arises from special relativity; if one uses Newtonian mechanics, a wrong result is obtained.

Special relativity deals with space and time coördinates x and t, so that it is usually considered to be a classical theory; that is to say, a nonquantum theory. This seems to be correct when one considers it as a mathematical scheme; for there is no mention of Planck's constant h in the axioms set up by Albert Einstein. On the other hand, I do not think it is generally understood that this point of view has to be modified a bit when we take a hard look at the *interpretation* of the theory.

There are tides in the affairs of physics that drive us onward without cease. The greatest tide of all appears to be explicit faith in the unity and consistency of natural behavior.

In order to use the theory in physics, we have to say what the quantities x and t stand for, and Einstein made the choice that is really useful. When he said x, he meant a length measured with a real meter stick. He did not mean a hypothetical nonexistent "rigid ruler," the kind talked about in geometry classes. When he said t, he meant a time measured with a laboratory clock. Now, this has consequences. The object to be measured is a dynamic thing, and so is the standard. The meter stick is a group of crystals, a vibrating body held together by quantum forces, and so is the clock. It looks as though we are caught in a vicious circle; we want to study the interiors of atoms with the aid of laboratory standards, and Lo! The standards are made out of the very things we want to study.

True enough, we do not actually thrust a meter stick down into the atom. We have none with divisions fine enough, and we know that such a disturbance of the atom would not be pertinent if we could do so. Actually, we have to study the wavelengths of light emitted (and other useful quantities), recording them

always with the aid of gross apparatus—a favorite topic of Niels Bohr.

Always there are experimental troubles. Always, we are making use of a chain of experimental results and interpretation, concerned with the whole coupled apparatus and based on special relativity and quantum theory together. A central question is whether we wish to use our ordinary ideas about lengths and distances when we get into the domain of the very, very small; is this practice really bad? Not at all. The physicist is always trying to extend the scope of his laws or to find their limitations. He is a great fellow for cutting Gordian knots; so he says:

"I shall continue to use special relativity and quantum theory as a strange pair of partners, to interpret results of my experiments on collisions between elementary particles; and I shall find out whether I run into discrepancies."

Breakdown?

Nowadays, one kind of search for such discrepancies is called experimentation on the breakdown of quantum electrodynamics. It is carried on by studying, for example, collisions between two electrons; one looks at the distribution of scattered electrons to see whether it agrees with predictions from electrodynamics. As of 1968, there was no clear evidence of trouble,[1] down to inferred distances between the collision partners as small as about 1.8×10^{-14} cm.

The question now arises: Could particle theory continue to make use of the customary space-time concept if a breakdown of electrodynamics were found? Let us see. A failure of present-day theory would simply lead to construction of some new formulation, not to a modification of the space-time picture. People would keep that picture. What they want is *consistency* in theoretical talk over the whole range of space-time dimensions, "from zero to infinity." It will be extremely hard to eject the space-time picture from any part of physics. Curvature may be introduced; broader geometries may be invoked, but the continuous manifold will still be there because of the flexibility with which new physical fields can be introduced when experiments appear to suggest their presence.

Weak and Infrequent Things

The success of Fred Reines and Clyde Cowan[2] in starting up the subject of experimental neutrino physics showed us that studies involving miniscule cross sections can be worth a great deal of effort. There is also the search for gravitational waves. It is heartening to know that Joseph Weber[3] has really excellent apparatus to look for these waves; his laboratory is full of seismographs and the like, for throwing out spurious effects from tides and earthquakes. It is still more heartening to know that he has some events that are difficult to explain by means of terrestrial disturbances.

We should not forget that there *may* be very weak forces in nature, still undiscovered, aside from the gravitational ones. I do not know of any current search for such forces.

The whole trend in physics has been to assume that particles are extremely well standardized. Nevertheless a few people[4] have been looking for anomalous or nonstandard particles; here I am talking about aberrant electrons, protons, or what-have-you? The resources of modern technique (and in particular, the capabilities of optical spectrographs) are not now being fully used to make some progress with this matter. The trouble is that when one starts to speculate about such particles, the possibilities are very wide; so one must look very selectively for good opportunities to do an interesting experiment.

The Search for Underlying Levels

In recent years we have seen rather extensive searches for an underlying level of simpler things from which a horde of elementary particles might be made. There was the quark search and the search for Dirac magnetic poles; now there is the interest in so-called "W particles." The quark idea, as a mathematical scheme, is indeed ingenious and interesting. The quarks are sometimes thought of as *the* ultimate particles, but there is a trouble with such ideas. If we had quarks, people would just say, "What are they made of?" This is an example of the *Infinite Regression*—a question such that if you answer it you come up against another question of the same kind.

ASTROPHYSICS AND COSMOLOGY

We are all aware of the highly fruitful relations between advances in atomic and nuclear physics and those in astrophysics and nebular physics. Furthermore, the fruits of cosmic-ray work, radio astronomy and x-ray astronomy show us that high-energy physics is one essential key to the understanding of very violent astrophysical events.[5] But there is mounting evidence that, in a broader sense, particle physics and cosmology are closely related. Let us turn our attention to a few aspects of this fascinating realm of ideas.

Space-time and Matter

It is frequently said that the material content of space and the motion of that material determine the curvature of the space-time manifold. This is often called Mach's principle. Indeed, Einstein's gravitational equations say that a tensor built from curvature quantities is equal to the matter-energy tensor T_{ik}. *If* T_{ik} is treated as an *arbitrary* source term, the above statement is justified, but we are left with an incomplete story on our hands. Thus, if T_{ik} comes from electromagnetic sources, the fields appearing in it should be taken from Maxwell's equations, written out for curved space-time. Then the curvature and the matter-energy tensor are determined together, from these coupled equations. Einstein proceeded in this way, arriving at his first combined theory of gravitation and electromagnetism. True enough, he abandoned it later for reasons of personal taste, but others have carried on, and this first unified theory is a lively field of research even today, 50 years after it was created. However, a salient question still confronts us. When we proceed to a specific case, that of a single electron for example, do we simply put in the electronic charge as an unexplained parameter? Or do we look for underlying relations whereby the electron can be represented as a curlicue of particular dimensions in space-time? To speak more generally—do we want a completely unified theory of space-time and matter, or a dualistic theory? There is a literature on this subject, too extensive for discussion here.[6] An idea of the Mach type runs through it all. If I were asked for a comprehensive generalization of the Mach idea, I would say, "There is just one manifold. The equations describing physical phenomena contain not only fields defined on that manifold but also quantities characterizing the geome-

try of the manifold. The connections are such that the fields and the geometrical quantities are determined together, consistently." And I recommend to the reader some interesting studies of a generalized Mach principle, by Mendel Sachs.[7]

This is a good place to ask, "How is it that space has three dimensions?" This question is at least 70 years old. I have seen nothing on the subject that is more than a plausibility argument, but I have a small suggestion as to a fresh approach. Suppose we use the methods of tensor and spinor calculus to examine physical equations in space-time of several dimensions, from two up to six, for example. Let us cover both classical theory and quantum theory, remembering to look closely at the properties of simple solutions that represent point particles; we search for features that appear particularly desirable or unique (or both), in the case of four-dimensional space-time. If such features emerge, we may understand a little better the preference for three space dimensions in this universe. The results would still be plausibility arguments, but if they looked attractive, we would promote them to the status of assumptions; and that would be that.

Consistency: A Desirable Feature

Perhaps the most significant fact that has emerged from exploration of the distant galaxies is the *general consistency of physical law over very large spaces and long time intervals.* Apparently we are *not* dealing with different bodies of law, linked together only by very weak connections. We appear to be living in a Universe—not in some sort of Diverse, or Polyverse. A cardinal piece of support for this welcome notion is the red shift of Vesto Slipher, Edwin Hubble and Milton Humason. To an approximation, the light from distant galaxies is shifted toward the red, by amounts that can be explained by assuming that they move outward with speeds v, proportional to their distances R from us; the relation is

$$v = 75R,$$

with v in kilometers per second and R in megaparsecs; one megaparsec is 3.09×10^{24} cm.

Allowing for this red shift, we see the same spectral series, the same atomic behavior, that is found here on earth. Of course, this probing out to great distances means that one is looking back a long way in time. What is the inner meaning of this consistency? The distant atoms would not show the spectral series properly if they did not obey the Pauli principle. Those atoms are testifying to identity of the electrons and identity of the nuclei in the whole region available for observation. They are revealing *a most extraordinary degree of quality control in the creation and maintenance* of these particles. Why, not even Rolls-Royce . . . !

Is this uniformity of particle properties due to a uniformity in the properties of space-time itself? Or are these two ideas just the same idea clothed in different words? I leave the answer to you—or your grandchildren.

Long Ago and Far Away

There is another important fact that bears on the question of universal consistency. Suppose an atom in a galaxy 10^9 light years away emits a parcel of energy characterized by a far-ultra-violet wavelength. Looking aside from experimental difficulties, we can set up a suitable bulb containing sodium vapor, here in our solar system, to receive the light. After 10^9 years an electron may be kicked out of a single atom in that vapor. *If* we believe that an electromagnetic field traveled all that time through empty, darksome space, then we have to say that the field causes a definite amount of energy to appear at a target only 10^{-8} cm in diameter, after running through a distance of about 10^{27} centimeters. Also, from the observed conservation of energy in such processes, we have to conclude that the field does nothing elsewhere.

What shall we say about this result? An orthodox quantum theorist might say, "It is all a matter of chance; this matter was explained in 1927." A thoroughgoing determinist might say, "This astounding accuracy of aim is evidence of extraordinary quality control." A classical relativist might say, "All point events that are connected by light rays are at the *same spot* in space-time. We are dealing with a sort of contact action. From the standpoint of a being who perceives point events directly and intuitively, there is no problem." We possess considerable flexibility in contemplation of these answers or others like them; for each answer is based on some set of axioms, and axioms are arbitrary indeed. The orthodox quantum theorist will say, "Yes, but look at the fruits of my axioms." And we shall reply "The *fruits* of your axioms are very great indeed, but a large number of very respectable people are not satisfied with the foundations of your theory."

Perhaps the most significant fact that has emerged from exploration of the distant galaxies is the general consistency of physical law over very large spaces and long time intervals. . . . .We appear to be living in a Universe—not in some sort of Diverse, or Polyverse.

Permanence: A Desirable Feature

Let us consider the permanence of gross matter. The customary estimates of universe duration lie a little above 10^{10} years. It happens that Reines and his students have found lower limits for the lifetimes of electrons and nucleons by looking for their decay.[8] There are some nuances, but roughly the half-life figures are: for the electron, more than 2×10^{21} years; for nucleons, more than 10^{27} years. Thus we are confronted with a terrific factor of safety, 10^{11} at least, relative to the universe duration mentioned above. This looks like very good engineering. The stuff is made so it will last.

Diluteness: A Convenient Feature

People are generally impressed with the vast spaces between the stars of our galaxy, and also the spaces between galaxies, which, on the average, are somewhat like tennis balls 8 meters apart. This diluteness is much to be prized, because violent things happen when big pieces of matter get too close together. I invite your attention to the famous case of the galaxy M 82. A photograph of this galaxy can be found in

reference 9. More or less perpendicular to the disk of the galaxy there are great masses of ejected matter, believed to be mostly hydrogen. There was a big explosion in the middle of this galaxy. The products are pouring out at a speed of the order 10^8 cm/sec. It is estimated that this explosion involved disruption of a million stars in the dense core of the galaxy.

Information From Far Away

How much can we hope to learn about very distant objects? In general, the farther away an object is, the less we can find out about it. Details fuzz out; light signals from the object are fainter; spectra move out to the infrared. It is only in recent times that attention has been paid to the quantitative side of this common observation. Kenneth Metzner and Philip Morrison[10] have calculated the amount of information carried to us by the photons from a distant galaxy in any experiment of limited duration. They consider simple expanding universes of several types. This is a matter worthy of further research, because it can show us the boundary between verifiable physics and unverifiable speculation. Beyond the domains where individual galaxies can be identified—and there are hundreds of millions within sight—there may be others that show up as a faint general background. Astronomers know that they must increase their studies of this faint background light, when more big telescopes come on stream, a few years hence.

If and when they reach the limit of their resources, we shall be confronted with an interesting situation. For a long time philosophers have been saying that physicists continually work on the soluble problems, so that metaphysics is necessarily the bin of unsolved ones. Now I shall leave it to the reader to ponder the situation of an experimental science that reaches a limit because the objects under investigation cannot provide sufficient amounts of information to our detectors to give the answers we should like to know.

EPILOGUE

I have pointed out some lines of endeavor that lie at or beyond the present limits of our capabilities, and I have only two hints for those who may choose to attack these matters. The first is that one should pay close attention to a method used by Rene Descartes. I call it the "Method of Complete Skepticism." He adopted a systematic policy of denying any statement he was considering and of looking at the consequences. The second hint is connected with economy and simplicity of thought. I quote the famous dictum of William of Occam: *"Entia non multiplicanda sunt, praeter necessitatem."* Entities are not to be multiplied except for reasons of necessity.

In closing, I mention once more the consistency, the connectivity, revealed by physical studies up to the present. Though each of us usually thinks of himself as a part of the universe, this is a one-sided view, for great portions of our surroundings are always exerting their influence upon us. As an overstatement, one might say that the universe is a part of every man. Sir George Thomson[11] says in his book, *The Foreseeable Future*:

> "The universe that includes our perceptions and our feelings is one, and no single part can be put into a ring-fence completely isolated from all the rest."

Therefore I end this story with the thought: The universe is the proper study of mankind.

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A Psychologist's Perspective

The Manipulation of Human Behavior*

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While attempts to manipulate human behavior are very old, it is only recently that scientists have begun to study ways in which successful manipulation occurs. Research in the control of behavior through sensory deprivation, conditioning, and psychotherapy is typical of what is being done by psychologists who are interested in behavior manipulation. In view of the research findings, scientists—especially those who are Christians—must face several pertinent questions. Can behavior really be manipulated? What are the dangers in man's ability to control and manipulate? How do we prevent unethical people from using this knowledge for their own personal gain? Should we use these techniques of manipulation in the church? This paper gives some tentative answers to these questions.

Modern man is a manipulated man. While boasting of individual freedom, his behavior and thinking is controlled—sometimes subtly—by advertisers, political candidates, government officials, military leaders, counselors, employers, preachers, news media, social norms, and economic developments in the society. Publishing houses and research funding organizations manipulate the writer and researcher in his work. Parents manipulate their children, and children soon become skilled in manipulating adults. Teachers and students are involved in similar mutual manipulation. Even husbands and wives attempt, at times, to control the behavior of each other.

The attempt of one person to control the behavior of another is very old. It began with Eve and has continued throughout history. For the most part, the early methods of behavior control were discovered by chance. Some techniques worked and were retained. Others failed to work and were discarded to be replaced by some new method which, hopefully, would be more successful.

While non-scientific attempts to control behavior are old, the scientific study of behavior manipulation is, in contrast, relatively new. In psychology, experimentalists have investigated ways in which external and internal stimulation can change human and animal behavior. Clinical and other applied psychologists have sought to understand behavior with a view to removing, modifying or retarding neurotic symptoms; promoting adjustment and personality growth; resolving internal conflicts; stimulating learning; increasing efficiency of employees; and changing behavior in numerous other ways. It is not surprising that psychology has come to be defined as a science which seeks to understand, predict, and *control* behavior.

But the scientific investigation of behavior manipulation has not been limited to psychology. Biologists, geneticists, pharmacologists, economists, physiologists, sociologists, communication experts, and others have studied the problem empirically and have shown that human behavior can be altered and controlled with a high degree of efficiency. Space does not permit a survey of recent research developments concerning the control of behavior by shock or other physical stimulation, surgery and electrical stimulation of the brain, manipulation of genes, drugs, group pressure, mass media, hypnosis, persuasion, education, or the arousal of fear.[1]

For many people, the words "manipulation" and "control" of human behavior have a bad connotation. Popular novels such as Orwell's *1984*, Huxley's *Brave New World*, or *Walden Two*—written by B. F. Skinner, a prominent research psychologist—have led us to fear the implications of one person having the power to control and manipulate another. In our lifetime we have seen men like Hitler, Stalin, and Mao Tse-Tung control the behavior of millions and we are concerned lest such manipulation power again get into the hands

*Earlier drafts of this paper were presented at regional meetings of the North Central and New York Metropolitan Sections of the ASA.

of ruthless despots. Until recently, however, most scientists have been reluctant to consider the moral implications of this knowledge. We have worked on the hopeful assumption that an issue which is ignored will eventually disappear and perhaps even solve itself. It is now time for science to face the fact that we have uncovered some powerful and potentially dangerous manipulation devices.

Following a definition of behavioral manipulation, the remainder of this paper will summarize experimental evidence from three selected areas in psychology, and discuss some of the ethical implications of man's ability to control and manipulate behavior.

DEFINITION

Although there may be some technical differences between "control" and "manipulation", in this paper the terms will be used interchangeably. Following the lead of Ulrich and his colleagues (1966), behavior control or manipulation can be defined as *the changing of environmental conditions to which an organism is exposed so as to bring about a definite behavioral result.* The result may be a production of new behavior, a maintenance of existing behavior, and/or an elimination of undesirable behavior.

EXPERIMENTAL EVIDENCE

1. *Reduced environmental stimulation* (more commonly referred to as "sensory deprivation") became a topic for careful psychological study after a number of solitary explorers, shipwrecked sailors, and isolated prisoners of war had published autobiographical descriptions of their reactions to being alone. Admiral Richard Byrd (1938), for example, voluntarily spent 4½ months alone in the antarctic. He recorded his experiences in a diary and later described his reactions in a book. Originally, Byrd had hoped to "taste peace and quiet and solitude long enough to find out how good they really are." Instead, in the dark polar night, snowed in, confined to the monotonous unchanging surrounding of a small space, and with little or no sound from the outside, his life became a nightmare. He experienced absent-mindedness, hallucinations, severe depression, loss of motivation, fears, and strange ideas that he was floating like some disembodied spirit in timeless space. In his own words, he "felt the tremendous need for stimuli from the outside world and yearned for sounds, smells, voices and touch." During the Korean war psychological and physical isolation was one technique used by Communist Chinese brainwashers to control the thinking and behavior of prisoners.

We have worked on the hopeful assumption that an issue which is ignored will eventually disappear and perhaps even solve itself. It is now time for science to face the fact that we have uncovered some powerful and potentially dangerous manipulation devices.

In the early 1950's a group of psychologists at McGill University conducted the first of several experimental studies to determine the influence on behavior of reduced environmental stimulation (Bexton, Heron and Scott, 1954). Undergraduate volunteers were paid $20 a day to come to the psychology department and essentially do nothing. Both the rate of pay and the job description must have sounded attractive. A number of people volunteered and were requested to lie on a comfortable bed in a semi soundproof room for as long as they wished to stay. They wore translucent goggles and long cardboard cuffs which extended beyond their finger tips. This prevented them from looking around and reduced tactile stimulation. Eating and going to the toilet were the only deviations from this inactive routine.

At first, the subjects passed the time by thinking about their studies, their friends, their personal problems, and other matters. Then most fell asleep. When they woke up the trouble began. They became bored, restless, irritable, and hostile towards the experimenters. They engaged in fantasy and appeared so eager for stimulation that they would talk to themselves, whistle, sing, or recite poetry. Some experienced auditory or visual hallucinations and when they were tested with intelligence, perceptual-motor, learning, and thinking tests, most showed a marked impairment in their functioning.

The original work at McGill gave impetus to several related studies. In one of the most dramatic of these, subjects were equipped with a breathing apparatus and then were submerged to hang suspended in a tank of water (Shurley, 1960). In this and similar studies the results of the McGill research were supported (Zubeck, 1969).

On the basis of this work, we know that human behavior can be altered by reducing the input of stimulation. Some of the practical implications are obvious! If a person is kept in solitary confinement his intellectual and perceptual functioning will be impaired, he will become more open to the suggestions of others, and his behavior will become more easily controlled and manipulated. Children who are raised in isolated environments develop at a slower rate, have more disease, and often develop psychological abnormalities which cause them to be misfits in society (Goldfarb, 1945).

