PERSPECTIVES on Science and Christian Faith

In this issue . . .

The Nuclear Weapons Debate

Standardized Testing

Chiasmic Cosmology

American & Middle Eastern Scientists

"Upholding the Universe by His Word of Power."
Hebrews 1:3

MANUSCRIPT GUIDELINES

The pages of *Perspectives* are open to any contribution dealing with the interaction between science and Christian faith in a manner consistent with scientific and theological integrity. Papers published in *Perspectives* do not reflect any official position of the American Scientific Affiliation.

1. All manuscripts (except Book Reviews) should be addressed to the Editor, P.O. Box 668, Ipswich, MA 01938.
2. Authors of *Papers* and *Communications* must submit **3 copies** of their paper for review purposes (an original and two copies).
3. Regular Papers should be accompanied by an *Abstract* of not more than 100 words.
4. All manuscripts should be typed double-space on good quality 8 1/2 x 11 paper (computer copies should be printed letter-quality).
5. References and footnotes should be collected at the end.
6. Figures or diagrams should be clear, black and white, line ink drawings or glossy photographs *suitable for direct reproduction*. Captions should be provided separately.

REGULAR PAPERS are major treatments of a particular subject relating science and the Christian position. Such papers should be at least 10 manuscript pages in length, **but not more than 20 pages**. Publication for such papers should normally take 12 to 18 months from the time of acceptance.

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Putting Things Into Perspective

Theologian Bernard Ramm has served the Christian community in full measure through a lifetime of teaching and scholarship. His first, of eleven, papers in the ASA Journal, "The Scientific-Logical Structure of the Theory of Evolution," appeared in the June 1949 issue. *The Christian View of Science and Scripture* (1954) helped many evangelicals develop a deeper understanding of scripture-science themes. Readers may wish to refer to "A Bernard Ramm Festschrift" in the December 1979 issue of this journal for a retrospective view of his enduring work. As Bernie leaves the Editorial Board, we wish him many happy retirement years, and acknowledge his faithful two decades of service.

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The Swearengens, father and son, offer a model for discussing divisive issues. Their recognition and respect for the presuppositions of the contending parties and the social dynamics of debate provide a means for more fruitful dialogue and (perhaps) agreement. Their topic, "The Nuclear Weapons Debate," remains relevant in spite of the fast pace toward peace in Eastern Europe.

The legitimacy of psychological testing is the subject of Harold Faw's paper. In bringing a "Christian" perspective to this question, Faw reviews the use of such tests in scripture, and offers a working approach which recognizes the benefits and limits of these evaluative tools.

Physicist-theologian George Murphy offers us a view of treating biomedical ethics, which begins with Luther's theology of the cross. He sees this approach as foundational to the traditional use of "code ethics" and "situational ethics" in such problem areas as abortion, life-support systems, and genetic engineering.

The mark of an "Ugly American" still stamps those who are unwilling to understand and be sensitive to those in different cultures. George Jennings brings a lifetime of experience to an article offering advice to a group of ASA members who will visit the Near East this summer. His counsel is valuable for all of us who would seek to build bridges whether at home or abroad.

In the first Communications paper, Bob Newman opens up another round in the discussion of the application of Langton's self-reproducing automaton to the origin of life question. It seems clear that this will not be the last attempt to bridge the gap between estimates of 5×10^{-45} sec and 3×10^{139} years for the synthesis of this automaton in a universe the size and age of ours.

ASA's Committee for Integrity in Science Education reviews "Science and Creation: A View from the National Academy of Sciences." The NAS polemic is found wanting along a number of scientific, biblical, and philosophical lines. It remains to be seen whether "Goliath" will listen to "David."

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Each of these papers challenges us to consider ideas and issues which may provoke dissent. We seek your response in a Letter to the Editor, or through an article.

JWH

Comparative Analysis of the Nuclear Weapons Debate: Campus and Developer Perspectives

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Many statistics (e.g. numbers, tonnage, killing capacity) regarding nuclear weapons and their effects are available to both sides of the weapons debate, including weapon designers and anti-nuclear activists. However, the same statistics are frequently used to support very different conclusions. The process is shaped by the convictions of each sector because the convictions determine how information is obtained, interpreted, distributed, and used by a sector's members. In this paper we have considered the debate over nuclear weapons from perspectives taken by designer and campus activist. We look at the questions usually raised by each community, the common forms of communication used, and the role of objectivity in each. U.S. nuclear weapons policy and apparent underlying assumptions are outlined, and opposing viewpoints are discussed. We have concluded that the perceived power of the members of each community to influence issues tends to determine how information is used. In time, the associated information becomes more important than the weapon itself. For Christian members of these opposing communities, we set forth some biblical perspectives that are independent of particular convictions about weapons.

