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

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Planet Earth in Turmoil

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It would be foolish for anyone to attempt to give a banquet talk, a presidential address, and a State of the Union message all at the same time, but on the assumption that fools and psychologists rush in where angels fear to tread, I would like to attempt all three goals in this paper. To begin I would like to look back to an ASA convention which we had five years ago at Gordon College where we discussed our society in turmoil. Then I would like to think back over the past five years and make some observations about our Affiliation in turmoil. Finally I would like to share some personal observations that I have made recently about our planet earth in turmoil.

Our Society in Turmoil

At our convention in 1969, we discussed a number of social issues including poverty, race, famine, pollution and war. Following the convention, these papers were published in a book (Collins, 1970). I'm not sure I liked the title or even the cover design but *Christianity Today* picked our ASA volume as one of the twenty best books to appear in 1970. Shortly thereafter, *Moody Monthly* published a rather positive review which read in part:

> Unrest . . . best describes the social and spiritual turmoil of our times. This symposium effectively confronts us with the fact that we evangelicals can no longer pontificate smugly, "Just preach the gospel and society will right itself." The result of this strategy in the past has been, in the words of John Montgomery, "a socially retarded evangelical Christianity" with an introverted, semi-monastic life style. . . .
>
> Though from varied backgrounds (eleven professors, two medical doctors, one editorial assistant and one an authority on space science), all sixteen authors agree that evangelical Christianity can play a key part in helping to bring order out of confusion—if it will.

Presidential Address given at the twenty-ninth annual convention of the American Scientific Affiliation, Bethany, Oklahoma, August 21, 1974.

There was also a review in the *Journal of the American Scientific Affiliation*. This *Journal* is usually perceptive and the reviewer wrote:

> Most of the book's chapters use a format of facts, conjecture and Christian application. However, before specific issues are discussed, an initial tone-setting chapter by John Montgomery demonstrates a Scriptural basis for social involvement by the believer. In addition, Montgomery very lucidly challenges Christians to be as aware and outspoken in such areas as open housing and ecological responsibility as in the area of sexual freedom, the traditional fundamentalist's major moral concern. Fourteen social issues follow Montgomery's chapter, most of them relevant in contemporary thinking.
>
> A chapter on racism by William Pannell is an incisive plea for the church to stop being racist: "The sin of Evangelicalism is not that we are un-American. It is rather that we are more American than Christian."
>
> In a discussion of crime and civil disobedience Russell Heddendorf takes the sociological position that civil disobedience indexes a basic questioning of the "presuppositions which are fundamental to society." The distinction made between crime and civil disobedience is one of many extremely provocative notions set forth in this well-written and scholarly essay.
>
> A chapter on birth control by Merville Vincent furnishes a good exposition of the problem: he presents the issue and the most viable alternatives before giving his bias. Other lively and well-reasoned chapters focus on issues of war, space exploration and man's future with computers.
>
> Some chapters, however, are not so strong. . . .
>
> Despite some shortcomings, *Society in Turmoil* deserves reading by the great majority (silent) of Christians because of its unique willingness to grapple with contemporary issues. The final goal of the book is stated as challenging renewed dedication to our Lord. Potentially, the essays can serve as a basis for evangelical churches to "stir up that gift which is within them," so as to be aware of and involved in meeting our current social dilemmas in a Christ-like *and* informed manner.

A review in *Eternity* magazine was, to say the least less than positive:

> Never trust a book that can't even get its footnote numbers straight and gives cross references to nonexistent chapters. These are but intimations of worse to come.
>
> All but two of the volume's 16 contributors are members of the American Scientific Affiliation. Their purpose was to examine current social issues from the vantage points of both science and Christianity.
>
> The result is drab indeed. John Warwick Mongomery's theological overview, Bill Pannell's comments on race, and Gary Collins' on student unrest are rehashes. Some of the articles, e.g., C. Eugene Walker on Christianity and scientific control of human behavior, and Rodney W. Johnson on space exploration, become silly.
>
> Janet Rohler Greisch on organ transplants, and Merville O. Vincent on birth control, supply competent but pedestrian papers. "Hunger, Malnutrition and Famine: The World Food Problem," by Richard T. Wright, is the book's only outstanding essay. It is superlative and deserves to be part of a better book.

One other review appeared in the *Journal of Ecumenical Studies*.

> *Our Society in Turmoil* is composed of fifteen articles written by scholars belonging to the American Scientific Affiliation, an organization which accepts the Bible as the inspired Word of God, seeks to understand the relationships between faith and science, and also has as its purpose the communication of its understandings to others. The essays within this volume are written from the viewpoint of "evangelical" Christianity. The purpose of the book is to explore various social and intellectual problems in order to encourage social action on the part of "evangelical" Christians, particularly scientists. Given its chosen task, it is a fairly creditable production considering that it is pointed to a very selective audience, i.e., the scientists of "evangelical" Christian persuasion. . . .
>
> In general, this book demonstrates the weakness of the fundamentalist approach to social problems in two ways: directly, by decrying the lack of interest and even an antipathy toward relevant social issues on the part of "evangelical" Christians; and indirectly, by demonstrating in its very format the limitations of reductionism, i.e., of trying to interpret everything from the one assumption that the Bible is the inspired Word of God and has something to contribute in all areas of human existence. Also, there is a type of sectarian chauvinism which underlies almost all of the contributions—a failure to acknowledge that there are other viable faiths or even other forms of Christianity which have something to offer toward the resolution of man's worldly dilemmas.

We who are scientists must carefully and diligently apply every scientific technique that God has given us to deal with the problems and issues of mankind.

I have learned that a book review often says a great deal more about the reviewer than it does about the book. In one sense this kind of a review in the *Journal of Ecumenical Studies* is a compliment. They could see what we are doing. They recognized that we take the Bible seriously and I am glad that this point got across.

The meeting we had in 1969 and the volume that our ASA members produced subsequently at least was an attempt by competent evangelical scientists to grapple with the issues facing our society and our culture. As we look back to that 1969 symposium, however, it is interesting to note how the issues have changed. We did talk about ecology then and we discussed hunger; but we were also concerned about the Viet Nam war, about student rebellions, the ethics and wisdom of space exploration, and whether or not we should be doing organ transplants. Nobody mentioned corruption in the government, prison reform or young people who are caught up in transcendental meditation, eastern religions, western cults and the occult. During a short period of five years our focus of interest has changed a great deal.

I wonder what we will be talking about at ASA meetings five years from now? Probably the issues will have changed, but I suspect that our society will still be in turmoil. Social turmoil reflects an underlying instability within men. I agree, therefore, with the writer of this last review when she suspects that the

ancient world views reflected by these essays will hardly suffice to resolve the complicated problems of our society in turmoil. I think, however, that the essays pointed to the fact that if we are going to understand the world in which we live, and if we are really going to make a contribution to our changing society in turmoil, then at least we must do two things.

We who are scientists must carefully and diligently apply every scientific technique that God has given us to deal with the problems and issues of mankind. We come from varied scientific disciplines and backgrounds. We do not all approach scientific problems in the same way. But we are all scientists and our emphasis must be on *good* scientific investigation. Evangelicals and other Christians sometimes show a tendency to speculate or to accept poorly documented "scientific" findings because we are trying to prove something. Nowhere is sloppy science more apparent than in attempts to prove our pet views of the earth's origin. In the ASA we must develop the reputation for being good scientists.

We also, however, must be men and women who seek to understand, develop and apply the best knowledge of the Scriptures and of theology that we can get. For the most part we are not theologians, hut just as Christians in science have on occasion been guilty of sloppy science, so too have we on occasion been guilty of poor Biblical exegesis and apologetics. As competent scientists we should never tolerate poor science, and as committed Christians we should not accept poor theology either.

Christians in science can do the cause of Christ much harm by being poor in Biblical exegesis and careless in scientific techniques. Perhaps there is no place where this happens more often than in the field of psychology. We have literally dozens of people travelling around the country conducting seminars which combine pseudopsychology with what seems in many cases to be poor Biblical theology. All of this is set forth in the name of science and Christianity.

We also, however, must be men and women who seek to understand, develop and apply the best knowledge of the Scriptures and of theology that we can get.

We who are evangelicals and particularly we who are members of the ASA must grapple carefully and head-on with problems of a society in turmoil. Our meeting five years ago was a good move in the right direction, but we must continue the search for a way to apply our science and our knowledge of the scriptures to the problems of our society. We must show the Christian community the difference between good science and bad science, and we must show the scientific community how a Biblically Christianity differs from pseudo-Christianity. We have an outreach to both communities: to the Christian community to show what good science is, and to the scientific community to show what Christianity is. This is a challenge that faces our Affiliation and our individual lives as we spend our days in a society living in turmoil.

Our Affiliation in Turmoil

I am not sure that turmoil is the best word to use in describing the recent history of the ASA. Certainly there have been many changes, especally during those five years that I was looking at the ASA from inside the Executive Council. Many exciting things have happened. Harold Hartzler and others have worked for many years to build the ASA on a solid foundation and now within the past five years we have been able to hire a full-time executive secretary who has "taken hold" and has done a number of creative and worthwhile activities in our central office. We have established a larger and more active central office, more effective because we now are able to have more people working there. We have paid off our back debts, we have increased the size of both our *Journal* and our *Newsletter,* and the influence of both publications has increased. In addition, within the past year we have increased membership in the ASA by roughly 15%. This growth has not stopped and we must continue recruiting — helping the organization to grow. Within recent years we have increased our visibility through advertisements and news stories in Christian and scientific magazines. In addition, our members were active in the California textbook controversy.

We must recognize, however, that we are not universally accepted. We have been criticized by some because we are too liberal and by others because we are too conservative. We have heen forsaken by some because we refuse to endorse some preconceived (and not necessarily Biblical) view of the earth's creation. We have heen rejected by some who believe that evolution and creation are the only areas where science and Christianity are in contact. Some sincerely fear that we are getting too involved in social issues such as those that we wrote about in 1969. We have been overlooked by some who do not know we exist, and we have been ignored by others, including many Christians in science, who seem to feel that Christianity and science are two fields that are completely separated and have nothing to do with each other.

I find ASA meetings to be stimulating and challenging times for interaction. I do not know of any other interdisciplinary organization in existence that seeks to explore the relationships of general science and Biblical Christianity. I enjoy the opportunity to interact with chemists, biologists, mathematicians and others whom I do not normally meet. This is an exciting opportunity that makes our affiliation a growing and developing organization.

Nevertheless there is much to be done in the ASA. As a start, we need to be more solvent. We received a $10,000 grant last year and this helped, but expenses are constantly going up. In the past years we have borrowed money every summer, but we did not have to do that in 1974. We are still going to have to rely on continuing gifts if we are to meet our expenses and keep moving ahead as we have done in the past.

We must show the Christian community the difference between good science and bad science, and we must show the scientific community how a Biblically based Christianity differs from pseudo-Christianity.

We also need more exposure. This comes when individual members spread the message. We must also develop strong local sections so that we can have an impact in our own communities. We must also look at our publishing policy and move out a little more. Those of us who speak as we travel around the country should mention the ASA in our talks. Quite often people come up to me after a talk and mention that they have never heard of our organization. Every one of us can have the kind of an outreach that will give the ASA more exposure.

As individuals we must also get more active. Over the years the ASA has become an organization of many fine people who read the publications but do little else. While serving on the Executive Council I have seen us struggle with numerous projects that we could complete if we had sufficient man-power. Worthwhile projects often require active people, time, energy, and money to complete.

Within the past few years I have noticed that those projects that have really grown are those that have been taken over by individuals. Dave Willis is doing something about his concern for high school science students. Dan Geisler wants some course outlines on science and Christianity; he has become concerned enough to get something moving. Jack McIntyre thought we needed to have a speakers' bureau; he has developed a workable proposal. John Stewart recognized that the people in Canada were not getting tax breaks for their ASA contributions; he and some colleagues took it upon themselves to get through the substantial legal red tape that led to the establishment of the Canadian Scientific and Christian Affiliation. Harold Hartzler got the idea that we need to have one hundred members who are willing to donate one hundred dollars each year; he took it upon himself to get the 100 Club started. Many of us might have pet projects that we would like to see started in the ASA. Perhaps the place to start is with individuals — like you!

Our Planet in Turmoil

I have recently returned from a trip which took me around the world. This trip was sponsored by Overseas Christian Servicemens' Centers (OCSC), a missionary organization which has an outreach to American service personnel overseas. It may never have occurred to you that servicemen are often lonely and confused. Many live on ships or in military installations where there is no privacy or concern for individual rights. It is an environment where there is a great deal of boring work, meaningless activity, and considerable peer and sexual pressures. At the gate to the U.S. Navy base at Subic Bay in the Philippines, for example, there are 15,000 registered prostitutes who support themselves and their families by offering their services to the American military community (and another 5,000 who are not registered). Although there are many good chaplains in the military, others are not; thousands of servicemen have need of a Savior but no opportunity to hear the gospel.

O.C.S.C. is a mission organization and their personnel have considerable training in Bible study and evangelistic techniques. But they did not have any training in counseling, and so I was invited to help with their counseling skills. Here was an opportunity to apply my training in a practical way to the problems of our planet in turmoil.

As I travelled around the world (accompanied for a part of the trip by my family), I talked to missionaries, servicemen, seminary students, Youth for Christ leaders and a host of other people. I have come back impressed by several things; I want to mention six of these.

These are, of course, the observations of only one man. They are observations that may mellow over time, but at present they are fresh. I am a psychologist and I see things differently from you whose specialties are in other areas.

I have observed first that planet earth is in a mess. Recently I read the address of Malcolm Muggeridge (1974) to the International Congress on World Evangelization. Let me quote a portion of his paper:

> . . . let me boldly and plainly say that it has long seemed to me clear beyond any shadow of doubt that what is still called Western Civilization is in an advanced stage of decomposition, and that another Dark Age will soon be upon us, if, indeed, it has not already begun. With the Media, especially television, governing all our lives, as they indubitably do, it is easily imaginable that this might happen without our noticing. I was reading the other day about a distasteful but significant experiment conducted in some laboratory or other. A number of frogs were put into a bowl of water, and the water very gradually raised to the boiling point, with the result that they all expired without making any serious effort to jump out of the bowl. The frogs are us, the water is our habitat, and the Media, by accustoming us to the gradual deterioration of our values and our circumstances, ensure that the boiling point comes upon us unawares. It is my own emphatic opinion that boiling point is upon us *now*, and that as a matter of urgency Christians must decide how they should conduct themselves in the face of so apocalyptic a situation.

One need not travel around the world to recognize there are problems on this planet. It was interesting to me to observe the political nervousness in Greece and to a lesser extent in Spain; the intense poverty and hunger in India; the superstition which is overwhelming in Thailand; the stress and pressure in Hong Kong; the occult bondage in the Philippines; the sexual looseness in England; the national smugness in Germany and Switzerland; and the self-centered attitudes which I saw everywhere but especially in America.

Recently I read an interesting comment by Arnold Toynbee the historian.

> With the mechanization of industry came acceptance of Adam Smith's philosophy which held that the selfish pursuit of private interests would create the maximum benefits for society. This, I think, is an obvious untruth . . . it does not, as Adam Smith contended, produce the maximum benefit for society. It produces, in the end,

> the destruction of society. He tried to make private selfishness respectable by saying it was socially beneficial. This is not true. In our generation we are paying for this philosophy, because it has now become the philosophy of the ordinary man.
>
> Toynbee's answer? "Although I am an agnostic myself, my answer is a religious one—religious in a more general sense. To reverse the breakdown of morals in our Western society will require self-restraint, self-denial—even against one's own interest . . . Being human, each of us seeks personal advantage. But at a certain stage he must stop and say although I have a grievance and a moral right and the power to remedy it for my personal advantage, I must stop at a certain line. I am not justified in wrecking society or putting society under tribute just for my own personal reason. That is the root of morailty." (Evangelical Newsletter)

How are we going to get this self-restraint and self-denial? I think people in the ASA need to line up with those people in Switzerland who concluded in the Lausanne Covenant that telling people about Jesus Christ and social involvement are both part of our Christian duty. It is a concern for those of us who are scientists and for those who are not. We are all living in and are responsible for a planet that is in great trouble.

A second observation that I made is that many of the most severe problems on planet earth are human problems. We do not even know how to convince people to turn off lights, conserve energy, ride in car pools, or deal in a personal way with the energy crisis.

I know how they deal with these issues in New Delhi. One night we were having dinner and all the lights went out. My missionary hosts informed me that when too much power is being used, someone in the electric company pulls a switch without warning and all the power goes out for a portion of the city. The darkness may last from two hours to twenty-four. In Madras the water is turned on for only one hour in the morning and one hour in the evening.

On our planet, people do not know how to handle stress; how to manage the economy (let alone their own finances); how to fight loneliness, discouragement, and emptiness; how to keep marriages and families together; or how to deal with a rising suicide rate. A well-known preacher stated recently that in his opinion young peope aren't really interested anymore in intellectual questions about apologetics. They are worried about how to get along with people, what to do about the turmoil inside, and how to handle personal problems.

I am not trying to play down those sciences which do not deal with people. These are important and significant, but so are our families, our students, and the people that are all around us. It is time for us to realize that the problems that bother us most are basically human problems.

A third thing that I observed in my travels was that science does not have all the answers. Many people think that science has even created some of the problems. It is interesting that a psychologist like Abraham Maslow who formerly was president of the American Psychological Association suggested before he died that we need a transpersonal psychology: something that will go beyond man and try to find solutions outside of the realm of scientific experience. Maslow did not personally know the gospel of Jesus Christ but he realized that scientific man could not solve all his problems.

Recently I had a long discussion with a noted biologist named Sir Alister Hardy, whom I specifically went to Oxford to see. In retirement from his professorship of biology at Oxford, he is spending his time directing Oxford's Religious Experience Unit, because he thinks that religious experience is of extreme importance to mankind. This man is very much concerned about going beyond his earlier work and trying to find an answer to the problems around us.

How can we deal with these problems? I do not believe that science has all the answers, but I do believe that there is a God who exists, who is the source of all truth, and who has revealed much of the truth that we know about the universe through science. He has also revealed much of the truth we know about the universe through the Scriptures. Because of our understanding of both science and of Scripture, we in the ASA are in a unique position to pull the two fields together as we grapple with the problems men face on planet earth.

A fourth observation that I made in travelling was that my personal values on planet earth tend to get out of shape. I wonder if my experiences are widespread among ASA members? In graduate school it is ingrained in us that we should publish, push ahead, and be successful. But what represents success in our society? Fame and money. I have found it easy in my professional career to strive for fame sometimes without even being aware of what I am doing. Money also becomes important — too important. When I should be asking, "Lord, what do you want me to do?" I find myself saying instead, "Lord, help me to get ahead."

On the day after I returned from my trip my body was still on European time and I awoke long before my family. I went down to the living room, looked around the house and decided that it isn't as big as I would like it to be. I noticed that the carpet was worn

Why Don't You Live Differently?

Three years ago I taught a course entitled, "Theology of the Environment." We faced the empirical data of our reckless waste of irreplaceable natural resources. We examined the biblical directive that we be stewards of God's creation. Near the end of that course one student put exactly the right question to me. He did it gently, but directly. "If you really believe these things, why don't you live differently?" That's the right question. And that is why I am reluctant to return to this subject. I know too much of the truth. And I am not doing enough about it.

I believe that I can change. But I have decided that I probably cannot do it alone. I will need more than a little help from my friends. The glorious possibility is that we are members of a community - the body of Christ. The grim practicality is that we rarely let that come to concrete expression.

I am not doing very well. I feel locked into a system that is individualistic, competitive, and selfish. I know that I need a community which emphasizes cooperation and sharing. . . .

After all, "this is what real love is all about: Jesus gave up his life for us on the cross, and we ought to be willing to do the same for our brothers and sisters" (I John 3:16 - *Letters to Street Christians*).

Jack B. Rogers
"Christmas Lights and Cannibals," *The Reformed Journal*, pp. 23-26, January 1975

Six impressions as the result of world travel:

1. *Planet earth is a mess.*
2. *Many of the most severe problems are human problems.*
3. *Science does not have all the answers.*
4. *Personal values tend to get out of shape.*
5. *Missionaries are doing a highly significant but difficult job.*
6. *While Satan is powerful, God is ultimately sovereign.*

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by the stairs. I thought about my salary that is not as large as I would like and began to think about my own dissatisfactions with life. Then I thought back to the night that I left New Delhi for Athens. As was my custom, I took out my log book and started to write what I had observed in India. There are children there who do not have anything to wear, so they run around naked. There are people who have nothing to eat and no place to sleep except on the streets. I have never seen such potential for disease in my life, nor such poverty. I though about the superstition of the people in that country and about the fact that these people have so little hope for getting out of their difficult living situations. Most of them have never heard of Jesus Christ and missionary activity is very difficult. I sat on the plane that night and thought about these people that were behind me in India—and cried.

We who are educated westerners have our values all wrong. Really we are very rich; we don't miss very many meals, our children rarely go to school without clothes, we have warm houses, people who love us and a God who cares about us.

In the midst of our difficulties, we need new values and a new sense of gratitude. We need to recognize what we possess, and how God is willing to work through and in our lives. Perhaps we need to be less concerned about pursuing our own personal little careers in a selfish way and more concerned about the needy people on planet earth.

A fifth observation is that the missionaries on planet earth are doing a highly significant but difficult job. In travelling I had the opportunity of talking to many missionaries; I have learned something of their sacrifices, their needs, their burdens, and their commitment.

Perhaps as individual Christians and as ASA members we should have a greater interest in the evangelization of the world in which we live and a greater concern about missionary activity. I wonder if we should have a greater understanding of missionary work. Perhaps we need a greater willingness to give of our time, our money, and our scientific skills in order to advance the cause of Christ through world missions.

Finally, in travelling I noticed the power of Satan and the sovereignty of God. C. S. Lewis in his introduction to the *Screwtape Letters* makes a frequently quoted statement, that we tend to make two mistakes when we talk about the devil. Either we give him too much attention or we don't give him enough attention.

A few years ago in our society if you said you believed in the devil people would have laughed. Now the devil is big news. We write books and hold conferences about him. Some people even worship him. It was interesting for me to see the grip that Satan has over so many individuals especially in oriental countries where superstition abounds.

I came home firmly convinced of the existence and power of the demonic forces that we read about in Ephesians 6. It appears to me that there will be Satanic opposition especially when one is concerned about doing the Lord's work. I don't think we ought to forget that even as sophisticated scientists. One of the disturbing things I noticed about the devil's activity is that he so frequently accomplishes his purposes by using other Christians.

While in Greece, I visited Corinth and was reminded of Paul's letters to the Corinthians.

> I have been informed concerning you, my brethren, that there are quarrels among you. Now I mean this, that each one of you is saying 'I am of Paul,' and 'I am of Apollos,' and 'I of Cephas,' and 'I of Christ.' Has Christ been divided? I exhort you, my brethren, by the name of the Lord Jesus Christ, that you all agree, and that there be no division among you, but you be made complete in the same mind and in the same judgment. (I Cor. 1:10-12)

As I saw missionary work undercut by other missionaries, I came back thinking, "Am I doing anything to undercut the Lord's work?" Are my actions or criticisms hindering the Lord from working through someone else?

Perhaps we need to be re-alerted to the fact that Christians should work together. We might not be members of the same Christian organizations, we might not be in the same field as somebody else but let us not try to undercut people, especially other Christian people, by our caustic remarks and lack of cooperation with others.

In my travels, however, I also saw the power and the sovereignty of God. When thinking about the major lesson I learned in 1974 I am reminded of a little chorus taken from Song of Solomon (2:4), "His banner over me is love." Our society is in turmoil, our planet is in turmoil, but we who are in the ASA serve a powerful and sovereign God who provides for us and whose banner over us is love. Our real job is to be His instruments. He may work through us to reach our families, our scientific colleagues, our fellow Christians and our fellow ASA members. It is my prayer that we in the ASA will all be vessels, fit and ready for the Master's use, armed with the skills and the abilities that He has given us so that we might have a lasting impact on our planet earth in turmoil.

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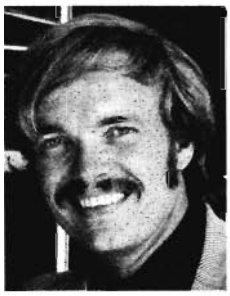
Psychology as Scientism: Alienation by Objectivity

Part I: The Growth of the Scientistic Outlook



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By committing psychology to a rationalist-empiricist epistemology, psychologists hoped to achieve scientific status alongside other natural sciences that have been successful in applying the scientific method generated by this epistemology. Instead, psychology as it is represented in the dominant American tradition has aided in alienating man from his lived experience. Psychology as an imperfect science has been guilty of encouraging scientism, claiming ultimate truth via a reductionistic epistemology.

Part one of this two-part paper examines the growth of this scientistic attitude in psychology. Part two examines the effects of this attitude on the present cultural situation in America, particularly as manifested in the so-called youth culture.

Rocket Man: Marooned and Manipulated.

> And all this science,
> I don't understand.
> It's just my job, five days a week,
> a rocket man.
> And I think it's gonna be a long, long time
> till touch down brings me round again to find
> I'm not the man they think I am at home.
> Oh, no, no, no,
> I'm a rocket man,
> rocket man burning out his fuse up here alone.
>
> —*Rocket Man*
> Elton John and Bernie Taupin[1]

As contemporary popular artists, songwriters Elton John and Bernie Taupin are not expected to understand fully all the science surrounding rocketry. But the lament of their Rocket Man—the outstanding modern symbol of a technologically tuned hero—captures the expression of alienation brought about by scientific advance in the twentieth century.