But the studies of reduced environmental stimulation also have more positive implications. One study has shown that a reduction in stimulation interferes with efficient functioning in pilots. With this knowledge, the people who are responsible for military and space programs can be aware of the need for changing environmental influences as pilots and space captains guide their vehicles on long journeys. On the ground, policemen, highway department officials, and researchers studying accident prevention, should be alert to the impact on drivers of long monotonous trips and unchanging stretches of road. Physicians are recognizing that some of the disorientation and inefficient thinking of people who are in respirators or casts, and some of the disorientation of older people who live in lonely rooms may be due to the lack of changing stimulation. In addition, we all know that if someone gives a talk which is boring (i. e., not very stimulating) the listener's mind wanders. He thinks about other things in an attempt to provide

himself with an adequate level of stimulation. This presents a challenge to any speaker who wants to manipulate the behavior or thinking of his audience.

All of this is complicated by the recognition that there are individual differences in the way people respond to reduced stimulation. Nevertheless, an appreciation for the importance of adequate stimulation and an understanding of the disruptive influence of reduced environmental stimulation enables us to control and manipulate behavior more effectively.

2. *Conditioning* and the whole field of behavioral modifications through learning techniques is another area of special interest to psychologists. Here the work of Ivan Pavlov and of B. F. Skinner are primary in a monumental body of research.

Ivan Pavlov was a Russian physiologist and Nobel prize winner, interested in the study of digestion. As every beginning psychology student soon learns, Pavlov discovered that the flow of saliva in a dog's mouth was influenced not only by the taste of the food, but also by the sight and anticipation of food. This observation led Pavlov to perform some experiments in which he discovered that if a buzzer was sounded immediately prior to presentation of the food, salivation would begin in response to the buzzer. Pavlov called the buzzer a conditioned stimulus. It was a stimulus which had originally brought no response from the dog but which the animal learned to associate with food. The saliva which flowed in response to the buzzer was called the conditioned response.

In the early 1920's, two psychologists described a study in which they had applied Pavlovian Conditioning techniques to the learning of emotional behavior in children (Watson and Rayner, 1920). A nine-month-old child named Albert was observed as he played with some little animals including a white rat, a rabbit, and a dog. At no time did the child show fear of this situation. Then the conditioning began. Whenever the child touched an animal a loud noise sounded behind him. (One of the experimenters hit a suspended steel bar with a hammer to make the sound). This sound scared Albert and caused him to cry. Quickly he learned to associate the animal with the noise, just as Pavlov's dogs had associated a buzzer with food. Whereas the dogs salivated at the sound of the buzzer, Albert began to cry at the sight of the animal.

On the basis of their work, these researchers suggested that many of our fears and phobias are really emotional reactions that we have learned by conditioning. If this is so we should be able to get rid of them by conditioning procedures. Other experimenters used conditioning techniques to take away a child's fear of animals and they succeeded in restoring him to his normal pre-experimental state.

This and similar research stimulated a number of attempts to use conditioning procedures for the control and elimination of such undesirable problems as bed wedding, asthma attacks, and excessive drinking.

One interesting study treated drinkers with Pavlovian conditioning procedures. First, the subjects were given a drug which normally produced vomiting. Immediately prior to the vomiting they drank an alcoholic beverage. It was hypothesized that the alcohol would become a conditioned stimulus which would be associated with vomiting. The procedure was somewhat humorously described as follows:

> Each patient was responsible for bringing a towel, blanket and a bucket to the treatment room (these patients soon became known as the "bucket brigade"). While in the treatment room, conversation was restricted and attention was focused only on the alcoholic beverage. Each man was obliged to fill his own water glass from his individual pitcher. It is necessary that the patients consume fairly large quantities of tepid water, occasionally in the amount of two liters during the treatment session, as it seems to potentiate emesis and also obviates "dry heaves."
>
> On entrance into the room, patients are requested to take places around the table. They are cautioned to refrain from conversation and to concentrate intensively upon the alcoholic beverages before them. Each patient drinks two glasses of tepid water and then receives an injection of emetine mixture. Each therapist is provided with a data sheet upon which he records the amount of medication given his patients, the time of onset of emesis, and general behavioral observations.
>
> Shortly after the injection is given the members of the group are requested to uncap the liquor bottles, open the beer, and pour themselves a 2-oz. glassful of the beverage of their choice. At frequent intervals each man sniffs at his glass, and only when gagging begins, or when it seems likely that the individual is about to vomit, is it suggested that he drink the liquor. Between bouts of emesis the patients are encouraged to drink copious amounts of water and as many different beverages as possible are included in the pour-sniff-drink routine.
>
> Sessions usually last from 30 to 45 minutes. The group is not released until all doubt is dispelled from the mind of each participant that he cannot tolerate any of the alcoholic beverages on the table (Miller, Dvorak, and Turner, 1964).

Well over a hundred attempts have been made to treat alcoholism with conditioning procedures, such as this. The success of these attempts has been varied, but in the study described about half of the subjects stopped drinking altogether and the others cut back in their alcoholic consumption, at least temporarily.

Psychotherapy is a procedure wherein a professionally trained person, known as a therapist, seeks to manipulate, control and modify the behavior of another person, known variously as a patient, client, or counselee.

While Pavlov's work has led to some interesting attempts to control human behavior, the research of B. F. Skinner at Harvard has been the stimulus for most of the recent conditioning studies. The greatest part of Skinner's work has been done with pigeons who are trained to peck at a round disc in return for food. This food is called "reinforcement" because it strengthens or reinforces the pecking behavior and increases the likelihood that the pigeon will peck again. Skinner found that the pigeon's behavior could be effectively manipulated and controlled by the presentation of appropriate reinforcement.

But could the same principles be applied to human behavior? There are now several hundred studies which suggest that the answer to this question is "yes". Human behavior can be manipulated and controlled by reinforcement. Some researchers on the west coast, for example, have shown that the content and speech

duration of a person in an interview can be directly controlled by the utterances, head nods, and "Mm-hmm's" of the interviewer (Matarazzo, 1965). A job seeker or distressed patient is usually anxious to please the interviewer. For this reason even a slight smile or head nod from the man behind the desk is reinforcing to the person being interviewed and encourages him to continue the behavior or topic of discussion which was reinforced.

By administering desirable reinforcement following acceptable behavior, and withholding reinforcement following undesirable behavior, psychologists have been able to change the behavior of uncooperative children so that they cooperate; modify the behavior of mute psychotic patients so that they talk; control the actions of schizophrenics; eliminate thumbsucking, stealing, crying, tantrums, stuttering, excessive vomiting, hyperactivity, and social withdrawal in children; control overeating; eliminate phobias; train retarded children; treat neurotics; and eliminate undesirable sex behavior.[2] I have even heard of studies in which the behavior of speakers has been controlled by the members of the audience—sometimes with neither the speaker nor the audience being aware of what is happening. Apparently, the research behavior of scientists is manipulated by the giving of research grant reinforcements for performances of one type of research behavior and the withholding of reinforcements for proposals to study something else. Dr. Skinner, the man who started most of this, has himself shown how teaching machines can provide reinforcement at the most desirable time and bring about more efficient learning (1968).

Of course there are critics of these conditioning procedures both within the field of psychology and without. Some have pointed out that conditioning doesn't always work. But more often it does work, and I suspect that the terms "reinforcement" and "conditioning" describe many of the manipulation techniques which we use to control the behavior of our children and of each other.

3. *Psychotherapy* has been defined as:

> A form of treatment for problems of an emotional nature in which a trained person deliberately establishes a professional relationship with a patient with the object of removing, modifying or retarding existing symptoms, of mediating disturbed patterns of behavior, and of promoting positive personality growth and development (Wolberg, 1954, p. 3).

To me this is another way of saying that psychotherapy is a procedure wherein a professionally trained person, known as a therapist, seeks to manipulate, control, and modify the behavior of another person, known variously as a patient, client, or counselee.

Of course psychotherapy is not exclusively a function of psychologists. Psychiatrists, social workers, pastoral counselors, and many others spend their lives attempting to help distraught, confused and unhappy people to change their behavior in ways that will make their lives happier.

Psychotherapists use different techniques and have different goals, depending somewhat on the patient's problem and on the therapist's personality, abilities, and theoretical position. Some therapists attempt to change behavior by encouragement, support, and reassurance; some try to promote patient insight into problems; some try to teach new methods of behavior;

It is a matter of historical experience that those who by one means or another exercise absolute control over their fellow men have a propensity to exempt themselves from the restrictions and prohibitions which they impose on others. They above all wish to act as gods —decreeing, but not themselves submitting to the decrees they enforce. In controlling the lives of others they will themselves be uncontrolled. But not ultimately; for they are not really gods, but men; and however impregnable their tyranny may be it is ultimately subject to the control of death and of judgment at the throne of the one true God. But meanwhile the urge of unregenerate man is to be as God and to exercise plenipotentiary authority over his fellow creatures, as though he himself were creator and lord of all. Unregenerate man hates the divine image in which he is created. The resulting corruption of his nature guarantees the corruption of the power he seizes. Hence the nemesis by which his footsteps are dogged. The idealistic utopia he first envisioned becomes a place of torment and brutality. Hitler the redeemer becomes Hitler the monster and the destroyer. The Nazi utopia, originally so bright and beckoning, is stamped not with the image of God but with the mark of the beast; its incense is the stench of corpses. Of all individuals the most psychotic is the one with the mania for power. The facade of his impregnability can be propped up only by the control not merely of the bodies but also of the minds of those whom he wishes to dominate. Mental manipulation which reduces persons to puppets and the insecurity which is bred from the knowledge that everybody is trained to be an informer have already become commonplaces in the totalitarian regimes of our day. The philosophy of 1984 *has ceased to have a futuristic ring.*

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some encourage patient expression and ventilation of pent-up feelings; some give advice and suggestions; some make interpretive statements about patient behavior; some work with individuals; some work with groups; and most therapists use a combination of these techniques.

It has been estimated that at least 200,000 Americans are paying anywhere from $5 to $50 an hour to get help from psychotherapists. Since people are willing to pay to have their behavior changed in this way, the implication is that psychotherapy works. At present, however, nobody has empirically demonstrated this. H. J. Eysenck (1952), a British psychologist, who has devoted considerable effort to research in the effectiveness of psychotherapy has concluded that psychotherapy, psychoanalysis, and other such treatment techniques are ineffective and valueless. Eysenck and a number of professionals who agree with him would surely applaud one critic's definition of psychotherapy as "an undefined technique applied to unspecified problems with unpredictable outcomes."

Few psychologists are willing to throw out psychotherapy, however. In the first place, it is one of the best techniques thus far devised for treating distraught behavior. Secondly, present research concerning therapeutic effectiveness or lack of effectiveness, is far from convincing. To a large extent this is because research on therapy is very difficult. The therapists (especially the insecure ones) often are reluctant to be investigated; it is important to insure that research does not interfere with a patient's treatment; it is difficult to arrive at satisfactory criteria of "improvement"; concepts like "insight," "catharsis," or "degree of rapport" are almost impossible to measure; and since it is unethical to withhold treatment from people who want it, we have difficulty getting control groups.

I do not believe that we can trick or psychologically manipulate a person into become a Christian.

Perhaps Rosen and Gregory in their text on abnormal psychology give the best answer to the problem of therapy's effectiveness. "Since no research so far performed has succeeded in the difficult, and perhaps impossible, task of controlling all the relevant patient and therapist variables while conducting a study of adequate size, there is to date no definitive proof or disproof of the effectiveness of psychotherapy" (1965, p. 219). Undoubtedly psychotherapists do control and modify behavior, although the evidence in support of this is still incomplete.

CONCLUSIONS

Man's increasing ability to control, manipulate, and modify the behavior of other men, raises a number of ethical issues which scientists and Christians cannot ignore. From my perspective as a psychologist it would appear that we must face at least four pertinent questions.

1. **Can we control and manipulate human behavior?** I am reminded of Dr. Elving Anderson's address to the A.S.A. a few years ago (1966). In discussing genetic control he suggested that it is not a question of can we or should we control—we are already doing it! In the case of psychological manipulation, some of the techniques are exceptionally subtle. Not only do we control behavior now, but as research continues—and I doubt that it would be possible or desirable to stop such studies—our abilities to control and manipulate behavior will be even greater.

2. **What are the dangers in our ability to control and manipulate behavior?** The danger is not in the research findings but in their potential misuse. A few years ago, a physicist, Dr. A. R. Oppenheimer, in addressing members of the American Psychological Association, gave a similar warning. "The psychologist can hardly do anything without realizing that for him the acquisition of knowledge opens up the most terrifying prospects of controlling what people do and how they think and how they behave and how they feel" (1956, p. 128).

As was suggested at the beginning of this paper, sometimes we avoid using the words "control" and "manipulation" because we don't want to face the moral, ethical, and legal implications of the fact that our techniques could be used to enslave people, depersonalize them, and control them by a means so subtle that they would never realize that they were being manipulated.

When faced with this possibility we must remember two things. First, in our complex society some control of human behavior is inevitable. The government, the economy, and the mores of the culture all exert a control which is essential to our survival as a civilization. Secondly, we must realize that the techniques which can enslave people are also able to free men in order that they might be more happy and productive. The same reinforcement techniques which could make us into robots, could also change our educational procedures so that we are able to learn with greatly increased efficiency. The same sensory deprivation studies which bring about psychotic symptoms can also help us to understand old people or to prevent automobile and airplane accidents.

3. **How can we prevent unethical people from using these devices to serve their own selfish ends?** I suspect that the answer to this question lies in an increased awareness of ourselves and of the world in which we live. There are at least five ways by which this awareness can be increased.

a. We can conduct research into the nature of behavioral control and manipulation. The attempts to study the effectiveness of psychotherapy are steps in this direction and so are a whole series of studies designed to show how to resist persuasion.

b. We can increase communication between the general public and research investigators. If the public knows what we are doing, they are less likely to be manipulated against their will and they are less likely to be influenced by sensationalist writers. It has already been empirically demonstrated that awareness of the manipulator's goals and techniques is a good way to resist manipulation.

c. We can learn more about ourselves—our needs, our values, our emotions. We cannot be easily manipulated if we know more about ourselves than does the would-be manipulator.

d. We can learn to see each other as persons, rather than manipulable objects. According to Elton

Trueblood, we must "make a real effort to see persons as *persons*—and not as our servants or masters or teachers or students or steppingstones for our own progress" (1961, p. 110). We are less likely to manipulate others when we remember that each of us has feelings, aspirations, frustrations, and hopes.

e. We must realize that if the nature of man can be changed so that he is under the control of the Holy Spirit, he will not be involved in manipulating other people for selfish motives. Such a change in nature comes only when an individual realizes his sin and need for a savior and invites Christ to be Lord of his life.

A few years ago, B. F. Skinner (1955-56) suggested that there is another way to prevent the misuse of controlling power. We must continue to work out laws and systems of government which prevent the strong man from using his power to enslave others. "Control itself must be controlled" by group pressures, and by governmental and religious measures.

4. **Should we use techniques of behavior manipulation in the church?** This question is of special concern to evangelical Christians. Pastors, Christian education directors, missionaries, Sunday school teachers, and other church leaders are actively involved in the work of manipulating other people's behavior. We want, for example, to bring men who are unsaved to a saving knowledge of Jesus Christ. We want to assist the believer to grow in his faith and to live a purposeful spiritual life. We also want to train Christians so they can study the Word of God on their own and spread the Gospel through effective witnessing. Since so much is known about behavior manipulation, should we be using psychological techniques in order to bring about these changes in behavior? Should we be using these manipulation techniques in world evangelism?

Difficult problems rarely have simple solutions and so I leave these questions without an answer. Let me conclude with one personal opinion, however. I do not believe that we can trick or psychologically manipulate a person into becoming a Christian. It is the Holy Spirit, and not any psychological techniques, who works in men's lives to convict them of sin and of their need for Christ. In a recent address the president of Moody Bible Institute dealt briefly with this issue:

> I shall respect each man's right to his faith or even lack of it. But that does not mean that I shall not attempt to convert him. I'll oppose any attempt to coerce him, or force him by physical or other means to a decision against his will. For I believe God wants only the glad-hearted, willing surrender of a heart to Himself.[3]

Nevertheless, pastors, evangelists, and other Christians are currently using psychological techniques—sometimes in ignorance—in an attempt to change behavior. As a result of this preaching people are sometimes "won" as "converts." But the man who is persuaded by gimmicks is not really converted. No wonder he "falls away." Psychological techniques of manipulation can be misused in the church. Whether they can or should be used as a vehicle through which the Holy Spirit works, is a question which I leave for some theologian or Bible Scholar to answer.

FOOTNOTES

[1]There are several concise surveys of research in the field of behavior manipulation. The interested reader might check the work of Biderman and Zimmer (1961), Brown (1963), Farber and Wilson (1961), Neuringer and Michael (1970), Sonneborn (1965), Uhr and Miller (1960), Ulrich, Stachnik and Mabry (1966) and Zubeck (1969).

[2]Most of this research is described in Ulrich, R., Stachnik, T., and Mabry (1966), and in Neuringer and Michael (1970).

[3]From a sermon delivered during the 1967 Founders Week Conference by William Culbertson, Moody Bible Institute, Chicago, Illinois.

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A Sociologist's Perspective

The Manipulation of Human Behavior*

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Despite the fact that most people react negatively to the idea of being manipulated, much human behavior aims at manipulating others. The necessity for orderliness in human relationships demands social control over individual and group behavior. Socialization and other forms of control in the family, education, employment, welfare institutions, law, corrections, medicine, politics, mass communications, salesmanship, churches, science, and every other realm of human endeavor involve varying forms and degrees of "manipulation." Much of this takes place in a manner and context that allow man to feel as if he is free and independent, but there are many limitations to human freedom. The goals of control in every society include the "containing" of persons, perspectives, and groups which are interpreted as "detrimental" to societal welfare. Since all men are to a degree autonomous, they have moral responsibilities. Understanding the nature and consequences of social control can increase liberty, as does the fact that we live in a pluralistic society. In their manipulative behavior, Christians ought to implement scriptural values.

As Americans, we tend to react against anyone who is labeled a "manipulator." We fear such persons, thinking that they may use their manipulative influence upon us or upon our wives, children, and friends. People who are not members of labor unions hence tend to be highly critical of COPE, the Committee on Political Education of the AFL-CIO, in its efforts to get laboring people to the election polls and to stimulate them to vote for politically "liberal" candidates. When they pour large funds of money into key electoral districts, they are charged with "manipulating the vote."

Likewise, some have been very critical of the propagandistic activities of the American Medical Association, which has given its members extra assessments in order to pour millions of dollars into its campaign against "socialized medicine;" it has successfully prevented the passage of numerous pieces of proposed social legislation and thus has "manipulated" the political fortunes of our nation. Efforts of the National Association of Manufacturers, the Foundation for Economic Education (publisher of *The Freeman*), and *Human Events* to promulgate their interpretations of liberty are interpreted as propagandistic "manipulation" by those who do not sympathize with them, as are the publications and fulminations of Carl McIntire, Billy James Hargis, and Howard Kershner. Meanwhile, the followers of these and similar "right wing" gentlemen are convinced that their movement is giving "the true facts," educating the nation, and sounding a clarion call to freedom while the American Civil Liberties Union, Americans for Democratic Action, the Southern Christian Leadership Conference, the National Council of the Churches of Christ, and other organizations are distorting information, suppressing truth, and stealthily and subversively "manipulating" the masses, moving them gradually into the morass of "creeping socialism."

The point I wish to emphasize through these illustrations is that *our own in-groups*, the groups with which we personally identify ourselves, *never manipulate;* they educate, inform, warn, guide, persuade, explain, edify, instruct, enlighten, disseminate the facts, disclose, unmask, clarify, affirm the truth, and defend the public weal. Our own group is honest, frank, plain-speaking, truthful, trustworthy, pure, scrupulous, and without equivocation. Our own group is consistent with history, with the welfare of our nation, and with the great traditional virtues of our faith.