Preface

Since this writing in early 1989, a number of amazing events have occurred which have portents for U.S. defense posture. A popular demonstration for democracy in the Peoples Republic of China was crushed in Tiananmen Square; the Berlin wall has been opened; the USSR has begun withdrawing conventional forces from eastern Europe; Warsaw Pact countries are undergoing such major political changes that the existence of the Pact as a military alliance is questionable; Soviet Foreign Minister Shevardnadze admitted that the Krasnoyarsk Radar site was indeed in violation of the ABM Treaty; and the B-2 Stealth bomber made a successful maiden flight.

The opposing communities on both sides of the U.S. defense debate are responding predictably. For example, "arms controllers" interpret Shevardnadze's admission as a good faith demonstration of genuine change and that the Soviet State is becoming more benign. Calls have been issued for reductions in the U.S. defense budget, possibly by as much as one-half within a decade. Strategic nuclear systems with offensive capabilities (such as the B-2) especially are being questioned.

Conservatives, however, assert that Shevardnadze's admission only proves that Western liberals have been duped by the Soviets. They believe that Reagan's arms buildup has made the world more stable, and that the West must maintain its

defenses in the event that Gorbachev is replaced by a Soviet hard-liner. Extremists caution that relaxation of international tensions will be used to create a rebirth of the Russian Revolution, or at least culminate in a "Finlandization" of Western Europe. Defense Secretary Richard Cheney points out that the U.S. must be prepared for more than a Soviet adversary. He says that "part of U.S. defense requirements are driven by Soviet capabilities, and the Soviets in fact continue to modernize their strategic nuclear forces. But by no means is the Soviet threat the only thing we have to worry about. We are a global power with global interests and responsibilities."

In the wake of a perceived decrease in the threat of war, public debate in the U.S. is beginning to shift from nuclear weapons to the issues of housing, abortion, U.S. policy in Latin America, and environmental concerns. Although the topics or foci of debate will change, the process of public debate and demonstration over public policy unquestionably will continue. The authors continue to believe that the methodology and insights developed in this paper should in some measure continue to apply, independent of the subject of the debate.

Introduction

This work was first presented orally as a father-and-son dialogue. In order to preserve some of the flavor of that approach, the manuscript is organized essentially along the lines of the talk, with perspectives from either group represented upon the work of the other. Our purpose is to shed some new light on the nuclear weapons debate. Taking positions representative of first one, then the other, of the communities each author represents, we look at the debate itself from the vantage point of two participants. Our first assumption is that each community considers itself to be a "peace activist." Second, there are members of each community who want to alter the nuclear balance of terror. The difference in approach is shaped by underlying beliefs about the U.S., the U.S.S.R., and the nature of man.

One of the two particular subgroups we represent is that of weapons developer. This is not to be confused with policy-maker, because hardware developers and concept-developers are not policy-makers except to the extent that we will discuss later. Likewise, the student campus activist is not to be confused with the academic community *per se*, nor on-campus think-tanks. The activist represents a particular subgroup of the student community.

In what follows, the role of the nuclear weapons developer is described first; then we present a caricature of the student-activist as seen by the developer. Next, the role of the activist on campus is described, followed by a caricature of the developer as perceived by the campus activist. We then consider some venues of change that might be available to bring about reduction in the "balance of terror." The conclusion draws out some biblical perspectives on the issues identified.

In the abstract we noted that the associated information dealing with a particular weapon may become more important than the weapon itself. A nuclear weapon in our view is a *political* instrument, and not a *war-fighting* instrument. Walter Slocombe, former Deputy Assistant Secretary of Defense, stated that "Deterrence rests not [only] on how the Soviets measure the severity of our retaliation, but also on their judgements about its certainty."[1] In other words, how a weapon is perceived and its likelihood of being used determines its effectiveness. U.S. nuclear strategy is *deterrence*, not mutually assured destruction *per se*.[2-12] In the strategic realm, the U.S. government has said that the U.S. will not strike first ... meaning no first-strike on the Soviet homeland. In addition, U.S. targeting strategy is "counterforce," meaning that U.S. nuclear weapons are "aimed" primarily at military targets, in the order

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of: first, nuclear weapons launch capabilities, then other military targets, followed by targets which comprise the industrial base. Finally, we hope to maintain a "strategic reserve" for rapid termination of hostilities should deterrence fail and nuclear war break out.