The astronaut hero understands very little of the technological complex that propels him into space. An electronic nerve center on the ground calculates his every move and activity. Encapsulated in his missile or space suit, the rocket man is a fleshly cog in an enterprise that epitomizes man's development and application of the methods of science.

This depersonalized role of the rocket man is dramatically illustrated in the film *Marooned*. Produced amid the frenzy of American and Russian space endeavors during the late 1960s this film dramatizes the effort to rescue three astronauts whose space vehicle has malfunctioned and left them helplessly orbiting the earth with a rapidly depleting oxygen supply. Melodramatics and merits of the production aside, the film's sterile dialogue is true to the live television newcasts that brought specialized space jargon into American living rooms. At one point, that dialogue underscores the astronaut's technologically imposed narrowness and justifies the plaintive and very human lament of the songwriters' rocket man.[2]

The actor astronauts, frustrated by their passive helplessness in the face of the programmed death awaiting them, decide to move outside the spaceship to examine it for defects they might possibly repair. They communicate to space headquarters on the ground their intention to take "affirmative action." The project director on the ground, maintaining the cooly objective manner demanded by his scientific status, responds with a tinge of passion, "Don't do anything stupid." He calmly pleads with the crew to leave any rescue measures to ground control. He reminds the trio they are being electronically monitored and that nothing indicates they can correct the fault of the vehicle. His words are meant to remind the astronauts of their specialized role in the project, a role that prohibits any expression of autonomy. The success of the project, even its rescue from death, depends on the dehumanization of the space capsule.

No less in real life situations are these much heralded heroes of the stratosphere channeled into a similar, subtle plight. Their choice to become aircraft

specialists renders them objects in the cockpits of the vital organisms of the aircraft industry. The human pilot is relegated to an ancillary role. Much as the ceremonial monarch is lavished with attention, the pilot receives the public plaudits, but the technocratic specialists revel in the sophisticated equipment and the computerized execution of scientific pursuits. The pilot is obsolete long before the equipment.

But where science and technology have provided at least token freedom and dignity to astronauts, they have systematically withheld even a modicum of autonomy from the average man. At every turn, from maternity ward to nursing home, man is reminded of his *object*-ness. Man, the originator and builder of machines, is today repeatedly reminded and subversively convinced his flesh is but a good simulation of the machine. Television's banal repetitions of pounding hammers for headaches, or plumbing analogies for digestive processes mixed with a ceaseless parrotting of engineering terms to describe human functions and dysfunctions, points to the deep-seated problem of man's alienation from his *human*-ness.

The thesis of this paper is that man's alienation from himself is rooted in scientific epistemology which has become scientism. Any single approach to reality that claims ultimate validity as the criterion for truth is defined as scientism. The scientific method, the most all-encompassing and influential theory of knowledge in history, has as scientism effectively robbed man of his personal, existential experience. All knowledge, including self-knowledge, rests on a repository of "expert" knowledge gleaned by a rigidly defined and culturally influenced method whose aim is ultimate objectivity. This phenomenon has been described as "the myth of objective consciousness,"[3] the "splendid virtue of objectivity,[4]" and the "rape of Mother Nature."[5]

While the so-called exact sciences have abetted the growth of scientific technology that has led to the mass-man mentality that hovers over non-technical man, this paper argues that the less precise science of psychology particularly deserves criticism as scientism. The *logos* of the soul is expected by most laymen, and advocated by a surprising number of intellectuals, to bring insight to the perplexing nature of man. Yet, the mainstream of psychology has reduced itself to studying data that can be described only by operational definitions, and in so doing has reduced man from a vital living organism to an electro-mechanical reactor. Psychology, by committing itself to a scientism of sensory empiricism, has subtly suggested flesh and bone, though admittedly complex, is only a machine with exceeding mysterious parts. The branch of knowledge most expected to cast light on the fullness of man's humanity has failed even to approach the task.

Scientism as a major contributor to modern man's despair and dehumanization could be applied to all ranges of the scientific spectrum. This paper, however, concentrates on psychology. If technology is indeed the rapist of human experience, it is psychology that has intoned the seductive voice, wooing humanity to technology's tainted tent.

The Growth of Scientific Mythology.

Contrary to a widespread notion of history, the Middle Ages had a distinctive technology that affected major social changes.[6] The waterwheel, spinning wheel, armor, and a score of mechanical devices made the work of homemakers, sailors, and warriors more streamlined.

The mainstream of psychology has reduced itself to studying data that can be described only by operational definitions, and in so doing has reduced man from a vital living organism to an electro-mechanical reactor.

While the tools and devices of the Middle Ages represent a primitive technology by today's standard, they did not contribute to widespread alienation from experience. The medieval technicians could not be called scientists in the modern sense. They were more nearly craftsmen whose practical daily work led to serendipitous discoveries of more efficient means to practice their livelihood. A systematic, rigidly defined method of attacking technological problems had not yet developed.

Before the method could be systematized, several social changes and changes in man's perception of his world and himself had to occur. The authority of the church, then a kind of "sacred scientism" that held man to be a sacrosanct being on a perhaps round earth that was the center of the universe, had to be challenged. Numerous challengers rose in the sixteenth century and the scientific revolution began. But even the giants of the revolution were hardly technocrats or scientistic thinkers who believed they had uncovered the singular path to truth. So confined was their work, Alfred North Whitehead has said of the revolution they began: "Since a babe was born in a manger, it may be doubted whether so great a thing has happened with so little stir."[7]

It was the philosophers who planted the seeds of scientism. Francis Bacon and Rene Descartes intended to give man a key to knowledge, but their pronouncements were to become the seedlings of an epistemic worldview that has sprouted to strangle everything else in the garden and produce the bitter fruit of experiential alienation in contemporary twentieth century society.

Bacon, impressed by the results of systematic observations, insisted principles of truth could be stated only when collected particulars pointed to such principles.[8] His "inductive" epistemology became the major ground rule of experimentation that was to dominate the rapid and astounding forward movement of the natural sciences.

Descartes, in attempting to defend man's unique cognitive characteristics, produced a dualism that provided the rationale for a mechanistic view of human nature. Psychology, as we shall see, followed the natural scientific lead and addressed itself to the *res extensa* (body), while neglecting the *res cogitas* (mind). The scientific developments and discoveries, particularly the physical laws worked out by Newton, seemed to validate Descartes' notion of a vast mechanical universe.[9]

Systematic observation leading to experimentation, coupled with the advent of mathematical precision and measurement, provided the keys for unlocking the physical universe. This philosophical movement was to transform the conditions of living radically by ushering in the industrial revolution. Certainly science and technology are not the only precursors to industrialization, but the production and transportation capabilities they brought are of staggering proportions. To a major degree the history of civilization from the sixteenth century to the present is a history of scientific and technological advance.

Before tracing science and technology to the present and asking how they have affected mankind, we should note the subtle mental revolution this rapidly burgeoning phenomenon wrought.

Writing on this factor with different purposes in mind, Whitehead traced the origins of modern science on the basis of the following thesis:

> . . . this quiet growth of science has practically recoloured our mentality so that modes of thought which in former times were exceptional are now broadly spread through the educated world. This new colouring of ways of thought had been proceeding slowly for many ages in the European peoples. . . . The new mentality is more important even than the new science and the new technology. It has altered the metaphysical presuppositions and the imaginative contents of our minds . . .[10]

Whitehead suggests, and the history of science supports his notion, that men were unaware of the radical mental changes taking place. Voices were raised by eighteenth century Romantics and nineteenth century Existentialists[11] but until the twentieth century they were overwhelmed by the entrenched empiricist–rationalist epistemology, which insisted all experience be sensory and quantitative. Science was moving toward scientism.

The genuinely exciting growth of science and technology was accompained by a disturbing dichotomy between what C. P. Snow has called "two cultures,"[12] the scientific culture and the artistic culture. In a provocative and telling analysis, Joseph R. Royce[13] has described the results of this subtle revolution in man's awareness of his own knowledge. Royce outlines four major approaches to reality that have historically been applied by man. The four are rationalism, intuitionism, empiricism, and authoritarianism.[14] Royce argues that each approach has a criterion for truth, but

> none of these approaches is looking at *the truth*, either individually or in combination, and further, . . . each approach is susceptible to encapsulation, that is, claiming to have the whole of truth or the meaning of life when one has only part of it.[15]

Science has become the filter through which modern man is urged to run his experience.

Part of Royce's thesis is that the rationalist and empiricist traditions have been joined to give contemporary culture a "specialist" syndrome. Astronauts exemplify such a specialist orientation. Future education, Royce argues, must prepare "generalists," who are equally versed in the intuitionist and ideological (i.e., authoritarian) traditions.[16]

Royce is strong in his indictment of the scientific attitude as an encapsulating movement. Arguing that even so-called objective and empirical science is structured on a "mythological statement concerning the nature of reality," [17] Royce calls into question the comprehensiveness of scientific knowledge. "Science," he notes, "is in danger of religiofication, the art of turning a secular matter into a religion."[18] In the hands of scientists Royce sees little danger, but when such attitudes move outside the limiting confines of the laboratory the danger of scientism arises.

"There are strong indications that this has already occurred to a considerable extent," Royce continues.[19] He sees scientism in the pervading distrust shown by academicians to non-scientific disciplines and in "the extent to which nonscientific disciplines ape the sciences."[20] The pervasiveness of this attitude is shown, Royce notes, in the prevailing view of what is currently "accepted as 'really' real."[21] That is, only science, with its rationalist–empiricist epistemology, can validate what is real; only science can authenticate experience.

Royce's argument supports the thesis that science has become the filter through which modern man is urged to run his experience.[22] What Royce describes as scientism is described by Roszak as the "myth of objective consciousness."

> . . . objective consciousness is emphatically *not* some manner of definitive, transcultural development whose cogency derives from the fact that it is uniquely in touch with the truth. Rather, like mythology, it is an arbitrary construct in which a given society in a given historical situation has invested its sense of meaningfulness and value.[23]

By investing so steeply in this scientific worldview American society has reaped the convulsions of the counter-culture, the sociological phenomenon Roszak analyzes. The "social scenery" it has painted for the individual psychologically has been critiqued by Yale psychiatrist Kenneth Keniston.[24] Before examining the alienation resulting from adoption of a scientistic stance, however, note must be taken of psychology's contribution to and adoption of this mythology. Indeed, it is imperative to any claim that human experience is being systematically usurped by subtle scientific demands.

Psychology as Scientism: A Soul for a System.

By pedestrian definition psychology is the study of the soul, the *logos* of the *psyche*. But rational science took away the concept of the soul, replacing it with mind. American psychology went one step further, dropping all hints of metaphysics and defining itself empirically as the science of behavior.

While it has been said jokingly that psychology sold its soul, then lost its mind, and is now having trouble controlling its behavior, the significance of these subtle changes by definition should not be lost in humor. The danger Royce foresees in scientism has largely come to fruition in psychology, for in clarifying its definition, psychology has made quantitatively measurable phenomena its data base, and has gone through excruciating pains to "ape" the natural sciences,

For a large segment of academic psychology, sexual response is equated with love, neural brain patterns are equated with mind, and an electro-mechanical complex is upheld as the simulated model of life.

most notably, physics. To do so, it has traditionally committed itself to a sensory empiricism, disregarding significant events in human experience as too subjective or metaphysical.

Expressions of this attitude abound. For a large segment of academic psychology, sexual response is equated with love, neural brain patterns are equated with mind, and an electro-mechanical complex is upheld as the simulated model of life.

It is strange in a field that is commonly believed to study human phenomena that its own writers must plead for relevancy within their discipline. In 1961, O. Hobart Mowrer, a distinguished learning theorist steeped in the rationalist-empiricist tradition of psychology, wrote, "There are signs that all is not well with psychology, either as science or profession, and that we may need to re-examine some of our most basic assumptions."[25] Another professional psychologist, Hubert Bonner, brings serious indictments to his field, pleading that psychology be "mindful of man."[26]

In a humorous vein, but with earnest intentions, American existentialist Rollo May caricatures psychology as charged by St. Peter at the gate of heaven with the sin of *"minis simplicandum."*

> You have spent your life making molehills out of mountains—that's what you're guilty of. When man was tragic, you made him trivial. When he was picaresque, you called him picayune. When he suffered passively, you described him as simpering; and when he drummed up enough courage to act, you called it stimulus and response. Man had passion; and when you were pompous and lecturing to your class you called it "the satisfaction of basic needs," and when you were relaxed and looking at your secretary you called it "release of tension." You made man over into the image of your childhood Erector Set or Sunday School maxims—both equally horrendous.[27]

With philosophical and historical intensity, Amedeo Giorgi calls for a redefinition of psychology "conceived as a human science and not as a natural science."[28]

The most consistent and effective critiques of psychology from inside the profession are those of the late Abraham Maslow. Orthodox science, Maslow argued, rests on "unproved articles of faith," is overly conservative, and is unaware of its own ethnocentricity. These weaknesses are glaring in psychology, he claims, where the goal is knowledge of persons.[29]

Unfortunately, these challenges have not been assimilated by the field. There is at present a humanistic counter-culture within academic psychology that parallel's Roszak's youth culture. Maslow refers to this as the "Eupsychian network,"[30] and Roszak picks it up in his significantly titled anthology: *Sources: An Anthology of Contemporary Materials Useful for Preserving Personal Sanity While Braving the Great Technological Wilderness.*[31]

The self-consciousness of psychology may seem overly indulgent, but such pleas for internal change express necessary correctives to the direction psychology has taken in its historic development. While denying any traces of human subjectivity in its data, psychology has affirmed a mechanomorphic view of man. Coupled with a scientific dogmatism concerning what is admissible as the proper study of man, this mechanomorphic anthropology has been instilled in repeated generations of students who implicitly carry a reflex model of their own behavior. The resultant dehumanized man does not choose, he responds; he does not create, he makes stimulus discriminations.

That this assessment is not a straw man caricature is evidenced by the 1971 publication of B. F. Skinner's *Beyond Freedom and Dignity.*[32] In this work, Skinner suggests society be conditioned and controlled according to the behavior-shaping principles developed in his Harvard University laboratory experiments with pigeons and rats. Skinner's book is a popular, though controversal success. His influence as a scientist is immense.[33]

To this development Arthur Koestler brings his pungent attack against "ratomorphic psychology." Koestler argues:

> It is impossible to arrive at a diagnosis of man's predicament—and by implication at a therapy—by starting from a psychology which denies the existence of mind, and lives on specious analogies derived from bar-pressing activities of rats. The record of fifty years of ratomorphic psychology is comparable in its sterile pedantry to that of scholasticism in its period of decline, when it had fallen to counting angels on pin-heads—although this sounds a more attractive pastime than counting the number of bar-pressings in the box.[34]

The age of psychology as a science is just less than twice Koestler's fifty-year celebration of Behaviorism. When Wilhelm Wundt carried out his systematic psychophysical investigations in Leipzig in 1879, it marked the beginning of the end for psychology as a branch of philosophy.

The empirical methods of physics, impressively successful in expanding the fields of astronomy, chemistry, geology, and biology, captured the fancy of psychologists. It was left to John B. Watson in the early 1900s to sweep mind from the psychologists' workbench to make room for behavior. But long before Watson, the metaphysical carpenter Descartes framed the jig for a naturalistic and mechanistic psychology. Wundt and Watson were merely carrying out the extension of Descartes' classifications.

Descartes provided philosophy a dualism for conceiving man. The philosophical world and the general populace inherited from Descartes the distinct anthropologic categories of mind and body. Only the body has a material extension; the mind and spirit, Descartes' *res cogitas,* were exempted from the laws of mechanics and motion. The philosopher was conceiving man to accord with the laws being promulgated by the new science.[35]

With mind and body so separated, and with the body so easily accessible to measurement, it became an easy exercise for nineteenth century philosopher-psychologists to neglect the mind in their pursuit of scientific rigor. The precursors of Wundt's laboratory launching of the new discipline are all physiologists and physicists, basing their investigations on the phil-

osophy of materialistic rationalism and empiricism that triumphed in the eighteenth century.[36] The body was more an *object* for study than the mind.

(To be concluded)

REFERENCES

[1]Lyrics copyrighted 1972 by Dick James Music Co. From a recording produced by MCA Records, Inc., Universal City, Calif.

[2]Howard Thompson. *New York Times*, Dec. 19, 1969, 65:1. Review of "Marooned," (1969) Columbia Pictures. Thompson notes: "There is not a note of music in the picture, only an electronic hum or beep-beep . . . The dialogue is as blunt and honest as the acoustics.

[3]Theodore Roszak. *The Making of a Counter Culture*. New York: Doubleday, 1969. See especially Chapter seven.

[4]Hubert Bonner. *On Being Mindful of Man*. Boston: Houghton-Mifflin, 1965.

[5]William Braden. *The Age of Aquarius: Technology and the Cultural Revolution*. Chicago: Quadrangle, 1970.

[6]Henry Lucas. *A Short History of Civilization*. New York: McGraw-Hill, 1953, p. 470.

[7]Alfred North Whitehead. *Science and the Modern World*. New York: Macmillan, 1925, p. 10.

[8]Lucas, *op. cit.*, p. 601

[9]*Ibid.*, p. 603.

[10]Whitehead, *op. cit.*

[11]Paul Tillich. *The Courage To Be*. New Haven, Conn.: Yale University Press, 1952, pp. 126-138.

[12]C. P. Snow. *Two Cultures and the Scientific Revolution*. New York: Cambridge, 1959.

[13]Joseph R. Royce. *The Encapsulated Man*. Princeton, N.J: Van Nostrand, 1964.

[14]*Ibid.*, p. 12f.

[15]*Ibid.*, p. 19, italics his.

[16]*Ibid.*, p. 183f.

[17]*Ibid.*, p. 158.

[18]*Ibid.*

[19]*Ibid.*, p. 159.

[20]*Ibid.*

[21]*Ibid.*, p. 158.

[22]The technological corollary to this epistemic filtration is the growing demand for "instant replay," epitomized with televised athletic events. Indeed, television, with so-called "live tapings," represents the most extensive technological filter of human experience. This is not, however, the place for a critique of television.

[23]Roszak, *op. cit.*, p. 215.

[24]Kenneth Keniston. *The Uncommitted: Alienated Youth in American Society*. New York: Harcourt, Brace, Jovanovich, 1965. See especially Part one.

[25]O. Hobart Mowrer. *The Crisis in Psychiatry and Religion*. Princeton, N.J.: Van Nostrand, 1961, p. 2.

[26]Bonner, *op. cit.*, Like Mowrer, Bonner does not represent a fringe element within the field of psychology, but was a known and respected member of the psychological fraternity. This could also be said of Abraham Maslow, mentioned below, who was leading the critics prior to his death.

[27]Rollo May. *Psychology and the Human Dilemma*. Princeton, N.J.: Van Nostrand, 1967, p. 4.

[28]Amedeo Giorgi. *Psychology as a Human Science*. New York: Harper and Row, 1970, p. 3.

[29]Abraham Maslow. *The Psychology of Science: A Reconaissance*. Chicago: Henry Regnery Co., 1966, p. 1.

[30]Abraham Maslow. *Toward A Psychology of Being* (Rev. Ed.). Princeton, N.J.: Van Nostrand, 1968. Eupsychian is Maslow's word for the "good society," first proposed in 1961. It implies a movement toward psychological health as defined by humanistic ideals.

[31]New York: Harper and Row, 1972.

[32]New York: Alfred Knopf, 1971.

[33]Skinner, besides being the innovator of the teaching machine and the programmed textbook, both now in wide use, is the theoretician behind educational shaping techniques. The extent of his influence is traced in Kenneth Goodall, "Shapers at Work," *Psychology Today*, Nov. 1972, 6, (6), pp. 53-63ff.

[34]Arthur Koestler. *The Ghost in the Machine*. New York: Macmillan, 1967, p. 18. A similar assessment, equally critical, but less caustic and set a a humorous tone, is found in chapter five of Anthony Standen's *Science is a Sacred Cow*, published in 1950 (N.Y.: Dutton). See also Martin Malachi, "The scientist as shaman," *Harper's*, March, 1972, 244, (1462), 54-61, for a critique of Skinner, geneticist Jacques Monod, and ethologist Konrad Lorenz as scientians—practicioners of scientism.

[35]John B. Harrison and Richard E. Sullivan. *A Short History of Western Civilization* (3rd ed.), New York: Alfred Knopf, 1971, p. 618.

[36]*Ibid.*, p. 614. Edwin Boring, the most influential historian of psychology, traces this background in his *History of Experimental Psychology* (2nd ed.). New York: Appleton-Century-Crofts, 1950.

The paradigm of the enormous benefits of modern technology to the common man—as distinct from astronauts and generals—is the automobile. The dividing line between its success and failure is the factory door. So long as the automobile is being constructed, technology is admirably successful. However, once the automobile is allowed out of the factory and into the environment, it reveals itself as an agent which has rendered urban air pathogenic, burdened human bodies with nearly toxic levels of carbon monoxide and lead, embedded carcinogenic particles of asbestos in human lungs and killed and maimed many thousands annally. The human value of the automobile is created by technology and diminished by its environmental failure. Air pollution . . . is a reminder that our most celebrated technological achievements—the automobile, the jet plane, the power plant, industry in general, and indeed the modern city itself—are, in the environment, failures.

Barry Commoner

The Closing Circle: Nature, Man and Technology,
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Psychology and Christianity: A Substantial Integration

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The assumption is made that God's revelation in the Bible is complementary to His revelation in nature, and that psychology is complementary to theology and science and other areas of investigation. An attempt is then made to see how the Bible, nature, psychology, and science in general stand in relation to truth and how psychology conducts its individual inquiry into that truth. First, it is shown how platonic thinking causes scientific psychology to lead to nothingbutism and ratomorphism, humanistic psychology to the illusion of communication and mysticism with nobody there, and both to existential despair. Second, a levels of inquiry model is proposed, with several variations. Third, a conduct of inquiry model is presented whereby psychology can combine with and supplement Christianity with each retaining its integrity at its own level of inquiry. Dogmatizers, dichotomizers, and synthesizers are discussed, along with their implications, and it is concluded that unity of inquiry is possible only within the wholeness of truth. Given the premise that we can know truly without knowing exhaustively, we can indeed accomplish a substantial integration of psychology and Christianity.

The Psychologist

He takes the saints to pieces,
And labels all the parts,
He tabulates the secrets
Of loyal loving hearts.
He probes their selfless passion
And shows exactly why
The martyr goes out singing,
To suffer and to die.
The beatific vision
That brings them to their knees
He smilingly reduces
To infant phantasies.
The Freudian unconscious
Quite easily explains
The splendour of their sorrows,
The pageant of their pains.
The manifold temptations,
Wherewith the flesh can vex
The saintly soul, are samples
of Oedipus complex.
The subtle sex perversion,
His eagle glance can tell,
That makes their joyous heaven
The horror of their hell.
His reasoning is perfect,
His proofs as plain as paint,
He has but one small weakness,
He cannot make a saint.[1]

What is a saint? As a Christian psychologist, I want to know, to fully understand. On the one hand, psychology can take me only so far; on the other, religious writings and my own Christian experience also provide something less than a full understanding of what it is to be a saint.

The logical strategy would be to combine in some way the best of both worlds. But if I simply take what man can do (psychology) and tack onto it what God can do (Christianity), I will have constructed a false dichtotomy. It would be similar to the boundary-line mentally referred to by Jacques Ellul:

> One drew a boundary line between two efficacies, that of human means and that of prayer, which latter was set in motion at the point at which the human means stopped, or else it added its efficacy to the efficacy of those means. The famous saying of Amboise Pare, 'I bandage, God heals,' illustrates that attitude very well.[2]

Genuine prayer is a part of living with God, an attestation of God with us, a permission granted by

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God, a reality dependent upon Him alone, according to Ellul. This is exactly the point I wish to make about psychology. Psychology is a part of living with God, an attestation of God with us, a permission granted by God, and a reality dependent upon God alone.

To achieve a significant integration, psychology and Christianity must come together in a way that includes wholeness of truth and in a way that promotes unity and mutuality, not dualism. The goal should be mutual enrichment: a calling not for less science, but more and more than science.

My strategy in this paper is to recognize that Christianity is represented most clearly by the Bible, which is at a different level of inquiry than psychology. Whereas God's revelation in the Bible is complementary to His revelation in nature, psychology is complementary to theology and science and other areas of investigation. (John R. W. Stott represents God's special revelation in Scripture as verbalized and His general revelation in nature as visualized; and His special revelation in Christ as both – "the Word made flesh.")[3] My goal is to see how the Bible, nature (including people), psychology, and science in general stand in relation to truth, and how psychology conducts its individual inquiry into that truth.

In order to begin, we must expand on the "I bandage, God heals" mentality cited above. Psychology can help us to understand and appreciate how God works more fully, but only if we leave false boundaries of fact vs. faith aside and resist the temptation to utilize psychology as "proof" either for or against God. Francis Schaeffer severely criticizes our historic opting for Plato, which encouraged using psychology as proof for God or for some equivalent: "The resurrection and ascension prove there is no reason to make a false dichotomy between the spiritual and the material. That is a totally nonbiblical concept. The material and the spiritual are not opposed."[4] Had God wanted us to know of a totally spiritual resurrection, He would have raised Christ as a formless, bodyless spirit – but Christ appeared, ate food, and was touched. The New Testament does not get caught up by Plato's immortality of the soul, but speaks of the resurrection and ascension of the body, the totality, the *gestalt*.