It is only out-groups, groups from which we are alienated by aloofness or antagonistic non-membership, that manipulate. They indoctrinate, propagandize,

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garble data, misinform, pervert the truth, deceive, misrepresent, cloak the facts, falsify, misinterpret, engineer consent, engage in pressure politics, lobby, and go about spreading lies in cunning craftiness. Their members are equivocators, propagandists, subversionists, masqueraders, brainwashers, or scoundrels who are anxious to stab us or our cause in the back. They are sly, stealthy, surreptitious, evasive, secretive, beguiling, double-tongued, hypocritical, and insidious prevaricators or charlatans.

In other words, manipulation is always an act of somebody else. We influence; others manipulate. We educate; others indoctrinate. We disseminate truth; others disseminate lies and half-truths. We give men the kind of education that liberates; other so-called educational programs are suspect because they tend to enslave their students in isms of one sort or another.

As Piet Hein, the Danish poet-philosopher, put it in his "grook" about *Mankind,* men are good to their brothers and want to mend their ways, but they do not want to mend their own.[1] There is a paradox in all this. None of us wants to be manipulated, but all of us are inclined to want the power, the status, the honor, and related results of manipulating others.

Manipulation Is Inevitable

Manipulation is present in varying degrees in all areas of man's social life. Parents manipulate their children. Spouses manipulate their mates. Teachers manipulate their pupils. Employers manipulate their employees. Social workers manipulate their clients. Parole officers manipulate their parolees. Medical doctors manipulate their patients. Political parties manipulate their candidates and prospective candidates. Editors manipulate their authors and reporters. Publishers manipulate their editors. Salesmen manipulate the thought processes and actions of their customers. Pastors manipulate their congregations. Young men manipulate their girl friends. In every instance, there is a certain amount of feedback and attempts at counter-manipulation.

Anticipatory socialization is present in many of these realms of human activity. Expecting to become a businessman in the future, the student of business administration begins to act and think like a businessman. Hoping to become a college professor, the graduate student adapts his behavior and thought processes toward the professorial role as he understands it. Planning to be a mother in the distant future of adult life, the little girl acts toward her dolls as she thinks mothers should act or as she sees them act toward their babies. What men hope to become thus helps to make them what they actually do become.

There are great variations in the techniques used in the numerous patterns of manipulative social control. The robber uses a different set of methods for manipulating his victims from those of the blackmailer. The confidence man uses methods which differ from those of the shoplifter. The Don Juan who seduces "innocent" girls uses methods which are not the same as those of the panderer finding clients for his prostitutes. The evangelist's methods are not the same as those of the dictator to whom full political powers of censorship are added to conventional propaganda. A church's board of Christian education or the nominating committee of a professional society does not manipulate its "pawns" as readily as the sales manager reassigning territories to his staff. The parent cannot use the same techniques on his teen-agers as he used on them when they were of pre-school age. Nevertheless, manipulation is present in all of these activities to some degree.

Manipulation is always an act of somebody else. We influence; others manipulate. We educate; others indoctrinate. We disseminate truth; others disseminate lies and half-truths.

Man's Sense of Freedom

The degree of manipulability varies greatly. It is a product of the resistances internal to the person as well as of external conditions in the social situation. The more subtly and effectively men are controlled by their environment, the less is the degree to which they ordinarily realize they are being controlled. The better they have learned to "follow the rules," the freer they feel.

Every person is a product of his society as well as of his biological heredity. He is controlled by that society to a very high degree. The language he uses is determined by it. The basic customs, folkways, mores, and laws which regulate his behavior are given to him by society. His *Weltanschauung* is acquired chiefly from his society and the subcultural groups of which he is a part. The food he eats (and that which he refuses to eat) is culturally determined, as well as culturally provided.

Some portions of these social pressures and influences upon us are relatively easy to perceive, but others are not evident until we have stepped actually or vicariously outside of our own culture and subculture through study, reading, television, conversations with cosmopolitan people, and other experiences. We readily perceive the soldier of an occupying army or the policeman on the corner as he controls human behavior, but informal social controls are more difficult to identify. We tend to cloak the latter under the guise of "naturalism;" we assume that our refusal to eat insects, snakes, or horseflesh is part of "human nature," for our own cultural ways of doing things are not normally questioned. But we see Hindus who refuse to eat meat as "contrary to human nature" on the basis of the same ethnocentric interpretations. Yet the Hindus know that beef-eating is not only pagan and sub-human but that it also will make them ill. Both our values and the Hindus' are products of social control; society has manipulated us.

As Alfred McClung Lee expressed it, "When things go well, we may like to dwell on how free and independent our will is."[2] We may even like to think that we personally are the masters of our fate and the captains of our souls. When, however, things do not move smoothly, we may blame outside determinants for our experience. Divine Providence, luck, heredity, magic, economic factors, society, or other influences are then assumed to control our ill fortunes.

The *feeling* of being autonomous or being controlled is not the same as actual conformity or nonconformity with manipulative social pressures to which we all are exposed.[3] When social controls have become a part of our own personal internalized habits and values, we conform "of our own free will" without

recognizing the fact that social forces modify and direct our behavior.

> The type of social control most difficult to sense . . . is that which operates by virtue of the fact that each person is a product of his society. To a considerable extent the society guides his behavior by virtue of having formed his nature . . . . The concept of the human as a person with a responsible and free mentality . . . thus appears to be sociologically inadequate because it fails to recognize the amount of control which the person cannot resist because he is utterly unable to perceive it.[4]

This, nevertheless, does not remove all personal responsibility from the individual, for he experiences many pressures from diverse sources, and there are usually many alternatives of action open before him within the scope of his "conditioned freedom." From this range of freedom open to individual choice within his socially controlled and culturally determined situation, each person is responsible for much of his behavior.

Social Limitations on Freedom

The degree of unanimity in society is related to the degree to which its members feel controlled. Those who wish to return to the mythical "good old days" when everybody presumably shared the same religious, moral, ethical, and cultural values actually are desirous of returning to an age in which men were, as a whole, much *more* manipulated and controlled by influences external to the person than they are now. Indeed, our modern interest in manipulation and control may be due to a considerable extent to the breakdown of the older forms of social control which has resulted from industrialization, urbanization, and other radical changes in modern civilization. No longer is every detail of a person's conduct subject to the scrutiny of next-door neighbors who are concerned about every area of a person's life, to the restraint of a church that attempts to make conforming automatons out of its members by providing them with a guidebook of rules and regulations that has clear black and white answers for every problem and thus makes it unnecessary to make any decision other than a "Yes" or a "No" to any given opportunity, to the influence a school that is closely linked with the church and helps to control behavior in a manner and direction consistent with those of other community institutions, and to the pressures of an employer who holds direct sanctions over family life and leisure-time activities.

The degree of freedom and control varies greatly, in other words, with social conditions. There are great differences among societies as well as from one community, functional grouping, or subculture to another within the same society. These differences apply, among other things, to the degree of manipulation, the forms or types of manipulation, the techniques of manipulation, the goals of manipulation, and reactions to manipulation.

The goals of social control once were uniformity. Today, with the great variety of groups and perspectives in society, the goal tends to be individual consistency within a general framework of societal welfare. Individuality is prized, and it can be exhibited to a far greater degree than in the past, for its acceptable boundaries have been vastly extended. Supreme Court decisions related to mass entertainment and freedom of the press reflect the expansion of personal liberty and increase the individual's responsibility for controlling his own behavior instead of being "protected" by the narrow conceptions of "public morality" which greatly limited personal choices under past conditions.

There are varying degrees of resistance to manipulative social control. We expect complete conformity from the convicted criminal who is undergoing a prison sentence. We expect little conformity from persons who are considered to be "creative" in the performing arts—but the actors who play the various dramatic roles created by these creators must conform strictly to the demands of their parts and the instructions of the producer. We are free to resist the orders of our employers, but usually exercising this freedom frees us of our jobs!

People who are labeled as nonconformists sometimes conform highly to one another; their subgroup has become for them a manipulative overlord. Their nonconformity is restricted to limits which, in our society, are gradually expanding with the legal breakdown of certain rules that have hampered the civil liberties of many subcultural groups.

The alternative choices that are open to individuals are themselves cultural products. They are not unlimited, and the exercise of choice even among the limited possibilities is subject to numerous restrictions that could be labeled "manipulative." I am free to fly to Australia, but the financial costs, my sense of obligation to many duties, and other restrictions related to such a trip hamper my freedom.

Our modern interest in manipulation may be due to a considerable extent to the breakdown of the older forms of social control which has resulted from industrialization, urbanization, and other radical changes in modern civilization.

One of the tasks before every society is that of "containing" persons and groups which are detrimental to social welfare. Thus we imprison criminal offenders who are deemed incorrigible, and we place the bounds of probation and parole upon others. We lock up drug addicts while they are in process of physical and psychological rehabilitation. Parents may "ground" their teenagers after they have indulged in conduct that they feel is not consistent with their own welfare or that of the family. The most effective constraint of all is that which comes from within the mind or "heart" of the person—that which rests upon realistic self-conceptions, high moral values, and wholesome spiritual commitments. "Inner containment" of self-control, good self-images, a high sense of responsibility, and the like must supplement and complement the "outer containment" of structural arrangements in society in order to have the most effective preventive and rehabilitative impact on deviant persons.[5]

Manipulation in Science

One of the major goals of science is manipulation of either its subject matter or of human reaction and

adjustments to it. The human aspects of this are especially significant in the social and behavioral sciences. We aim to develop laws and principles of human behavior which will enable us to predict and thus to control individual and group behavior.

A great deal of manipulation is connected with research. The funding agencies, whether government agencies, foundations, or universities, control the resources necessary for scientific research. By making funds available for certain subjects and not for others, they manipulate the growth and development of the respective sciences. In our society generally the physical sciences have prospered in this regard, for material things are much more marketable than the intangible principles for human behavior and social organization which result from research in the social and behavioral sciences. In recent years, research resources for the social sciences have greatly expanded, but this has not uniformly applied to all areas. Family research, urban studies, analyses of military organizations and communications, and more recently medical sociology have moved ahead rapidly, while such subjects as the sociology of religion and humanistic studies have lagged behind.

Manipulation on another level occurs in research and development projects to test the effectiveness of certain types of treatment. When an experimental group is paired off with a control group, one group gains the benefits or suffers the damages of the treatment, while the other does not. The subjects are thus manipulated for the sake of science!

"The engineering of consent" through marketing research, advertising, and public relations work has become a major enterprise in our society; our sciences provide a foundation for it. Whenever we attempt through the media of mass comunications, educational institutions, political action, and other means to change the attitudes and behavior of people, we are trying to manipulate them. We manipulate them also through the "technological fix" of making automobiles and highways safer, buildings less hazardous, parts of industrial machines more shielded, electric circuits better controlled by rheostats and protected by fuses, water supplies purer, aircraft guidance systems more efficient, and a multitude of additional changes. Most of the manipulation to which men are subjected in open democratic societies protects their welfare, enhances their individuality, and is desired by the majority.

A Moralistic Evaluation

In conclusion, let me add a few directly evaluative comments. First, let us face the facts. All men are controlled to a very high degree. Much of this manipulation is desirable. Order in society is maintained by manipulation; this order is a basic prerequisite to freedom even while it also limits our liberty. Understanding the nature and extent of social control therefore comprises a first step toward appreciating and realistically appraising our freedom.

Second, we have self-consciousness and are not the passive victims of social pressures. We are autonomous beings with a responsibility to decide between the limited, yet in our society extremely extensive, alternatives before us. Our responsibilities to man and God flow out of our autonomy, our ability, and indeed our necessity to decide among the alternatives that lie before us at the moment of decision.

Third, understanding can help us control the social controls that constrain us. Knowing the consequences of alternatives makes it possible for us to choose with greater liberty rather than less. Social science research reveals the limitations of cultural influence on our behavior[6] as well as its ubiquity.

Fourth, multiple memberships and orientations in our pluralistic society produce a high degree of freedom, for they promote recognition of alternatives of choice and in our open society allow a broader range of viable choices than was true in the days of our grandparents. Dialogue as in the Minneapolis-St. Paul "Town Meeting of the Twin Cities," the mingling of all social classes within church congregations and other groups, and a concern for all mankind and not merely for those of our kin or nation can help to balance our knowledge of which choices promote human dignity and the will of God and which ones subtly erode them. Because we are "multivalent men," our freedom is enhanced.[7]

Fifth, as far as our own attempts to manipulate others are concerned, let us make certain that our goals are what they ought to be. When and if we have the proper ends in mind and use means that are fully consistent with those ends, our "manipulating" can promote God's purposes by upholding the welfare and dignity of man who is created in His Image. We also need to heed in true humility the scriptural admonition, "Let not many of you become teachers, my brethren, for you know that we who teach shall be judged with greater strictness. For we all make many mistakes . . ." (James 3:1-2, RSV). Not only teachers, but all other manipulators as well, are in a vulnerable position of high moral responsibility and can easily heap condemnation on themselves.

FOOTNOTES

[1] *Life*, vol. 61, no. 16, p. 61, Oct. 14, 1966.
[2] Alfred McClung Lee, *Multivalent Man* (New York: George Braziller 1966), p. 5.
[3] *Ibid.*, pp. 5-6.
[4] Robert E. L. Faris, "The Discipline of Sociology," in Robert E. L. Faris, Editor, *Handbook of Modern Sociology* (Chicago: Rand McNally and Co., 1964), p. 6.
[5] Walter C. Reckless. "A New Theory of Delinquency and Crime," *Federal Probation*, vol. 25, no. 4, pp. 42-46, December 1961.
[6] See Lee, *op. cit.*, pp. 44-47.
[7] *Ibid.*, esp. pp. 5-6, 19-21, 311-326.

Christianity and the Military Establishment*

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Opposition to Militarism

The threats posed to the individual Christian and to American society by the gains of militarism suggest the outlines of a rationale on which opposition to that system might be based. An interesting sidelight is the condemnation of war as policy by the British House of Commons in 1936; ". . . this House affirms its profound belief in the futility of war, [and] views with grave concern the world-wide preparations for war."[1] Much of American activity during the Cold War may very well be adjudged as having been useless by men in the future, for in spite of prodigious spending and the massive power of American military forces, communism has not been prevented from extending its influence or control over great areas of Europe and Asia. The opponents of militarism need not follow along with the Tolstoyites who have renounced every use for force by man on man. Instead, the Western humanist may plead, as did his Greek predecessors, for rational action. He may question whether war waged under modern conditions is reasonable at all. The ordinary citizen of the United States may take a pragmatic approach and insist that militarism will not bring him the satisfaction of his desires as a free individual in the free society. The ancient aspiration for justice under moral law can hardly be realized through militarism. Have not warring nations often destroyed as much as they have preserved? As one observer has noted: "Even if the end of the adventure were peace and freedom for all, the story would have been long and bloody enough to make of this final meaning a rather belated consolation."[2] The Christian, dedicated to compassion and love for all men, will question a system organized for the task of slaughter.

Militarism vs. Humanism

The course of action of the military-industrial complex in the United States seems to be leading almost inevitably toward thermonuclear war. The humanist will oppose this trend for humanity's sake. The early humanists re-emphasized in Western society the intrinsic value of every man. Each individual was of immeasurable worth for each person shared in humanity, a sovereignty not to be assaulted by the state, nor by the church, nor by another man. The consistent humanist cannot admit any ultimate demand by the state on man. Militarism and humanism are essential opposites for the martial ideology dehumanizes man. Militarism treats man as an object, the state's property, and places the enemy on the level of animals to be exterminated. The *Christian* humanist, in his most lucid moments, has always understood the universality of his religion and that his vocation must not be limited by national boundaries nor false calls to patriotic duty. The Christian is bound to suspect the national Military Establishment which asks him to obliterate one who is divinely loved without being morally certain that this action toward his human counterpart is unavoidable. The basic dilemma of the Christian at war will always be how to love one's enemy and kill him too.

In an interview with Mike Wallace of CBS News, Meadlo said he and other American soldiers killed scores of South Vietnamese civilians—old men, women, children and even babies—by shooting them during an Army raid on a village at Song My in March, 1968. "They didn't put up any fight or anything," Meadlo recalled. "The women huddled against their children and took it. They brought their kids real close to their stomachs and hugged them and put their bodies over them trying to save them."

"Why did you do such a thing?" Wallace asked.

"Why did I do it?" Meadlo replied. *"Because I felt like I was ordered to do it.* And it seemed like I realized . . . at the time, *I felt like I was doing the right thing."*

Portion of an interview with Paul Meadlo conducted by Mike Wallace, and reported by Louis Cassels, United Press International Religion Writer.

The military-industrial complex in this country apparently has used and plans to use the ordinary citizen as a tool to create a monument to national self-glorification, the triumph of "democracy" and "capitalism"

*Reprinted from *Protest and Politics: Christianity and Contemporary Affairs*, R. G. Clouse, R. D. Linder and R. V. Pierand, Editors, Attic Press, Greenwood S. C. (1968).

over other economic and political systems. The military speaks of the "duty" of American boys to die for the nation's ideals—to die before they have had a chance to distinguish between the verbalization of ideals and those actually practiced by the military-industrial complex. The military has sought for constant renewals of the draft and periodically called for universal military training. "Duty" becomes not an inner compulsion but the bowing to the superior force of the state. American boys become objects to be honed for warfare. They are taught to kill an enemy they may never see, a foe visualized only as a stereotype implanted by the propaganda of the military-industrial complex and not a fellow creature with warm blood, human loves, and simple hopes and fears. No action could be more uncharacteristic of the divine Son of God whom Christians claim to imitate than this depersonalization of one's relation to his fellow man.

Next War the Last

All of this suggests that militarism poses a threat to civilization and that the long-continued jostling for the high seats of power by nations armed with thermonuclear weapons assures more than ever that the next conflict will most likely be the last war. Almost any modern war, even without the use of those terrible weapons, would be worse than the evils it was designed to ward off, but a nuclear contest will only destroy what man has labored so mightily to create, his civilization. The unthinking mouth the slogan, "Better dead than Red," not realizing that war and militarism may be more destructive of their goals than communism. There is a fate worse than death—life without meaning. As Professor Hoffman so ably sums it up in his study of war:

> The social scientist can hardly fail to see history as a graveyard of men, buried after having killed and been killed for an incredible number of causes. Retrospectively, it is hard to find a meaning here—and easy to lament with so many poets the absurdity of the whole story.[3]

Thermonuclear war is not likely to usher in a period of utopian peace for the victor, but it may very well preclude the possibility of history having any further meaning.

Threat to Democracy

The Christian citizen will discover that the garrison state destroys his ability to function as a free individual in a free society. He has already found that as militarism has grown in America there has been a reciprocal reduction in his ability to take a meaningful part in the government. Basic decisions come not as a result of consensus, but are imposed from above by a power elite. When the militarists are finished, only a hollow mockery of democracy will remain. Civil rights will be unprotected by tradition or a yellowing scrap of paper and raw power will prevail. The free citizen ought to oppose militarism in order that he may retain his freedom to act—to go here or there without an official pass, to enter whatever vocation he wishes without permission, to assume or refuse employment without a government penalty. Americans have generally enjoyed the freedom to act but certainly will lose this liberty in a militaristic, totalitarian society.

The individual of sensitive mind eagerly longs for freedom of expression and the right to become his best possible self without restrictions or encumbrances except those to which he has freely assented. Perhaps no man living with other men can attain this ideal but it can be more nearly achieved in a free society than in a militarized state. Basic to the free individual is the right to freedom of thought, but how can he think if his mind is constantly barraged with propaganda? If the press is prohibited from functioning freely, if sources of information are distorted, if access to some types of information is prohibited, if free experimentation and the exchange of ideas is forbidden, there is no freedom of thought. The militaristic state restricts a man in these ways and many more as well. The free individual finds himself compelled to stand

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In view of the evidence of an association between nuclear testing and the increase of fetal and infant mortality in the United States, an association which appears to be of a direct casual nature, the need to end all further atmospheric weapons testing and to halt all shallow underground cratering tests that permit escape of radioactive material into the environment is of paramount urgency.