Similarly, we later opted for Freud and continued radically to distort the biblical view. We simply bought the material half of the platonic dichotomy and used psychology as proof against God or any God-substitute. How tragic! In neither way, following either Plato or Freud, have we fully understood an answer to that question: what is a saint?

Platonic Thinking

As a Christian psychologist, I am continuously confronting a modern thought pattern that I call "platonic thinking." This is the precipitous forcing of what we perceive into dichotomous polarities. In psychology, it has led to "nothingbutism" and "ratomorphism" (for those who opt for Freud this includes behaviorism), to an illusion of communication and "mysticism with nobody there" for those who opt for Plato, and ultimately to existential despair for both camps. Of course I could have begun this section with, "In my professional life as a psychologist and in my personal life as a Christian . . .", but that would in itself have been a forcing of my life into a dichotomy and a glaring example of platonic thinking.

Psychology is a part of living with God, an attestation of God with us, a permission granted by God, and a reality dependent upon God alone.

Psychologists for the most part are fond of announcing from time to time that man is nothing but this or nothing but that. To think of man in any other way is nonrational and epiphenomenal; to behaviorists, words like *freedom and dignity* are merely explanatory fictions and "mental way stations".

A large number of psychologists are also prone to argue through analogy with animals, i.e., attaching the same label to human and rat behaviors which look similar, and then claiming that the human behaviors have been explained. This overemphasis upon observable and quantifiable information relegates other ways of viewing the human condition to the nonrational area of human thought. The assumption is made that the human behavior need not be further "explained", particularly if the animal behavior arises from obvious and well-documented causation. The effect is a diminishing sense of wonder and mystery. Questions about either half of the analogy tend to cease, and if they don't, the result is simply an infinite regression of analogies.

Rationally, these psychologists leave each of us existing at the center of a personal universe where nothing happens—the scenery "outside" changes and people pass by, and that is all. There are no beginnings, there is no exit, and the only relationship that can be established is that of being in the way. None of us has any right to exist; each of us is a zero. We deny any claims on us from the outside and deny the necessity for making decisions. We deny that meaning is personal, that it is worth finding, or that it is even possible to find. This existential despair, drawing on the works of Jean Paul Sartre and Viktor Frankl, is the ultimate result of platonic thinking.

Existential despair is also inevitable for those psychologists relegated to the nonrational pole of the platonic dichotomy. These humanistic psychologists have created what Francis Schaeffer calls an "illusion of communication"—using undefined words with strong connotations, such as *love* and *will*, thereby provoking highly motivated reactions simply because such words are deeply rooted in tradition. The use of these connotation words is always in the nonrational area, a process which Schaeffer calls "mysticism with nobody there". "And having no absolutes, modern man has no categories. One can think of the movie *Blow-Up*: 'murder without guilt; love without meaning.' One cannot have real answers without categories, and these men can have no categories, beyond pragmatic, technological ones."[5] No absolutes—no categories—no definitions. Being thus separated from definition, connotation words are divorced from possible verification by reason, and there is no certainty that there is anything beyond the words themselves. "We need to understand, therefore, that it is an act of desperation to make this separation, in which all hope is removed from the realm of rationality. It is a real act of despair, which is not changed merely by using [humanistic] words."[6]

Our conclusion should not be that psychology should be eliminated from the scientific enterprise, but

that platonic thinking should be eliminated from our modern thought pattern.

Levels of Inquiry

Francis Schaeffer has very graphically analyzed the evolution of human thought, showing how modern thought has grown from polluted roots far back in the late Middle Ages. At that time God and nature, the original grounds of all knowledge, were set against each other in a dichotomous fashion:

$$\frac{\text{grace}}{\text{nature}}$$

God was thereby arbitrarily taken out of the foundational level of inquiry, just as reason has gradually been relegated out of the transcendental area of human thought:

$$\frac{\text{grace}}{\text{nature}} \longrightarrow \frac{\text{freedom}}{\text{nature}} \rightarrow \frac{\text{faith}}{\text{rationality}} \rightarrow \frac{\text{non-rational}}{\text{rational}}\ ^{7}$$

In terms of the discussion of platonic thinking above, the characterization of the present state of affairs becomes:

$$\frac{\text{non-rational (connotation words)}}{\text{rational (defined words)}}$$

It then becomes obvious that the dilemma for psychology is much the same as for theology: any attempt to experience oneself in a nonmachine-like way necessarily entails a nonrational "leap upstairs". God is dead.

Applying my own terminology to Schaeffer's "upper and lower stories", as he calls them, I come up with the following:

Bible	humanities
nature	Science

In this model, the Bible and humanities (including theology and Humanistic Psychology) comprise the upper story, and nature and Science (including Scientific Psychology) comprise the lower story.

Now if we rotate the above model to the left 90 degrees, we end up with a model that I regard as an accurate representation of reality rather than of the thoughts about that reality as depicted by Schaeffer:

humanities	Science
Bible	nature

My contention is that rationality exists in each of the quadrants; there is no rational-nonrational split in the real world. This model is our first step in eliminating platonic thinking from our modern thought pattern and promoting an integration of psychology and Christianity based on unity and not on dualism.

The second step is to recognize that we have a model of two different levels of inquiry. This is necessary because the problem still exists after step one that one area of rationality can defeat or "disprove" another, e.g., the traditional Bible-Science dichotomy. The danger is expressed well by Viktor Frankl:

> As soon as we have interpreted religion as being merely a product psychodynamics, in the sense of unconscious motivating forces, we have missed the point and lost sight of the authentic phenomenon. Through such a misconception, the psychology *of* religion often becomes psychology *as* religion, in that psychology is sometimes worshipped and made an explanation for everything.[8]

The fact that there are two levels of inquiry is well stated by Richard Bube:

> Science is *not* regarded as complementary to the Bible. The created natural world is regarded as complementary to the revealed world of the Bible. . . . If we recognize that we have trustworthy revelation from God both in the natural world and in the Bible, can we not then cease from pursuing these false dichotomies: science or Scripture, evolution or creation, natural or God-caused . . . ?[9]

Psychology should not be eliminated from the scientific enterprise, but platonic thinking should be eliminated from our modern thought pattern.

Similiarly, John R. W. Stott views natural law not as ". . . an alternative to divine action, but [as] a useful way of referring to it", of thinking God's thoughts after Him.[10] More specifically,

> Any theory of evolution—as a *biological* theory and *not* as a philosophical position—seeks to explain *how* plants an animal got to be the way they are. Biblical creation explains *Who* did it and *why* He did it; it does *not* explain how. . . . The Bible does not disprove evolution as *biological* theory; it does deny philosophical evolutionary materialism. Neither can biological theory be used to invalidate Scripture, although it may cast doubt on some of the traditional (and often unjustified) interpretations of Scripture.[11]

Translated into the levels of inquiry model I am proposing, we have:

$$\frac{\text{how}}{\text{Who; why}}$$

Another way of expressing the levels of inquiry is given by Rollo May:

> If science does not give the content of . . . values, this is not because science has not progressed far enough as yet. It is, rather because the content of values and the testing which science does are on two different levels. As Albert Einstein put it, the scientific method 'can teach us nothing else beyond how facts are related to, and conditioned by, each other; . . . the aspiration toward such objective knowledge belongs to the highest of which man is capable. . . . Yet it is equally clear that knowledge of what *is* does not open the door directly to what *should be*.[12]

This can be presented as:

$$\frac{\text{what is}}{\text{what should be}}$$

Or,

$$\frac{\text{descriptive (what is)}}{\text{prescriptive (what must be and what must have been)}}$$

And with a little alteration, it becomes:

$$\frac{\text{what men can do}}{\text{what men should do}}$$

While representing levels of inquiry, this last variation of the model also represents boundary conditions for our inquiry. As graphically portrayed by Schaeffer's *Pollution and the Death of Man*, Christians operate under both what men can and should do; "modern man", however, is limited only by what technology limits him to. Whatever is, is right. Purposes and genuine ends drop out of sight, and efficiency and mere results become the central concern.[13]

Regardless of how we choose to conceptualize the two levels of inquiry, it is important that we keep in mind two things about the Bible/nature level. First, it is *prescientific*, not in the sense of being less sophisticated than science, unscientific, or even antiscientific, nor of merely preceding scientific inquiry, but because it is not bound by particular methods of inquiry. Second, it may be *combined with* and supplemented by the humanities/Science level, but not subdued, confirmed, nor altered by it.

Conduct of Inquiry

How can psychology, as an attestation of living with God and a reality solely dependent upon God, combine with and supplement Christianity, the experience of living with God and a reality based on God's revelation through Scripture and nature? How can this be done so that each retains its integrity at its own level of inquiry?

D. M. MacKay tells the story of two people sitting on the edge of a cliff, looking out to sea one evening. After a while they saw a light flashing on and off at sea, and one of the people, a physicist, remarked that given a little time he could give a full account of the wavelength, emission rate, frequency, and various other characteristics of the light. His friend, however, became increasingly agitated, since he vaguely remembered having learned something about the Morse code. He had become quite aware that the light flashes were communicating a message. In fact, they were saying that the piece of cliff on which the physicist and his friend were sitting was beginning to crumble and would shortly slide into the sea.[14] The physicist could have provided an exhaustive description of the physical phenomenon occurring at the light source, but this alone would have left out another extremely important aspect of the phenomenon, namely its meaning. The implication is that two inquiries into the same phenomenon can maintain their integrity and still supplement each other in a fruitful way.

When truth is fragmented, with each of several camps claiming to possess all of the "truth" in some general sense, inquiry becomes a sham.

In the quadrant model I have proposed above, integrative movement should be possible vertically and diagonally across levels of inquiry and horizontally within levels of inquiry. There is only one big *if*: if it is done in terms of *approach* and not in terms of some present *answer*. Each individual approach does need to be clarified, however. Integration is obviously contaminated by the easy application of preset answers, among which is modern-day scientism. People who practice this mentality, I call *dogmatizers*. Much more subtle is the violation of integration accomplished by two misguided approaches, represented by people I call *dichotomizers* and *synthesizers*.

Scientism, simply stated, is ". . . the unscientific attitude of making science the ultimate source and goal of knowledge and life."[15] This is the kind of unthinking dogmatism condemned by Abraham Kaplan as bias: dictating the problem and prejudging the solution.[16] It can also be what Milton Rokeach refers to as a closed mind: intolerance of ambiguity.[17] This is the distinct inability to live with dilemmas and a seeking to "wrap up" issues rather than pursuing them at both levels of inquiry. If the dogmatizer were to adopt an open mind, he would not have to fear ending up with an empty one.

I have discussed dichotomizing at some length above, but the dichotomizer presents a little different twist. In the words of Richard Bube.

> Science is a human interpretation of data derived from sense contacts with [the] created natural world. Its complementary category in Christian faith is not the Bible (which corresponds to the created world—the data) but rather *theology*, which is the interpretation by men of the revealed word of the Bible in the light of the Bible and their experience. God made the world, and God gave the Bible. Men make Science and men make theology.[18]

This clearly prevents the false dichotomy of Science vs. Scripture, as referred to above, but it is in terms only of answer, not approach. Whereas the dogmatizer is thereby limited, our approach toward integration is also severely limited, because of the creation of a diagonal, a horizontal, and a vertical dichotomy. Given our levels of inquiry model,

humanities	Science
Bible	nature

our approach becomes very narrow if Science and the Bible cannot mingle, if Science is rigidly defined as method as opposed to way of thought, and biblical revelation is simply data to be interpreted. Perhaps Science should not actually interpret the Bible, but how will they ever combine with and supplement each other if they are kept so rigidly apart? If both were considered as levels of inquiry, with both providing supplementary answers —

$$\frac{\text{how}}{\text{Who; why}}$$

there would be no problem.

The horizontal dichotomy consists of not allowing the humanities and Science to mingle, by restricting the former to interpretation of biblical revelation and the latter to interpretation of natural revelation. This may be the more natural pattern, but it is simply not reasonable to assume that Scientific Psychology cannot speak to the Bible and Humanistic Psychology cannot dialogue with nature, with each remaining with integrity at its own level of inquiry.

Vertically, we have the man-made and the God-made. That does not give much of an impression of psychology as a living with God, as a reality solely dependent upon God, does it?

The synthesizer is a person who, following Hegel,

> . . . believes only in dialectical synthesis. There is a thesis; it has an antithesis. Neither is true or false. 'Truth' . . . lies only in a synthesis. And even that synthesis is not true forever, for tomorrow there will arise another thesis different from today's and out of the combination of these will come 'truth' for tomorrow. But in no case will any of these 'truths' be absolute.[19]

Here we have a clear example of the platonic thinking discussed above. That is quite an obstacle to integration itself, but it leads further to two more obstacles for any approach toward integration.

First is the obstacle of the psychological crutch. If two views are mutually exclusive, they can never be brought into synthesis. One is not a little right and the other a little right and a synthesis more right than either. One is right and one is wrong. "If you say less than this, then you reduce Christianity [used in his example] to a psychological crutch, a glorified aspirin."[20]

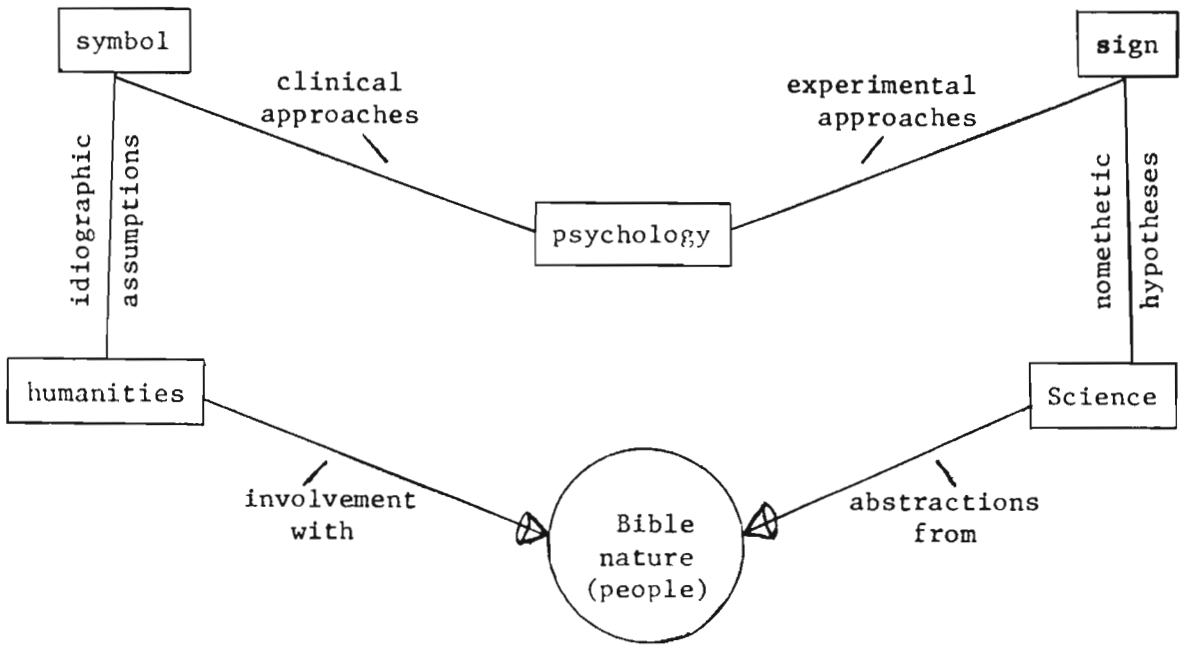
Second is psychological manipulation. Without antithesis, we no longer have Science as Science nor do we have Scripture as Scripture. We end up with both Science and Scripture being used and manipulated for other purposes. For instance if we choose a certain scientific solution to a biblical dilemma, not because it has anything to do with a scientific approach but because it leads to the psychological answer we want, at that point Science dies, Scripture dies, and all we are left with is psychological manipulation. (This basic idea, with somewhat different terminology, derives directly from Francis Schaeffer's *Pollution and the Death of Man.)*

With an emphasis on approach, without being a dogmatizer, dichotomizer, or synthesizer, and without creating a psychological crutch or psychological manipulation, I would like to draw a picture of the conduct of psychological inquiry. The following model, drawing heavily on the work of Joseph Royce,[21] utilizes two approaches: clinical (humanistic); experimental (scientific.) It should be noted that the levels of inquiry is embedded in the conduct of inquiry model and that all possible interactions—diagonal, horizontal, and vertical—are possible within the unity of the Bible/nature circle.

As a further note of clarification, signs point to one-to-one relationships while symbols point to one-to-many relationships, where there are a variety of meanings. Whereas signs are verified by the well-known scientific validities (content, construct, etc.), symbols are verified by existential validity, which is much less well-known. Since language is symbolic, the verbalized propositional revelation of Scripture can be included as verifiable by existential validation. This includes the historic, space-time, biblical statements of "brute fact" which, while being open to scientific verification, also must have meaning in present existential, moment-by-moment experience.[22]

To be existentially validated, a symbol must: (a) point beyond itself; (b) participate in that to which it points; (c) open up levels of reality which are otherwise closed; (d) unlock hitherto unknown dimensions of human experience. Further, a symbol must not be invented but must be discovered and allowed to grow and die experientially as well as logically. The overall, crucial requirement for the existential validation of a symbol is a transformation in the quality of existence, not merely subjective certainty.

With an uncontaminated conduct of inquiry across the levels of inquiry, each of which maintains its own proper integrity, psychology and Christianity can become integrated in a way that promotes unity and mutuality and includes wholeness of truth. It must be emphasized, however, that this will not be a perfect integration, but that it will be *substantial*—real and



evident, which is consistent with Schaeffer's use of "substantial". In a word, it will be a substantial integration.

Wholeness of Truth

Unity of inquiry is possible only within the wholeness of truth. But when truth is fragmented, with each of several camps claiming to possess all of the "truth" in some general sense, inquiry becomes a sham.

The whole idea of unity is well expressed by Francis Schaeffer:

> There may be a difference between the methodology by which we gain knowledge from what God tells us in the Bible and the methodology by which we gain it from scientific study, but this does not lead to a dichotomy as to the facts. In practice it may not always be possible to correlate the two studies because of the special situation involved, yet if both studies can be adequately pursued, there will be no final conflict. For example, the Tower of Babel: whether we come at it from biblical knowledge given by God or by scientific study, either way when we are done with our study, the Tower of Babel was either there or it was not there. . . . Science by its natural limitations cannot know all we know from God in the Bible, but in those cases where science can know, both sources of knowledge arrive at the same point, even if the knowledge is expressed in different terms. And it is important to keep in mind that there is a great difference between saying the same thing in two different symbol systems and actually saying two different exclusive things but hiding the difference with the two symbol systems. What the Bible teaches where it touches history and the cosmos and what science teaches where it touches the same areas do not stand in a discontinuity.[23]

When the wholeness of truth is substituted with *exclusive truth* at or within one of the levels, the unity or continuity of the conduct of inquiry across and within levels of inquiry is broken. Diverse sources of knowledge arrive at the same point, however, only if truth is assumed to be operative at and within both levels of inquiry.

A handy way to avoid the exclusive truth, dogmatizer mentality is to go back to the levels of inquiry model and substitute into the quadrants the kind(s) of truth actually operating at each level. Using Schaeffer's terminology,[24] we get:

experiential truth	exhaustive truth
true truth	

We can get an idea of the sorts of things that comprise *experiential truth* by consulting the left half of the conduct of psychological inquiry model. The right half, of course, comprises *exhaustive truth. True truth* is simply revelational truth, or with specific reference to the Bible, *propositional truth.*

The key to understanding the wholeness of truth and ultimately to realizing a substantial integration is that *we can know truly without knowing exhaustively.* In other words, we can know truly without verification, simply by rational faith, or we can know just as truly through experiential (clinical approach; existential validity) and/or exhaustive (experimental approach; scientific validity) inquiry. Exhaustive truth does not yield totally described, comprehensive knowledge, for which we need a combination of truths within and across the levels of inquiry. And it is particularly important to realize that we can know truly and can therefore substantially integrate psychology and Christianity even though we do not know exhaustively.

The key to understanding the wholeness of truth and ultimately to realizing a substantial integration is that we can know truly without knowing exhaustively.

God is acting equally in all places and at all times upholding His creation. He certainly is not a "stopgap" nor a "machine-minder",[25] nor is He merely playing "peekaboo"[26] with us. With regard to the stopgap theory, there is a real trap. If we blindly say that what we do not know about the natural world is simply explainable by God, as science becomes more and more exhaustive in its discovery of truth, the gap decreases, and our God becomes smaller. So what I am talking about is a rational faith inquiry into truth, not "blind faith", which is no better than the nonrational leap upstairs mentioned above.

Included in God's activity is psychology. I stated above that in my view "psychology is a part of living with God, an attestation of God with us, a permission granted by God, and a reality dependent upon God alone." This is the initial assumption upon which integration of psychology and Christianity rests. Such dependence on God is not, however, a resignation, a collapse, a neglect of responsibility, but rather an assertion of freedom from social conditioning, enslavement, and limitations, a "combat of total involvement" —every bit in the way Jacques Ellul talks about prayer.[27] With this attitude, wholeness of truth and unity of inquiry can be maintained, and psychology can remain as psychology and Christianity can remain as Christianity. And yet the two can come together. We can indeed accomplish a substantial integration.

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Christian Authority: A Detriment to Psychological Theory?

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The charge of "authoritarianism" that may be leveled against the Christian behavioral scientist is evaluated within the context of three different models for relating Christian faith to psychological theory: the apologetic, the correlational and the radical. The radical model is recommended not only as an adequate Christian response to the critics' charge but as an affirmative basis for the continuing development of a Christian contribution within the discipline of psychology.

"Science is an empirical enterprise, whereas Christianity is confined to an authoritarian structure." To Evangelicals, this allegation is all too familiar, sometimes stated explicity, although more often covertly implied. Such a statement, if acknowledged, leads the Christian behavioral scientist at best to a resolution of disjunctive accommodation (*i.e.*, there is a material reality and there is a separate spiritual reality, and the Christian while practicing science must restrict himself to the former). It leads him at worst to a kind of bashful, embarrassed acknowledgement that his Christian faith is not relevant to his scholarly discipline. Each of these alternatives is equally unacceptable and both are unnecessary.

It must be recognized that many psychologists in this country consider the "break away" of psychology from philosophy and theology in the last century to have been a decisive victory from the bondage of traditional mentalistic speculation to the liberty of independent scholarship. From this point of view, why then return to the shackles?

To be sure, liberty is essential to the advance of scholarship. We cannot expect our non-Christian colleagues to understand the meaning of the freedom that we have in Christ. Yet, we must in honesty admit some historical justification for the reasonable fears of sensible men that dogma can be misused to suppress the continuing search for truth. As we seek to relate our faith to our discipline, we must at all cost avoid the pretentiousness of self-proclaimed, "encapsulated, final truth."

There is irony here, however. Many who are shouting the loudest for liberty from traditional conceptions are themselves very evidently guilty of attempting to impose their paradigms on others (*e.g.*, Skinner, *Beyond Freedom and Dignity*[1]). Such inconsistency should not surprise us, but should be expected. Few if any serious thinkers today hold to the optimism of the naive realism of an earlier era that scholarship should, indeed can, be value-free. One's "pre-theoretical" value

orientation is a major determinant of one's systematic theory: from the decision as to what phenomena will be viewed, to what problem(s) will be explored, to what means of investigation will be employed, to the manner in which the evidence will be interpreted, to how the findings will be utilized. On these issues, there is no neutrality, and intolerance is a danger no matter what one's chosen theoretical base; many contemporary material-monists are at least as guilty of bigotry as the "conservative" opponents that they decry.

The Apologetic Response

How should Christians respond to the accusation of "authoritarianism"? One trend among Evangelicals has been to react to critics' charges by an almost total retreat to "special revelation," or a Biblical justification for positions being advocated. This *apologetic* frame of reference has as its principle goal the defense of Christian truth. The understanding of psychological processes is itself relatively unimportant in this context, but secondarily useful insofar as psychological discoveries support one's faith-system. This motif requires absolute reliance upon certain propositional truths and an unwavering defense of those "truths" against the onslaught of would-be destroyers. On the face of it this might seem to be quite proper. After all, the authority of the Word of God is the normative source of the Christian's total life, and consequently the necessary foundation for any sincere Christian scholar.

However, there is no unanimous agreement among Christian psychologists as to the most appropriate model for relating Biblical faith with psychology as a discipline. Although "propositional truths" are at times discernible within the special revelation of Scripture, it would be antithetical to scientific inquiry and to Biblical revelation to claim that absolute propositional truths are attainable within the natural pursuit of psychological investigation. Under these circumstances, it is hardly reasonable to use the less reliable data of natural revelation to support the more reliable data of Scriptural revelation[2]. Furthermore, the discipline of psychology may be conceived as principally important in its own right, not merely as a defensive reaction to heresy but as an affirmative search for truth. Admittedly, natural revelation is more difficult to perceive (one's interpretation is more subject to error) than the major doctrines within the special revelation of Scripture, but it is not on that account less important in the Kingdom of God. Our Father has not chosen to reveal all truth in the Bible, but has given us the privilege to explore His creation by natural means; this activity is itself pleasing to Him (*cf.* Genesis 1:26 ff., Psalm 8).

The Correlational Response

Other Evangelical psychologists follow a predominantly *correlational* frame of reference. In this approach an endeavor is made to delineate one's Biblical faith on the one hand, one's psychological principles on the other hand, and then to relate elements from the one domain to the other. The implication is that where a positive "fit" is welded, "integration" is achieved, and where no "fit' is possible, "integration" is unrealized. With reference to this strategy, it cannot be overlooked that at times Biblical revelation may shed light on psychological theory (*e.g.*, the nature of guilt) and at other times psychological theory may shed light on one's understanding of the Bible (*e.g.*, relationship with one's earthly father may influence one's conception of God the Father).