Since significant changes in the rates of fetal and infant mortality seem to have been produced as the result of tests in 1945-54 *involving only a handful of kiloton weapons now classified as "tactical" in size, the full dimensions of the threat to the biological survival of mankind posed by a possible nuclear war become apparent.*

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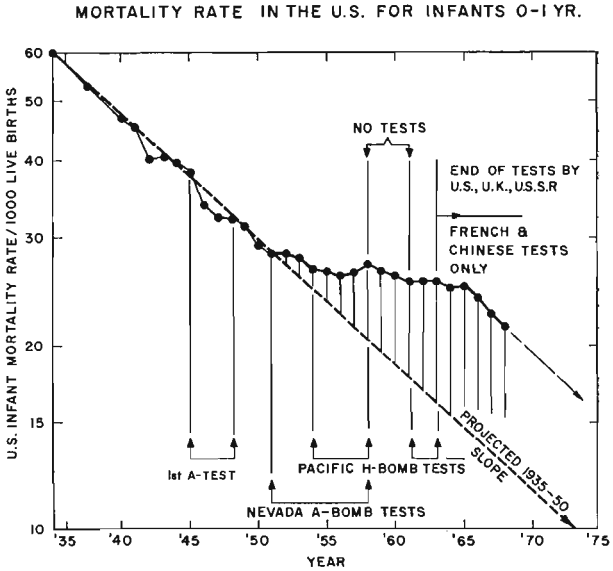
Reprinted with permission from the Bulletin of the Atomic Scientists 25, 4, 18-20 (1969). *The interpretation of the data continues as a controversial issue, e.g., see* Bull. At. Sci. 25, 10, 23-34 (1969).



Data from "Vital Statistics of the United States," National Center for Health Statistics.

against any person or system which would treat his mind as a magnetic tape to be programmed at will.

For Conscience Sake

The evangelical Christian finds a rationale for opposing militarism in his faith—he opposes it for conscience's sake. Contrary to the assertion of Ernst Troeltsch that the state and all questions relating to it were ignored by Jesus, the state was a part of the mundane scene and was so affirmed in the Messiah's teachings. Followers of the Way were not urged to ignore the present age but to redeem it. There is no loophole here whereby the citizen may escape the obligations of the Christian ethic by positing a separate civil ethic. A dual standard of morality with one code to guide the Christian's action in the religious area and another code for the secular realm has been proposed, but the evangelical Christian must insist on one consistent ethical norm for all men in all conditions. Scholars have uniformly agreed that the Jews did not compartmentalize life into secular and sacred divisions. Men were to live their *whole* lives before God according to his will revealed in commandments and instructions. This characteristic of Jewish thought was basic to the thinking of Jesus also. The Christian citizen, thus, must resolve any apparent conflicts between the demands of the state and his duty toward God within the bounds of one ethical system—that of Jesus of Nazareth.

> **Medina . . spoke deliberately and emphatically in the . . news conference. . . . "I moved to that location with my command element.**
>
> **As I approached the VC with weapon, the helicopter that had been marking the location began to move back. . . . as I approached I seen that it was a woman. She had already been wounded. I did not see any weapon. I turned around and started to walk away. As I turned around I saw movement out of the corner of my eye. My first thought was, 'boy, you've had it, you're dead,' if she did have a weapon or did have a hand grenade.**
>
> ***I instinctively, from Army training, turned around and fired two shots* and I assume that I did kill her . . .**
>
> *Report of Fred S. Hoffman, AP Military Writer, on the testimony of Capt. Ernest Medina on the My Lai affair, December* 5, 1969.

Romans 13

Those who believe that war may be justified have often quoted the verses in Romans 13 which begin "Let every person be subject to the governing authorities." This Pauline statement in no way endorses the unbridled use of force by the state. Indeed, it comes immediately after a passage in which the apostle exhorts his readers to live a life of non-violence, blessing their persecutors, seeking no vengeance, feeding their enemies, and overcoming evil with good (Rom. 12: 14-21) The statement of Jesus that one ought to "Render therefore to Caesar the things that are Caesar's" is quoted also to imply the heavy obligation of the Christian citizen to the state. This single, rather oracular statement is less convincing than the fact that Jesus refused to concern himself with the national aspirations of the Jews. His energies were devoted to the Kingdom of God, a spiritual realm. He chose for himself the role of a spiritual leader and refused resolutely to become a military messiah, even though there were Old Testament precedents. If the "Caesar" statement does indicate an obligation to the state, that debt should not be throught to have the same absolute character as the debt to God. The Christian sees his first and highest duty to God, as did Jesus. Therefore, one may never in the name of serving Caesar act contrary to the ethical principles of Christ. One might add concerning the passage in Romans that Paul admittedly put more stress than did Jesus on obeying the civil authorities, perhaps because he feared that unnecessary violations of the law might stir up persecutions worse than the local ones already being experienced by Christians. Never did the apostle imply that one's allegiance to the state justified an immoral act.

Pacifism

The American Christian, living in a country moving toward militarism and engaged in periodic wars abroad, is faced with a pressing question: "Is the Christian ever justified in using force, and may he with a clear conscience become a participant?" Here is not the place for an extended discussion of pacifism, a subject upon which so many words have already been penned. This writer has found the most thorough and concise discussion of the relevant Biblical passages to be that of the English theologian G. H. C. Macgregor in his volume *The New Testament Basis of Pacifism.* This lucid little book makes the point that a Christian does not need to, and perhaps cannot, stand on an absolute prohibition of the use of force between men or groups of men. Professor Macgregor maintains, instead, that the Christian's choice is "between moral and non-moral use of force" in many situations. There is an absolute ban on *war* because it transgresses the New Testament ethic.[4] After a thorough examination of the Scriptures, Macgregor concludes that the Gospels, with two doubtful exceptions, show Jesus consistently living by the principle of non-resistance. If Christ's life is one that is well-pleasing to the Heavenly Father, must the Christian not seriously consider the possibility that he himself is to forego the use of force and also shun war?

The Christian Perspective

The history of the early church indicates that it understood the life of the Way to be one of peace. "Blessed are the peacemakers, for they shall be called sons of God." (Mt. 5:9). For nearly two centuries the church was almost wholly pacifist. Scholars can find no examples of Christians becoming soldiers *after baptism* until about 170 A.D. The early church fathers—Justin Martyr, Clement of Alexandria, Tertullian, Origen—insisted that Christians were pacifists. Origen, writing perhaps as late as 230 A.D., declared: "We Christians no longer take up sword against nation nor do we learn to make war any more, having become children of peace, for the sake of Jesus who is our leader."[5]

Yet, in spite of the consistent witness of the early church, the question still remains: may a war be justified on certain occasions and under certain circum-

stances? Perhaps so, if war, as a means, and the end which it seeks do not transgress the ethics of Christ. Another relevant question, however, is: "Does not war always contradict the goals of the Kingdom, and the redemption of man, and does not modern total war inevitably involve every participant in immoral means?" One noted scholar recently concluded: "In modern total war, where murder without risks, slaughter in anonymity, and the denial of the humanity of the foe prevail, the sacrifices of conscience which national loyalty demands have reached a new high."[6] It is perhaps too high.

The evangelical Christian, however far he may wish to walk with the humanists, knows that there is a higher reason for him to question the whole idea of modern war toward which the militarists are leading him. The heart of the New Testament ethic is the injunction to love. Christians are instructed to love God, one another, their neighbor, *and their enemy.* Loving one's enemy is not an optional matter: "But I say to you, love your enemies . . . so that you may be sons of your Father who is in heaven" (Mt. 5:44-45). There is a lengthy passage in Matthew (5:38-48) which sets forth the Christian way of meeting evil. It is the way of non-violence and love for the adversary. One is to overcome evil not by greater evil but by good. Perhaps such actions in the face of an armed foe are foolishness. It led the Galilean to the cross, but it was the redemptive way. If force is to be used, surely it must not be for punitive measures or merely to save our own lives. Rather, it must have redemption as its end. Given the ambiguities of the international situation and the awful efficiency of modern devices for killing, and faced with the threat that man may end his history with a final and fiery act of sin, it seems crystal-clear that the Christian ought to expend every possible effort to resist those pressures which militate for the use of force in international affairs. If a thermonuclear debacle is avoided, we may have time to go about our Father's business.

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[2]Hoffmann, *The State of War*, p. 261.
[3]*Loc. cit.*
[4]G. H. C. Macgregor, *The New Testament Basis of Pacifism* (New York: Fellowship of Reconciliation, 1947), p. 11.
[5]*Contra Celsum*, v. p. 33.
[6]Hoffmann, *The State of War*, pp. 262-263.

A SET OF CHRISTIAN THESES ON VIOLENCE AND WAR*

Part I. The Individualistic and Collective Ethic

1. In individualistic Christian ethics, the Christian is enjoined to respond with love when evil is perpetrated upon him, not returning evil for evil.
2. The Christian is not to seek revenge. Blessing the enemy is the Christian's response to evil done against him.
3. This individualistic ethic, however, is not to be interpreted as forbidding the Christian to defend either himself or those for whom he has responsibility.
4. In fact, for a Christian not to defend those for whom he is responsible is a violation of his Christian stewardship of all things before God.
5. Such defense of self or of others by the Christian, however, is to be done in the sense of restraining evil with the minimum of injury to others, and without hatred or desire for harm against the aggressor.
6. The collective ethic for Christians is not different in kind from the individualistic ethic. Such a collective ethic is applicable to (a) Christians in collective action, (b) Christian action in a democratic society, and (c) a state guided by Christian principles.
7. The collective ethic may call for willingness to accept injury from another collective body without seeking retribution, or it may call for the defense of those individuals for whom the state is responsible.
8. Pacifism, therefore, which declares that any exercise of force under any circumstances is to be condemned, cannot be defended on Christian grounds. Pacifism undercuts both the individualistic and the collective responsibility each man has for his neighbor.

Part II. The State

9. When, in the fulfillment of the collective ethic, the state acts out of responsibility for the welfare of its own or any other people, war may become a necessary instrument, just as the police force is a necessary instrument to maintain law and order within the state.
10. To say that war may become a necessary instrument in the fulfillment of the state's collective ethic, however, is not to say that an individual state is arbitrarily justified in engaging in unilateral warfare to protect its own interests or the interests of others.
11. The basic responsibility for the general defense of the peoples of the world rests upon the collective action of nations acting cooperatively together. As the state (a group of individuals) has the responsibility of resolving problems between individuals who make up the state, so the group of nations in the world has the responsibility of resolving problems between nations.
12. Nevertheless, it must be conceded that there may occur such clear violations of human rights and dignity, that a state may be driven by its collective ethic to take action in defense of the injured individuals or states. Such action is to be bound by the conditions of Theses 1 through 8, and is to be first through the joint efforts of nations in non-violent actions, next through unilateral non-violent actions, and only in the last resort, and because of the immensity of the inhumanity exhibited, through unilateral warfare.

Part III. The Individual

13. Since a man's obedience to God is an act of conscience, not publicly assessable, the detailed application of these theses cannot be proscribed.
14. The first responsibility of a Christian resides in the fact that he is a child of God and must obey God rather than men. In the light of this primary responsibility, all other responsibilities to family, state, and world are secondary and must be so

evaluated.

15. The Christian is also responsible as a human being and a member of the human race. This responsibility, second to that to God Himself, transcends all national and other divisive factors. The Christian is responsible to work to uphold and maintain the orderly exercise of justice and righteousness among the peoples of the world.
16. The Christian is also responsible as a citizen of his country to uphold and work for its orderly exercise of justice and righteousness both within its own borders and in its relationships to the world.
17. As a citizen of a democratic government, it is the Christian's responsibility to shape and influence government policy through the established procedures of a legal and orderly political system.
19. Nevertheless, it must be conceded that there may occur such clear violations of human rights and dignity, that an individual may be driven by his Christian convictions to act outside the normally accepted procedures of law and order. Such action is to be bound by the conditions of Theses 1 through 8, and is to be first through the joint efforts of individuals in non-violent actions, next through individual and joint breaking of the law in non-violent actions, and finally, only in the last resort, and because of the immensity of the inhumanity exhibited, through individual or joint violence.

*This set of theses is the result of a five-month discussion at Stanford University in 1968 with the following participants: Richard Bube, *Materials Science and Electrical Engineering;* Peter Lindquist, *Materials Science;* David Mantik, *Biophysics;* Gordon Simons, *Statistics;* and Paul Simpson, *Chemistry.*

The Creative Power of God

In the beginning God spoke, and it all happened:
heaven and earth, light and darkness,
water and land, trees and animals.
The eternal, triune God was at work:
the Spirit who moved upon the waters,
the Son through whom all things were made.

We stand baffled in the face of all of this:
from nothing to everything by a Word.
Create *is a verb alien to human language.*
We use it, but incorrectly. Hats, casseroles, computers, political programs, chemical compounds, church anthems—these are called creations. But are they really?
At best man conserves, rearranges, combines.
At worst man exploits, defiles, destroys.
God alone creates.
And because he does, our existence is
designed—not for our glory,
dependent—not on our abilities,
directed—not to our goals—but his.

In the end God will speak, and it will happen again:
new heaven and new earth, bride and Husband,
God and people.

We stand amazed at the hope of all of this:
out of spiritual, emotional, political,
physical chaos comes an ordered pattern of harmony and reconciliation—and by a Word:
"Behold, I make all things new."

Between the beginning and the end, the creative voice of God is not stilled. The universe has no automatic power of sustinence.
The Psalmist was right:
grass for cattle, prey for young lions,
wine, oil, bread for man are God's gifts.
Job heard correctly:
weather is controlled, planets are guided,
animals are reared by God's counsel.
And more: a new creation is being shaped.
A new people doing new things,
like worshipping God and loving each other.
This too is the creative power of the triune God.
And because it is, our lives are
rescued from the formless void,
restored in our Creator's likeness,
related to his sovereign purpose.

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BOOK REVIEWS

THE MONKEY'S ON THE RUN by D. Lee Chestnut, published by the author at 2301 West Shadyglen Ave., Phoenix, Arizona. 1969. 52 pp., $0.75

This booklet, subtitled ". . . yes, it's about EVOLUTION!", is an attempt to present the layman, or more probably the high school biology student, with a reasoned critique of contemporary Darwinian and Neo-Darwinian evolutionary theory. To do this the author employs courtroom techniques (based, one would assume, on Scope's "Monkey Trial") against a varigated background of recent biological research and writing as well as scripture. If his use of these techniques had been more consistent, the book might have been unique enough to stand out from other such efforts; as it is, this reader became rather disconcerted by repeated jumps from courtroom cross-examination to author's editorializing and back again, and decided that the technique subtracted from rather than added to the value of the presentation.

The author, an electrical engineer and nuclear science lecturer, in order "to gain a working knowledge of the subject, . . . read approximately fifty scientific books plus a number of technical journals." He uses some very recent quotations from the literature to support his arguments—noteworthy among which is the challenge flung at Neo-Darwinists by a group of mathematicians at the Wistar Institute Symposium in 1966.

A glossary containing informal definitions and explanations of technical terms used in the text will be of value to the uninitiated reader.

Although this work contains no information not readily available to the alert scientist, it does perform a service by collecting and translating into layman's language some of the pertinent criticisms of evolutionary teachings.

Reviewed by Stephen W. Calhoon, Department of Chemistry, Central Wesleyan College, Central, South Carolina 29630

HISTORY OF CREATION AND THE ORIGIN OF SPECIES by Reuben L. Katter. Theotos Logos Research, Minneapolis 1967.

This book has a great deal of what I would call "metaphysical" in it and therefore is rather hard reading. One can say that every page is loaded with ideas and the author must have a wide grasp of many subjects. It would appear that one of the purposes for writing the book was to harmonize geology and the scriptures.

Many debatable statements can be found but these do not cloud the obvious erudition of the author.

Reviewed by Irving W. Knobloch, Department of Botany and Plant Pathology, Michigan State University, East Lansing, Michigan 48823

FROM SCIENCE TO THEOLOGY, George Crespy, translated by George H. Shriver, Abingdon Press, Nashville, 1968, 174 pages ($4.00)

THE RELEVANCE OF TEILHARD, R. Wayne Kraft, Fides Publishers, Inc., Notre Dame, Ind., 1968, 158 pages ($0.95)

AN INTRODUCTION TO TEILHARD DE CHARDIN, N. M. Wildiers, translated by Hubert Hoskins, Harper and Row, New York, 1968, 191 pages ($6.00)

Not less than thirty-five books have been written or translated into English about Pierre Teilhard de Chardin (a Jesuit) and his marriage of Christianity with an evolutionary cosmology. Although denied permission to publish most of his non-paleontological writings during his lifetime, the principal exposition of his cosmology, "The Phenomenon of Man," was published by friends in 1955 and translated into English in 1959. Thirteen additional books by Teilhard, most elaborating "The Phenomenon of Man," have been published in English since then.

While Teilhard's professional duties were primarily in the field of paleontology, he felt his most valuable contribution would be to show that the Church's separation of God from the material world was not necessary or desirable. Since his contributions were pioneer explorations, he hoped others would fill the gaps and amend where needed. His writings should be an inspiration to those firmly committed to the unity of all "truth," whether biblical or scientific.

The books by Kraft, a metallurgist on the faculty of Lehigh University, and Wildiers, a Dutch (French) theologian, were both written as introductions to the grand design of Teilhard. The first seems to have been written for the lay person not freely conversant in either science or theology. The latter is written, in the reviewer's opinion, as an apologetics of Teilhard's theological constructs. The third book resulted from eight lectures Crespy gave while a visiting professor at the Chicago Theological Seminary in the winter of 1965. His book is perhaps the most objective of the three. Only Kraft considered the apparent conflict between Teilhard's law of "increasing complexity and consciousness" and the laws of thermodynamics.

Crespy

Crespy began his lectures with a review of some of the shortcomings of popular evolutionary theories and the generally negative reaction to evolution by the Church. He sets the tone for the remaining lectures with the following points: theologians in reality have argued against an evolutionary view of the world rather than the scientific theory of evolution. Secondly, the dogmas of the organized churches were conceived in

a culture with a static, pre-Copernican world view. Further, the theologians have searched the scriptures diligently to find "proof texts" to show that God has condemned the "evil world," thereby requiring that man separate himself from the world if he wishes to be holy. The second lecture outlined the main features of Teilhard's cosmology, i.e., matter has become increasingly more highly organized as the earth aged until man appeared with his power of reflective consciousness. (Since man was derived from this material, all matter must have some consciousness or interiority.) Man has further intensified this consciousness through his numerous social interactions. In the subsequent lecture Crespy reviews the philosophical bifurcations of man into soul and flesh, of the world into spirit and matter and of God from man. Teilhard saw man as the natural consequence of a universe oriented to create from itself a super consciousness, the Omega Point. Thus the division between soul and flesh is artificial, spirit can not be separated from matter and man will ultimately be in harmony with God. "The Christology of Teilhard" is the vaguest part of Crespy's book. (It also may be the most obscure of Teilhard's writings.) Teilhard believed the forward movement of evolution towards its goal "assures the transformation, or rather the promotion, of the human milieu of the 'noosphere' into the 'divine milieu.'" In other words, the future is intimately tied to the continual improvement of the quality of men's consciousness, and the early success of cosmogenesis is related to the effectiveness of man's involvement in the forward movement. In the fifth lecture Crespy justifies Teilhard's very limited consideration of evil on the basis that no one has ever satisfactorily explained evil. Secondly, evil is irrational and thus beyond the scope of a rational treatment.

Crespy next criticized the theologians and historians for their failure to take cognizance of the unity of matter and spirit in man, and to posit a unified goal for man. Thus they have not been able to help man decide what is good and evil or help him find meaning in time and history. Teilhard believed that the despair of modern man is the product of these deficient world views. That is, the scholars have led him to believe that he is either marking time on a doomed planet (Christian dogma) or doomed to an existence without transeunt meaning which ceases at the end of biological life (an agnostic view). Crespy concludes his third book on Teilhard with a plea to theologians to take note of Teilhard's cosmology and to pose again the problem of God to this world in a new, meaningful way.

Kraft

Kraft states in the preface of his book that he sees Teilhard's cosmology as Christ's cosmology. The first chapter contains a brief biography of Teilhard, short synopses of twelve books by Teilhard and concludes with an assessment of the effect of his writings on his Church and those "outside the Church." The second chapter entitled "His Vision," has as its goal the summary of the main points of Teilhard's cosmology and theology under the following topics: exterior-interior properties, the law of increasing complexity and consciousness, cosmogenesis and geogenesis, biogenesis, noogenesis and post-biological evolution, and Christogenesis and the Omega Point. Although Teilhard described his scheme in grand, vague and newly-coined terms, this reviewer feels that Kraft's attempt at a "translation of Teilhard" suffers from superficiality in a number of areas (interiority, radial energy, and evolution, among others), and a very obvious attempt to align Teilhard's ideas with dogma, both scientific and theologic.

In his next chapter Kraft makes a concerted effort to take Teilhard's writings from the realm of the theologian and philosopher into the world of the living. This is done with three interesting sets of quotations about the coherence of truth, the need to clearly perceive the world around us, and acting in a manner to bring to completion the convergence of mankind at the Omega Point. The chapter concludes with some "real life" situations in which Kraft feels combined Christian and Teilhardian principles give definitely "better" guidlines for action.

This short book contains two appendices entitled "Thermodynamics, the Two Energies and Life," and "Sin, Suffering and Hell" and a glossary containing definitions to twenty-two Teilhardian and scientific terms. As with most appendices, these are much too brief to be understood by anyone except those that comprehend the material anyway. Further, his arguments lack the compelling logic and confidence found in the writings he is introducing, e.g., "Who can say with certainty that it will never be" was used to argue the validity of Teilhard's use of radial energy as the driving force of evolution. The saving virtue of the chapter on sin is its conclusion with the prayer of Teilhard in which he confessed his inability to comprehend this part of traditional dogma.

Wildiers

According to Wildiers, Teilhard envisioned the personal God of Christianity intimately involved with a real, evolutionary universe, which has meaning and is not an abstraction to be discarded at some later time. He further believed that the union of these concepts must occur in the day to day thoughts and concepts of the Christian as well as in the theologian's metaphysics. Wildiers began his discussion of the main points of Teilhard's writing in a manner very similiar to that used by Crespy. Namely, if one has some concept of the purpose of the universe, one has a much better chance of understanding the universe, especially an evolving one. He likewise criticized the theologians for their failure to accept an evolutionary view of the world, which has a future as well as a history.

Wildiers (as did Crespy) makes it clear that when Teilhard postulated an interiority to matter, he did not mean panpsychism. Rather that the interiority (consciousness) of matter varied greatly in its quality and concentration. Although biological evolution apparently stopped with man, the evolution of consciousness has continued at the collective level. Physics, psychology and democratic governments are trite examples. Nowhere is Teilhard's optimism more evident than when he states his faith that the process of evolution will continue and culminate in Christ. Men can hasten the process by correct conscious effort or slow it (but not prevent it) by selfish, meaningless acts. Much that Wildiers says in this part of his book is also found in the other two, especially Crespy.

The remaining third of Wildiers' book deals with Teilhard's efforts to unite traditional Christian theology

with the recently discovered Earth and Universe. First, it is pointed out that the believers in modern cosmology tend to be as religious as Christians, although their views and understandings are very different. The former are "pantheistic, immanent, organicist and evolutive . . . whereas in Christianity . . . concepts such as personality, transcendence, juridical relations, . . . fixity" are appropriate. Teilhard was confident this conflict could be resolved by a deeper exploration of the relationships in the evolving universe and the interactions of the God-man, Christ, with this world.

Teilhard's "phenomenological approach" to Christianity Wildiers summarized as follows: 1) The founder of the religion is a person who is the actual content of his message. "One becomes a Christian . . . by being united with him." 2) Christ said he will return at the end of the age. 3) "The return of Christ must be prepared for by the gradual building up of the mystical body." 4) The commandment to love our neighbor sums up the ethics of Christianity. Wildiers further points out that Teilhard's views and those of the scotist interpretation of the incarnation are similiar in their belief that Christ was God's supreme revelation to this world, and it was God's original plan to reveal himself through Christ rather than being necessitated by "the fall." Some of the benefits to be derived by the conceptual union of Christ and the cosmos in the lives of men who take seriously their role as men on this earth is the high point of the final chapter.

Summary

Since both Crespy and Wildiers are theologians their books about Teilhard's writings deal primarily with his theology. Kraft, even though a layman, also emphasized the theological aspects of Teilhard's writings. Perhaps Teilhard's greatest contribution will be that he stimulated men to expand their theologies. But in doing so, they should realize that some of his postulates (interiority of all matter and an evolutionary force) grew more from his faith and his desire for a unified, theological cosmology than from "scientific facts." It would be a grand thing for someone to conceive an experiment which might demonstrate a level of consciousness in a mineral or that there is a type of energy available to compensate for entropic energy losses.

Both Crespy's and Wildiers' books are comparable in scope. What differences there are between them is probably a reflection of the different theological and philosophical persuasions of the authors. Crespy, who holds a chair in protestant theology, writes as a protestant while Wildiers' book has received a Nihil Obstat and has an Imprimatur. Parts of Wildiers' book, the discussion of biological evolution for example, gave the feeling it had been obtusely written to avoid criticism by the "doubters" of the evolutionary scheme.

Although each of the books is well worth reading, they are no substitute for a study of Teilhard's writings, especially his "The Phenomenon of Man."

Reviewed by Bruce Phillips, Department of Chemistry, Eastern Nazarene College, Wollaston, Mass.

A Second Review of ***The Relevance of Teilhard....***

In traditional terms Teilhard is an optimistic, evolutionary postmillenarian. His optimism is refreshing if hard to justify, his evolutionary perspective is challenging, and his postmillennial perspective is as beset by biblical and historical difficulties as the classical postmillennial view that has almost ceased to be a live option in orthodox Christian circles since the days of the Depression and the second World War. The book by Kraft, a Professor of Metallurgy and Materials Science at Lehigh University, provides an easily read insight into Teilhard as viewed through the eyes of an ardent disciple. If Kraft at times seems to go out of his way to relate the abstract concepts of Teilhard to the concrete doctrines of historic Christianity, he is doing no more than presenting Teilhard a la Kraft. Perhaps scholars may insist on ferreting out what it is Teilhard meant to say by a given formulation, but the rest of us will find it more profitable to find what there is in Teilhard that throws illumination or gives insight into our own Christian perspective on life and the world.

Kraft gives us a useful overview of the sweep of Teilhard's view by pointing out that "Teilhard's vision is simultaneously a theoretical system encompassing all of man's knowledge, a rule for action which can resolve man's problems, a profound expression of Christianity and a plausible prediction of the near and far future." He points out that "Each reader of this book must decide for himself whether he thinks Fr. Teilhard's theory is 'the truth of the universe for man,' now, as well as he can understand it, — or whether he thinks it is merely a meaningless or exaggerated hypothesis, or an illusion, or pseudoscience tied together with poetical mysticism. I believe it is the former."

One barrier to the understanding of Teilhard is his invention of phrases to suit his own purposes. Kraft does a good job in defining such key Teilhardisms as *centrated-complexity, within* and *without* of things, *tangential* and *radial* energy, *cosmogenesis, biogenesis, noogenesis* and *Christogenesis.*

He emphasizes the profoundly Christian roots of Teilhard's thought. If Teilhard does not do justice to the biblical concepts of sin and atonement, he sheds new light on the concepts of creation and incarnation. To him evolution is a mighty work of God, and his optimism is rooted in the trustworthiness of God rather than a naturalistic process. The evolutionary convergence of man to the *Omega point*—the God of Creation, the Father of our Lord Jesus Christ—should be considered as an exaltation of God, not of godless man. The atonement of Christ for sin and the whole Christian missionary enterprise can be viewed as the God-ordained means by which man responds to the responsibility he has as one who has become aware of his own evolutionary position and destiny.

Teilhard's optimism for the future is refreshing, but is it founded? It is good to hear a refutation of the prophets of doom and gloom; Teilhard cannot believe that evolution is just a farce, that life is just a joke with man as the victim. But what is the prognosis for the future—better and better, or worse and worse? It is the old question of Christian eschatology with faith in the building of a better world through Christ on

the one hand in conflict with the apparently clear biblical prophecy of tribulation and faithlessness in the world on the other. Will Christ return to receive a Kingdom prepared for Him, or to institute a Kingdom in a rebellious world? There have been orthodox Christians who defended the postmillennial perspective from a biblical point of view—can their insight be used to enlighten the vision of Teilhard, or are they both hopelessly wrong?

Kraft interjects a number of comments from his scientific background as a metallurgist trained in the discipline of thermodynamics. He develops the theme that according to Teilhard the total energy in the universe is not constant but continually increasing, due to the continuous input of *radial energy* from God. Thus he points out that Teilhard rejects the popular scientific notion of an ultimate "heat-death" for the universe; on the contrary, he argues that every day there is more and more life in the universe, and life by its very nature is anti-entropic. Information, a growing product of our converging civilization, is also anti-entropic in nature. Turning to the moral realm, he defines sin as "moral entropy," any non-Christ-centered free action of an individual. In terms of Teilhard's and Kraft's exposition, this suggests another definition of sin: any act that violates the direction of the evolutionary process. Since Teilhard sees acts of love as the criterion for cooperation with the evolutionary process (God working in the world), this new and strange-sounding definition of sin may also be presented as biblical!

TEILHARD DE CHARDIN: An Analysis and Assessment by D. Gareth Jones, Tyndale Press, London 1969. 72 pp. Paperback, 7s6d.

This little book of pithy criticism of Teilhard was published for the Research Scientists' Christian Fellowship in England. Its very brevity rules it out as a first reader for anyone unacquainted with Teilhard, but makes it an easily-read critique for one who is at least familiar with the Teilhardisms under discussion. It is written by a committed Christian and working biologist who does not share Teilhard's presuppositions or way of thinking.

One of Jones' principal contentions is that Teilhard's proposed solution is at least as much a product of Teilhard's own deep personal psychological needs—to find a purpose for man, to reconcile love for God and love of the world, to be both truly Christian and fully a man— as it is of the objective data or evidence. "It is not surprising, therefore, to learn that Teilhard envisaged the whole adventure of his inner life as being the Christification of matter."

> By placing man at the summit of the evolutionary process and by insisting that the cosmos is held together by spirit and not by matter, and that it converges towards persons and not things, Teilhard was able to confer upon evolution a direction, a goal and hence meaning and purpose. By bringing together a religion of the Christic type and an evolution of the convergent type, he could view as one his Christianity and his science, as ultimately—at Omega—the spiritual process and the natural process would coincide.

Jones criticizes Teilhard's scientific view of evolution because of Teilhard's espousal of orthogenesis, the view that evolution has taken place in a set line toward a determined goal, and because of his efforts to replace the "without" of genetic change by the "within" of individual desires, which smacks of Lamarckism to Jones.

Teilhard is also criticized for repeatedly falling back on "synthetic science," which Jones sees as nothing else but "belief in the pre-eminent significance of man in nature, and belief in the progress and ultimate success of evolution . . . worked out in a logical manner," whenever "empirical science" cannot be used to further him along his way.

Teilhard's intense optimism is called into question—do we really have any evidence at all that it is justified? Furthermore will the next stage of progressively greater socialization result in anything other than the *de*personalization of man?

Wherever consciousness is experienced today, it is always in connection with matter and dependent on the biological. Is there any scientific basis for reversing this order, of moving from the material to the matter-free consciousness as Teilhard proposes?

Jones argues that if Teilhard had been fully consistent to his own system, he would have been forced to the conclusion of a natural god, to be completed only at the end of the universal process. The fact that Teilhard does introduce a transcendent God into his discussion, with many of the attributes of orthodox Christianity, signals a self-contradiction in his system.

> We are faced with two alternatives. If we accept his system as a fully coherent one it amounts to no more than evolutionary naturalism. If we allow his introduction of a transcendent God, his system as a system has little value. It is internally self-contradictory, and all that remains of it are a number of instances of evocative terminology.

Why then did his synthesis work for him and for many others? Jones ventures the following opinion.

> It is those in need of intellectual and spiritual deliverance from the conflicts of the modern world, and who are drawn towards some form of spiritual solution to the problem, who are likely to be instinctively drawn towards Teilhard. In the end, it is the mystical element in Teilhard's synthesis that triumphs over the rational, and it is the mystical side of Teilhardism which remains as the determinative factor in a person's approach to it.

Teilhard's shortcomings in coming to grips with the problem of evil are also criticized. In his system, evil and sin become simply by-products of the process of evolution and have nothing to do with the central issues of life. But if evil is simply a part of the incomplete evolutionary process, then evil is necessarily decreased by an increase in scientific knowledge. No connection is made between sin and evil, and the holiness of God, for example. In rejecting the juridical biblical pictures of sin and atonement, Teilhard must defend a metaphysical rather than a moral basis for sin and evil in the world. Individual salvation is irrelevant, for either all of mankind will arrive at Omega or none will.

Jones concludes with the following trenchant appraisal of Teilhard.

> Whatever may have been Teilhard's own aims, it is difficult to avoid the conclusion that what stands out most clearly in his synthesis is his naturalism at the expense of his supernaturalism; man at the expense of God; and the world at the expense of Christ (in spite of his professions to love Christ more than anything else.) Herein lies the danger of Teilhardism. Its emphasis on the incarnational and cosmic Christ, to the detriment of the redeeming Christ, can only lead to worship of a generalized nature-deity with consequent neglect of the transcendent triune God revealed in the Scriptures.

References are given in the Preface to 9 principal publications of Teilhard, 6 publications generally fav-

orable to Teilhard, and 6 publications critical of Teilhard.

THE SCIENTIFIC ENTERPRISE AND CHRISTIAN FAITH by Malcolm A. Jeeves. Tyndale Press, London 1969. 169 pp. 23s.

Good show! This seems like an appropriate compliment to bestow on this highly literate mature evangelical treatment of the major issues relating science and Christian faith. In August 1965 thirty-six Christian men of science from ten countries (including several ASA members) met in Oxford, England, for an 8-day conference sponsored by the Research Scientists' Christian Fellowship. Malcolm Jeeves, formerly Professor of Psychology at the University of Adelaide and now occupant of the Chair of Psychology at the University of St. Andrews, has produced a synthesis of the papers and discussion of this conference. Playing a prominent role in the conclusions presented is the creative thought of three participants in particular: Donald M. MacKay, Professor of Communication at Keele University, England; R. Hooykaas, Professor of History of Science at the Free University, Amsterdam; and F. H. T. Rhodes, Professor of Geology at the University of Swansea, Wales. The book faces up to and deals helpfully with every major intellectual issue in the interaction between science and Christian faith, particularly in the areas of cosmology, evolution, phychology and sociology. The underlying philosophy of the book is that "science is a true friend of biblical faith and not, as is often assumed, in conflict with it."

There are two essential themes that dominate the perspective of the book in a vital way, and which must, by their very centrality, form the foci of any comprehensive treatment of these matters. The first is that the relationship between God and nature must be pictured in terms of "the clear biblical teaching that God continues to sustain the universe and hold it in being moment by moment." Any model of God's relation to the universe that involves such terms as "leaving room for God to act," "the use of natural law by God," or "the intervention of God into an otherwise orderly working creation" are seriously mistaken; they "may be seen to be condoning a radical misconception of the relation of God the Creator to the created order." The second theme is the possibility of description in terms of different levels of experience, the description on each level being in itself and in its own terms exhaustive but in no way subtracting from or making superfluous similarly exhaustive descriptions on other levels.

An example of the utility of the first of these themes may be given with respect to the understanding of miracles. "Such a view . . . means that since the whole pattern of space-time events is not only conceived but also held in being moment by moment by God, we should not regard what we term miraculous events as interventions. They are in fact no more and no less dependent upon God's activity than day-to-day occurrences which we take so readily for granted." An example of the second theme is given in a discussion of the validity of a religious description of the conversion experience. Jeeves writes, "we do not see any reason why ultimately we may not be able to give exhaustive accounts of the psychophysiological changes taking place at conversion in biochemical, physiological and psychological terms. . . . It is the contention of the Christian that . . . he finds it necessary to see and interpret the over-all pattern of his experience not only in biochemical, physiological or psychological terms, but also in religious terms."

Too many scientific and religious statements are assumed to be contradictory, Jeeves makes plain, when in fact they are truly complementary. Models in neither science nor religious thought should be interpreted ultraliterally or pushed beyond their proper realm of meaning. Scriptural revelation provides us commonly with a multiplicity of models so that we may come to "realize that we need all of these held in a delicate balance in order to give us as full and adequate a presentation of the theological truths conveyed to us as possible. 'The principal and distinctive difference between scientific models and religious models is that scientific models are the product of man's mind, whereas religious models are *given* by special revelation.

Recognizing the impropriety of taking "the biblical narrative as a textbook for physical cosmology" or of submitting to the temptation to "rest our case on naively pseudo-scientific interpretations of certain portions of the Bible," Jeeves argues that serious problems for Christian belief do not arise from cosmological theories, evolutionary theories, or theories concerning the origin of life. Difficulties in Christian thought with evolution are traced to the mistaken insistence upon the need for God's intervention over against natural law (thus failing to see the significance of the first theme mentioned above, and implying the non-divine character of the 'naturally' explicable), to the ill-advised attempt to "identify particular scientific processes with scriptural counterparts" (indeterminacy, second law of thermodynamics), to the misconception that the recognition of ultimate purpose is inconsistent with the existence of randomness, and to "the attempt to read and interpret these early chapters of the book of Genesis as if they are modern scientific statements." Jeeves makes the thought-provoking statement, "God, to the theist, while being the cause of everything, is in the scientific sense the explanation of nothing." A clear distinction is made between evolution and evolution*ism*, the elevation of evolutionary theory "to the status of a metaphysical structure . . . based upon a foundation which by its very nature as a scientific theory is destined to be continually changing."

There are many more treatments in this book that the reader will appreciate and will absorb to chew over in quiet for some time to come to test their ultimate tractability: the relationship between spiritual life, psychological life, and physical life; the difference between "surgical conversion" and Christian conversion; whether a man who believes that the world is completely determinate can arrive at a meaningful decision concerning anything; whether the introduction of an element of randomness in a person's actions makes him more or less responsible for them; the persistence of human freedom of choice even if the functioning of the brain could be given a completely mechanistic explanation; and the irrelevance of determinacy and indeterminacy in natural law as far as God's action in nature is concerned.

Surely not the least significant aspect of this book is the quiet consensus expressed by the international group of Christian men of science participating. This book is not the product of a single man's culture and religious outlook; it is the statement of a perspective of an international community of men whose lives daily

touch deeply into the issues explored. It seems to me that what is said carries all the more impact because of this consensus, and that every reader of this review would do well to add this volume to the small and select list of books that he has studied well.