The discipline of psychology may be conceived as principally important in its own right, not merely as a defensive reaction to heresy but as an affirmative search for truth.

However, as a *modus operandi,* the correlational viewpoint has severe limitations. It is analogous in some ways to sewing a patchwork quilt with a variety of non-matching leftover fabrics — the patterns do not necessarily match, and you can't sew on the pieces that are left over. But, since those who follow this model are working toward perfect symmetry, they are inevitably disappointed with the quilt that is obtained. Even if symmetry were attained, it would not last, because the nature of psychological investigation is dynamic and ever-changing; the instant one claims to have arrived at final synthesis one is no longer a searching scholar but a pretentious saint.

The Radical Response

If we pause to evaluate the *apologetic* and the *correlational* models within the framework of the critics' charge of "authoritarianism," it seems to me that the former leads to unwarranted defensiveness and the latter to unnecessary restrictiveness. I would suggest that the *radical* model is the most adequate formal conceptual base for a Christian theoretical development. It recognizes no distinction between sacred scholarship and secular scholarship. The theologians are not more sacred because of their unique subject matter, and the statisticians and physiological psychologists are not more secular because of their's. The experimental psychologist who devotes his life to investigation of basic research questions with rats is neither more nor less sacred in his endeavors than the clinical psychologist who commits his life to the alleviation of mental suffering. If a psychologist chooses to explore an area remote from the possibility of direct Biblical input (*e.g.*, mathematical models of learning), his labors are no less sacred than the psychologist who investigates more Biblically related concepts (*e.g.*, the uniqueness of man as "image of God"). Truth, whenever and wherever it is found, is always God's truth, whether "spiritual' or earthy, whether abstract or applied; and the pursuit of truth, any truth, is glorifying to God.

The radical motif does not demand propositional certainty, but simply intellectual honesty and personal integrity. The radical frame of reference is not as easily described and categorized as the apologetic or the correlational, since it claims no exclusive paradigm but is characterized by creative activity — careful, dedicated scholarship that by its very nature cannot be easily "packaged."

The idea being advanced for radical Christian contribution to theoretical advancement is not new, of course. There is evident within the Evangelical tradition a history of dedicated men of God who confessed their faith by advancing their scientific disciplines[3]. Rhodes observes that:

The radical model recognizes no distinction between sacred and secular scholarship.

> . . . it was the philosophy, theology, and outlook of a whole Christian civilization that provided the cradle of modern science . . . the majority of the individual leaders of early scientific thought were men of deep Christian conviction, who saw in their pursuit of science the opportunity to glorify God[4].

What, you may ask, distinguishes the radical conceptual model of relating faith and discipline from any extant non-Christian system? The answer is primarily in this much too often taken-for-granted fact: the essence and substance of a Christian's life is always a Biblical faith commitment to the Lord, Jesus Christ. Certainly, this involves attitude but it is more. It is *living* for the One who is Truth. That makes the dramatic difference. How, then, can we judge the uniqueness of our contribution as *Christian* scholars? Not necessarily by the glaring distinction of our theoretical constructs as opposed to non-Christians' constructs (although at times this will be the case). Rather, the more adequate criterion of our Christian contribution is our faithfulness: Are we working toward the ultimate purpose of exalting God with a redemptive ethic of active care-taking of our Father's creation?

Although Christian scholarship must be rooted in theory (as, indeed, must any worthwhile scholarship), mere abstract symbolism is in itself incomplete. Young people are increasingly asking, "What is the relationship of this theory to reality out in the world?" Of course, some people's world-views are too restricted, and they need to learn to expand their phenomenological fields (perhaps for the value of basic research, etc.). But the question is quite legitimate: a good theory should be capable of being tested in the external world; and a genuine Christian commitment should be evidenced by one's life.

It is at this very point that Christian psychologists have an opportunity and a responsibility to assume more leadership among their professional colleagues. Currently, both within the behavioral sciences and without, major attention is being focused upon moral and ethical concerns, particularly with the influence of technology upon the meaning of human life. It is becoming increasingly clear that in the formulation of research problems and in the applications of the resultant findings, one is strongly influenced by one's metaphysical faith. For example, the present dilemma of technological enslavement is due at least in part to the influence of a material monist philosophy that leads inevitably to an incomplete view of reality as consisting merely of matter. What, then, should be the influence of the faith of the Evangelical behavioral scientist on his psychological discipline? It is the strong recommendation of this author that we cease to be apologetic and/or restrictive in our thinking and begin to exert our influence in an affirmative manner precisely on the basis of our faith:

> Consequently, my beloved brothers, be steadfast, immovable, at all times abounding in the Lord's service, aware that your labor in the Lord is not futile . . . In Him we enjoy redemption through His blood, the forgiveness of our trespasses to the measure of the wealth of His grace . . . for we are His handiwork, created in Christ Jesus for good works, which God previously prepared for us so that we should live in them[5].

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[1]B. F. Skinner, *Beyond Freedom and Dignity* (New York: Alfred A. Knopf, 1971).

[2]In fact, this very argument against the use of the method is commonly advanced by some apologists themselves on those occasions where the less reliable data do not support their own hypothesis; such selective application of the apologetic model, only when it supports one's position, smacks of dishonesty.

[3]See H. Butterfield, *The Origins of Modern Science,* 1300-1800 (New York: Bell, 1962); R. Hooykaas, *Religion and the Rise of Modern Science* (Grand Rapids: Eerdmans, 1972); A. F. Smethurst, *Modern Science and Christian Beliefs* (London: Nisbet, 1955); A. N. Whitehead, *Science and the Modern World* (New York: Mentor Books, 1949).

[4]Frank H. T. Rhodes, "Christianity in a Mechanistic Universe," in D. M. MacKay, ed., *Christianity in a Mechanistic Universe* (Chicago: Intervarsity Press, 1965), p. 19.

[5]The references, taken from the *New Berkeley Version* of the Bible, are quoted as follows, in order: I Corinthians 15: 58; Ephesians 1:7, and Ephesians 2:10.

One of the greatest tragedies of our age is that so many Christians allowed themselves, particularly in the last century, to be frightened away from proclaiming the full message of biblical Christianity by the notion that it was scientifically out of date or discredited. The greatest possible service that Christians can render to the cause of true freedom, I believe, will be to help recover for our generation the old but ever and true faith of which we have thus wrongly and mistakenly been robbed in the name of science.

Donald M. MacKay

The Clockwork Image,
InterVarsity Press, 1974, p. 105

The Historical Development of Christian Scientific Presuppositions

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Scientific presuppositions do not usually form an important part of the thought of the average student dealing with science today. He is interested in "the facts" or in the hypotheses of scientists, but when one begins to talk to him of the presuppositions of his scientific work, he usually replies either that he has none, or that they are irrelevant to his work. This point of view appears very frequently in a course on the subject of science, for the students feel that the religious and philosophical presuppositions of the scientist hold no interest or importance for them. As one student wrote when asked to evaluate such a course: "Why do we have to have all the philosophical bunk? This is supposed to be a course in the history of science, not in philosophy." Even Christians frequently have the same outlook on the scientific endeavor, but they also have their presuppositions that very definitely influence their work. In this paper, therefore, I seek to show the historical development since 1500 of these Christian presuppositions.

Two Levels of Christian Presuppositions

In thinking of the question of the Christian presuppositions to scientific understanding we must always keep in mind that the Christian has two levels of interpretation. He does not merely look at or examine the phenomena. He must of course do this, but as in the case of any other scientist, that is not enough. He has to look beyond his own particular situation, and even beyond the scientific system in which he is working. In fact, and in this he is no different from any other scientist, he assumes a position which is in accord with his religious beliefs. Whether he likes it or not, whether he is conscious of it or not, his Christian faith is at the basis of his thinking, just as the atheism, the agnosticism or some other "ism" is the starting point of another scientist.

What then are these basic "religious" presuppositions of the Christian? Without doubt the first is the biblical doctrine of the tri-unity of God: Father, Son and Holy Spirit. Yet in this belief he is not thinking in merely metaphysical terms, nor is he speculating upon the idea of ultimate "being." Rather he is thinking in very concrete terms concerning God's actions. He approaches his work with the belief that God is ultimately the creator, sustainer and ruler over all things. Without his action at all times, laws, knowledge and understanding could not exist. Furthermore, the Christian scientist is deeply conscious of the fact that man, including himself, is a sinner who tends not only to disobey God's moral laws, but who also perverts and misunderstands God's creation. The only solution to this situation is that God in his grace has redeemed and reconciled rebellious man to himself through the Lord Jesus Christ, who makes his saving work effective in men by the inworking power of the Holy Spirit. One may say that the whole of the Christian's religious presuppositions are summed up in Colossians 1:15 ff, where Paul speaks of Christ in these terms.

These presuppositions, however, are not the product of metaphysical or scientific speculation. They are based upon the teachings of the Old and New Testament, which the Christian believes to be the very Word of God, revealing not only certain truths about God, but actually setting forth the ultimate nature of the universe and of the scientific endeavour itself. The Christian, therefore, in his approach to his work believes that he comes to it not with some humanly devised system of belief, but with what is absolutely true because it is the revelation of God, himself. Therefore, even before he begins his work he knows the ultimate meaning of it. True, he does not know it exhaustively nor perfectly, but he realizes and believes that behind the whole of reality is the sovereign Triune God.[1]

Because this is the case, his religious presuppositions are constant. Founded on divine revelation, they do not change nor alter from age to age. What was true in this sense for Abraham was as true for the Apostle Paul and is as true today. For this reason we

cannot talk of the historical development of the Christian scholar's ultimate presuppositions. Each succeeding age may clarify them, formulate them more carefully and apply them more specifically, but they do not change. Consequently the Christian's religious presuppositions cannot be said to have any historical development. The position of the Protestant Reformers of the sixteenth century is in this respect still the same today. The Christian, even though he may not consciously realize it, still begins with the same starting point in his scientific work. At this level there is no change or historical development, for God does not change. (Heb. 8:13)

The Christian's presuppositions at the phenomenal level, however, are of a very different order. These are very liable to change and alteration, for no modern scientist would be willing to hold with many of the medieval thinkers who insisted that since "the Philosopher" Aristotle had stated some propositions, it must be true. The Christian recognizes that at the level of historical, sociological, political, physical or chemical phenomena there is a flux and change of opinion that prohibits anyone from adopting the attitude that the final word has been said. The Christian's scientific presuppositions, therefore, may alter and develop in many different directions as he carries on his work of research and investigation. His scientific understanding and knowledge should always be expanding, a process which inevitably forces him to change and develop his scientific assumptions, for in God's creation he may always find something new.[2]

The causes of such changes and developments are at least three in number, and probably more. Most obvious is the growth of knowledge of the universe. As man works at his scientific task, he comes to an increasing understanding of what makes it operate in the way it does. Consequently the Christian finds it necessary to adjust his perspective, as most have found it necessary to give up Archibishop Ussher's estimate of the age of the earth and of man. This means, however, a deeper and more thorough study of the biblical text in the light of the new knowledge. Not infrequently this has led to a changed view of what the Bible does actually say about creation. What has often at first been regarded as a conflict between science and the Bible turns out to have been instead a conflict between science and the biblical interpretations of earlier exegetes who have accepted the science of their day as the key to the understanding of the Scriptures. Frequently a third factor in changing the Christian's scientific presuppositions has been a greater understanding of man, himself, whether as scientist or as object of investigation. One could cite the work of Sigmund Freud, Hans Selye, Abraham Kuiper and others who have contributed to a new comprehension of man within the last century or so. Whether one will always agree with all that the new theories and hypotheses claim is another matter, but there can be no doubt that they have all given new "angles" to the understanding of man as a whole personality.

And yet from the Christian point of view, while specific changes may come in the Christian's scientific presuppositions, it is his religious presuppositions that make possible not only Christianity, but also science. It is the belief in the sovereign tri-une God that provides the background and foundation for belief in a coherent universe so necessary if science is to accomplish anything.[3] It was the belief that conditions which prevailed upon earth under certain circumstances also prevailed upon the moon that made it possible for American astronauts to walk upon the moon. But on the other hand, it is the Christian's acknowledgement that the universe is God's handiwork that enables him to look for the new and the novel, conscious of the fact that God is not bound by rational systems devised by his human creatures. Moreover, he also recognizes that to the scientist, as to everyone else, ultimate reality is a mystery that man cannot solve. As Max Planck stated in one of his essays, ultimate reality is not physical but metaphysical.[4] For this reason the Christian has the conviction that his duty is to try to understand the universe as far as he possibly can, but his knowledge will never be exhaustive. This is the mandate that God has placed upon him in this life (Gen. 1:28).[5]

The Christian's religious presuppositions cannot be said to have any historical development . . . The Christian's presuppositions at the phenomenal level, however, are of a very different order.

The Christian working in the field of science because of his two levels of presuppositions, to use a navigational expression, obtains a fix on his work. He seeks to interpret the universe, he seeks to carry out his scientific activity, in the light of God's Word, recognizing that the heavens declare his glory and the firmanent shows his handiwork. At the same time, he also is quite conscious of the fact that both he and his fellow scientists are but fallible men, limited by time and space and tainted with sin, which limits and confuses all attempts to see the fullness of God's sovereign creative, providential and redemptive action.

The Christian also recognizes however, that God in his grace has not left even the unbelieving non-Christian without a witness in this world. By his Common Grace he has enabled even those who deny him to attain to much knowledge and understanding at the immediate phenomenal level. Yet while this is true, when the non-Christian scientist attempts to go farther in his explanations than the phenomenal level, he ultimately accepts some system of chance or determinism that would destroy both a coherent universe and the possibility of knowing it. The Christian, on the contrary, redeemed by the grace of God and enlightened by the Holy Spirit sees all things *sub specie aeternitatis* [in the light of eternity] as God's creation, which gives it meaning, coherence and comprensibility. The Christian alone, therefore, has the necessary presuppositions for true science.

The Three Points of Development

In attempting to see how the Christian presuppositions to science have developed since 1500, we cannot in the space allotted give a complete history of their

unfolding down to the present day. Nor do we need to do so. Instead it seems best if we look at what we might call the three main turning points in western science, to see how the ideas put forward at those crucial times have affected and influenced Christian thinking. Certainly the views of Copernicus, Newton and Darwin have had what we might call a revolutionary impact on scientific thought of all types, including the Christian approach to a scientific understanding of the world.

The year 1543 was for the scientific world a crucial date, for in it two important and ultimately influential works appeared: Nicolas Copernicus's *On the Revolution of the Celestial Orbs* and Andrea Vesalius's *Concerning the Fabric of the Human Body*. Although neither had any intention of destroying the Christian's faith, they did in fact have a disturbing effect upon contemporary scientific thinking, since they both laid, however unwittingly, the groundwork for a mechanical concept of the universe and of man himself.

This became fairly clear within the next half century in the development of astronomical studies. Johann Kepler (1571-1630), a Copernican who used the observations of Tycho Brahe, sought to give a mystical interpretation of the universe in the Pythagorean tradition. When he found that this did not work, he turned to a more purely mechanico-mathematical approach that eventually enabled him to formulate his three laws of planetary motion. At the same time in Italy Galileo Galilei (1564-1642) had not only worked out a number of hypotheses concerning the mechanics of motion, but by means of his telescope he was able to observe the movements of the heavens that manifested a mechanical type of operation. Giordano Bruno (1548-1600), who was burned at the stake for his temerity, went to the length of insisting that all things in the universe operated purely by mechanical laws, and that there is no center to the universe which is expanding in all directions. Thus as one enters the seventeenth century, the whole world picture has changed radically from that set forth by the Egyptian, Ptolemy, or the Italian, Dante Alghieri, in earlier days. Spirits are out and physical laws are in!

The Calvinists in particular, with their stress upon the doctrines of divine sovereign creation and providence, were prepared to admit that they could find things in God's creation that they had never foreseen or imagined.

At the same time a new approach to man had begun to become current. Paracelsus (1493-1541) attempted to introduce the techniques and ideas of alchemy into medicine by using both chemical experiments and a certain amount of mysticism. Vesalius had laid the foundation for the view that man's physical structure was fundamentally that of a machine. This view was carried further by Servetus, burned in Geneva in 1553, and by William Harvey (1578-1657), who in his *On the Motion of the Heart* sought to set forth the idea that the blood in the bodies of both men and animals moved in a circular pattern similar to the orbits of the planets. As a result of these discoveries and theories, man himself began to take on a different aspect from that held during the Middle Ages. Even as the Aristotelian belief in the four elements of earth, air, fire and water began to falter, so did the idea of man being made of the four humours of blood, phlegm, choler and melancholy.

What was the Christian reaction to all of this? There was at first no unanimity. Although Rheticus and Osiander, both Lutheran pastors, took part in the publication of Copernicus's work, Luther said that it was nonsense to say that the earth went around the sun. On the other hand men such as Thomas Digges (ob1595) and William Gilbert (1544-1603) seemed to feel that the Copernician system was quite in accord with their Christian faith. We must also remember that Kepler was a devout, albeit mystical Lutheran, who found nothing in his three laws of planetary motion which contravened his faith. Similarly while Francis Bacon (1561-1626) rejected the Copernician view of the universe, he nevertheless insisted that God had revealed himself in two books, that of nature and that of Scripture, for which reason he could say:

> Let no man upon a weak conceit of sobriety or an ill-applied moderation think or maintain, that a man can search too far, or be too well studied in the book of God's word, or in the book of God's works: divinity or philosophy; but rather let men endeavour an endless progress or proficiency in both.[6]

The only result could be that by 1650 Christians had generally accepted the heliocentric description of the universe. They had learned that God did not confine himself to the syllogisms of Aristotle, nor to the rationalisms of the medieval philosophers.

With regard to the Christian's reactions to the mechanical interpretation of man, there seems to have been few difficulties. Ambroise Paré (1510-1590), the Huguenot surgeon, was quite prepared to accept the idea of man's physical consitution being mechanical in its construction. He did, however, insist that man's physical image was not the "image of God." He distinguished between the two, with the result that he had little or no trouble with the concepts set forth by Vesalius, nor is there any sign that Protestants objected to Harvey's explanation of the circulatory system.

The Roman Catholic authorities, on the other hand, faced serious problems as can be seen from their treatment of Galileo. Aristotle and his leading medieval disciple, Thomas Aquinas, had formulated a physico-theological system that predetermined any investigation of the universe, with the result that an attack on one side of the partnership meant an attack upon the other. The Protestants, however, as in the case of Pierre de la Ramée (1515-1572), usually rejected Aristotle as well as Thomas. The Calvinists in particular, with their stress upon the doctrines of divine sovereign creation and providence, were prepared to admit that they could find things in God's creation that they had never foreseen or imagined. Calvin had stressed the importance of empirical investigation and study of not only the Bible, but also of nature, and his followers adopted the same approach which was set forth most clearly and distinctly by Francis Bacon in his *Advancement of Learning* and *Novum Organum*. The Calvinists linked their evolving scientific knowledge closely to their fundamental religious presuppositions.

Up to the end of the sixteenth century, natural philosophers had spent their time attempting to work out an empirically verifiable description of the universe and of man. They had not, however, attempted to answer the question of why the universe or man acted in the way that they did. Kepler thought in terms of the sun having arms extended on which the planets moved, while the concept of "vital spirits" still dominated much of medical thinking. Men such as Richard Baxter (1615-1691), the Puritan divine, insisted that Thomas Hobbes and the contemporary materialist philosophers were really destroying everything when they attempted to explain all of creation, including man, on purely material lines. He contended that they

> doe give so much more to meer Matter and Motion, than is truly due, and know or say so much too little of Spirits, active Natures, Vital Powers, which are the true principles of motion, that they differ as much from true Philosophers, as a Carcas or a Clock from a living man.[7]

The next step in scientific advance would therefore be somewhat more difficult.

Sir Isaac Newton (1642-1727) did not originate the attempt to discover why the universe acted as it did, but he put the finishing touches to work that had been going on for about a century. With his theory of universal gravity, he presented two relatively new ideas that he proved both empirically and mathematically. He demonstrated that the law of gravity operated uniformly throughout the physical universe. Furthermore, what was even more important, and to many disturbing, he clearly indicated that the universe did not operate by means of Baxter's "Spirits, active Natures, Vital Powers" but by such things as mutual attraction which could be measured in terms of mass and distance. Here was a new approach which the poet Pope could say made all things light, but which must have shaken a good many Christians who had long held to a "vitalistic" interpretation of the physical world.

Yet there were also many Christians who did not find these ideas disturbing. William Gilbert, one of the founders of this physico-mechanical approach, thought of the world as a great magnet, but does not seem to have believed that this destroyed the Christian approach to nature and nature's God. Certainly Robert Boyle (1627-1691), who discovered much concerning gases and their actions, was in no way shaken in his deep Christian faith. Even Newton, himself, although he was perhaps not as evangelical as one might wish in his theology, in no way felt that his discoveries and formulations ushered God out of the universe. The creation was still God's creation that operated according to his laws, which he in turn constantly oversaw and renewed when things tended to run down. Consequently Christians gradually came to accept the view that God was still sovereign, even over the Newtonian universe. As Joseph Addison (1672-1719) expressed it:

> The spacious firmament on high,
> With all the blue ethereal sky,
> And spangled heavens, a shining frame,
> Their great Original proclaim. . . . .
> In reason's ear they all rejoice,
> And utter forth a glorious voice,
> For ever singing, as they shine,
> 'The hand that made us is divine.'

Yet while Newton's work seemed to take very little away from the Christian view of the physical universe, the fact was that it opened the way to a new naturalism. Thomas Hobbes (1588-1679), the philosopher, had insisted that everything including man operated by purely physical forces. With the discoveries of Newton this interpretation seemed quite valid to many. The position of Bacon had now been deserted by such thinkers, for the Bible was no longer God's Word and nature ceased to be God's work. All ultimate explanations of natural phenomena were to be purely natural and phyiscal. The position of the Westminster Confession of Faith (1647), for instance, which stated that

> God, the great Creator of all things, doth uphold, direct, dispose, and govern all creatures, actions, and things, from the greatest even to the least, by his most wise and holy providence according to his infallible knowledge. . . . God in his ordinary providence maketh use of means, yet is free to work, without, above, and against them, at his pleasure, (cap. V, i, iii)

was rejected as being unscientific and contrary to the empirical evidence concerning the nature of the world.

This, of course, meant that the interpretation of man and his world experienced a radical change in the eighteenth and early nineteenth centuries. While Bishop Butler (1692-1752) and Archdeacon Paley (1743-1805) could attempt by the use of reason alone to prove the validity of Christianity, the general trend was in the direction of a denial of any concept of God behind the universe. Consequently Buffon, d'Holbach, Laplace, Erasmus Darwin, Lyell and Wallace came to regard man as primarily a product of natural forces and nothing else.

This interpretation of man and his origin received its classic exposition in Charles Darwin's *Origin of Species* (1859). This was the third crucial point in the development of scientific thought that called in question Christian presuppositions. While earlier geologists and biologists had attempted to describe how man had come into existence, Darwin like Newton went beyond description to explanation. Basing his thinking upon Thomas Malthus' *Essay on Population* (1798) he offered "natural selection" and "survival of the fittest" as the sources of man's evolution from the lower forms of life. Man was simply an animal who through the fortuitous concatenation of events had risen to his present superior state. Man was simply the product of blind chance.

Accepted at first by a few as an hypothesis, it soon became to the anti-Christian thinker an incontrovertible dogma. T. H. Huxley seized upon it to attack any concept of supernaturalism, although he did rather inconsistently hold that man, the product of evolution, now had to fight it.[8] Taken up by Sigmund Freud, the doctrine became largely the basis of his theories of psychoanalysis. Those working in the bio-medical field, behavourist psychology, sociology and even politics have now all adopted the evolutionary approach to their subjects. Even the organized church seems to have given in on many points, for much of biblical criticism is based on evolutionism, as is also situational ethics. No longer the "image of God", man is simply a combination of physical forces to be manipulated by psychological experts, the real scientists. As F. W. Matson has pointed out, such thinking leads to a flat denial of the individual's responsibility and freedom, which cannot but end in a police state that will make George Orwell's 1984 look like a rather pleasant senior citizens' tea party.[9]

As is well known, the Christian reaction to the dogma of evolution has been generally negative, from the famous Oxford debate between Huxley and Bishop Wiberforce, through the Scopes "monkey" trial down to the present time. Some have attempted a compromise on certain points, talking in terms of "theistic evolution," while the more determined have denied any possibility of God creating by means of evolutionary processes. The important thing, however, is that the theory of evolution strikes not at the theories of Christians concerning how God in his providence governs the world, but at the basic doctrine of the nature of man. It even substitutes chance for God himself. In the earlier developments of Copernicus, Kepler and Newton, demands were made for the alteration or modification of Christian presuppositions in the scientific field. Darwinism, particularly as set forth by some of its advocates, however, destroyed even the religious presuppositions of the Christian.

While Christians were battling with this difficult problem, one Christian, Abraham Kuiper, founder of the Free University of Amsterdam and later prime minister of the Netherlands, was clarifying the matter of presuppositions themselves. He showed that whether they recognize it or not, men always begin their scientific activities with certain "religious" presuppositions. They must of necessity begin all their thinking with certain points that they take on faith. Furthermore, the crucial difference between the Christian and non-Christian is that the former, regenerated by the Holy Spirit, strives to see all things "in the light of eternity," while the non-Christian under the influence of sin seeks to explain all things merely in terms of that which is "under the sun," i.e., he denies any ultimate meaning beyond what he can give. Professor Herman Dooyeeweerd also of the Free University has sought to carry this idea farther by working out a whole system of philosophy, while Professor Cornelius Van Til of Westminster Theological Seminary, Philadelphia, has applied it to Christian apologetics.[10]

Yet although these men have clarified the nature and importance of presuppositions philosophically, Christian thinkers and particularly scientists have been slow to present a Christian approach to modern science, especially to the problem of origins. It is one thing to talk about Christian presuppositions, but what about their application in the lab? A Christan student going to class on biology, genetics or even history or sociology, finds little assistance in setting his thinking straight if he is simply told that the modern theory of evolution conflicts with the Bible. The question remains: Can the specific and known facts of palaentology, geology, biology, genetics, anthropology etc. be fitted into a biblically grounded creationism? Christians have been able to fit Copernicus, Kepler, Galileo, Newton and similar scientists of past ages into their Christian scheme of thought based upon Christian religious presuppositions, by changing some of their interpretations of the Bible, thus modifying and altering some of their scientific presuppositions. Darwin and his followers have proven to be more difficult to deal with, since they have laid siege to the very inner keep of the Castle of Man-Soul.

To the problem of evolutionism has now been added that of relativity. With the publication in 1915 of Albert Einstein's theory of relativity the Newtonian universe disappeared. Absolute time and space became

The principal stumbling block and source of conflict still seems to be evolution, which forms the basis of the whole modern concept of man not only in biology, but in sociology, psychology and even in the humanities.

space-time, and the Newtonian presupposition of God the great artificer dissolved into pure chance. This tendency has been carried even farther by Einstein's followers who have dissolved all reality into absolute atomism.[11] But even while this development has been taking place there have been voices raised in opposition. In 1941 Max Planck set forth the idea that "ultimate reality" was not something physical but metaphysical. Others have likewise come to the conclusion that "behind" all physical reality is a spiritual reality that cannot be understood by purely physical means. The problem of presuppositions is again raising its head even for scientists without any apparent religious convictions. They are faced with the question of the possibility of scientific knowledge in a completely atomistic world. Only a coherent reality can make science possible, and coherence presupposes "something" beyond the physical to give the coherence. Most scientists at this point are content to declare that ultimately the universe is opaque, but some believe that a spiritual reality must be posited to make sense of scientific work and discovery.

Where does the Christian stand in all of this? Some Christian scientists have contented themselves with doing their work without attempting to work out any over-all explanation from the Christian point of view. Others such as P. Groen, C. A. Coulson, R. Hooykaas, E. L. Mascall and E. C. Rust have sought to integrate modern scientific thought with their Christian faith.[12] Yet as one reads their work, one sometimes has a rather strong feeling that something is lacking. In some cases one finds that Christianity is watered down to fit the scientific scheme, while in others one cannot help feeling that more might be said to elucidate the whole picture. But they have pointed out quite clearly that for science to be possible a coherent universe is necessary, and since its coherence is seen in the fact that even the apparent random actions of atoms follow a statistical pattern that can be plotted and predicted, only the Christian presuppositions make sense.

Thus as we look at the present situation of the Christian *vis a vis* the scientific world, we find that he has accommodated himself to the earlier developments that did not conflict with his basic religious presuppositions. The more recent theories of relativity and quantum mechanics, however, do not seem to have yet been assimilated, although some moves have been made towards an acceptance of these physical theories. The principal stumbling block and source of conflict still seems to be evolution, which forms the basis of the whole modern concept of man not only in biology, but in sociology, psychology and even in the humanities.

The Need Today

As we look at the scientific situation today we cannot but wonder what may be the outcome of present

The Christian scientist must insist that his presuppositions are not merely one set of starting points among others, one hypothesis among a number, but that they are the only presuppositions that make science possible.

developments. As Bernal has pointed out, Einstein's theories are really nineteenth century in character since he posited a coherent universe, while today scientists are tending to accept a completely atomistic, chance universe. Sir James Jeans' aphorism that every possible accident will take place if only time lasts long enough, seems to be the basis of much scientific thought. Yet as Coulson has insisted, without belief in a coherent universe science is not possible. The result, if atomism becomes the prevailing philosophy, may well be the complete collapse of scientific activity, which is perhaps forshadowed in other developments such as the swing to occultism, magic and witchcraft now so widespread. On the one hand we have the behaviourist psychologists attempting to control man absolutely by means of conditioned reflexes or "brain washing," while others are seeking to do the same through spells, satan worship and drugs. Science today seems to have reached a crisis situation that may well spell its breakdown together with much of western society and culture.

In this state of affairs scientists with Christian convictions are needed more than ever. Christians have often tended, particularly since Darwin, to shun scientific studies and investigations as leading to unbelief and loss of conviction. But this is God's creation. The Christian believes God has established it according to certain basic laws that give a certain coherence to reality, thus enabling man to study, explain and use it. Bacon's view that the Christian has a responsibility to read intelligently the book of God's works as well as the book of God's word, still stands. The danger is that Christians often forget this, with the result that in an age that has come almost to worship science, Christians have had relatively little impact on any type of scientific thinking. The outcome has been the introduction of a completely mechanistic, materialistic view of all things, including man, which has led us now to the threatened breakdown of science and the replacement of it by the occult. The only answer seems to be a revival of the Christian approach to scientific endeavour.

This means that the Christian man of science must have an extensive and accurate knowledge of his own field of endeavour. He must be as good a scientist as possible. This goes without saying. But it also means that he must have a firm conviction that all things in this universe were not only created but are from moment to moment sustained by the providential action of God. He is to take seriously Paul's statement in Colossions 1: 16 and 17 that "in him [Christ] were all things created in the heavens and upon the earth . . . and he is before all things and all things in him hold together." He is not to think of the physical world and man as operating on their own in some deistic fashion with God intervening occasionally to wind up and repair the machinery. Rather he is to keep in constant remembrance that God by the secret and mysterious action of the Holy Spirit maintains and governs all things at all times. The God-of-the-gaps is an impossible concept for both the scientist and the Christian.[13]

But the Christian cannot merely talk in terms of his religious presuppositions. He must work out the implications of his presuppositions to show how they apply to science in terms of coherence, comprehensibility and applicability. We need desperately scientists who are Christians, who can think creatively for themselves, and who do not merely parrot the very often unscientific views of some theologians and evangelists who have little knowledge of the scientific field. They must see ever more clearly that there can be no division between their religious and their scientific activities, and that the biblical doctrine of the Triune, Sovereign God makes science possible.

They should not, however, merely hold this viewpoint as a kind of "private" faith, but they must seek increasingly to work out the implications of their Christian presuppositions at the level of scientific endeavour. This does not mean that they are to content themselves with saying that all causation is the result of God's activity and let the matter go at that. Rather, they have the responsibility of investigating the physico-chemical universe, of discovering the causes of its existence and continuance as far as in them lies, and then to point out that only on Christian grounds is this possible. They will also have the work of showing to their fellow Christians that not infrequently their presuppositions have been more Aristotelian than Christian. This may involve much education and at times even recrimination, as when Luther rejected Copernicus's concept of the universe, calling him a "fool."

When they do this, the scientists will not only manifest that Christianity is not anti-scientific, but that at both the ultimate or metaphysical level and also at the spacio-temporal level, Christian presuppositions are the only presuppositions that make scientific work possible. Yet while the Christian presuppositions at the physico-chemical level may change, the ultimate meaning and purpose of the universe in Christian thinking still remains. God is still the creator, sustainer, governor and redeemer of the universe, the ultimate reality behind all the things which appear. Thus the Christian scientist must insist that his presuppositions are not merely one set of starting points among others, one hypothesis among a number, but that they are only presuppositons that make science possible.

Science today is not merely facing abstract philosophical problems. Its most pressing difficulties are in fact moral with the development of behavioral psychology through which men such as B. F. Skinner hope to be able to control all human thought and action according to the psychologist's whim. Likewise there is the problem of cloning and the production of mechanically devised people who may well be so many robots. The results of such thinking and achievement can lead to a horror situation that even the wildest imagination of scientific fiction writers has never contemplated. The answer again to this, and the one hope of salvation from such possible developments, is none other than the Christian belief in the sovereign God and the fact that he has created man in his own image. While man has indeed wandered far away from his creator, denying that the creator is the creator, yet the creator has

provided a way of return through his Son, that man may once again see all things truly "in the light of eternity" and do all things "to the glory of God alone."

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[1]C. Van Til, *In Defense of the Faith*, (1967), I ,2ff deals with this in great detail. Cf. R. Hooykaas, *Religion and the Rise of Modern Science* (Grand Rapids, Mich., 1972) pp. 7ff.

[2]*Ibid.*, pp. 39ff.

[3]C. A. Coulson, *Science and Christian Belief*, (London, 1960), p. 75.

[4]Quoted in: F. Le Van Baumer, *Main Currents in Western Thought* (New York, 1970), p. 677.

[5]Cf. Van Til, *op. cit.*, pp. 2; H. Dooyeweerd, *A New Critique of Transcendental Thought* (Philadelphia, 1955), II, 264ff..

[6]*The Advancement of Learning*, (London, 1954), p. 8.

[7]Quoted in: *Science and Society*, 1600-1900, P. Mathias ed. (Cambridge, 1972), p. 26.

[8]Quoted in: Baumer, *op. cit.*, pp. 556ff.

[9]F. W. Matson, *The Broken Image* (Garden City, N.Y., 1966), chaps. II & III.

[10]A. Kuyper, *The Principles of Sacred Theology*, (Grand Rapids, Mich., 1963), pp. 150ff; Dooyeweerd and Van Till, *op. cit.*

[11]J. D. Bernal, *Science in History* (Pelican, 1969), 3:742ff.

[12]P. Groen, "Faith and Physics," *Free University Quarterly*, (Amsterdam, 1964), IX, 148ff; E. L. Mascall, *Christian Theology and Natural Science* (London, 1956); E. C. Rust, *Science and Faith* (New York, 1967)

[13]R. H. Bube, "Man Come of Age," *Journal of the Evangelical Theological Society*, XIV (1971) pp. 206f.

The Doctrine of Special Creation

Part II. Catastrophism

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Chapters 21 to 25 (unit 9) contain the heart of the authors' argument for special creation. Although no doubt they wish this section to be the strongest, yet in some points it is the weakest. There is an unevenness of organization not apparent in the first eight units—as though the authors were not quite sure what arguments would carry the most weight. Apparently there were no geologists on the writing staff.

The authors argue for the instantaneous creation of the major groups of organisms in the not remote geologic past (p. xix, 398, 413-416). According to their view of species, all present-day living organisms are lineal descendants of these primordial creatures. There is variability, but this does not denote kinship, for there is no hereditary relatedness betwen different species in time (p. 147, 398, 419, 430, 451).

While acknowledging the controversial nature of their view, they hold that it fully supports the account of origins given in *Genesis* by Moses. They find evidence for their interpretation in the fossil and geologic record; groups of organisms succeed one another in the rocks, there are no transition fossils, and discontinuities indicate that major changes occurred in the past by geologic agencies no longer in operation (p. 7, 393, 404). Noah's flood was the most important and recent of these agencies (p. 412, 414). Moreover, we are invited to believe that Noah's flood scoured out Grand Canyon and deposited the fossils in the wake of this swift, paroxysmal convulsion, that engulfed the whole Earth (p. 405, 412, 418).

Thus, special creation is to the authors a scientific "theory"; it is more persuasive than the alternative view held by the persons to whom they refer as "evolutionists." Undaunted by more than a century of scholarship

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in geology and paleontology and a half-century in genetics, they argue that no evolutionary change has occured in time—for the major groups of organisms were created fully formed, *ex nihilo*, in the beginning. The chicken, in short, has come before the egg.

Diluvial Geology

With unit 9 we are at once back in the early decades of the 19th century, when Noah's flood was viewed as a major agency of geologic change. Just as the design argument epitomizes the age-old discussion between science and religion, so catastrophism was the means by which the special-creationists usually accounted for the changes they were obliged to recognize in the past history of the Earth. To assess the authors' point of view we must therefore place it in the context of rapidly shifting concepts in geology and biology during the decades immediately preceding the publication of Darwin's *Origin of Species* in 1859 (see Gillispie, 1959).

The 17th century had seen the dramatic introduction of change and natural law into the hitherto static heavens. During the 18th century, scientists such as Georges Buffon (1707-88) and James Hutton (1726-97) began to recognize that change also had characterized the Earth. When stability and permanence thus gave way to change in time—first in the heavens and then on the Earth—it was inevitable that the same interpretation would be applied to living things as well.

Soon after the turn of the 19th century, diluvial geology emerged as a serious attempt to account for very real problems in Earth history. In this the Mosaic tradition was a major, but by no means the only, guiding influence. The fossil remains of extinct animals, the curious locations of immovable boulders, and the puzzling features of river valleys all demanded explanation. Diluvial geology sought to equate a supposed natural event of worldwide scope with a direct, providential intervention. The proponents of this view thought the facts of geologic history might establish the historical reality of the Noachian deluge and so remove any threat to religion posed by geology.

There are three scientists whose work may be cited as representative of the period of about 1812-57—the period in which, I believe, the effort of this book may be set. They illustrate, first, the types of problems—the age of the Earth, directional change, and causal agencies—that had to be defined before the Darwin revolution could be achieved; and, second, the international character of the preliminary solution.

Most students of Earth history during those years continued to think the Earth was comparatively young. They also recognized that the Earth must have gone through many changes in the past. They were led therefore to the conclusion that such changes must have been sudden and dramatic. Georges Cuvier (1769-1832) of France gave this view—catastrophism—new prestige, in 1812, with his work on fossil vertebrates, *Recherches sur les Ossemens Fossiles de Quadrupédes*. He was sure that within such a short time-interval only a series of land-upheavels and paroxysmal deluges could account for the sudden extinction of whole species of animals. The impressive skeletons of mastodons and *Megatherium* entranced his public. Cuvier also included an engraving of an extinct elephant that was once engulfed in Siberian ice—as a result, he thought, of a dramatic drop in temperature following northern extension of a deluge. The authors refer (p. 404, 406) to this elephant as an argument for their view.

Undaunted by more than a century of scholarship in geology and paleontology, and a half-century in genetics, the authors argue that no evolutionary change has occurred in time — for the major groups of organisms were created fully formed, ex nihilo, *in the beginning.*

Cuvier's catastrophism must be set in the context of his impressive and permanent contributions to comparative anatomy. He stated the main arguments of this doctrine: a relatively short age of the Earth, the progressive and sequential character of the fossil record, and a series of terrestrial paroxysms.

The authors might also approve of the Rev. William Buckland, an energetic and competent English geologist of the period. His books, including *Reliquiae Diluvianae* (*Relics of the Food*), of 1823 are outstanding examples of the catastrophists' attempts to reconcile science with the Bible. He summarized evidence, from animal bones in caves, that England had been visited by Noah's flood. Buckland discussed in detail how hapless antediluvians must have been swept in by diluvial detritus. Actually, animals frequently haunted these caves to feast on imprudent intruders, whose bones were left behind for burial and eventual exhumation by eager diluvialists. The view offered in unit 9 reminds me particuarly of Buckland's treatise of 1836, *Geology and Mineralogy;* the 6th Bridgewater Treatise, it was part of a series commissioned in the 1830s to demonstrate the "Power, Wisdom, and Goodness of God, as manifested in the Creation." Despite his Noachian presuppositions, Buckland displayed substantial geologic knowledge, particularly his command of the layering of strata and their sequential fossil remains. Arguing for a universal deluge, he tried to show how the successive fossil record matched the *Genesis* account, and he recited evidence everywhere of providential design, including even the coal that insured England's economic prominence.

However, the authors would probably find Hugh Miller (1802-56) somewhat disconcerting. Also an acute observer and certainly no dilettante, he was not as confident as Buckland. In his *Testimony of the Rocks* (1857), Miller devoted two lengthy chapters to "The Noachian Deluge." In these pages he turned a critical eye on the legends and geologic arguments for this supposed event. He rejected the evidence for a universal deluge and argued the folly of sending Noah's flood around the world. He held that Noah's flood was a local event that had occurred somewhere in what is now the Middle East. Buckland's caves had therefore been visited by a flood of much more modest and local proportions. Hugh Miller rather marks the end of the serious 19th-century attempts to equate Earth history with *Genesis*.

An even more important publication was the *Principles of Geology*, in 1830-33 (first edition), by Charles Lyell (1797-1875), whose uniformitarian views the authors dismiss. More than anyone else in his time, Lyell saw the past in terms of agencies now in operation. Leonard G. Wilson (1967, 1969, 1972) has pointed out how Lyell was able to remove the qualitative distinction between the past and the present by a reassessment of these agencies, that included the erosive force of flowing water, the action of volcanoes, and the deposition of sediments. Lyell replaced violence with tranquility, extended the age of the Earth, and thus gave Darwin all the time he needed. This achievement alone is one of two reasons why I find it inconceivable that the authors, however brave their effort, can now bring about any major redirection of biology-teaching to the conceptual framework of this period before Darwin.

In perusing unit 9 I could not help but think that had the authors consulted these books more fully they might have strengthened their arguments and avoided serious pitfalls. From Cuvier and Buckland they might have derived a more coherent argument for diluvialism; and from Miller, if not from Lyell, perhaps a wholesome urge to steer clear of Noah's flood altogether. For instance, I find it difficult to understand, on p. 405, the ingenious explanation of why the remains of the more complex animals are found higher in the rock strata than are the less complex. Apparently the more complex, such as an elephant, though of considerable weight, would have swum to the top during Noah's flood, whereas the simpler, such as lizards, though lighter in weight, would have plummeted forthwith to the bottom. I can find nothing like it in the writings of Buckland or Miller. It is also difficult to visualize how aquatic animals, that comprise a substantial portion of the fossil record, would have been done in by a flood.

From Cuvier and Buckland they might have derived a more coherent argument for diluvialism; and from Miller, if not from Lyell, perhaps a wholesome urge to steer clear of Noah's flood altogether.

We are informed on p. 412 that Noah's flood was a "major catastrophe of world-wide proportions." Yet two pages later we are reminded that Cretaceous shales in Glacier National Park "show no evidence of disturbance except in small areas." Now it seems to me that such an epic flood should have torn things up. Moreover, if Noah's flood scoured out the Grand Canyon, would the authors be able to find marks of this flood on say, the upper slopes of Mt. Whitney, or perhaps on Mt. Hood? After all, "the mountains were covered" (*Genesis* 7:20). But Lyell did not find that such a single devastation could account for the present or past characteristics of the Mississippi valley, which he visited in 1845-46 (Lyell, 1849, II, ch. 34). If he were correct, how then could the flood account for the Grand Canyon—much less any changes at higher elevations?

Footprint Hoaxes

On p. 417-418 we are told of alleged footprints of large men who lived with dinosaurs in Texas and with trilobites in Utah. I suppose these tracks are meant to substantiate the *Genesis* 4:6 account of "giants in the earth." But Keith Young, professor of geology at the University of Texas at Austin, has informed me (letter, 24 May 1971) that on several visits to the Glen Rose, Texas, location he has never seen, nor has he been shown, such "human" footprints, though there are dinosaur tracks to be seen there. Moreover, he observes that these "human" tracks show no pressure points as the result of walking, whereas the dinosaur tracks do show the flow of mud as the animal shifted its footing when walking; there is no narrowing of the "human" instep; and the "human" tracks are chiselled evenly, whereas the dinosaur tracks, made in soft mud, show deformation due to the rolling-in of the mud.

As for the "human-like sandal print" at Delta, Utah: R. A. Robison, professor of geology at the University of Utah, has informed me (letter, 1 June 1971) that the supposed "footprint" has probably resulted from a fracture pattern that commonly occurs in certain sedimentary layers there. Moreover, the "footprint" occurs in company with trilobites, brachiopods, and echinoderms—creatures of the ocean, which is a strange habitat indeed for antediluvian man.

William Buckland and Hugh Miller, who were among the ablest geologists of the 19th century, routinely distinguished between marine and fresh-water sediments and between fossils and artefacts. They would have been quite able to recognize a hoax when they saw one.

A similar misreading of the rocks occurred in the 18th century with the discovery of the skeleton of a "man who witnessed the flood." Because Noah's flood cleansed Switzerland, reasoned Johann Jacob Schneuzer (1672-1733), physician and fossil hunter, then human bones would have been left behind—although plants, of course, were more worthy of preservation. Success came in 1725 when he dug a skeleton from a quarry; he prepared an engraving of it and proclaimed that he had found "Homo Diluvii Testis." He happily notified the Royal Society of London, which soberly published his report in the *Philosophical Transactions* [1726, vol. 34, p. 38-39] Scheuzer's story of his "ancient sinner" escaped serious challenge for 100 years until Cuvier, who could tell one skeleton from another, republished Scheuzer's engraving with a complete analysis. If the bones once belonged to a man who drowned in the flood, what happened to the forehead, Cuvier wanted to know? Why were the eye sockets so large, and where were the teeth? Cuvier showed that it was only an extinct salamander. So much for the "man who witnessed the flood." [Cuvier, *Recherches sur les Ossemens Fossiles*, 3rd ed., 1825, vol. 6, p. 431-444; 4th ed., 1836, atlas, vol. 2, plate 253; Jahn, p. 193-213 in Schneer.]

Geographic Distribution

The authors ought to have had another look at Louis Agassiz (1807-73), the Swiss-American zoologist who always opposed evolution. His *Studies on Glaciers*, first published in French in 1840, is now available in a splendid English edition (1967). Agassiz' ice displayed a considerable amount of diluvial mud

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from 19th-century thought by accounting for peculiar events that really had occurred in the recent geologic past, such as the transportation of those boulders. Lyell, and even Buckland, soon incorporated Agassiz' views into their own (Lyell, 1854, p. 154-155, ch. 15; Rudwick, p. 151). And according to Gray, glaciers were a physical agency that, by prompting the migration of plants and animals, led to their present distribution (Aulie, 1970; Dupree, 1968, p. 250-252).

I should now like to ask: how would the authors account for the present existence of alpine plants high in the Rocky Mountains, if presumably they all had perished in Noah's flood? Inasmuch as they cannot live on the warm valley floor, are we to believe that they were created where they are now found at the conclusion of Noah's flood? If so, that would be adding to the *Genesis* account of creation.

Straying from a literal interpretation of *Genesis* is what Agassiz did when he sought to accommodate the fossil record with the known facts of the present distribution of animals. According to his version of special creation, he held to a series of catastrophes, and denied that animals were created in a single place, that is, in the vicinity of the Garden of Eden. "Of such distinct periods, such successive creations, we know now at least about a dozen," and there may have been at least twenty, he thought—substantially more than Moses allowed, it would appear (Agassiz, 1850a, p. 185). Because Agassiz denied that physical agencies could influence the distribution of animals, he viewed his glaciers as catastrophic evidence of divine power—"God's great plow," he called them (Lurie, p. 98). They caused extinctions, and they led, not to migrations, as Gray and Darwin concluded, but to subsequent creations. Animals were therefore created where they are now found, and in much the same proportions (Agassiz, 1850b, 1851).

The Lingula Problem

A major weakness in the authors' position is on p. 416-417 where we are told that the longeivity of such animals as the *Lingula* (a shellfish) and the opposum, that show little change through millions of years, is further evidence against evolution. Apparently we are supposed to conclude that, because these animals have not evolved, then all other animals have not evolved, either. Widely distributed in the fossil strata, these animals do form series of similar specimens from an early geologic period to the present. It is quite true that they show little evolutionary divergence. Probably the oldest brachiopod, *Lingula* has flourished for 500 million years since Ordovician times, and strongly resembles its present-day cousin (See Darwin on *Lingula* in *Origin*, 1859, p. 306, and 1872, p. 308). And the Cretaceous opposum of 70 million years ago is very much like the form now living. But this is actually evidence against the position of the authors, inasmuch as they hold that catastrophes, notably Noah's flood, obliterated entire species in the past (p. 393, 412). Why therefore is the longevity of these animals *not* an argument against their position, if all creatures perished, save those in the ark?

That some orders and species have not changed appreciably in geologic times has been known since the early part of the 19th century. Even before Darwin published the *Origin* their longevity was seen as not favorable to the special-creation doctrine (Lovejoy, p. 391-394); this point was made in 1858 by Thomas Henry Huxley (1825-95) in his article "On the Persistent Types of Animal Life," in which he included in his long list the sturdy *Lingula* (Huxley, 1858-62). Huxley suggested that the durability of these animals did not support the hypothesis of catastrophes and subsequent special creations. Their survival, he noted, rather supported the view that they had experienced uniform conditions throughout their geologic history.

Such continuous series of similar fossils can tell us nothing about the manner of origin of the first member, whether it arose by a sudden act of creation, or whether it had dissimilar antecedents. We can only say that in their case no evolutionary divergence has occurred (See Darwin on longevity, 1872, p. 193, 330-331). And because some animals and plants have not evolved, it by no means follows that others have not. A reasonable explanation for the longevity of *Lingula* and the opposum might therefore be, as Huxley perceived, that they encountered no substantial competition or physical stress in their particular ecologic niches.

The authors might counter, however, that these animals rode to safety with Noah and then migrated to the geologic site where they are now found. But Hugh Miller, whose piety we should not doubt, remarked (1857, p. 347) that if all living animals are descendants of passengers in the ark, then they would have had to be ferried across the Atlantic by a miracle not recorded by Moses, not to mention the initial journey to safety.