THE CHRISTIAN AND SCIENCE, A Symposium held at Calvin College, April 23-25, 1969, V. J. Ehlers and R. D. Griffioen, Editors, 1969. 84 pp. (multilith) $1.75 (Copies available from Calvin College, Grand Rapids, Michigan)

As part of the ceremonies to mark the dedication of the new science building at Calvin College, a Symposium on the Christian and Science was planned by a committee of six members from the Calvin College faculty, five from the sciences and one from theology. The purpose of the Symposium was to provide an opportunity for discussion between scientists and theologians. Striving to offset both the theologians' complaint that scientists tend to ignore theology completely, and the scientists' complaint that theologians contribute little to problems except criticism of scientists and the waging of a war against scientific discoveries of the 19th century, the Symposium emphasized an attempt to outline many of the current and pending problems. It is hoped that future symposia of this type will continue the effort started here, and both Dordt College and Trinity Christian College have indicated their interest in sponsoring such symposia on their campuses in the future. The symposium itself was organized in five main parts: (1) a summary of problems of the past by Dr. Rienstra, historian, with a response by Dr. Vander Vennen, chemist; (2) a discussion of the nature of science by Dr. van de Fliert, geologist, with a response by Dr. Orlebeke, philosopher of science; (3) a summary of problems of the present by Dr. Den Besten, physician, with a response by Dr. Van Elderen, theologian-archaeologist; (4) a public address on "The Bible and Geology" by Dr. van de Fliert (see *Journal ASA* 21, 69 (1969)); and (5) a summary of problems of the future by Dr. Faber, physicist, and by Dr. Rottman, biochemist. This record of the principal papers of the Symposium is a valuable contribution to the modern interraction between science and Christian faith.

EVOLUTION AND CHRISTIAN FAITH by Bolton Davidheiser, the Presbyterian and Reformed Publishing Co., 1969, 366 pp. $6.50.

A balanced critical analysis of inadequacies in a contemporary scientific theory is always a contribution to understanding. The theory of evolution with its widespread corollaries and implications is particularly well suited for such an analysis. In such a treatment it is necessary to distinguish carefully between the various ways in which the term "evolution" is used: (a) changes in living plants and animals, (b) a general theory that proposes a common origin for all living plants and animals, and (c) a system of philosophical speculation that views evolutionary processes as basic to all life. Dr. Davidheiser rejects all such distinctions and as a result his treatment of the problem is a grave disappointment.

Dr. Davidheiser, PhD in Zoology and Genetics from Johns Hopkins University and Professor of Biology at Westmont College and Biola College, hates evolution with singleness of mind. In his own Christian experience his interraction with the theory of evolution proved to be a great stumbling-block. Since he believes that he came to a saving faith in Christ only after release from the bondage of evolution, it is understandable that he should feel so strongly. He would purge even the word "evolution" from the vocabulary, as dealing with any real phenomenon. Unfortunately his approach takes the form of such an outrageous overkill that only those already completely committed to his point of view will respond favorably to this book.

The issue according to Dr. Davidheiser is incredibly simple. Christian faith and evolutionary faith are two world views locked in mortal combat. Anyone considering the evidence must choose between them. "Bible-believing" Christians have no choice but to condemn any position that even suggests evolutionary ideas. If man evolved, then the Biblical account of the fall is false, man is constantly getting better, sin is only a decaying remnant of his animal nature, Christ was only a martyred reformer and not the redeeming Savior, the Christian religion is only a code of ethics and not the way of eternal life. Evolutionary ideas present a prime argument against the existence of God, a repudiation of Scripture, a central factor in the degradation of such schools as Ohio Wesleyan University from Bible-centered to nominally liberal Christian, a cause for modernism and apostasy in the church, a motivating factor for scientists to play God, balm for the consciences of big industrialists, aid to those who take advantage of the poor, a cause of racial strife, a means for the glorification of war, and the foundation of Mussolini's and Hitler's fascism as well as of Marx and Engel's communism.

Dr. Davidheiser believes that the creation of Eve from a rib of Adam is *the* crucial evidence against the theory of evolution, mentions on several occasions the importance of "divine intervention" into the natural order, objects to the phrase "man and other animals" in biology textbooks, faults atheistic or theistic evolution and progressive creationism alike, attempts unsuccessfully to salvage an argument from the Second Law of Thermodynamics, feels that Whitcomb and Morris have reestablished the legitimacy of "flood geology", speaks favorably of the "apparent age" theory, and suggests that the past instances of fossil hoaxes allow one to speculate about how many other such there may be yet undiscovered. Dogmatic assertions abound. "Those who say there is no real conflict between evolution and Christian faith are ignorant of the most basic Christian doctrines, or else they repudiate them." "Espousal of the theory of evolution leads to compromises which in turn lead to liberalism, modernism, and a repudiation of the gospel of salvation through the atonement of Christ." "Theistic evolution contradicts the Bible both historically and doctrinally. . . . No matter what the approach, theistic evolution leads logically to modernism."

Although the author himself points out the ambiguity of the method, he uses quotations from evolutionist authors as his main methodology. Late in the book he states, "As is rather characteristic in matters pertaining to evolution, one can find just about every imaginable point of view advocated by someone." In spite of this comment, however, the book carries over 900 quotations, or an average of 2½ quotations per

page throughout the entire book. In one climax of this approach, 81 quotations are given on 6 pages to show that evolutionists themselves admit ignorance about the origin of life. In spite of his own remark, the author does not seem to recognize that this same procedure could be used with great apparent effectiveness to show the evils and shortcomings of the Christian faith as exercised by the church throughout history. Such out-of-context spot quoting gives the reader no basis for sound evaluation.

The first half of the book is devoted to setting the stage for the actual chapters criticizing proposed evolutionary mechanisms. One hundred pages are devoted to tracing the historical development of evolutionary ideas from Empedocles (5th century B.C.) to the American Scientific Affiliation. In this historical development the focus of attention naturally falls on Charles Darwin. The author describes him directly and via quotations as a failure as a young man caring about nothing but hunting, theologically trained at a school noted for gambling, drunkenness, moral laxity and lack of discipline, taught by Professors of Botany and Geology who publicly admitted ignorance of their subjects, almost rejected by Capt. Fitzroy of the *Beagle* because the captain didn't like the indications of character he read in the shape of Darwin's nose, a victim for years of illness finally characterized as more mental than physical, afraid of criticism, keenly desiring recognition and honor, intentionally ambiguous and slippery in his writing, opportunistic, equivocal, without historical sense, indirectly responsible for the suicidal death of Capt. Fitzroy in guilt-ridden remorse, recognized and honored by communists as an atheist, admired by Karl Marx.

The American Scientific Affiliation comes in for about a dozen critical comments in the course of the book. ASA members Ramm, Mixter, Knobloch, Buswell III, and Cassel all come in for their share of criticism for failing to take a firm anti-evolutionary stand. Buswell's statement that there are no data which conflict with the Genesis account as interpreted in the context of the author's language and culture is dismissed as denying the "authorship by divine inspiration." The ASA is faulted, not because anti-evolutionary writings do not appear in its publications, but because *all* writings of the Affiliation are not anti-evolutionary.

Flashes of humor break through in various places, making the reader wish that the author had practiced a consistently saner exposition of the major problems. The miracle of passing through a closed door does not become easier to understand, he argues, because we now know that a door is mostly "empty space"; "a chicken wire fence has less matter and more empty space than a door, but neither a man nor a chicken can pass through such a fence." Discussing the difficulty in accounting for certain structure of the body in terms of natural selection, he says, "It is evident that natural selection is not responsible for the fortunate position of human ears as an adaptation for wearing glasses." Criticizing the view that vertebrates derive from segmented worms, he writes, "to become a vertebrate, the worm would have to turn over on its back. Worms do not like to do this even for a short time, not to mention staying this way while evolving into something else." I think my favorite is Dr. Davidheiser's comment on reconstructed models of early man, "a picture of a restored *Zinjanthropus* surely would not draw a second glance in the New York subway, provided he was wearing a cap that concealed the fact that he had no forehead."

This attempted tour de force founders on certain basic issues. It fails from the very beginning to recognize that creation and evolution are not necessarily antithetical, that a view of the universe which depends moment-by-moment for its very existence on the upholding power of God need have no difficulty in seeing the creative activity of God expressed *in* an evolutionary process. By assuming that the interpretation of the Biblical creation account is obvious, it ignores the basic hermeneutical considerations involved in such an interpretation. By seeking to define "Bible-believing" in a narrow and restrictive way, it tends to drive separations between Christians. By appealing to the weight of endless quotations and by failing to introduce new evidence or new perspective, it merely reorganizes and sets forth old arguments and opinions already part of the record.

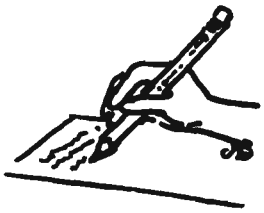
If Dr. Davidheiser were right about the dogmatic certainty of the meaning of the Genesis account, there would be no need for the lengthy attempt to show that the scientific foundations of evolution are wrong. Why belabor the point further? But, if the interpretation of the Genesis record about the mechanisms of creation is ever so slightly uncertain, then we must listen at least with one ear to the testimony of science. The final resolution of the problems in the evolutionary description must come, if indeed they are ever to come, from improvements in scientific process and understanding. Evolution is a scientific question; it would be unfortunate indeed if a scientific question were permitted to become the crucial point for Christian faith.

Reviewed by Richard H. Bube, Department of Materials Science, Stanford University, Stanford, California 94305. *The review of* Evolution and Christian Faith *has been published also in* The Reformed Journal.

Since God in the majesty of His being transcends the world of our ordinary experience, He can be known only through His revelation of Himself within that world. Because He is transcendent, we cannot know Him by our own methods of discovery: to do so is either to reduce Him to the level of creatures whom we can understand, or else to conceive of Him negatively as an abstract, lifeless absolute. But this "unknowability" has been overcome, not by our intellectual ascent to His eminence, but by the descent of His Word into our realm. In His saving acts in history, culminating in that event in which He took on the conditions of finitude and thus became "knowable" and "visible" to us, He has revealed Himself to us. In this we do not know directly His transcendent essence and being; but we do know His inmost will, His intentions for us and our world.

From *Maker of Heaven and Earth*, by Langdon Gilkey

Communications



Kind Words for the Journal

The current *Journal* (Vol. 21 No. 2) is just excellent.

V. Elving Anderson
The Dight Institute for Human Genetics
University of Minnesota Minneapolis, Minn. 55455

The current issue of the *Journal ASA* (Vol. 21 No. 2) is excellent! I received a few extra copies, which I shall keep circulating—and will also start giving some subscriptions again. Wish I had time to take all that bait you offered!

Walter R. Hearn
Department of Biochemistry and Biophysics
Iowa State University, Ames, Iowa

This is a good time to congratulate you on the "new look" of the *Journal ASA*. Internally it is attractive. I'm glad for the quality improvements on every level!

David O. Moberg
Department of Sociology and Anthropology
Marquette University, Milwaukee, Wisconsin 53233

Great Journal in June.

Russell L. Mixter
Department of Biology
Wheaton College, Wheaton, Illinois

Your "Christian Responsibilities in Science," (*Journal ASA 21*, 2 (1969)) is a beautiful job. Thanks!

B. D. Napier
Dean of the Chapel and Professor of Religion
Stanford University, Stanford, California 94305

I think you are to be congratulated on the exciting new direction that the *Journal* has taken and I am glad to be listed as one of the consulting editors.

Gary R. Collins
Professor and Chairman, Division of Pastoral Psychology
Trinity Evangelical Divinity School
Bannockburn, Deerfield, Illinois 60015

I was very much impressed with the September issue of the *Journal*, particularly the article by Tom Skinner entitled "What is the Next Move?" (*Journal ASA* 21, 66 (1969)) I feel that this has a great evangelistic appeal and I am showing it to a number of my friends. You may be interested to know that the first person to whom I gave the article was one of my colleagues at Mankato State. He said he was greatly moved by this article and is seriously considering the claims of Jesus Christ as his Savior. On the other hand I am somewhat disturbed over the second article on "Fundamentalism and the Fundamentals of Geology," by J. R. van de Fliert. It seems to me that he exhibits that which I find in so many writers that science is a god and that the Bible is a secondary book. I may have overstated this position but it seems to me that I find it in a number of writers from the Christian perspective.

H. Harold Hartzler
Executive Secretary, ASA
Mankato, Minnesota 56001

The new issue (September 1969) will really provoke letters, I predict. I'm glad that the issues can thus get out in the open, however. At least it will help to bring into focus the fact that zeal for the Lord is not much without intelligent direction. . . . We enjoy great freedom among ourselves and other Christian scientists (not members of ASA) in formulating our views about the origin of the world and how things continued, and it is a valuable freedom. It is too bad that Christians have to be so black-and-white where the evidence won't allow it. How much better than a stout defense of a position that lacks complete support is the humble stance of one who is a permanent seeker after the truth, going where the evidence leads.

Charles Hatfield
President, ASA
University of Missouri
Rolla, Missouri

I want to say that I feel there has been a noticeable improvement in the *Journal*. I have enjoyed the selection of the articles, the spirited letters of exchange of opinion, and the format you are using in which representative sentences are boxed in to catch reader attention. You have also warmed my heart by your recommendation of Langdon Gilkey's "Maker of Heaven and Earth." This has long been one of my favorite books . . . . . I have talked to several other ASA members recently and I asked their opinion of the *Journal*. Their feelings were very much the same as mine; the progress is encouraging, keep up the good work etc.

Dewey K. Carpenter
Department of Chemistry
Louisiana State University
Baton Rouge, Louisiana 70803

I wish to thank you for the truly helpful articles which I have enjoyed the last fifteen months. Much of the material has been used in lectures and sermons and has blessed many. Keep up the excellent work. Since it is axiomatic that our judgment cannot be better than our insight, I believe that yours is a very necessary function.

May I as a missionary make a respectful suggestion? It appears to me that some articles on Anthropology as it applies to the Christian milieu would broaden our scope of understanding and at the same time make more clear the purposes of God.

David Kent Irwin
International Correspondence Institute
Foreign Missions Department - Assemblies of God
Inglewood, California 90302

Darwin and Spontaneous Generation

(Editor's Note: The following letter by James D. Bales was forwarded to the Editor by Dr. A. E. Wilder Smith.)

I noticed in the *Journal ASA* 20, 123 (1968) the statement that you (Dr. Wilder Smith) were wrong in saying Darwin believed in the spontaneous generation of life. Darwin believed the law of continuity committed one to this position, *so the reviewer is wrong.* See MORE LETTERS of Darwin, Vol. II, p. 171. His letter to D. Mackintosh, Feb. 28, 1882. (This is referred to in Clark and Bales, WHY SCIENTISTS ACCEPT EVOLUTION, 44-45). *Huxley criticized Darwin* for not taking a *forthright stand on this in the Origin of Species.* (See Leonard Huxley, *Life and Letters of Thomas Henry Huxley,* N.Y., The Macmillan Co., 1903, Vol. I, p. 352. See Huxley's position in Vol. II, pp. 15-16). This is referred to in Clark and Bales, pp. 80-81.

(A reply by Richard P. Aulie, author of the Journal ASA *article referred to above, follows.)*

Two questions present themselves in this letter, which concerns my earlier review of an article on "Darwinism and Contemporary Thought"[1,2]. First, is it true that Charles Darwin (1809-1882) "believed in the spontaneous generation of life", or is it not? Second, what difference does it make? The first question we ought to settle by examining the passages from Darwin's writings in which he commented on spontaneous generation. I know of eight such passages, which are quoted below.

Before examining these passages, it is well to point out that in Darwin's day biologists were aware of two aspects, or "kinds", of spontaneous generation. That is, they asked whether the first form of life on earth may have arisen by some form of spontaneous generation, and, second, of more importance to them, whether living microorganisms form spontaneously before their eyes in formless nutrient solutions and infusions. In our day, the second question remains settled in the negative, but the first remains a subject of chemical speculation. The second question was settled in Darwin's day by the classic work of Louis Pasteur (1822-1895) in France and by that of John Tyndall (1820-1893) in England. Tyndall understood the extent of bacterial pollution, which hitherto had obscured a solution of the problem.[3]

This issue is important to the readers of the *Journal ASA* since Smith, and Clark and Bales attempt to find in Darwin's writings, particularly his letters, an association with spontaneous generation as one of their arguments that his thought is inimical to theism. They do so because they feel that the idea of the spontaneous generation of the first form of life is somehow contrary to the Genesis account of creation[4,5]. Clark and Bales develop the view in their book that 19th century "evolutionists", including Darwin, "accepted evolution because of their anti-supernatural bias"[6]. In this context, they hold that Darwin's alleged sympathy for, or adherence to spontaneous generation reflected such an "anti-supernatural bias". It is well therefore to be clear on what Darwin said on the subject, and also what he did *not* say.

What did Darwin say?

First. Dr. Bales writes above that "Darwin believed the law of continuity committed one to this position" ("spontaneous generation"). He supports this conclusion with a reference to Darwin's letter, dated February 28th, 1882, to D. Mackintosh in which the following passage appears[7]:

> . . . Though no evidence worth anything has as yet, in my opinion, been advanced in favour of a living being, being developed from inorganic matter, yet I cannot avoid believing the possibility of this will be proved some day in accordance with the law of continuity. I remember the time, above fifty years ago, when it was said that no substance found in a living plant or animal could be produced without the aid of vital forces. As far as external form is concerned, *Eozoon* shows how difficult it is to distinguish between organised and inorganised bodies. If it is ever found that life can originate on this world, the vital phenomena will come under some general law of nature. Whether the existence of a conscious God can be proved from the existence of the so-called laws of nature (i. e. fixed sequence of events) is a perplexing subject, on which I have often thought, but cannot see my way clearly . . .

I do not know what Darwin meant by "the law of continuity", nor what Bales takes this phrase to mean. Within the context of Darwin's writings, however, he probably meant only that all living phenomena are controlled by natural law, which seems to me not unreasonable. But Bales asserts this "law" "committed" Darwin to the view of spontaneous generation. Now I frankly do not see, when we examine Darwin's first sentence in the above passage, that when he asserted the "possibility" of spontaneous generation, he was thereby "committed" to this view, particularly when we take into account the phrase which comes just before: ". . . Though no evidence worth anything has as yet, in my opinion, been advanced in favour of a living being, being developed from inorganic matter . . .". Darwin was 73 years old when he wrote this letter, in the year of his death, and this passage is probably his last statement on the subject.

Second. The main passage in Darwin's *Origin of Species,* first published in 1859, that concerns the origin of life, as distinguished from the origin of species, is as follows[8]:

> . . I believe that animals have descended from at most only four or five progenitors, and plants from an equal or lesser number.
>
> Analogy would lead me one step further, namely, to the belief that all animals and plants have descended from some one prototype. But analogy may be a deceitful guide . . . probably all the organic beings which have ever lived on this earth have descended from one primordial form, into which life was first breathed.

As far as I know, this is Darwin's only *published* statement that may be characterized as a declaration on spontaneous generation. We may note three points of interest in this cautious passage: first, Darwin here stopped by analogy with one prototype, and did not state where this prototype came from; second, he admitted that arguing by analogy in this case may be a weak method; and third, he used the phrase, "into which life was first breathed". He dropped this phrase from the second and succeeding editions. But Darwin employed a similar phrase in the last sentence of his book, which appears in the first edition as "having been originally breathed into a few forms or into one". In the second and succeeding editions, he added the words, "by the Creator". Now, if the first "life" were introduced from the outside, as Darwin allowed

(I do say "asserted"), it could scarcely have arisen "spontaneously" in the sense in which Bales and Smith have used that adverb.

Thomas Henry Huxley (1825-1895) objected to this passage in a letter of May 22, 1863, which Bales cites above[9]:

> . . . Against the doctrine of spontaneous generation in the abstract I have nothing to say. Indeed it is a necessary corollary from Darwin's views if legitimately carried out, and I think Owen smites him (Darwin) fairly for taking refuge in 'Pentateuchal' phraseology when he ought to have done one of two things —(a) give up the problem, (b) admit the necessity of spontaneous generation. It is the very passage in Darwin's book to which, as he knows right well, I have always strongly objected . . .

Third. In a letter to Sir Joseph Dalton Hooker (1817-1910) dated March 29, 1863, Darwin did regret the wording of this passage from the *Origin* quoted above[10]:

> . . . It will be some time before we see "slime, protoplasm, etc.," generating a new animal. But I have long regretted that I truckled to public opinion, and used the Pentateuchal term of creation, by which I really meant "appeared" by some wholly unknown process. It is mere rubbish, thinking at present of the origin of life; one might as well think of the origin of matter.