The geographic distribution of living organisms is scarcely mentioned in the text and is one of the major weaknesses in unit 9. And no wonder: it was the examination of this question, to which Agassiz' ice provided so useful an insight, that brought about a further substantial modification of the special-creation doctrine in the 1850s (Aulie, 1970). The authors miss the important relationships among extinction, adaptation, and distribution, toward the resolution of which in Darwin these early 19th century investigators pointed the way.

Catastrophism sought to maintain a short time-span for the Earth by accounting for observable changes in terms of sudden convulsions. Lyell lengthened the age of the Earth by arguing effectively for gradual, long-term changes. Those persons who today are drawn to the former view ought to weigh the arguments put forward in Lyell's *Principles of Geology*. It is Lyell, not Darwin, whose monumental achievement remains a challenge to the reestablishment of this 19th-century doctrine.

(To be continued)

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Hemoglobin Structure and the Biogenesis of Proteins.

Part II. Significance of Protein Structure to the Biogenesis of Life

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In Part I (Journal ASA, *March 1975), the author has reviewed structure-function relationships for the hemoglobin molecule, with particular emphasis on the properties of mutant hemoglobins of man. In Part II, the relation of these studies to theories for the biogenesis of life is discussed. It is concluded that protein function is a consequence of a unique arrangement of the individual amino acids, and that this arrangement could not be achieved by chance. It is noted that data on protein stability is not in accord with views that proteins might survive for extremely long periods of time. Adverse effects of inactive protein molecules on cellular function are also noted. The data strongly favor the view that "design" or "intelligence" must be involved in the beginning of life.*

The review of properties of abnormal hemoglobins suggests several aspects that are significant in relation to theories for the biogenesis of life. A tenet advanced by various workers, and especially by Fox and his coworkers[1], has been that a random combination of amino acids would produce a protein with minimal,

but adequate function. Presumably, this protein, in the absence of degradative organisms, would remain functional until all other proteins, nucleic acids, etc., necessary for primitive life were also produced. Among the implications of this hypothesis are:

(1) The function of a protein as a catalyst, oxygen carrier, etc., is not uniquely dependent upon amino acid sequence. Also numerous bonds other than the peptide bond linking the a-amino group and the C_1-carboxyl group could be tolerated. For example, peptide bonds might utilize the e-amino group of lysine, the C_4-carboxyl group of aspartic acid or the C_5-carboxyl group of glutamic acid.

(2) In the absence of organisms or enzymes produced by organisms, a protein molecule would retain functional activity for long periods of time (thousands of years?).

(3) All of the functionally inactive protein molecules in the protein "soup" would not adversely affect the action of those proteins that did have functional activity.

(4) Minimal functional activity of the various essential proteins would be all that would be necessary to sustain life.

(5) Out of all the randomly produced protein molecules, one is selected and ultimately serves as the archetypal globin chain, the precursor of the various polypeptide subunits of globin for all living organisms which utilize a heme protein as an oxygen carrier.

Protein Function and Amino Acid Sequence

Let us consider the relation of protein function to amino acid sequence. Is it plausible to suggest that a random arrangement of amino acids would produce a protein that would function in the transport of oxygen as does hemoglobin? The studies summarized earlier indicate that the polypeptide chains making up the hemoglobin molecule are indeed unique, and that the properties of these polypeptides are a consequence of their amino acid sequence. A recent tabulation indicated that 41% (49 out of 112) of the known hemoglobin mutants have impaired functions[2]. For mutants where the amino acid substitution involved an internal portion of the molecule or contacts between subunits, 89% (41 of 46) had impaired function. It seems likely that the means utilized for detection of mutant hemoglobins would introduce some bias toward detecting hemoglobins with abnormal function. Nevertheless, the conclusion is clear that a single amino acid change in the hemoglobin molecule will, in a high percentage of cases, result in diminished function[a].

A unique structure for hemoglobin is also indicated if one examines the known variations in amino acids at each of the positions of the beta, gamma and delta chains of the vertebrate hemoglobins[3]. There are 40 positions in the polypeptide chain where there may be 2 alternative amino acids, 23 positions with 3 alternatives, 13 positions with 4 alternatives, 11 positions with 5, 5 positions with 6, 3 positions with 7, and 1 position with 8. Amino acids in the remaining 50 positions are identical in the species studied. Theoretically, there could be 20 possible alternatives for each position in the molecule. As hemoglobins from additional species of vertebrates are studied, the number of alternatives for amino acids at each position of the polypeptide chain will undoubtedly be increased somewhat. Nevertheless, the trend of the data clearly supports the view that there can be only limited replacement of amino acids without loss of function.

The structure of the polypeptide chains of the hemoglobin molecule is a consequence of design and not simply of chance combinations of amino acids. Murray Eden and George Wald also conclude that chance combinations of chance mutations cannot explain the unique structure of the hemoglobin molecule.

It is also important to note that every peptide linkage in the globin polypeptide chain involves the a-amino group and the C_1-carboxyl group. The e-amino group of lysine, the C_4-carboxyl of aspartic acid, and the C_5-carboxyl of glutamic acid are not involved in peptide linkages even though these amino acids occur frequently in the molecule (for the human beta chain: aspartic acid, 7 times; glutamic acid, 8 times; and lysine, 11 times). Also, every optically active amino acid in the globin polypeptide chain is of the L-configuration. This implies optical purity of the starting materials and no racemization during the formation of the amino acid polymer. These characteristics of the hemoglobin molecule are not found in the proteinoid produced from amino acids by thermal polymerization[1].

The studies cited are in accord with the view that the structure of the polypeptide chains of the hemoglobin molecule is a consequence of design and not simply of chance combinations of amino acids. Any plausible theory for the biogenesis of proteins must provide an explanation for the ordered sequence of amino acids in the protein molecule. Murray Eden and George Wald have briefly considered the relation of hemoglobin structure to evolutionary theory[4]. They also conclude that chance combinations or chance mutations cannot explain the unique structure of the hemoglobin molecule.

Protein Stability

A second aspect of the properties of hemoglobin is that related to protein stability. As noted above, proponents of the random combination theory for the formation of proteins presume that a protein molecule will retain functional ability for long periods of time. When compared to many enzymes, hemoglobin would be considered a relatively stable protein. Nevertheless, hemoglobin A in solution gradually is oxidized to methemoglobin. If the heme is removed, the globin becomes increasingly unstable and precipitates. Within the red cell there are protective enzyme systems that maintain hemoglobin in the functional state. Methem-

oglobin reductase is continually involved in reducing methemoglobin (ferric iron) to ferrohemoglobin[5]. Enzymes linked to glutathione peroxidase are essential for the protection of hemoglobin from oxidative breakdown[6]. In the intact metabolically active red cell, normal hemoglobin retains its functional ability for the life span of the cell (ca. 120 days). However, when the hemoglobin is abnormal, or when there is an abnormality in one of the enzymes involved in the protection of hemoglobin, a pathologic condition often results. The unstable hemoglobins illustrate this point very well. The amino acid modification causes instability in the molecule, the globin precipitates within the red cell, and the precipitate often attaches to the membrane[7]. With some mutants, the consequences of this globin precipitation within the cell are very severe (e.g., Hb Sabine)[8,9]. There are also a wide variety of drug-induced hemolytic anemias[10], where a defect in one enzyme in the protective enzyme sequence permits hemoglobin damage and precipitation within the cell. In another type of hemolytic anemia, the formation of either beta or alpha chains within the maturing erythrocyte is impaired[2]. Under these circumstances, there is a formation of a hemoglobin from four like polypeptide chains; i.e., Hb a_4, Hb H (b_4) or Hb Barts (g_4). These hemoglobins are functionally abnormal and are unstable. Hb H and Hb a_4 are quite deleterious to the cell due to intracellular precipitation and Hb Barts appears to be lethal to the fetus. This indicates that not only must a tetrameric structure be formed, but that we must have the correct subunits in the tetramer.

The studies summarized above clearly show that even normal hemoglobin is only moderately stable. In the absence of bacteria or enzymes, it would still deteriorate within several months. If the hemoglobin is modified by substitution of certain amino acids (Part I, Table 2), it becomes unstable. As noted above, the stability of hemoglobin does not appear unusual when compared with other proteins. Consequently, studies of hemoglobin stabillity are not consistent with hypotheses for biogenesis of protein which appear to require a protein to remain functionally active for very long periods of time, while all other essential components for life were being formed.

If one does permit the intervention of "intelligence" or "design," one could make reasonable speculations, but with no apparent way of knowing whether the hypotheses are valid.

Effect of Inactive Protein

Another tenet of the theory for the biogenesis of proteins is that all of the totally inactive proteins (99.9% of the total ?) would have no adverse affect on those that do have biological activity. In the hemoglobin mutant, Hb Sabine, the abnormal protein in solution within the red cell constitutes 10 to 15% of the total hemoglobin. Possibly an equivalent amount is precipitated within the cell. No defective enzymes have been demonstrated in these cells and the amount of normal hemoglobin within the cells appears to be adequate for oxygen transport. Nevertheless, the life span of the red cells is markedly shortened and this appears to be due to precipitation of the unstable hemoglobin within the cell. These studies provide experimental evidence that a living cell cannot tolerate large amounts of non-functional intracellular protein, especially if the latter tends to precipitate and bind to membranes.

Minimal Protein Function and Life

The implication that minimal function of a protein would be all that would be necessary to sustain life is difficult to prove or to disprove. With enzymes, the enzymic activity in most cases is greater than is necessary for normal metabolism, and one could argue that diminished activity would not necessarily be deleterious to the cell. However, there are a wide variety of known genetic disorders due to enzyme deficiencies. In many of these cases, the mutant enzyme retains 5% or more of normal activity, yet this reduced activity is not sufficient to maintain cellular metabolism. If one enzyme with markedly reduced function can cause the severe consequences noted in these genetic disorders, it does not seem possible that a cell could survive with all proteins exhibiting only minimal function. Also, one of the primary characteristics of life is that enzymic pathways are under metabolic control. A portion of this control is exercised by enzymes that have a control site or sites on the enzyme molecule that are distinct from the catalytic site. Some type of control seems to be a prerequisite for life. The postulation of chance formation of protein molecules with enzymic function implies that there would be no control of enzymic pathways. This lack of control would be totally contrary to life as we see it exemplified in living cells today. Although some primitive enzymes might serve in metabolic pathways, in other cases, a more sophisticated enzyme (e.g., one with narrow substrate specificity, allosteric sites, etc.) would be required. One might make the comparison of the tetrameric hemoglobin molecule to a more sophisticated enzyme. The properties of hemoglobin are dependent not only upon the oxygen-binding site, but its physiologic function is dependent upon the proper interaction between the four subunits and also upon the binding of 2, 3-diphosphoglycerate. Although one might consider the monomeric myoglobin molecule as a more primitive oxygen carrier than hemoglobin, careful inspection of the data indicates a complex structure for myoglobin. Its properties are dependent upon a region of specific amino acids surrounding the heme, and also upon having appropriate intrachain contacts between R-groups of the component amino acids. Consequently, the hypothesis that only minimal protein function would be required for primitive life is not supported by the available experimental evidence.

Selection and Reproduction of an Archetypal Globin

The question of how one functionally active protein molecule could be selected from the tremendous numbers of non-functional molecules and be utilized for the reproduction of further like molecules is totally unanswered. Instead of presuming that proteins were the first molecules that were formed, it would appear more reasonable to propose that the first molecules formed

were nucleic acids. The transfer of information for amino acid sequence could then proceed by base-pairing of the purine and pyrimidine bases. The major problem, of course, is that polynucleotide synthesis requires a protein enzyme as a catalyst. Also, the synthesis of the mononucleotide building blocks (nucleoside triphosphates) for polynucleotide synthesis requires enzyme catalysis. Consequently, if one chooses to make the presupposition that no "intelligence" or "design" is involved in the biogenesis of life, the problems appear to be insurmountable. If one does permit the intervention of "intelligence" or "design", one could make reasonable speculations, but with no apparent way of knowing whether the hypotheses are valid.

One additional aspect of hemoglobin structure that merits attention is the lack of heterogeneity in the polypeptide chains that is found in a particular species. If the different hemoglobins are all derived from some archetypal precursor by mutations, deletions, chain fusion, etc., a marked heterogeneity in structure should be evident in every species. A small amount of heterogeneity has been noted in the globin molecule in recent studies[11]. This would be consistent with some evolutionary modification of the polypeptide chains with the passage of time. This should be distingushed however, from the marked heterogeneity expected if all presently existing globins were derived from a single archetypal precursor. The author has discussed this problem in evolutionary theory in more detail previously in relaton to the structure of cytochrome c[12], and the problem will simply be noted in this publication.

Footnote

[a]There is no indication that any of the mutant hemoglobins have superior function when compared with HbA. Consequently, there would be no reason to suggest that natural selection would, at some time in the future, establish one of the mutant hemoglobins as the predominant type.

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If we are to survive economically as well as biologically, industry, agriculture, and transportation will have to meet the inescapable demands of the ecosystem. This will require the development of major new technologies, including: systems to return sewage and garbage directly to the soil; the replacement of many synthetic materials by natural ones; the reversal of the present trend to retire land from cultivation and to elevate the yield per acre by heavy fertilization; replacement of synthetic pesticides, as rapidly as possible, by biological ones; the discouragement of power-consuming industries; the development of land transport that operates with maximal fuel efficiency at low combustion temperatures and with minimal land use; essentially complete containment and reclamation of wastes from combustion processes, smelting, and chemical operations (smokestacks must become rarities); essentially complete recycling of all reusable metal, glass and paper products; ecologically sound planning to govern land use including urban areas.

None of us—singly or sitting in committee—can possibly blueprint a specific "plan" for resolving the environmental crisis. To pretend otherwise is only to evade the real meaning of the environmental crisis: that the world is being carried to the brink of ecological disaster not by a singular fault, which some clever scheme can correct, but by the phalanx of powerful economic, political and social forces that constitute the march of history. Anyone who proposes to cure the environmental crisis undertakes thereby to change the course of history.

Barry Commoner

The Closing Circle: Nature, Man and Technology,
Bantam, N.Y. (1972), pp. 282, 283, 299

BOOK  REVIEWS

CHRISTIANITY FOR THE TOUGH MINDED, edited with Introduction and Preliminary Essay on God's Existence by John Warwick Montgomery. Bethany Fellowship, Inc., Minneapolis, Minnesota. 1973. Paperback. 296 pp. $3.95.

Subtitled "Essays in Support of an Intellectually Defensible Religious Commitment," this book was written by evangelicals for non-Christians. It is equally valuable for the Christian concerned with the world of secular ideas and its relationship to his experience. Twenty-four short essays—only two are over fifteen pages—explore diverse topics.

Part One, "Philosophy and Scientific Method," contains the Montgomery article on the existence of God, plus articles on Bertrand Russell's rejection of Christianity, Julian Huxley's evolutionary humanism, and the peaceful coexistence of science and Christianity. Part Two, "Ethics and Society," includes articles on situation ethics, war, blacks, and Herbert Marcuse. Part Three, "Religion and Truth," has articles on anthropological structuralism, Buddhism, and Eric Hoffer. Part Four, "Psychology and Religious Experience," discusses existential psychology, Martin Luther, pleasure, and drugs. Part Five, "Literature and World-View," includes Kafka, Hermann Hesse, and Ayn Rand. Part Six, "Christianity and Personal Commitment," discusses the reliability of the gospels, the resurrection and the distinction between evaluating something as an observer and evaluating it as a participant. Finally, the three appendices are articles on Schoenfeld's *The Passover Plot* (by E. M. Yamauchi, previously published in the March, 1969, issue of *Journal ASA*), on John Marco Allegro's bad reporting about the Dead Sea scrolls, and on the methodology involved in computer analysis of the Pauline epistles.

With few exceptions the authors are all "graduate students or recent alumni of graduate degree programs at the Trinity Evangelical Divinity School" (p. 9). More than two-thirds of the articles are written especially for this volume. The authors seem to be working under the following general directive:

> Do not assume any prior knowledge on the part of your audience. Present Ayn Rand or Marcuse or whatever you are writing about in such a way that after reading the first five pages someone will have the feeling that they understand the basic position involved. Then begin to point out presuppositions and methodological difficulties, and finally evaluate all of this in the light of Christianity.

It would be impossible to evaluate each of these articles in a short review but in general each succeeds quite well in its assigned task. To examine presuppositions and methodology is to get off to the proper start in evaluating beliefs about the world. But my major hesitation about the book lies along these same lines. The non-Christian reader of this volume may think that the supporter of Christianity has hidden his presuppositions and glossed oved the uncertainties, while seeking out those of his rival. To cite one example, in the lead article Montgomery "proves" that the universe was created as follows:

> The second law of thermodynamics states that for irreversible processes in any closed system left to itself, the entropy (loss of available heat energy) will increase with time; thus the universe, viewed as such a system, is moving to the condition of maximum entropy (heat death): *but* (and this is the significant aspect of the matter for our purposes) if the irreversible process had begun an infinite time ago—if, in other words, the universe were uncreated and eternal—the earth would *already* have reached maximum entropy; and since this in not the case, we are driven to the conclusion that the universe is indeed contingent and finite, and requires a creative force from the outside to have brought it into existence (p. 26).

Montgomery ignores the possibility that the laws of thermodynamics do not apply on the cosmic scale, or that these laws may not be "absolutely true" at all. He ignores the possibility of conceiving of a beginning for the universe without the benefit of Divine efficacy. To reject these possibilities is one thing but to pretend they do not exist is quite another.

The quality of this book is somewhat uneven, the organization into sections seems somewhat arbitrary, and there is a certain lack of unity. But at the same time its work is of generally good quality and there is something here for almost everyone. You will want to see how the topics with which you are familiar are handled, and if, for example, "Levi-Strauss" sounds like a manufacturer of pants to you, the articles on structuralism will teach you something. In other words, there is probably something old and something new for each reader. This is a valuable book that should probably be in our personal libraries, and certainly should be made available to students.

Reviewed by Glenn C. Joy, Division of Philosophy, Southwest Texas State University, San Marcos, Texas.

CHRIST AND THE MODERN MIND by Robert W. Smith, editor, Inter-Varsity Press, Box F, Downers Grove, Ill. 60515. Paperback. $3.50

A helpful collection of 26 essays intended primarily for young people planning to attend college. The contents are also valuable for faculty members in particular and the Christian community in general.

The purposes for this volume are:

1. To show how Jesus Christ relates to
   a. Each academic discipline
   b. All of life
2. To guide students interested in strengthening their Christian life by developing the dimensions of the mind
3. To help the undergraduate liberal arts student who

has not yet chosen his major; or if he has, to obtain more insight into its nature

There are two presuppositions (not clearly stated as such) upon which the essays were supposedly written. The *presuppositions* are:

1. A person's world view or ultimate commitment is a dimension of all fields of knowledge.
2. Faith in God provides a perspective on one's education unattainable by human insight alone.

The *modus operandi* by which editor Smith sought to realize these purposes was to invite 26 scholars to contribute an essay showing how his discipline relates to Christianity. The subjects are those commonly found in the curriculum of liberal arts colleges. Specialized curricula such as law, medicine, and engineering were not considered.

Editor Smith is to be congratulated for selecting twenty-six essayists who are committed Christians and thoroughly conversant with their fields of expertise. This is no mean accomplishment in itself. The reviewer was gratified to discover that he is personally acquainted with seven of the contributors.

As might be expected from the wide diversity of contributors, the book is not of uniform quality. The reviewer studied each essay with respect to the purposes previously outlined. Using these criteria, he judged that eight of the essays were very good in accomplishing the stated purposes, fourteen were fair to good, and four were poor. In the last category he places the essays on Drama, Music, Education, and The Humanities. The "very good" essays were those on Classical Languages, Religion, Psychology, Philosophy, Social Sciences, Anthropology, Natural Science, and Geography.

The essay by Douglas Feaver on Classical Languages is extremely good. Dr. Feaver points out that the modern university, more than any single contemporary institution, is a child of ancient Greece and Rome. It reflects modern culture, and is dominated by three controlling concepts:

1. The autonomy of inquiry.
2. The ultimate unity of the universe. (The scholar believes it is worth one's while to seek truth. This is the "uni" of the "university".)
3. The centrality of man. ("Man is the measure of things;" Christianity is incompatible with this humanism, yet the modern university is sold on this "humanistic" religion.)

Robert Baird in his essay on Religion reinforces Feaver's thesis. He shows that departments of religion have found a place in modern secular universities because the views presented are primarily those of secularized religion. He reminds us that the Christian student is faced with discerning the differences between the Christian world and life view and the goals of humanistic education.

Jacob Loewen's essay on Anthropology is a masterful discourse and should be exteremely useful to students planning to take one or more courses in this field. Loewen sees a danger to Christian students who enroll in anthropology courses but are unaware of the fact of cultural relativism. He warns students that a majority of anthropologists see all truth as relative. Loewen points out that whereas individual cultural traits vary from society to society, each given society has cultural absolutes. He observes that one presupposition, widely adopted by anthropologists, is that religion is a cultural survival. The current mood in anthropology is that a well-educated person is agnostic and neutral toward religions since most of them are derived from animism or equally primitive religions. Anthropology can afford the Christian student three worthwhile dividends:

1. become aware of the problems of ethnocentrism,
2. appreciate the supracultural nature of the gospel,
3. become better equipped to render cross-cultural service.

The essay on Psychology by Dr. Pattison is very illuminating and well-written. He points out that psychology, as a science, has tried to disavow its philosophic heritage, yet the questions it faces are ultimately philosophic in nature. The questions are: (1) what is the nature of man? and (2) what is good, healthy, moral behavior?

Pattison asserts (p. 191) that "In American psychology there are no real exponents of the view that man is intrinsically evil." The reviewer assumes that this statement is true, and if so, what a sad state of affairs! Why is it that there are insufficient Christian psychologists who are vocal enough to interpose a minority viewpoint? The same question might be raised with regard to the field of anthropology.

Pattison implies (p. 196) that conscience is conditioned by a child's training. Pattison defines conscience as "the physical and mental phenomena we all experience when we say 'we feel guilty.' The reviewer has difficulty with this view in light of the first three chapters of Paul's epistle to the Romans. From Romans I deduce that conscience is that voice inside each human which compares his conduct in a given situation with an external and absolute standard of right and wrong conduct. This, it seems to me, is closer to the biblical view.

On page 200 Pattison implies that marriage is merely a social contract; a viewpoint that needs amplification. Pattison probably doesn't mean to imply this, but the impression is there in the wording as printed. On the same page Pattison suggests that "theology cannot produce a morality without a knowledge of human process and affairs." The interpretation of this sentence would depend upon the definition of "theology." If "theology" is properly defined as "the science of God," and if by the term "God" is meant the self-revealing God of the Bible, then His moral judgements expressed in His revelation are surely based upon a "knowledge of human process and affairs." Perhaps a better approach by Pattison would have been to assert that "contemporary theologians cannot produce a morality without a knowledge of human process and affairs." The latter statement would seem to the reviewer to be less subject to misunderstanding.

Peterson, in his essay on Political Science, makes an assertion much in the same vein that Pattison does with respect to morality. He asserts that "law in part rests on general public morality," and "morality in part rests on law." One reason that men know that stealing is bad is that the law identifies it and calls it illegal. All of this is true, but the essayist, it seems to me, missed a golden opportunity to show that this attitude falls short of the biblical norm. The essayist might well have shown the relevance of the scriptural principle contained in Romans 1-3 that men know they do wrong

in such matters, yet deliberately suppress the truth about God who has shown this fact to them.

The essay on History by Dr. Clouse raised a few questions in the mind of this reviewer. The opening two paragraphs are excellent. In them Dr. Clouse asserts that "Christianity and history are closely bound together," and "Believers also feel there is a purpose for and an end to history." The reviewer says "amen" and reads on to this (to him) amazing statement (p. 166) "most Christian historians consider the attempt to construct a philosophy of history invalid." The reviewer certainly has not gotten this impression from reading such 20th Century evangelical Christian scholars as Gordon Clark, Edward Carnell, John Warwick Montgomery, and E. E. Cairns to name a few. What about Augustine, the great 5th Century scholar who expressed a distinctively Christian philosophy of history in his classic work "The City of God"? The Bible, as I see it, explicitly presents a philosophy of history. The reviewer was also amazed to read a few sentences later "The cross of Christ led to the resurrection and victory over evil. Consequently all of the gloomy and discouraging details of life are preludes to a glorious tomorrow. Although often the righteous suffer and the wicked prosper, the Christian can assure the historian that 'truth will not remain forever on the scaffold'." What is this but a philosophy of history?

Another puzzling statement (to this reviewer) occurs on p. 167, "It is a mistake to feel that history demonstrates the sinfulness of man." I dislike bickering over small details and maybe the key word here is "demonstrates". It is true some people deny the reality of sin. It is, however, plain to the Christian that history affords elaborate evidence that mankind has departed from the law of God, which is sin.

The article by Dr. Frank Cassel on Biology raises excellent questions concerning a Christian attitude toward recent reseach in Biology. Can and should a man play the role of God: "The DNA molecule can be manipulated to prevent 'bad' hereditary effects, but also can be used to make improvements." Much food for sober thought is found in this essay.

The essay on Chemistry by Walter Hearn is not the best essay he has written. The essay focuses on some areas where chemistry interacts with religious and moral values such as pollution, ecology, and similar matters. He mentions briefly the contributions of chemistry to the age of the earth and archeological dating. I believe he stretches a point when he asserts that since people are at *least chemical,* that

> In order to pray for people (and things) intelligently, in order to bring out the best that is in them, you need to understand them. If you want to be creative and redemptive in this world, a knowledge of chemistry should help.