Darwin's son and biographer, Francis Darwin (1848-1925), has identified the phrase, "into which life was first breathed", in the passage from the *Origin* quoted above, as the "Pentateuchal term" that bothered Huxley[11].

Thus it is true from Huxley's own words, as Bales has observed, that "Huxley criticized Darwin" for not taking a stronger position in the *Origin* on the question of spontaneous generation. But I frankly do not see the point of this observation, since this passage from Huxley quoted above, together with Darwin's forceful use of the word "rubbish", do not support the argument of Bales and Smith that Darwin favored spontaneous generation[12].

Fourth. The following passage is from a letter by Darwin dated November 21st, 1866[13]:

> . . . As for myself, I cannot believe in spontaneous generation, and though I expect that at some future time the principle of life will be rendered intelligible, at present it seems to me beyond the confines of science.

Fifth. In 1870, Darwin again wrote to Hooker on the possibility of organisms' appearing spontaneously in nutrient infusions and solutions[14]:

> Spontaneous generation seems almost as great a puzzle as preordination. I cannot persuade myself that such a multiplicity of organisms can have been produced, like crystals, in Bastian's solutions of the same kind. I am astonished that, as yet, I have met with no allusion to Wyman's positive statement that if the solutions are boiled for five hours no organisms appear; yet, if my memory serves me, the solutions when opened to air immediately become stocked. Against all evidence, I cannot avoid suspecting that organic particles (my *gemmules* from the separate cells of the lower creatures!) will keep alive and afterwards multiply under proper conditions.

Sixth. In 1871, when he was 62 years old, and twelve years after publication of the first edition of the *Origin*, Darwin wrote[15]:

> It is often said that all the conditions for the first production of a living organism are now present, which could ever have been present. But if (and oh! what a big if!) we could conceive in some warm little pond, with all sorts of ammonia and phospheric salts, light, heat, electricity, etc., present, that a proteine compound was chemically formed ready to undergo still more complex changes, at the present day such matter would be instantly devoured or absorbed, which would not have been the case before living creatures were formed.

Again, this is a cautious statement by Darwin. But it is at the same time remarkable, written almost a century ago, in view of the present experiments on the artificial synthesis of amino acids.

Seventh. On August 28, 1872, Darwin again alluded to this problem at length in a letter to Alfred Russell Wallace (1823-1913) in which he gave his opinion of a book called *The Beginnings of Life*, by Henry Charlton Bastian (1837-1915)[16,71]:

> . . . His general argument in favour of Archebiosis (i. e., spontaneous generation, *sic*) is wonderfully strong, though I cannot think much of some few of his arguments. The result is that I am bewildered and astonished by his statements, but am not convinced, though, on the whole, it seems to me probable that Archebiosis is true. I am not convinced, partly I think owing to the deductive cast of much of his reasoning; and I know not why, but I never feel convinced by deduction, even in the case of H. Spencer's writings. If Dr. Bastian's book had been turned upside down, and he had begun with the various cases of Heterogenesis, and then gone on to organic, and afterwards to saline solutions, and had then given his general arguments, I should have been, I believe, much more influenced. I suspect, however, that my chief difficulty is the effect of old convictions being stereotyped on my brain . . .
>
> As for Rotifers and Tardigrades being spontaneously generated, my mind can no more digest such statements, whether true or false, than my stomach can digest a lump of lead . . .
>
> I wholly disagree with Dr. Bastian about many points in his latter chapters . . . I should like to live to see Archebiosis proved true, for it would be a discovery of transcendent importance; or, if false, I should like to see it disproved, and the facts otherwise explained; but I shall not live to see all this . . .

Eighth. A few days later on September 2nd, again in correspondence with Wallace, Darwin wrote[18]:

> . . . At present I should prefer any mad hypothesis, such as that every disintegrated molecule of the lowest forms can reproduce the parent-form; and that these molecules are universally distributed, and that they do not lose their vital power until heated to such a temperature that they decompose like dead organic particles.

What do these passages show? With the single exception of the passage from the *Origin of Species* (second above), all of them appeared first in private letters of Darwin to his friends and colleagues. In these seven passages, he commented on the biological problem then engaging the attention of certain biologists during the 1860s and 1870s, in particular, the controversial Bastian, who thought he found evidence for the spontaneous generation of microorganisms in nutrient infusions. Darwin also was very likely aware of Tyndall's definitive work, which largely settled the issue. The problem was whether there was some sort of "generative power"—Tyndall's expression—in such infusions, or uniformly dispersed in the air[19]. Never in these passages does Darwin cite an experiment of his own from which he could draw an independent conclusion.

With Darwin's views on spontaneous generation before us, I think we may fairly agree that he was

entirely cautious on the subject of the origin of life, either in the beginning, or in the present day. If anything, his caution *increased* toward the end of his life, shown by the above passages, as the chemistry of the problem began to be explored. We can scarcely develop an argument *against* "evolution" on the basis of what Darwin did *not* say. This brings me to the second aspect of this issue.

What difference does it make?

Of course, it does not make a particle of difference what Darwin thought with regard to whether organisms are spontaneously generated, either in the beginning, or in the present day. Chemicals come together in such and such a way, or they do not, and Darwin's opinion could not change the question.

But it does make a difference if we try to advance Darwin's alleged adherence to spontaneous generation as an argument for the idea that his thought is inimical to theism, that he had some sort of "anti-supernatural bias". Such a line of argument is then misleading to students and laymen who are not biologists and have no ready access to the literature. It is misleading because Darwin published no such argument.

It seems to me we should note a difference of intent between the *published* statements of Darwin, meant as a definitive declaration for posterity, and his hand-written letters to friends and colleagues, in which he commented informally on the scientific issues of the day. We may therefore note that in the single published statement, quoted above (second) from the *Origin*, he did not even use the term "spontaneous generation", he developed no theory, and he expressed himself cautiously. And in his letters, since they were not meant for the general public, we might expect to find *less* caution in his comments on the current speculations, yet this is not the case. His letters also reflect the caution of a competent biologist. If Darwin had an "anti-supernatural bias", it is *not* indicated in his informal statements on spontaneous generation. Clark and Bales, and Smith, therefore attach undue emphasis to Darwin's informal comments on the "possibility" of the spontaneous generation of the first form of life. They do so without taking into account the historical context of the problem. It was not for Darwin a question of primary concern.

It is true, as Clark and Bales recognize, that we should examine the "letters, biographies and autobiographies" of the 19th century English scientists who supported the doctrine of evolution in order to form a clearer picture of (a) how it was received by them, and, more particularly, (b) the role of their religious assumptions as they became convinced[20]. But this study should be balanced with an examination of the scientific arguments *per se* that are developed in the *Origin of Species*, as distinguished from the religious views of the scientists who eventually supported these arguments. If Darwin's thought is indeed inimical to theism, then we ought to be able to identify for study particular, representative passages that are directly responsible for this dire result. It was Darwin's *Origin of Species*, not his letters, that became the focus of religious controversy over evolution. Yet Smith, and Clark and Bales do not have a single page-citation from any of the six editions. Smith has only a passing reference to the *Origin*—the page-citation not given—which notes Darwin's reverence to the Creator[21]. We have yet to hear what chapter, or paragraph, or sentence in the controversial book is actually inimical to theism[22].

Conclusions.

1. Darwin developed no theory about spontaneous generation. He was always skeptical about such speculations.

2. In the *Origin of Species*, he allowed the view that in the beginning the Creator introduced life into the first organism.

3. At the close of his life, he remained skeptical about the spontaneous generation of microorganisms in nutrient infusions.

4. His views on spontaneous generation could have had nothing to do with whether it actually occurred.

5. The validity of Darwin's scientific views on evolution cannot be assessed by an examination of his religious views.

6. Arguments against evolution should be supported by exact page-citations from particular editions of Darwin's *Origin of Species*.

References

[1]Smith, A. E. Wilder, "Darwinism and Contemporary Thought", *Christianity Today*, May 26, 1967, pp. 3-6.

[2]Aulie, Richard P., "Darwinism and Contemporary Thought, a Review", *Journal ASA*, December, 1968, pp. 123-125.

[3](a) Pasteur, Louis, "Memoire sur les corpuscles organisees qui existent dans l'atmosphere". *Annales de Chimie et de Physique*, 3rd series. 1862, 64, 1-110.
(b) Tyndall, John, "Spontaneous Generation". *Popular Science Monthly*, 12, 1878, pp. 476-488, 591-604. Also in Tyndall's *Fragments of Science*. New York, Appleton, 1900. Vol. 2, pp. 290-334.

[4]Smith, A. E. Wilder, *Man's Origin, Man's Destiny*. Wheaton, Illinois, Harold Shaw, 1968. (320 p.) Pp. 33 *et passim*.

[5]Clark, Robert T., and James D. Bales, *Why Scientists Accept Evolution*. Grand Rapids, Baker Book, 1967. (113 p.) Pp. 44, 45; 80, 81. I do not comment on whether spontaneous generation of the first form of life is contrary to Genesis, since this question is a matter of theological opinion.

[6]*Ibid.*, p. 108. This is a tall order for a book of 113 pages Nevertheless, the authors have drawn from the letters and biographies of James Hutton (1726-1797), Sir Charles Lyell (1797-1875), Darwin, Herbert Spencer (1820-1903), T. H. Huxley, and A. R. Wallace some interesting observations and comments that merit attention. But they have by no means cited all the relevant literature that is readily available in this category. This is a subject worthy of further study. However, their particular approach, it seems to me, implies certain questionable assumptions: (a) that scientists in the late 19th century were more given to an "anti-supernatural bias" than those of any other age, or more so than the bias of teachers, plumbers, or any other calling; (b) that the religious ideas of a scientist play a *more* direct role in the formulation of his scientific arguments he advances; (c) that it is possible to delineate the religious and psychological motives of a scientist as he develops a theory, even though he has not so-identified them; and (d) that the doctrine of evolution is primarily in the category of the metaphysical and the religious, and therefore it is not in the category of such scientific abstractions as gravity, DNA, the atomic theory, ATP, and the like.

Furthermore, the theoretical orientation of this approach, it seems to me, necessarily negates secondary causation in the organic realm; this approach to biology also has considerable in common with the idealistic zoology of the early decades of the 19th century, but that is another subject.

It would be a distinct contribution in this regard for someone to prepare a study of *all* the letters and essays of just one scientist from this period, for example, those of Thomas Henry Huxley, who wrote vigorously on science and religion. For a start, his writings are cited in: (a) Huxley, T. H., *Collected Essays*. London, Macmillan, 1894-

1908. 9 volumes. (b) Foster, Michael, and E. Ray Lankester, Editors. *The Scientific Memoirs of Thomas Henry Huxley*. London, Macmillan, 1898-1903. 5 volumes. and (c) Bibby, Cyril, *T. H. Huxley*, Scientist, Humanist and Educator. London, Watts, 1959. (xxii, 330 p.) John C. Greene has written well in this area: *Darwin and the Modern World View*. New York, Mentor, 1963. (viii, 126 p.) But there can be no substitute for a careful study of Darwin's *Origin of Species* for finding out just what Darwin meant by "evolution".

[7]Darwin, Francis, Editor, *More Letters of Charles Darwin*. New York, Appleton, 1903. (2 vols.) Vol. 2, p. 171.

[8]Darwin, Charles, *On the Origin of Species*. Harvard, University Press, 1964. (Facsimile of the First Edition of 1859, with introduction by Ernst Mayr.) (xxvii, ix. 502 p.) P. 484.

[9]Huxley, Leonard, *Life and Letters of Thomas Henry Huxley*. New York, Appleton, 1900. (2 vols.) Vol. 1, p. 263.

[10]Darwin, Francis, *The Life and Letters of Charles Darwin*. London, Murray, 1887. (3 vols.) Vol. 3, p. 18.

[11]*Loc. cit., footnote.*

[12]Reference 1, p. 3; references 4, 5.

[13]Reference 7, vol. 1, p. 273.

[14]*Ibid.*, pp. 321, 322.

[15]Reference 10, vol. 3, p. 18, footnote.

[16]*Ibid.*, vol. 3, pp. 168, 169.

[17]Bastian, H. Charlton, *The Beginnings of Life* (Being some Account of the Nature, Mode of Origin, and Transformation of Lower Organisms.) London, Macmillan, 1872. 2 vols.)

[18]Reference 7, vol. 1, p. 321, footnote.

[19]Reference 3b, pp. 482, 486, 487.

[20]Reference 5. p. 108.

[21](a) Reference 4, p. 15. Darwin referred to the Creator on pages 186, 189, 488, 490 of the first edition of the *Origin*. (b) Smith also refers to Darwin's "displeasure and sarcasm" in the *Origin of Species* as a kind of "stepwise" creation, or a series of special creations. Reference 4, p. 51. Smith does not indicate the page-source to support such a position, but it may be on page 483 of the first edition, in which Darwin seems to be asking special creationists to state exactly what they mean. I do not find this passage particularly inappropriate.

[22]The best, general discussion I know of on the relations between science and the Bible was written in the year 1615: Galileo, Galilei, "Letter to Madame Christina of Lorraine, Grand Duchess of Tuscany, Concerning the Use of Biblical Quotations in Matters of Science". Drake, Stillman, *Discoveries and Opinions of Galileo*. New York, Doubleday, Anchor. 1957. (viii, 302 p.) Pp. 172-216.

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Environmental Exploitation due to Fallen Human Nature

I read with great interest the two articles: "Man on a Spaceship," by W. G. Pollard,(*Journal ASA* 21, 34 (1969)) and "The Historical Roots of Our Ecologic Crisis," by L. White, Jr. (*Journal ASA* 21, 42 (1969)) I was surprised to note that both authors have based their chief argument of man's mastery over nature—with its good or bad consequences, on the Genesis injunction "Be fruitful and multiply . . . and have dominion over . . . all the earth" *apart* from a second Genesis statement which follows the first injunction and clearly modifies the latter! In Genesis 11:4-6 God checks man's urge to assert his independence with an uncontrolled dominance over nature: "let us build us a tower, whose top may reach unto heaven . . .," to which God replies: ". . . let us go down and there confound their language. . . ." What seemed to have been a carte blanche for man *before* his fall, is now checked by God. Man is not to be entrusted with limitless power anymore. He has dethroned God from his life, replaced it with his "self" and become potentially destructive.

It is the fallen nature of man and *not* the Judeo-Christian tradition that should carry the blame for the ruthless exploitation of his environment. Apart from Christ, every human achievement has been distorted by his appalling spiritual mediocrity. Is it any wonder then that Christ should introduce a completely new and far more urgent injunction in place of the old Genesis one: "Go ye and teach all nations . . . to observe all things whatsoever I have commanded you" (Matt. 28:19,20).

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(Editor's Comment: The discussion by ASA commentators, Wayne Frair, E. S. Feenstra and Donald Munro, published in the same issue, make the same point as this correspondent.)

It is *So* Simple

The dialogue on evolution in the *Journal ASA* has been both interesting and disappointing. I really wonder if we know that the "Holy Scriptures are the inspired Word of God, the only unerring guide of faith and conduct." Can we as human beings put absolute trust in the Word of God when the "word" of men in the world today is so opposed to God's Word and at the same time is more popular than God's Word?

Here I would like to point out several *real* possibilities which would shed light on the credibility of God's Word.

(The author here summarizes (1) the gap theory of Genesis 1:1 and 1:2, utilizing I Cor. 14:33 and Isaiah 45:18; (2) the rebellion of Satan-and-other-spiritual-beings theory utilizing Isaiah 14:12-17 and Rev. 12:4; (3) the previous-population-of-the-earth theory utilizing Gen. 1:28; (4) a pre-Noachian-flood theory based on Genesis 1:2; and (5) the following "evidences" from today's observations: the random distribution of heavenly bodies, the absence of life on the moon, evidence of great flooding even billions of years ago, disappearance of life forms in the past, existence of very different life forms many years before man. A more detailed treatment of this theoretical interpretation (first scientifically discussed by Rosenmuller in 1776) may be found in The Christian View of Science and Scripture, *B. Ramm, Eerdmans (1955), pp. 195-210.)*

I claim then that our creator has revealed to us what truly happened in the past if we will only believe him instead of man! Furthermore, all the evidence we can observe today reveals what truly happened in the past, but we must interpret that evidence properly in light of the Holy Scriptures. John A. McIntyre (*Journal ASA* 21, 59 (1969)) has pointed out that there is an apparent discrepancy between scientific data and the scriptural record as far as the age of the earth is concerned. I am not sure this is true if we truly interpret the facts properly and understand the scriptural record. I claim that scientific facts and the Bible are reconciled if we believe God! God does not *inspire* or *reveal* a process of evolution. Our creator reveals a creation process. Will we *not* believe Him? It is that *simple.*

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Changes in ASA Name, Convention Locations and Membership Categories

I am in agreement that under the circumstances mentioned by C. Ray Carlson (*Journal ASA* 21, 59 (1969)) a suitable name change for the Journal and of course for the organization might be an advantage. However, finding a name that is in line with the objectives of the organization is quite another matter. Perhaps suggestions should be solicited? How about Christian Scientific Affiliation? That goes right along with the Christian Scientific Symposium held at Calvin College.

For some reason or other, I found this June issue of the *Journal* of greater reading interest than previous issues. Maybe it's because of more lucid writing, or topics were more timely, or could it be editorial organization?

Another question concerns having an ASA Convention closer to this section of the country. I know from experience that conventions are best planned for areas where there appears a good volume of the membrship, but it's also good publicity to plan such where the organization is not so well known. This might help bring more like-minded people into the fold. In a check of the membership list plus those added March 8, 1969, I found 98 members in the 9 state area of North and South Carolina, Georgia, Alabama, Mississippi, Arkansas, Louisiana, Texas and Tennessee. Shouldn't this be enough for a regional meeting or at least one national meeting once every 4 or 5 years?

At the foot of page 1, *ASA NEWSLETTER* Vol. 11, No. 1, *Editor's Note*, mention is made of "Fellows of the ASA are Brahmins . . . a self-perpetuating caste. . . ." This seems to me an odd situation among "Christians" who before God are all alike. We do have membership classifications in many organizations but for such delineation to exist in an organization whose purpose is glorification of God through the inspired apologetic of His creation to the world, is an anachronism. All who support the ASA with an annual financial contribution known as "dues" should be classed simply as members: nothing more, nothing less.

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(*Editor's Comment: Readers of the NEWSLETTER learn not to take the imaginative prose of the Editor of that publication too seriously.*)

Research Scientists' Christian Fellowship Annual Conference 1969

The Research Scientists' Christian Fellowship in England is a close counterpart to the ASA. Closer association with such sister organizations around the world is desired. The 1969 Annual Conference of RSCF was held September 27 at Bedford College, Regent's Park, London, on the subject, "Science and Ethics." Papers included "The Basis of Ethics," and "The Justification of Moral Judgments" by Dr. David Booth and a London group, as well as several short papers on particular problems such as euthanasia, homosexuality, control of personality by drugs, etc. by different RSCF groups including Oxford and Leeds. The RSCF is one of the Graduates' Fellowship Sections, associated with the Inter-Varsity Fellowship, and publishes in the *Christian Graduate*. Individuals interested in more information about this sister organization or in receiving the *Christian Graduate* should write to Dr. Oliver Barclay, 39 Bedford Square, London WC 1, England.

Pro and Con van de Fliert

First, let me congratulate you on the tremendous *Journal ASA* for September and a general improvement in ASA over the past year or so. Particularly, van de Fliert's article and Garrett Hardin's article with comments.

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I especially appreciated van de Fliert's article. I find about as little virtue in presenting arguments to establish the infallibility of the Bible as I do trying to *prove* the existence of God scientifically. I take these matters on faith. So I trust God and *use* the Bible. Since people have generally given up trying to prove God's existence, I think we may have reasonable hope that they will one day give up trying to prove the validity, infallibility, authority, spiritual power or whatever of the Bible. But until we reach that point, men like van de Fliert serve us well.

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I greatly enjoyed the refutation of Morris and Whitcomb's debacle by van de Fliert.

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For several years now we non-geologists have had to defend truth with our inadequate geological knowledge while the geologists in the A.S.A. either chose to remain silent or else were in such a small minority that their voices were not heard.

Dr. van de Fliert's article exposing the fatal flaws of Whitcomb's and Morris' book on flood geology was a most welcome and long overdue breath of fresh air.

I would like to add these facts to his scholarly

article:

1. Professor Kane, Chairman of Geology Dept., Ball State University, indicated to me that none of the geologists approving Whitcomb and Morris's book have been involved in geological research in at least 2 and probably more likely 3 or 4 decades. This, he said, he can vouch for by personal knowledge of the geologists themselves as well as of the research literature. He said that they are essentially "arm-chair geologists."

2. On Whitcomb's third visit to Ball State University (Fall, 1967), several geologists, anthropologists, biologists, and archaeologists pointed out to him some of the more obvious errors in the book. Not once in the 1½ hour meeting did he admit to the need for any correction in spite of overwhelming evidence from those research scientists to the contrary. However, it is encouraging to note that so far as many students were concerned, the meeting had beneficial results as they testified that no one had taken the trouble before to point out the dangerous grounds upon which flood geology rests.

3. The book's testimonies by non-geologists such as plant breeders, civil engineers, chemists, and the like are irrelevant to the primarily geological problem, are misleading to laymen, and appear somewhat (probably unintentionally) dishonest to be included.

It is pitiful to see so many of our fellow conservatives resort to intellectual dishonesty, browbeating, pseudo-pietism, and even hatred—all in the name of Christ and fundamentalism. It would seem that they feel that the end justifies the means.

It was good to see the testimonies of geologists Cuffy, Tanner, and Boardman regarding the article. May God give courage to other geologists in the A.S.A. to stand up and be counted for the faith!

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I appreciate very much the attention devoted to our book[1] by Professor van de Fliert[2] since most professional geologists have ignored it. However, I regret that he allowed himself to resort to emotional language in his discussion ("incredible", "flagrant nonsense", "extremely dangerous", "pretended scientific value", etc.). One evidence that evolutionary uniformitarianism is a religion rather than a science is the fact that its advocates almost invariably react emotionally whenever a fellow scientist questions it.

We agree completely with most of Professor van de Fliert's paper and are puzzled as to why so much that is in agreement with THE GENESIS FLOOD is included in a polemic against it. In many instances it seems to me that he is battling a straw man of his own preconception—like those evolutionists who forever are attacking the supposed creationist doctrine of fixity of species.

Thus we have always stressed the uniformity of natural law as a basic principle in science. Similarly we recognize abundant evidence of extensive earth movements in the past, including overthrusting, folding and other remarkable tectonic features which we do not see occurring at present. As a hydrologist and hyraulics engineer, I certainly believe that the same basic principles of hydraulics operating at present were in effect when the ancient lands and rivers were eroded and the ancient sediments were deposited. Furthermore we recognize the value of the standard geologic column as a taxonomic device and the fact that strata usually occur in the accepted order and that paleontologic criteria of identification are generally valid.

But the point of the discussion in THE GENESIS FLOOD (and not discussed by Professor van de Fliert) is that there are a great number of exceptions to the usual order in which the supposed physical criteria of overthrusting, reworking, etc., are *not* present, and that there are a great many geologic features which (on consistent uniformitarian principles) could not possibly be correlated with geologic phenomena actually observed by modern geologists, either quantitatively or qualitatively (e.g., regional volcanic terrains, continental glaciation, mountain-building, peneplain formation, fossil graveyards, incised meanders, regional alluviation, submarine canyon formation, and many others.) It seems to many of us that such things as these absolutely demand catastrophism of some sort, though within the framework of uniform natural law.

In the decade since THE GENESIS FLOOD was written (though I do not mean to suggest any connection) a significant reaction of orthodox geologists has emerged against the older uniformitarianism, with an increasingly frank recognition that local or regional catastrophism is fundamental in geologic interpretation. I have discussed this trend to some extent in two other papers.[3,4] Of course there is still as much antipathy as ever to the idea of a worldwide cataclysm such as the Biblical Flood.

In the book we attempted, in an exploratory way, to see how the actual observed data of geology and other sciences could be harmonized with the Biblical record of the Flood. We repeatedly stressed in the book that our proposed geologic interpretations are tentative and subject to revision with further study and evaluation. However, the one point we insisted on was that *the basic Christian presupposition of the inerrancy and perspicuity of the Genesis record must be maintained.* If this is not done, then the remaining system may possibly be theistic, but it can be neither Biblical nor truly Christian.

Now it is this fundamental requirement which not only van de Fliert but all other critics of THE GENESIS FLOOD have studiously ignored. Critics invariably dwell on certain supposed flaws in our geological perspective (e.g., our alleged failure to recognize the real nature of the geologists' concept of uniformitarianism, the supposed impropriety of documenting our case with quotations from men who don't agree with it, our alleged ignorance of the fact that there really are some examples of overthrusting, re-working of sediments and faunal mixing and other phenomena whose *universal* applicability we questioned, etc.), but they always pass by the much more important and fundamental fact that *the written Word of God uneqivocally teaches that there was a world-destroying cataclysm in the days of Noah!*

This reaction of course is to be expected from non-Christian geologists, to whom the Biblical record is utterly irrelevant anyhow. But it is disheartening and puzzling when evangelical scientists, who insist that

they still believe in the divine authority of the Bible, also completely ignore this powerful Biblical evidence for the worldwide cataclysm, as presented in THE GENESIS FLOOD and many other places. That this is a fair statement of the situation has been thoroughly confirmed in a recent study[5], by a man trained in both science and theology, who has analyzed all the reviews and criticisms of THE GENESIS FLOOD since its initial publication.

Professor van de Fliert admits, in fact, that "our scientific world picture has become different from that of the authors of the Bible."[6] To him, therefore, the fact that the writer of Genesis (as well as Job, David, Isaiah, Paul, Peter, and even Christ Himself) believed in a global Flood is of no importance. He feels this issue can be settled simply by saying that "the Bible is not a scientific book." He even thinks (and one is almost startled to encounter this kind of circumlocution in a serious scientist and Christian) that to apply the Biblical doctrine of inerrancy to matters of historic fact is "a colossal overestimation of science."

Atheistic scientists and philosophers, on the other hand, reason much more directly. To them, if the Bible is unreliable when it deals with matters of human observation and experience (i.e., science and history)—as it does with great emphasis and frequency—then it is surely not worth trusting when it attempts to treat intangibles such as sin and salvation, heaven and hell—and God!

Available space for this communication does not allow for a rebuttal to Professor van de Fliert's criticism of our discussion of hydrodynamic sorting as a partial explanation for the lithologic and paleontologic divisions in the strata of a sedimentary exposure, or of the highly uncertain growth rates and subsequent histories of ancient coral reefs, or of other geological problems. I can only say that he has not at all settled these questions.

But this is not the important thing. I again acknowledge that there are many, many problems in geology for which we do not yet have adequate answers in terms of the Biblical framework, even though we can at least see in a general way how many of the data can be reinterpreted to correlate with it. There are even more serious problems, on the other hand, for the dogmatic evolutionist and uniformitarian.

The real crux of the matter, however, is "What saith Scripture?" In THE GENESIS FLOOD, as well as in our other writings, Dr. Whitcomb and I have maintained, with a considerable number of straightforward Biblical arguments, that the Bible teaches a recent special Creation of all things and a worldwide Flood, and that there is no permissible interpretation of the Bible which can accommodate evolution and the geological ages. *No one has answered these arguments to date.*

How, for one example, can we harmonize the concept of a billion years of random variation, struggle for existence, natural selection, evolutionary dead-ends and extinctions without number, disease, confusion, disorder, decay, slaughter and death; with the fact of a God of perfect wisdom, order, power and grace—who could easily have created all things complete and perfect from the beginning (as He has revealed in His Word), but who according to the consistent evolutionist and uniformitarian, chose the tortuous route of evolution instead? This is a serious theological problem, one that cannot really be settled by a quip or a platitude.

It seems to me that each evangelical scientist and theologian owes it to the Christian community to do one of two things: (1) develop a sound Biblical exegesis of the fundamental chapters of the Bible (Genesis 1-11), consistent with the rest of Scripture, which will clearly warrant his acceptance of the geological ages and the general evolutionary world-view; or else (2) develop a re-interpretation of the observed facts of geology and other sciences to correlate with the facts of Biblical revelation concerning primeval earth history, centered in special Creation, the Fall, and the Flood.

There can be only confusion and danger in continuing to embellish the superstructure when the foundation has been destroyed.

[1]John C. Whitcomb, Jr., and Henry M. Morris: THE GENESIS FLOOD (Nutley, N. J., Presbyterian and Reformed Publ. Co.) 1961, 518 pp. 14th printing (paperback), 1969.

[2]J. R. van de Fliert: "Fundamentalism and the Fundamentals of Geology," *Journal of the American Scientific Affiliation*, Vol. 21, September 1969.

[3]"Science Versus Scientism in Historical Geology," *Quarterly of the Creation Research Society*, Vol. 2, October 1965.

[4]"Sedimentation and the Fossil Record: A Study in Hydraulic Engineering," *Quarterly of the Creation Research Society*. Vol. 2, December 1967.

[5]Charles C. Clough: *A Calm Appraisal of THE GENESIS FLOOD*. Th. M. Thesis, Dallas Theological Seminary, May 1968, 196 pp. This study is summarized in the Creation Research Quarterly for September 1969.

[6]van de Fliert, *op. cit.*, p. 80.

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I have been a pastor for more than forty years. During that time nothing has grieved my heart more than to see a young man start out with great promise and later end up a shipwreck.

I have enjoyed the privilege of being an Associate Member of A.S.A. during most of its history. At the beginning it promised to do what I and many others had prayed for a long time, namely, to bridge the widening gap between science and the Bible. For some years you did well. But the past few years there has been a gradual drifting. To me you reached the ridiculous in the recent article, "The Three Storied Universe."

Now you come forward with the article, "Fundamentalism and Fundamentals of Geology," by van de Fliert. All of his arguments are what you find in the average book on the subject. Mostly he vented his spleen on Morris and Whitcomb along with all the rest of us who still believe in the Bible as offering reliable historical facts as well as promises.

It is this kind of dividing reason (or futile effort) from faith that is causing most of the tragedy of our day. Of course, van de Fliert shows an abiding faith in his assumptions, his limited experiments, and conclusions. This is placing a *Mighty* faith in human reason and judgment. No wonder he shunts his faith in God and his word out into some mystical realm where reason can ask no questions nor expect any answer.

In my judgment this is a perfect example of the

Escape from Reason (*Journal* ASA, 21, 54 (1969)) that Francis Schaeffer recently wrote so well about. This is a true picture of modern man—and a professed Evangelical Christian not only lends aid but defends it.

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J. R. van de Fliert faults Morris and Whitcomb (*The Genesis Flood*) for dogmatism. It is true that they might have presented their case in a less judgmental way. However, van de Fliert then proceeds to be just as dogmatic *for* the historical geology approach, allowing no possibility that Morris and Whitcomb might be correct. This is strange, when in the same article he is able to speak of the "poor state of our scientific knowledge today . . . which will change tomorrow!" (p. 69) One then reads with wonder such statements as:

> ". . . this idea . . . was soon to be shown false by evidence accumulated as the science of geology began to grow" (p. 70).
>
> "There is no doubt about the answer in the present state of our knowledge . . ." (p. 73).
>
> "This basis makes it possible indeed to say that the broad lines of present-day historical geology . . . are correct, and are to be accepted as a well established fact" (p. 80).

Van de Fliert *may* be correct, but the very fact that there are scientists (including geologists) today who hold such a view, should call for a little more caution. Morris is faulted because he is not a geologist; it is true, this is not his main field. However, he is trained in geology, and he is so listed in the American Scientific Affiliation Directory.

Criticism, yes. Solid, first-hand research, yes. But dogmatism and stone-throwing, from either side, no. That will get none of us anywhere. Nor does it seem to me to be in the best Christian spirit.

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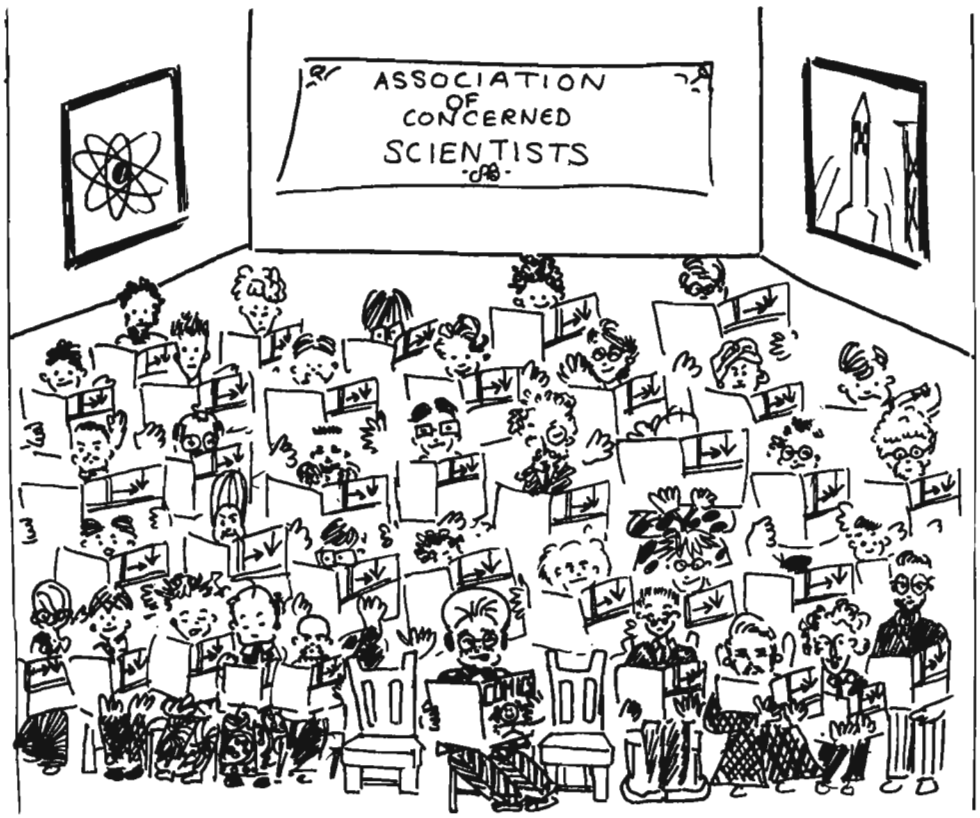

Almost every concerned scientist[1] is reading the new larger[2] *Journal ASA*.

[1]General *Journal* subscriptions increased by over 30 percent during nine months of 1969.
[2]25 percent larger since December 1969 issue.

What Do You Think of THAT?!

Scientists Cannot Create Life

Dr. Larry G. Butler gives an unequivocal negative to the question, "Can science create life?" He argues that Pasteur has shown that creation is a completed, not a continuing process. Attempts to explain life and its origin solely in terms of chemical and physical theories are labeled as the product of an atheistic viewpoint, which leads to the expectation that the creation of life will become possible when its chemistry is sufficiently understood. Dr. Butler goes on to maintain that, even if scientists were able to synthesize a living organism, there would be a "God-shaped vacuum" in the heart of a "synthetic" man, absence of love, sensitivity and gentleness from the heart of an "artificial" woman, no lovable or trusting qualities in a "synthetic" child. *Can a "chemically-real" man be a "spiritually-synthetic" man?* (*The Christian Reader*, June-July 1969, p. 19; reprinted from *Baptist Bulletin.*)

Science as Service

Kenneth V. Thimann of the University of California at Santa Cruz, emphasises the need for educational development of the theme that science and technology offer genuine avenues for service to mankind. Attention needs to be paid to the victories won over air pollution in England or even in Pittsburgh earlier this century, over the diseases of beri-beri, scurvy, pellagra and rickets through the discovery of vitamins, over dysentery, typhoid and cholera through the production of safe drinking water for city dwellers. The International Rice Research Institute with a staff of only 16 Ph.D.'s has changed the nutritional future of Asia in 5 years. Penicillin and streptomycin have saved countless lives; tuberculosis has been almost excluded from the western world. (*Science* 164, 1013 (1969))

Rejection of the Burdens of History

"In our streets and on our campuses riots an extremist minority dedicated to the now, to the moment, however absurd, degrading, or irrelevant the moment may be. It is an activism that deliberately rejects the past and is determined to start life anew—indeed to reject the very institutions that feed, clothe, and sustain our swarming millions." This is the analysis of Loren Eiseley, Professor of Anthropology and History of Science at the University of Pennsylvania, in his book *The Unexpected Universe* (Harcourt, Brace & World (1969)). By rejecting the past, the very conceptual, cultural and spiritual values needed to face the problems of the future are destroyed. As men live by the values of the cave man, society becomes like the society of that chaotic and violent day. (*Science* 165, 129 (1969))

Structural Basis for Inability of Nonhuman Primates to Mimic Human Speech

Recent research involving a computer program to simulate vocalizations of rhesus monkeys, chimpanzees and gorillas indicates that the inability of apes to mimic human speech is an inherent limitation of their vocal mechanisms. Specifically, such nonhuman primates lack a pharyngeal region like man's, where the cross-sectional area changes continuously during speech. It was concluded that the human speech-output mechanism is part of man's species-specific linguistic endowment. (Research of P. H. Lieberman, D. H. Klatt and W. H. Wilson; *Science* 164, 1185 (1969))

What Do You Think of THAT?!

Penological Reform Needed

In a letter treating the problem of XYY chromosomes and criminal acts (see also *Journal ASA* 21, 48 (1969)), Kennedy McWhirter, an English barrister and a practicing geneticist from the University of Alberta, advocates a reconsideration of penological ideas and priorities. The purposes of penal action should be (1) to minimize injury and damage, but not to advance "preventive social hygiene" to anticipate or prevent possible but uncommitted crimes, (2) to prevent repetition, (3) to make it possible for the guilty to recompense his victim, (4) to restore the guilty to a normal role in society, and (5) to deter persons with strong environmental dispositions from committing crimes. He argues that "retribution" for crime "is not a permissible activity of the human world; it should be left to a merciful God." (*Science* 164, 1117 (1969))

Scientists Can't Stay Out of Politics

Dr. Lee A. DuBridge, Science Advisor to the President, told the members of the National Academy of Sciences that science and technology can no longer be kept separate from political and social problems. When scientists voice political opinions, they must learn to expect politicians to treat them on the basis of their political viewpoint and not on the basis of their scientific competence. The contention that science is too important to get mixed up in politics can only be countered with the assertion that today science is too important not to get mixed up in politics. In a democracy, politics is how things get done. (*Science* 164, 1137 (1969))

The History of a Science-Communism Conflict

Organized Christianity is not the only religion to have a record of conflict with science. The organized Communist "religion" has also had its share of such conflicts. The fascinating story of one major and recent conflict is provided in *The Rise and Fall of T. D. Lysenko*, by Z. A. Medvedev, head of a Laboratory of Molecular Biology in Obninsk near Moscow (translated by I. M. Lerner and published by Columbia Univ. Press (1969)). The fact that in most such conflicts in both western and eastern worlds, responsible science is able ultimately to triumph over dogmatically asserted pseudoscience is a matter for comfort. (*Science* 164, 1507 (1969))

Science as Law Changer

A conviction for abortion was reversed by the Supreme Court of California on the grounds that the action was illegal on the basis of the conditions prevailing in 1850 when the law was enacted but had ceased to be such in view of the conditions existing in 1966 when the abortion was performed. The law forbade abortion "unless the same is necessary to preserve her (the mother's) life." The Court's decision rested on the difficulty of interpreting these words, and on the relative safety of modern abortion (safer during the first three months than going to term) when compared with the woman's threat to resort to a dangerous criminal abortion if refused. Many other issues may exist for which advancing medical, technological, sociological, or psychological knowledge will argue for a legal change. (*Science* 166, 457 (1969))

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

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

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