The essay by Charles Hummel on The Natural Sciences is a gem, and standing alone is worth the price of the book. He gives an excellent summary of the origins of modern science, and observes that "during the 19th Century Western culture discarded traditional morality as a value base and turned to science for its guidance." His review of the nature and presuppositions of science is excellent.

Evil Is Ordinary Folks

Institutional evil can be remarkably dull. It is scarcely ever conceived by leering evil geniuses who cackle in their echo chambers and rub their pudgy little hands together. It is seldom executed by people with red tights and pitchforks. It seems to be dominated instead by commonplace people just doing a job. Evil in its massive, ponderous, institutional forms is often assisted by ordinary folks in short dresses and short sleeves who love their kids and look forward to watching "Rhoda." They are not scrofulous monsters. They are not particularly aggressive. Like Eichmann, they come closer instead to being uninspired bureaucrats who can wreck people's lives, half unwittingly, by simply shuffling some papers around on a desk. Evil is so *banal.*

It may be possible to obey both God and man. More often than we realize, however, we are ordered to participate in immoral activities or to refrain from promoting some necessary good. In a society of entrenched secularism . . . we are going to have to develop increasingly greater powers of *scrutinizing* the orders which come at us from bosses, foremen, department heads, police, the military, the government, or whoever else may tell us what to do, and, when necessary, to find our peace in resisting those orders in the name of God. Otherwise we become living tools for the use of even wicked people. To obey automatically, to obey without thinking is to abrogate sacred responsibility to God and to become the Enemy's weapon for great evil against man.

Of all people, Christians, then, can never advocate . . . a person's seeing himself as "the instrument for carrying out another person's wishes," and therefore no longer responsible for his actions. We *are* responsible for our actions even when we are following orders, and we may offer ourselves finally, trustingly, as living tools only to the Lord who, as St. Francis of Assisi suggests in the opening of his famous prayer, makes us instruments of his peace. The biblically taught posture is one rejecting both unruliness and servility, a posture of amenable, thoughtful obedience to human authority and of unquestioning obedience, in any event, to the known will of God. For that we must continue to strive.

Neal Plantinga
"Doing What We're Told to Do," *The Reformed Journal,* pp. 10-14, January 1975.

In summary, this book will be very helpful to any Christian who seeks to improve his mental outlook and grasp of intellectual problems confronting all mankind. It contains a wealth of specific information, and can serve as a mini-university course for a serious reader. For the most part it succeeds in accomplishing its purposes.

Reviewed by Carroll Karkalits, Dean, School of Engineering and Technology, McNeese State University, Lake Charles, Louisiana.

IT'S NOT TOO LATE by Fred Carvell and Max Tadlock, Beverly Hills, California: Glencoe Press (1971). 312 pp. Paperback $3.95.

This book contains a collection of source materials that introduce the reader to the problems of environmental conservation. Carvell and Tadlock have selected twenty three essays and articles, grouped them in five chapters, and added an introduction, epilogue, and chapter prologues. A sprinking of quotations from various eminent personages adds emphasis or authenticity to the articles at suitable spots. Photographs from a 1970 "Dirty Pictures Contest", sponsored by *Psy-*

chology Today, are spaced throughout to give a grim nuance to captions quoted from the accompanying articles.

The edition received for review is the paperback edition of the 1971 publication. The reissue is presumably intended for class use at the university level, and it should be satisfactory for that purpose, within its limitations. There are some. To begin with, the articles chosen were first published between 1965 and 1971, with the exception of one 1949 extract from the work of Aldo Leopold; more than half originated within 2 years of the book's first printing. Yet despite the choice of then-recent articles, the book now shows the effects of the same premature obsolescence that some of its contributors have good reason to decry in the products of our commercial technology. In this case, of course, the obsolescence is not planned. It is another by-product of subsequent international developments, now culminating in pandemic inflation, shortages, and famine. The essays thus rendered out-of-date are, fortunately, only the polemical pieces which alternate between the durable contributions of authors like Leopold, Kesteven, Shepard, and Dubos.

The authors intended *It's Not Too Late* to be a book on how to think about our environmental problems. The chapter headings show how comprehensively Carvell and Tadlock have approached their objective: The Nature and Scope of the Ecological Concern; On Viewing Change in the Environment; Signs of Hope in Attacking Environmental Problems; The Need to Establish Priorities; and The Philosophical Prelude to Environmental Change. The book thus fits logically into the first phase of the "Education and Research approach to Conservation" favored by G. L. Kesteven. Evangelicals will discover that the hypothesis of God is unnecessary to the book as a whole, and it represents a distinct liability in the eyes of some of the contributors. Lynn White, in particular, colors the whole book with his thesis that the ethical roots of our ecological crises are attributable to the leftovers of Jewish and Christian teachings. White, however, would surely have to agree that any hope we may have that it is not already too late is ultimately rooted in and untenable apart from Christian teleology, as Dr. Francis Schaeffer would promptly remark. Rene Dubos has demolished the rest of White's thesis (*A God Within*, New York; Charles Scribner's Sons, 1972. Chapter 8). Even so, evangelicals must be resigned to the likelihood that it will die hard.

The serious reader would do well to begin in the middle of the book. Two analytical articles, "The Economics of Pollution" by Edwin L. Dale, Jr., and "The Metabolism of Cities" by Abel Wolman, give a solid introduction to the problems about which the reader is expected to think. These two articles also better prepare the reader to tackle the serious articles by Dubos, Leopold, and Garrett Hardin.

It is later than it was, but there are still both time and real merit in most of Carvell and Tadlock's book. Just be sure to take the more pejorative parts with more than a grain of salt.

Reviewed by Richard S. Barnett, Continental Oil Company, Lafayette, Louisiana 70501.

A THEOLOGY OF THE EARTH by Albert J. Fritsch, S. J., CLB Publishers, Washington, D.C. 20006, 1972. 8½″ x11″ paperback. $4.00.

Dr. Fritsch is co-director of the Center for Science in the Public Interest in Washington, D.C. In this booklet he presents a post-Teilhardian attempt to sythesize a scientific, theological and evolutionary worldview in such a manner as to provide a guide for living in the world, and specifically for care for the earth and the resources that God has given to us. The booklet consists of 8 chapters entitled, "Faith," "Revelation," "Incarnation," "Eschatology," "Sacrifice," "Resurrection," "Pentecost," and "Community." Tables in the booklet include "Expressions of Christodynamics," "Calvary and Cosmic Sacrifice," and "Cosmic and Psychic Units of Measurement." Dr. Fritsch confesses that he is a Christian and that this fact is ever the guide to what he does. The Teilhardian mold of all his writing, however, frequently makes one ponder whether the traditional terms of Christian theology have not somehow acquired quite new and different meanings. In the Preface, for example, he gives one of many prophetic insights,

> Earth beckons its human inhabitants to open the doors of individual cosmic experiences and share these within the community of man. If we are willing to share within the Family of Man and to purge ourselves of narrow self-interests, we can become a transformed people capable of controlling our technology. This Family of Man can then grow in mutual confidence, can cease fearing each other, can tear down national and local barriers and can begin to see the needs of the poor and dispossessed. We will then witness the birth of a cosmic consciousness, not monopolized by learned scholars and gifted mystics, but by everyone. Mysticism will be democratized and knowledge shared. The horror of global exploitation will begin to penetrate the privileged and wealthy nations. Gifts like life and fuel are not acquired and used at will; the resources of this earth were created to be shared. Immense and excessive wealth and economic power must be seen as intolerable.

The work abounds in such beautiful and poetic expressions of the yearning of the human heart. The difficulty in this lengthy quotation, however, appears at the beginning of the second sentence, with the word, "If . . ." By the final line this "If" has become "must." And this is the weakness of this work: the means are never specified how to bring the "If" into reality, how to break down the self-centeredness of the individual human and his collective society – instead repeated injunctions are given as to what "must", "ought to", "should," or "would" happen. This approach is wholly consistent with the Teilhardian philosophical context in which it is born, of course, and shares exactly the weaknesses of Teilhard in failing to develop a doctrine of sin and salvation to accompany his doctrines of creation and Incarnation. It is assumed that the world has been saved in Christ, that God (in process philosophy form) is ahead coaxing the world to Himself. The issue is never seen as one of individual responsibility in choosing to submit to the Lordship of Christ, accepting the salvation given freely by God's grace in Him, but rather as one's striving to live as a Christian without regard as to whether one *is* a Christian. Thus we have the following words put by Fritsch into the mouth of Christ,

> "Nothing is lost, all is saved. Do not fear, oh you of little faith; I will conquer all things and renew all

> things. Your hands are meant for good; your brain is meant to control your hands; your heart must control your brain. The Good News is that nothing is lost. I come in glory with all mankind; stay at the helm and prepare a place for my coming. Beautify the earth and renew it into resurrected glory; don't misuse the power streaming from this risen glory. Be concerned to use only what is essential for your needs and to share all wealth with your less-fortunate neighbor. The earth will not be lost because I am of the earth and I have redeemed the earth. The earth will survive because man will live forever, and man is of the earth and his destiny is bound to the earth. Man and earth are bound through my blood and sacrifice. Man is able to reestablish all things through me."

Dr. Fritsch is careful not to deny traditional Christian doctrines, as for example the preexistence of Christ, but in other places he argues that "anthropology is truly a Christology," "the believer, through scientific revelation, is becoming aware of who he is and what is his proper role in this world, thus becoming another Christ," "man is becoming divinized," "the Second Coming is an event . . . when Christ will emerge from a transformed world where he is now present but unseen by man," "a theology of cooperative redemption suggests the possibility of a physical conquest of death," and "the incorporation of scientific concepts and technological application into a living theology is a positive affirmation by the believing community of the need for cosmatization; it is an instance of universalization."

There is no question that one could learn from Dr. Fritsch; certainly by his professional involvements he is attempting to put himself into the mainstream of the living out of his theology. Yet, one cannot but help feel that Dr. Fritsch is living in a totally strange culture, one in which all the familiar words of biblical teaching have been subtly altered. Whereas the normal task of translation from one language to another is to choose different words in order to maintain invariant the basic concepts common to both language users, the course of Teilhardians seems to be to use the same words in order to speak of quite different concepts. Certainly, however, Dr. Fritsch is not alone, and if we wish to be able to relate to this group of professing Christians, we will have to learn what they mean by the words they use.

THE CLOSING CIRCLE: ***Nature, Man and Technology*** by Barry Commoner, Bantam Edition (1972). Paperback. $1.95. 343 pp.

There is probably something for everyone to learn from this book by Barry Commoner, well known ecologist and Director of the Center for the Biology of Natural Systems at Washington University, St. Louis. He plumbs some of the depths of environmental degradation (chapter titles: "Nuclear Fire," "Los Angeles Air," "Illinois Earth," and "Lake Erie Water") and goes on to dispel the notion that any solution short of a radical change in lifestyle, economics and social relationships can possibly be adequate for the crisis that is upon us. For Christians the book is a source of information that is badly needed to guide intelligent and responsible action, a warning that no simplistic answers – even religious ones –will suffice, and a challenge for the Christian regenerated life to supply the vital basic changes in social motivation.

What Commoner has to say can be summarized under three main categories: the nature of ecological interrelationships, the cause of the environmental crisis, and the types of solution required. In discussing the first of these, he introduces the four basic laws of ecology:

> The First Law of Ecology: *Everything is connected to everything else.*
> The Second Law of Ecology: *Everything must go somewhere.*
> The Third Law of Ecology: *Nature knows best.*
> The Fourth Law of Ecology: *There is no such thing as a free lunch.*

He then proceeds to a detailed probe of the nature and causes of pollution of air, earth and water under the chapter titles cited above.

Commoner rejects the thesis that the growth in population is the sole or even the major cause of environmental degradation. In what seems to be reasonably careful and valid analysis, he argues that the major cause of the large and rapid increase in pollution since World War II is the radical change in productive technology from one more or less compatible with the environment to one intrinsically incompatible with the environment. Although of course limitation of population will help, it will not, in Commoner's opinion, be any where near as effective as a careful overhauling of our productive technologies.

Commoner presses on to discuss the social and economic issues underlying the environmental crisis and concludes that "an economic system which is fundamentally based on private transactions rather than social ones is no longer appropriate and increasingly ineffective in managing this vital social good. The system is therefore in need of change." (p. 287) He arrives at this conclusion in full awareness of the magnitude of the changes called for, and without suffering from the illusion that a simple shift from "our" system to "their" system will solve the problem.

> Both socialist and capitalist economic theory have apparently developed without taking into account the limited capacity of the biological capital represented by the ecosystem. As a result, neither system has as yet developed a means of accommodating its economic operation to environmental imperatives. Neither system is well prepared to confront the environmental crisis; both will be severely tested by the urgent need to solve it. (p. 280)

Commoner is keenly aware of the inability of conventional science to solve this problem and he pinpoints the approach of reductionism as the key which prevents scientists from seeing the whole picture, even when the partial picture is quite insufficient.

The picture summed up by Commoner comes close to that of a Fifth Horseman of the Apocalypse – environmental strangulation, with the other Horsemen following on hard behind to reap the results. It is not a trivial concern, and Christians who desire to live responsibly in this world as well as the next have profound challenges thrown down to them.

THE SCIENTIFIC APPROACH by J. T. Davies, Academic Press, N.Y. 1973. 185 pp.

This is a beautifully illustrated little book by the Head of the Department of Chemical Engineering at the University of Birmingham in England. Early chapters on the nature and structure of scientific inquiry are quite good and could be used positively in educating non-scientists into the reality of science.

Dr. Davies treats the origin of theories, and gives three necessities for creative thought in science: an I.Q. of 120 or more, the ability to associate ideas, and certain personality characteristics such as dominance, an energetic attack, a rejection of conformity, and a curiosity about things rather than people. In discussing the testing of theories, he points out how early many "modern" theories were first advanced: a spherical earth by Pythagoras in 532 B.C., a heliocentric solar system by Aristarchus in the third century B.C., the germ theory of disease by Varro in 36 B.C., and of course the atomic theory by Democritus in 420 B.C. In a one-page treatment of the theory of evolution concerned primarily with fruit-flies, he concludes remarkably with the words,

> That mutations such as these are observed to occur so readily suggests that, over millions of years, chemical changes could well have led to the evolution of the species as we know them today. Thus has Darwin's theory of evolution of species successfully stood up to practical tests.

In a chapter on "Confirmations and Discrepancies" the author introduces a useful "searchlight model" of scientific research: a narrow beam may make it difficult to find an object, but pinpoints it when found; a wide beam may make it easy to find an object, but does not locate it exactly. He discusses the reason for the large number of simple laws, and attributes it essentially "to the wide separation of the various groups of forces occurring in nature." He attempts a quantification of the "inner perfection" of scientific theories by attributing quantitative values to aspects such as generality, simplicity, precision, testedness and refutedness.

The final two chapters are on "Predictions and Projections" and "Science and Society." The former goes into great detail with many examples of prediction, extrapolation and forecasting. This listing begins to become somewhat repetitious (26 figures in 24 pages) and one suspects that the author is treating the reader to some of the data he has acquired professionally over the years without specific correlation with the purpose of the book.

Perhaps the most disheartening aspect of this presentation, however, is that, having given in some of these records clear scientific evidence of the basis and growth of environmental pollution through changing methods of productive technology, Dr. Davies shows no sign of recognizing this in his final chapter on "Science and Society". Instead he speaks warmly of having "a body of trained experts . . . that . . .engender a sense of confidence that any difficulties which might arise over the supply of really important items could be rapidly overcome." So he speaks glibly of the possibility that "chemical engineers would be able to produce millions of sacks full of" chemical fertilizers with no recognition of the pollution attendant on such overfertilization. He repeats several times the comfort of knowing that we can produce large quantities of chemical fertilizers with no evidence that he understands the effects on the larger system. His only comments on pollution attribute the problem only to "a high population density," speculate that "perhaps the seriousness of the pollution problem has been overemphasized in recent years," and wax optimistic with the statement, "There is no reason to think that scientists and engineers will become unable to produce better and cheaper ways of reducing pollution in the future."

His approach to societal problems is unfortunately even more naive. He supposes that there is "reason for optimism for the future of the world: compared with the peaceful uses of technology, war is an uncertain and inefficient way of acquisition." Finally the gap between the "two cultures" poses no serious problem,

> If they (scientists) gain the confidence of the people that they can run such things as railways or operations of war as efficiently as they run chemical plants and instrument companies, then the "two-cultures" stratification of society should soon trouble us no more.

This book is well named. It shows us the "scientific approach" in all its strength – and in all its weakness, the former intentionally and the latter unintentionally but devastatingly.

ARE QUANTA REAL? by J. M. Jauch, Indiana University Press, Bloomington, Indiana, 1973. 106 pp. $6.95.

Taking the form of a Galilean Dialogue involving Filippo Salviati, Giovanfrancesco Sagredo, and Simplicio, this book by the late Director of the Institute of Theoretical Physics at the University of Geneva directs itself toward a number of fundamental questions at the heart of modern physics. The Dialogue, written essentially in layman's language, should help to shed light on the meaning of the Heisenberg Uncertainty Principle and the interpretation of quantum mechanics. Particularly helpful are the illustrations emphasizing the role of the "total system" in defining quantum mechanical results, and the argument that even in classical physics the principle of determinism cannot be proved but must be accepted as a presupposition on faith. The author summarizes the final conclusion for us in the Preface,

> That the whole is more than the sum of its parts and that the constructive interplay of complementary processes is the secret of all creative activity in life.

HIERARCHY THEORY: ***The Challenge of Complex Systems*** *edited* by Howard H. Pattee, George Braziller, New York, 1973. Paperback. 156 pp. $2.95.

Both the view that reality must be described in terms of a hierarchically structured set of levels, and the view that qualitatively different properties emerge from the patterned interaction of more and more complex structures, can be informed by further understanding of the nature of the operation in complex systems. This book in the International Library of Systems Theory and Philosophy brings together five papers on this subject with a final summarizing postscript by Pattee on "Unsolved Problems and Potential Applications of Hierarchy Theories." Its purpose is "to clarify relationships between parts and wholes of hierarchical systems from the perspective of basic physics and biology." It is concerned with four basic interwined hierarchic sequences: chemical substances, living organisms, DNA, and human societies.

The failure of mathematical models to account for the possibility of the evolutionary development of current living forms in the lifetime of the universe is understandable in terms of the neglect of hierarchical interactions.

> Organisms are highly improbable arrangements of matter; so improbable, in fact, that there has hardly been time enough, since the Earth's creation, for them to evolve. The calculation on which this argument is based does not take account of the hierarchic arrangement of stable subassemblies in the organisms that have actually evolved.

Taking such effects into account, it follows that the time required for systems containing 10^{25} atoms to evolve from systems containing 10^{23} atoms is the same as the time required for systems containing 10^{3} atoms to evolve from systems containing 10 atoms.

Pattee lists as the two central problems about hierarchical systems: (1) ". . . the apparent paradox that hierarchical controls both limit freedom and give more freedom at the same time," and (2) "a second problem about hierarchical constraints is that they always appear arbitrary to a large extent."

The authors are careful to indicate that they are concerned only with physical mechanisms, only with properties which emerge naturally, and not with Divine activity *per se*. Their results, still in an embryonic state, have few if any physical mechanisms to account for the establishment of a hierarchical structure; the theme of basic ignorance of many of the fundamental problems runs through the book. Christians should not assume, however, that such ignorance must *necessarily* persist, and that here at last is the evidence for God. For the Christian, hierarchical structures are a marvelous illustration of the handiwork of God; to seek to find evidence for His reality in areas of ignorance is simply to fall back into the error of the God-of-the-Gaps position.

THE MANY-WORLDS INTERPRETATION OF QUANTUM MECHANICS edited by Bryce S. DeWitt and Neill Graham, Princeton University Press, Princeton, N.J., 1973. Paperback. 252 pp. $5.50.

In his physics Ph.D. dissertation at Princeton University in 1957, Hugh Everett, III, proposed a new interpretation of quantum mechanics based on the reality of a state vector for the entire universe that never collapses and hence gives rise to a rigorously deterministic reality as a whole. Although few physicists have taken Everett seriously, his view did receive favorable comments in 1957 by distinguished physics theoretician John A. Wheeler, and this collection of unpublished and published papers by several authors expounds some of the technical and philosophical aspects of the interpretation proposed by Everett. Christians tempted to derive hard-and-fast philosophical and theological interpretations from even the best of contemporary science should take a look at this proposal of Everett's to get a new feeling for the difficulty in making such interpretations with assurance.

A popularized version of Everett's perspective has been published by Bryce S. DeWitt under the title, "Quantum Mechanics and Reality," in the September 1970 issue of *Physics Today;* this article is reprinted in the present book. In conventional quantum mechanics the total state function of a system is represented as a combination of eigenstate (possible state) functions for the system; the *act* of measurement somehow selects one of these eigenstates as the result of the measurement. It may come as a surprise to realize that this "somehow" is not at all understood. Wigner has proposed that it is the entry of the measurement signal into the human consciousness of the observer that selects one of many possible outcomes. Following von Neumann it is argued that the act of measurement causes the state function to collapse to a single eigenstate, the one given by the measurement; in this "traditional" interpretation, the state function does not represent reality but only provides a means of making statistical predictions about reality. A third suggestion is that now advanced by Everett, who seeks "to take the mathematical formalism of quantum mechanics as it stands without adding anything to it, to deny the existence of a separate classical realm, and to assert that the state vector never collapses." His interpretation proposes *the reality of all the possible worlds* represented by the superposition of eigenstate vectors in the system's state vector, i.e., "the universe is constantly splitting into a stupendous number of branches, all resulting from the measurementlike interactions between its myriads of components." Everett's success is in making a consistent representation with the significant conclusion that if his view is correct, then the laws of quantum mechanics do not allow us to feel these myriads of splits, and in showing that "formalism alone is sufficient to generate interpretation." The major weakness of his position is that it provides no empirical way to distinguish it from the "traditional" interpretation of quantum mechanics, since all of its predictions are identical to those of the latter.

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

THE PSYCHOLOGY OF RELIGION, by Wayne E. Oates, Word Books, Waco, Texas: (1974). 201 pp. $7.95.

The workaholic, Wayne Oates, has come with yet another book, his twenty first, to be precise. Oates is professor of psychology and religion at Southern Baptist Theological Seminary from which he received his Th.D. This book is the result of twenty-five years of teaching experience. The ideas were developed in classroom conversations with students and written in light of their reactions.

In this book Oates refers freely to both religion and psychology. His knowledge of both areas is quite extensive. The psychology of religion, according to Oates, tries to bring about a dialogue between sacred and secular definitions of life and God.

In his development of this dialogue, Oates is writing from his Judaeo Christian heritage. He employs a phenomenological attitude and a developmental method. The nineteen chapters of the book are supplemented by many footnotes as well as a helpful set of questions for further study for each chapter.

The topics covered in this book are the warp and woof of religion: conversion, prayer, temptation, sin, forgiveness and faith. Oates deals with these and other subjects in an analytical way. He brings many interesting quotes into his discussion but also gives opinions of his own.

Obstensibly intended to be used as a textbook, this book will probably serve that purpose adequately in graduate school. As a text for college, it may assume more knowledge and motivation than the average college student possesses. Unfamiliar names, esoteric hypotheses, and a lack of conciseness impede easy reading. A few technical errors mar the book, e.g., a mislabelled name index, inaccurate footnote format, and confusion of classical and operant conditioning.

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

REASONS FOR FAITH by Oliver R. Barclay. 1974. Paperback. 142 pp. 40 p.

THE GOODNESS OF GOD by John W. Wenham. 1974. Paperback. 223 pp. $2.95.

THE CLOCKWORK IMAGE: ***A Christian Perspective on Science,*** by Donald M. MacKay. Paperback. 112 pp. 40 p.

These books were published by InterVarsity Press and are available from InterVarsity Press, Downers Grove, Illinois 60515.

These three books from the continuous output of InterVarsity Press are representative of those that are related to the interaction of science and Christian faith. These paperback editions make available at low cost and in convenient sizes (books 1 and 3 above are in the 4½" x 7" Pocketbook size) a veritable library of information of aid principally to the Christian in developing and witnessing for his faith.

Oliver Barclay, Secretary of the Research Scientists Christian Fellowship in England, sets forth in *Reasons for Faith* a readable apologetic for the rationality of the Christian position. In three principal sections he treats "God the Creator," "the fact of Jesus Christ," and "the living God." Finally he concludes that "Faith, therefore, is a different kind of thing from mere logic, but far from going against reason it is the response we have to make when we understand that Christ is all he claimed to be. Faith is the result of seeing how things really are."

John W. Wenham, Warden of Latimer House, Oxford, offers *The Goodness of God* as a sequel to his earlier book, *Christ and the Bible* (*Journal ASA* 26, 82 (1974)). The book is written for Christians who are willing to face the "uncomfortable features" of the Bible humbly and openly before God. With great conviction and unyielding honesty Wenham tackles the question, "Is God good?" in view of our own experience in the world and the record of the Bible about the character of God. After exploring most of the most difficult questions without flinching and with many helpful insights, Wenham concludes,

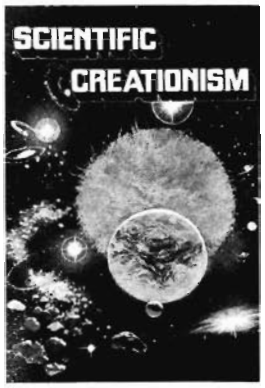
> It becomes clear now that our initial questioning of God's goodness arose from an imperfect idea of goodness. It was altogether too shallow a concept to match up to the terrors and glories and compassion of the God who is. Instead of allowing the Bible to mould our notion of goodness, we let our false standard of goodness become a standard whereby to criticize the Bible. In doing so we lost the purity of our doctrine of God, and blunted the razor-edge of theism. We lost something of that awe and fear of the Lord which is the beginning of true wisdom and worship and which is the necessary prelude to a realization of the depths of God's love.

The next time you face doubts or the questionings of another about how the goodness of God can be compatible with some event or other, take a look at this book for help before deciding that no answer is available.

In *The Clockwork Image,* Donald M. MacKay, Profesor of Comunication at the University of Keele and noted researcher into the functioning of the brain, puts into one powerful little book inputs from talks given "to students and others over the past twenty years." His theme is "the *wholeness* of the view of our universe presented by biblical Christian theism: the essential, non-accidental harmony between the Christian doctrine of the natural world on the one hand and the spirit and practice of natural science on the other." When a reviewer is faced with a book with which he is in complete and detailed agreement, when he places the template of his own understanding of science and Christian faith over that of another's and finds only virtually perfect alignment, he is in danger of becoming rhapsodic in describing the book in detail. I resist this temptation only with great difficulty and content myself with the simple statement that in my opinion this is the best collected, small, pocketsize, inexpensive treatment of the evangelical perspective on science and the Christian faith anywhere available today. It does not seem possible that any basically different approach to the problems of scientific and theological description than as hierarchically complementary can be as successful in facing the challenges of tomorrow's world.

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

SPECIAL CREATION OR EVOLUTION



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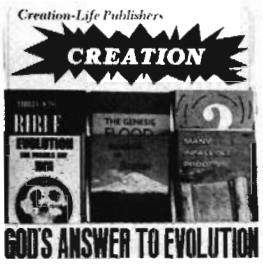

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EVOLUTION — THE FOSSILS SAY NO! by Duane T. Gish, 2nd. Edition; ICR publ. Co., San Diego, Calif. (1973) Paperback, 129 pp.

This short book is a popularized attempt to show that the fossil record fits a special creation model much better than it fits an evolution model. The account suffers severely from the lack of supporting argument for many statements (perhaps due to space limitations) and the reader is expected to accept many things at face value. For example we read (p. 25):

> We do not know how God created, what processes He used, *for God used processes which are not now operating anywhere in the natural universe.* (his italics)

Apart from the odd contradiction in this statement, it, like many others, is offered without a clear basis. We also read (p. 13):

> The Bible tells just as strongly against theistic evolution as it does against any other form of evolution.

Again, the reader is offered no reasons for the statement.

The author makes it clear that he does not accept the geological column as being the result of vast periods of erosion and sedimentation, feeling rather that Noah's flood accounts for all the rock formations. Incredibly, he states that the geological column is established according to the way the animals are *supposed to have evolved.* In common with other authors holding to the flood-geology doctrine, he reveals by this kind of statement an enormous naivite and ignorance of the methodical approach of modern geology to the establishment of local and regional geological successions.

Apart from the multitude of objections which can and have been brought against the flood-geology doctrine, the argument of this book suffers from one fatal flaw. The author states that an evolutionary model of the history of life would predict that the most ancient strata in which fossils are found would contain the most primitive forms of life capable of fossilization and that gradual transitions to more complex forms of life would be found. In contrast he claims that the creation model (which for some reason the author automatically expects the reader to mean the so-called special creation model) predicts an explosive appearance in the fossil record of highly complex forms of life without evidence of ancestral forms.

> Each major kind *at its earliest appearance in the fossil record* would possess, fully developed, all the characteristics that are used to define that particular kind. (p. 31) (my italics)

It seems fairly clear to this reviewer that if one accepts that the fossil record is an indication of the results of the "world-wide Noachian flood", i.e., ". . . is a record of mass destruction, death and burial by water and its continued sediments", that it is ridiculous to then argue about "earliest appearance in the fossil record" *or to place any relationship between time and rock strata whatsoever.* If the sediments are due to the flood, the depth of a rock stratum indicates only how quickly it settled after the flood. Any fossil sequences, whether small or large scale, must be related to settling speed after the flood, allowing for minor variations. On this basis, this reviewer would argue that the special-creation-and-universal-flood model does not predict any "explosive appearances in the fossil record of highly complex forms of life", for the fossil record on this view cannot be a time record at all. With this in mind, the author's arguments do not make sense, despite his statement that in the book, for purposes of argument, he will write as though the rocks were laid down as the "evolutionists" claim. What value is there in attempting to prove that there is a sudden appearance in the fossil record of diverse forms of life if you are then going to turn around and say "Of course, the fundamental aspect of time in this argument is a figment of the imagination?" For example, the author states that birds appear abruptly in the fossil record, *just as predicted on the basis of creation.* This bears no relation to the conclusion which must be reached from the author's stated belief in flood geology.

There are many places where I find fault with the facts of the book, and the author's ignorance of some modern biology and palaeontology. He states, for example, that no one has shown how the reptilian jaw articulation changed to the mammalian articulation. He appears unaware that there are known fossils (e.g., *Diarthrognathus*) which have a double jaw articulation. Similarly, he says that the monotremes appear too late in the fossil record to be the ancestors of mammals. Mammalogists have however, held for a long time that the "mammal" group is polyphyletic and few have held monotremes to be ancestral to placental mammals. The author's criticisms of radiometric dating is, considering its importance for the theory, weak and biased.

> . . . inherent in these assumptions (concerning the initial isotopic ratios in the rock) are factors that assume that the ages so derived, whether accurate or not, will alway range in the millions to billions of years. (p. 42)

The corrective value of several different systems, some erring on the old side (e.g. Uranium-lead) and some on the young (e.g., Potassium – argon) are completely ignored.

In searching for a historical parallel for the statement that in the case of evolution the majority of scientists are wrong, the author chooses the case of Copernicus, Galileo and others who ". . . only after a prolonged and bitter controversy succeeded in convincing the scientific world that the Ptolemaic system was wrong." It is amazing that the author can present this without also indicating that it was the power of the Church, firmly believing that the Ptolemaic system fitted with its own literalistic, dogmatic beliefs of "what the Bible says" which retarded our understanding of the universe!

It seems almost plaintive when, after noting that the Creation Research Society (of which he is Associate Director) has almost 400 members, the authors writes:

> There is yet a *vastly larger number of scientists* who do not accept the theory (of evolution) but choose to remain silent for a variety of reasons (my italics).

It is beyond me how Gish knows these silent people are there in such large numbers. However, I predict that unless the flimsy edifice supported by this book is helped by better informed and more logical ideas, these silent followers may desert the fold.

THE WORLD THAT PERISHED by John C. Whitfield, Jr., Baker Book House, Grand Rapids, Michigan (1973) Paperback, 155 pp. $1.95

This book constitutes a restatement and updating in more popular form of the contents of Morris and Whitcomb's *The Genesis Flood*. The thesis in the book is identical. The earth is young, evolution is a bankrupt hypothesis and Noah's flood was an event of unimaginable proportions which re-deposited its debris in the form of our present sedimentary rocks.

The language of the book is, if anything, less precise than its predecessor. In his foreword to this volume, Morris states:

> Here and there, scattered widely throughout the rocks, can be found artifacts or other fossil evidences even *(sic)* of the human life of long ago.

and

> The God who created all things is a God of both power and mercy. He need not and would not have used the principles of suffering and death . . . as instruments of creation.

There is much tasteless back-slapping in this book. Morris' glowing recommendation in the foreword is balanced by references to him on 18 pages of the book and Whitcomb acknowledges his debt to Morris

> . . . for his generosity in sharing his vast experience in the principles of hydraulic engineering as they apply to the Biblical account of the Flood.

Whitcomb then attempts to integrate Geological and Paleontological data into a universal-flood explanation for the world as we see it. The same gross misunderstandings of the data and exceedingly poor ability to comprehend the problems, which characterized the earlier book (and which have been competently criticised in this *Journal* previously) are found here also. The author states that

> In the world of science today, specialists in one field remain comparatively ignorant of the principles that underlie a remote branch of science.

Evidently, a theologian with a lot of help from a hydraulics engineer can overcome such trivial difficulties. Similarly, Whitcomb states:

> History has demonstrated clearly that *all* leading men of science have been *completely* in error in interpreting various important facets of our universe. And even more disastrously, *all* leading theologians during certain eras in church history have been in *complete* error in the interpretation of important doctrines of the Christian faith as set forth in Scripture. (His emphases!)

After this blanket statement, one would think the author would proceed with fitting humility. One gets the impression, however, that he is immune from such fallibility, for all the ideas are stated without a thought that they may be somewhat in error or exaggerated. Considering that the author lacks any advanced training in any form of the scientific fields which he attacks on so broad a front (a fact which is glaringly obvious throughout the book), one can only feel saddened that such material finds its way into young Christian minds.

The author's wild interpretations are buttressed with all manner of *ad hoc* hypotheses. For example, we read:

Books Received and Available for Review

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

Birx, H. J., *Pierre Teilhard De Chardin's Philosophy of Evolution*, C. T. Thomas, 1972.

Board, C. S. *et al*, *HIS Guide to Sex, Singleness and Marriage*, IVP, 1974.

Deely, J. N. and R. J. Nogar, The Problem of Evolution: *A Study of the Philosophical Repercussions of Evolutionary Science*, Appleton-Century-Crafts, 1973.

Hazelton, R., *Blaise Pascal: The Genius of His Thought*, Westminster, 1974.

Moyor, E. P., *The Day of Celestial Visitation: A Glimpse Into The Purpose of UFO's, Earth's Erratic Career, Our Estrangement from the Universe, and The Plan of Divine Destiny*, Exposition Press, 1975.

Oates, W. E., *Pastoral Counseling*, Westminster Press, 1974.

Rauscher, W. V. and A. Spraggett, *The Spiritual Frontier: A Priest Explores the Psychic World*, Doubleday, 1975.

Sullivan, E. A., *The Future: Human Ecology and Education*, ETC, 1975.

Tiner, J. H., *When Science Fails*, Baker, 1974.

Question: How could kangaroos have travelled from Australia to Noah's Ark?
Answer: They didn't. At least two of each of all the kinds of air-breathing animals – including kangaroos – must have lived on the same continent where the Ark was built, so they could come to Noah by divine guidance without having to cross oceans.

and we also read that the behemoth of Job 40 was actually a *Brontosaurus!*

Other problems of the universal flood idea are dealt with in a similar manner. Whitcomb claims that the Ark's floor space (95,000 ft^2) would have held two of every species of air-breathing animal today twice over. Such space would hardly be adequate for the 28,000 species of land vertebrates, ignoring the hundreds of thousands of species of air-breathing insects, molluscs etc. How did Noah's group care for the feeding and latrine needs of this population? He didn't – God imposed "a year-long hibernation or estivation experience" so that food was not needed. This in spite of the specific command in Gen. 6:21 for him to take on board the various kinds of food needed. Multiplying *ad hoc* hypothesis upon speculation, Whitcomb manufactures a totally unacceptable scheme. Old errors are repeated without modification, such as the odd notion that the second law of thermodynamics is incompatible with evolution.

Of interest to some ASA members will be a long chapter which attempts to answer specific criticisms of *The Genesis Flood* from the past 12 years, including a four-page rebuttal from Morris, reprinted from *Journal ASA*, March 1970.

Referring to evolution, the author claims that an interpretive scheme which does not incorporate all the facts should be abandoned. The interpretive scheme in this book makes geological and biological nonsense and should be abandoned. This kind of pathetic pseudoscience is obviously the weakest link in the young earth hypothesis.

Reviewed by Geoffrey A. Manley, Associate Professor of Biology, McGill University, Montreal, Canada.

SUMMARY OF COMMENTS AND QUALIFICATIONS OF RESPONSES TO THE OPINION POLL ON MEDICAL ETHICS

(Questionnaire Published in June 1974 issue of Journal ASA. *Comments are listed by question number in order from greatest approval to greatest disapproval.)*

11. *(3.5)* Yes, but not if a mother's life is at issue. A doctor should have the right to follow his own conscience, just as the patient should have. He can always refer the patient (who wants an abortion) to another doctor with no such scruples.

1. *(3.4)* This question uses a non-proven assumption that extending help to everyone who desires it inevitably must result in pollution of the human gene pool. However, we should not ignore such possible pollution and not encourage people with serious genetic defects to reproduce, while extending medical help to those in need. We cannot intelligently and consistently know what is best for another human being. If we ask God for guidance He will indicate what is best for the situation at hand.

6. *(2.9)* We should practice preventive measures when the future strength of our species is at stake. Elimination of individuals with defects would be inhuman but steps must be taken to avoid obvious defects in offspring. A genetic defect in the fetus is not adequate grounds for an abortion. Informed choice by the couple involved would be most appropriate. Genetic counselling (preferably before conception), contraception, and sterilization should be preferred to abortion. The extent to which we practice must be controlled. Who can trust man to do anything unselfishly?

4. *(2.7)* Replacing defective body parts in individuals is not eugenic, although highly desirable. But shouldn't such desirability be expressed by the individuals needing such replacements?

8. *(2.54)* The linkage betwen chromosomal abnormalities and agressive behavior may be slight, coincidental, or non-existent. The relevant issue is whether the accused is sane or psychotic, not whether he has genetic defects. Perhaps he should be subject to a greater degree of capital punishment than one without genetic defects, since he is not safe on the loose or probably even in confinement. "Capital" should be eliminated from this question, since it raises a basic moral question on another topic.

5. *(2.47)* Only if there is absolutely no possibility that the viral genes will be transmitted and enter the human gene pool. If the germ cells can be affected by the viral agents, the individual should be sterilized as an agreed-upon condition of treatment. Are we prepared to accept the possibility of failure and unpleasant results should such action be unsuccessful?

2. *(2.38)* This question uses a non-proven assumption that man is evolving rather than degenerating. In a general way man should attempt to control his own evolution. The main concern is over the specific methods to be used and whether they will be adequately tested and verified. Voluntary selection of mates is already practiced. All techniques to be used scientifically will suffer from the inability of some committee to foresee the future, choose the optimal characteristics for that future and then select those characteristics of man which make him best fitted for the future. Not only do human beings make too many errors but they are totally incapable of being entrusted with such an important task. Corruption would set in; some greedy ones would seek to use methods for their own gain. The question needs clarification; it presents a poor alternative and indicates a lack of understanding of solutions. At present, the best we can hope for in controlling human evolution is some reduction in genetic disease, which would be highly desirable.

10. *(2.1)* We are not fit to judge; we are not sufficiently knowledgeable to understand all the past, present, and future circumstances. Sterilization should be considered and be subject to approval by the legal guardian, if the mother is incapable.

7. *(2.05)* If this question had indicated a better chance for future pregnancies, some answers would have been different. Avoidance or prevention of conception is preferred to abortion when this great a risk of serious genetic abnormality is known before conception.

3. *(2.04)* No: for violent or criminal behavior; yes: for psychoses, if possible. A psychosis is defined as a psychological malfunction secondary to a biochemical abnormality. Criminal behavior that is not the result of a psychosis is considered to be secondary to a defect of the character and cannot be considered a psychic or mental defect of any sort. Drugs or brain surgery do not eliminate mental defects, mental illness or violent behavior; they merely reduce the intensity of emotional arousal, making the patient groggy. But such results may be preferable to violent behavior. Drugs and surgery are not advanced enough to use as control in eliminative eugenics. A number disagreed that these procedures are eugenic at all, since eliminative eugenics is the breeding only of persons with desirable characteristics.

13. *(1.8)* Only for a woman from her own husband (as in the case of his having a vasectomy and storing sperm should they decide to have a child later). There are countless permutations and combinations possible in the genes of the human chromosomes. We have no guarantee that the best combinations are contained in the sperm from ideal or selected donors in the bank.

17. *(1.3)* Yes, if there is no damage to the fetus from a rejection reaction or other type of incompatibiity. Trauma on the carrier forbids this procedure. It is very unwise. Not at this time. This would cause all con-

Responses to the Opinion Poll Questionnaire on Medical Ethics in Genetic Therapy and Engineering

Answers are rated as follows: **4** = *always or most definitely,* **3** = *usually,* **2** = *occasionally,* **1** = *rarely,* **0** = *never.*

1. Should we continue present medical practice and extend help to everyone who desires it, regardless of the pollution of the human gene pool and resulting decrease in the quality of physical human life? **3.37**
2. Should man attempt to control his own evolution, consciously and scientifically, instead of involuntarily by pressures from social mores, wars, etc. **2.38**

In order to counteract the deterioration of our genetic heritage and correct present defects:

a. Should we pursue the development of eliminative eugenics

3. by altering psychic or mental defects, such as violent or criminal behavior, with the use of drugs or brain surgery? **2.04**
4. by eliminating physical defects with organ transplants, artificial organs, or organs clonically grown from the same individual? **2.70**

b. 5. Should we use genetic manipulation or therapy with viral agents, thoroughly tested and approved for use in humans, to supply missing or correct defective genes? **2.47**

6. Should we avoid future defects by promoting genetic counselling of parents and prospective parents, advising them of the risks (based on amniocentesis and biochemical tests for genetic disorders) of genetic disease or defects in their potential children and allowing them to decide for or against abortion of their fetuses? **2.91**
7. Would you seek or believe in a legal abortion if there were 1 chance in 2 that your baby would be seriously abnormal? **2.05**
8. Should a convicted criminal having chromosome abnormalities linked with aggresive and antisocial behavior be subject to the same degree of capital punishment as one without such chromosome abnormalities? **2.54**
9. Shall we legislate to eliminate defective genes by prohibiting their carriers to propagate? **1.13**
10. Should we regard termination of pregnancies in the severely mentally retarded or in women carrying fetuses having fatal and costly genetic diseases as moral, as well as legal? **2.10**
11. Do you feel that a doctor should have the right to refuse to perform a legal abortion under any circumstances and regardless of the situation and needs of the patient? **3.47**
12. When should a fertilized egg have its rights to life as a human being?
    at the moment of conception **3.12** at three-month gestation **2.72** at 4½ months when life is detectable **3.15** when life outside the uterine environment is possible (after 6½ months) **3.78**
13. Should we allow the use of egg and sperm banks for artificial insemination with selection of characteristics of donors for potential children (genetic euphenics)? **1.77**
14. Is adultery committed in artificial insemination of the egg of a wife with the sperm from a nameless donor under the consent of the husband? **0.94**
15. Should artificial insemination be allowed in unmarried women who want to have children? **0.83**
16. Is it ethical to choose the desired sex or characteristics for a child from 3 or more fertilized eggs and then implant that chosen one in the wife's uterus while destroying the others? **1.22**
17. Is it moral for an unmarried woman to be implanted with the fertilized egg of a married couple unable to bear children and then carry their fetus to term, bearing this child for the married couple's family? **1.31**
18. Is it ethical to develop human life outside of the uterine environment (test tube babies)? **1.15**
19. What is your marital status? single **38** married **54** separated **1** divorced **2** widowed **0** engaged **5**
20. How many children do you have, including adopted? none **54** one **6** two **15** three or more **25**
21. What is your age? 18-29, **51** 30 to 49, **43** 50 or over, **6**

cerned a lot of problems. "Unmarried" should not be a factor. Not a problem if there was a shortage of children in the world, but since many starve each day in this world, couples unable to have children of their own should adopt. There are too many people already.

16. *(1.2)* Not when fertilized eggs are considered human. It is discrimination! It is foolish. It is not ethical to choose from eggs; leave this aspect to God.

18. *(1.15)* If a healthy baby could be produced — no objection, but it is very unlikely that the "human being" will survive until full term. Only if a woman cannot carry her child to term herself. For research or reimplantation to donor woman (mother) with husband. Not at present because of the extremely high probability of teratogenesis. No, because people cannot be trusted to be unselfish, and someone will surely try to manipulate such an operation for his/her own gains. Why? With overpopulation already? Consider the consequences?

9. *(1.13)* No, because it is highly probable that every

individual in the world has several defective genes. One generation of such legislation would be the last generation. Prohibitions may be difficult to enforce, but government could provide positive incentives for the patient and his caretakers to use voluntary sterilization, contraceptives, etc.

14. *(0.9)* Technically, adultery is not committed in artificial insemination (especially with consent of the husband), since adultery is intercourse between two who are not each other's spouse. Instead of "adutery" in the question, it should read, "Is it morally wrong to . . ." Then the answer is, "yes." (The greatest disparity in response by the age groups was evoked by this question. The under-30 group tended more to feel that adultery would be committed: 1.3 vs. 0.6 for the 30-and-older group.)

15. *(0.8)* Definitely not; a family should have two parents. Yes, with proper safeguards that the woman is carefully chosen, sane, and capable of taking care of the child.

There was general disagreement as to when a fertilized egg should have its rights to life as a human being. Although none of the four points in time were agreed upon by a majority, most (36%) respondents thought that time should be at conception, and in second place, at the other extreme, 29% thought that time should be when extra-uterine life is possible.

Professor Tom Dent, Chairman of the Department of Biology, Gordon College, Wenham, Mass., who polled freshmen biology majors, the Gordon faculty and staff, reported that the most common verbal response was that these questions can't be answered simply with a number. Helpful suggestions for improvement of the questions were made by those who wrote comments and explanations for their responses, especially the two Canadian members and a Chapman College (Orange, CA) class, following their seminar on genetics and biological engineering. Thanks to all who responded with their thoughts, time, and 10¢ postage stamps. I was helped in my own thinking on some of these problems.

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Sorry, Dr. Ramm

Bernard Ramm's suggestion (*Journal ASA* 26, 137 (1974)) that the ethical problems involved in decisions about abortion would be simplified if the question, "When does human life begin?" were to be replaced by the question, "What is human life intended to be?" was a good try, but wins no cigar. In theory, the use of such a question would permit abortion of a defective fetus but prevent abortion of a normal fetus. However, consider the following problems. First, there is no general agreement on what constitutes a "defect." Dr. Ramm suggested that a defect might be anything which prevented the fetus from becoming a mature, rational, integrated adult. Others might add anything which caused a physical defect. Still others might add anything which transmitted Jewish genes into the general pool, or anything which caused dark skin. Not so long ago we had a whole country convinced that Jewish genes were a defect which should be eradicated, and this idea is not yet extinct by any means. Remember also that one branch of the "evangelical" church in South Africa maintains that negroes have no souls; it would be a small step indeed to accept the idea that abortion of the "human-animal" hybrids produced by interbreeding is not only acceptable but a duty to the "human" race. Miscegenation laws are already strictly enforced in South Africa, for that reason. However, obtaining general agreement on the type of defect which prevents a fetus from becoming human is not the only problem; the *degree* of defect must also be specified so that a cut-off point can be established. What should be the lowest limit of intelligence to be defined as "human?" When it comes to physical defects, are club feet sufficient justification for abortion? Cleft palate and hare lip? Congenital heart disease? Blindness or deafness? Hydrocephalus? Lack of arms or legs? Defects of bowel or bladder control? On what grounds (other than arbitrary) could one possibly set a cut-off point for either mental or physical deficiencies?

The problems do not end here. If it is moral to kill a fetus which is not able to become "a mature, rational, integrated adult," then it is certainly ethical to kill a newborn, a child, a teenager, or an adult who by reason of accident, infection, metabolic disease, or old age, (or psychological abnormalities?) is judged to be incapable of ever becoming mature, rational and integrated. The same problems of deciding on the type and extent of the disability which justifies killing such a person are again present. Sorry, Dr. Ramm, but I think it would be better to stick with the original question. At least that can be answered biologically.

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Disappointed with MacKay

The many kind words about D.M. MacKay's book "The Clockwork Image" encouraged me to order a copy from ASA headquarters. I was disappointed. Perhaps the reasons for this will be of some value to other ASA members.

The chief difficulty is that his central thesis is not a thesis but an assumption. He claims that even if it were shown that *all* of the universe in its parts and its entirety could be explained mechanistically, there still would be room for other explanations, e.g., Christianity. He says, ". . .the 'nothing-buttery' assumption - that when you have verified a complete account in one set of terms you automatically debunk any others - is simply mistaken logic" (pg. 72). In support of this he makes two points: (a) one's ability to describe completely the workings of an electric sign leaves out the meaning of the sign and (b) scientific criteria cannot properly be applied to all areas of life. He apparently thinks the two points are the same since he illustrates the second by repeating the first (pg. 43).

The reply is that his claim is a bald-faced denial of the law of parsimony (Occam's razor). I suppose the choice is his privilege but then his thinking is useless to those who choose to retain the law. This eccentric choice is possible because he begs the question at a critical point. He assumes the existence of value and meaning. But, it is precisely that assumption that is under attack and in need of support. He seems totally unaware that modern men do not believe in values or God because they *do not* share his view of Occam's razor and because they *do* believe "the clockwork image".

There are other problems but enough is enough. In short, this book is, at best, an illegitimate tool with which to loosen the grip of "the clockwork image" on the minds of modern men.

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PUBLICATIONS include the *ASA News* (sent to all members four to six times each year); three symposia: *Modern Science and Christian Faith,* F. Alton Everest, Editor, Van Kampen, Wheaton, Illinois (1950) (out of print), *Evolution and Christian Thought Today,* Russell L. Mixter, Editor, Eerdmans, Grand Rapids, Michigan (1960), and *Our Society in Turmoil,* G. Collins, Editor, Creation House, Carol Stream, Illinois (1970). Individual authors are also encouraged to publish independently.

LOCAL SECTIONS of the American Scientific Affiliation have been organized to hold meetings and provide an interchange of ideas at the regional level. Membership application forms, ASA publications and other information may be obtained by writing to: AMERICAN SCIENTIFIC AFFILIATION, Suite 450, 5 Douglas Ave., Elgin, Illinois 60120.

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