In the tactical arena, the strategy maintained with NATO is called "flexible response."[13] Under this strategy, if conventional war in Europe should advance to the point that NATO forces are losing, the plan calls for consideration of "controlled escalation" to nuclear in the European theatre.

The cost and morality of these strategies is widely debated, but participation in the debate is not our purpose here.[11-15] Rather, our purpose is the development of a perspective on the debate itself, with the outcome of fostering communication and reducing vitriolic non-listening monologues, in order ultimately to facilitate means toward a reduction of the balance of terror.

Role of the Developer

Developers of nuclear weapons represent a *de facto* link between government policy, the defense industry, and the military, because they are providing the "tools" to implement policy. Viewed in this way, the developer as well as the military are extensions of national policy. Thus, we note with interest the comment by a DoD employee at a protest demonstration at the Pentagon: "They have the right to protest, but I have the right to go to work, to make up my own mind. 1 think they picked the wrong place to protest. We don't make the policy here; we just follow orders."[15]

The procedure by which the weapon developer carries out his task is primarily *passive*, in the sense that the procedures for doing the job, and the organizations for doing it, are in place. The developer responds to declared military needs and policy communicated from the Department of Defense to the Department of Energy Office of Military Applications. The Secretary of Energy is in the executive branch of the government, at a cabinet-level position. Reporting to the Secretary of Energy is the Assistant Secretary for Defense Programs, followed by the Deputy Assistant Secretary for Military Applications, who transmits requirements to the nuclear weapons labs.

Developers of nuclear weapons represent a **de facto** *link between government policy, the defense industry, and the military, because they are providing the "tools" to implement policy.*

The technical work of new weapon development is conducted at the nation's three nuclear weapon design/development laboratories: Los Alamos, Lawrence Livermore, and Sandia National Laboratories. Sandia's role is to weaponize the exploding devices developed by the other two laboratories; that is, to design the ordnance part of nuclear weapons.

The development of a new nuclear weapon proceeds somewhat as follows: The Department of Defense develops a "statement-of-need" pertaining to a perceived threat. Jointly, the Department of Defense and the Department of Energy then initiate a "Phase-1 Study," which includes a theoretical assessment of the threat, and what kind of weapon is needed to "hold a particular target at risk." In the meantime, exploratory technology is pursued to determine if such a weapon really can be developed. If it is determined that the threat is real,

Alan P. Swearengen received his Bachelor of Arts in Literature from the University of California at Santa Barbara in June 1989, where his scholastic emphasis in the College of Creative Studies was writing social commentary in the form of fictional literature. Alan is now working at the Servant Leadership School, one of the ministries of the Church of the Savior which operates in the Adams Morgan district of Washington, D.C. He is less cynical now about campus protest than he was during the period when this talk was prepared and delivered. "The landscape of campus activism will forever be changed by the addition of two inseparable elements: Christianity, and community."

and that the weapon can be developed, the Department of Defense initiates a formal request for development. This request initiates a formalized, institutionalized procedure. Implicit, of course, is the idea of tailor-made nuclear weapons—such as earth penetrators. This is the order of the day; "doomsday weapons" or "more bang for the buck" concepts are obsolete.

The nuclear weapons design laboratories are funded on a "level-of-effort" basis—meaning that their funding does not depend upon the number of weapon development programs that they have. As a result, there is no reason for them to lobby for more weapons development programs, except for the satisfaction that accompanies successful competition.

In addition to the "institutionalization" described above, the weapons development procedure is essentially objective. That is, it is a technological development process that requires special knowledge and training; it is a R & D process. It requires intelligence information regarding the target and

the threat. It is based upon quantifiable data, subject to statistical analysis, simulations, analytical modeling, and testing. Insofar as possible, the power involved in decisions is derived from quantitative information.

The weapons developer usually is convinced that the Soviet Union is driving the arms race. Soviet nuclear weapons and delivery systems are seen as offensive and first-strike postured, while U.S. nuclear forces are perceived as responsive and retaliatory. Although one occasionally hears references to moral superiority, human rights, or individual liberty in context of U.S. defense, such statements come more often from politicians than from technologists. Soviet expansionism is perceived as the greatest threat to peace, and containment of the expansionism is the objective of deterrence; hence, the selection of names such as "Peacekeeper" and "Minuteman."[5] The arguments employed by technologists in public debate are usually more quantitative than moral. Whether any of this necessarily classifies most weapons developers as "Hawks" will be addressed in a following section. However, the
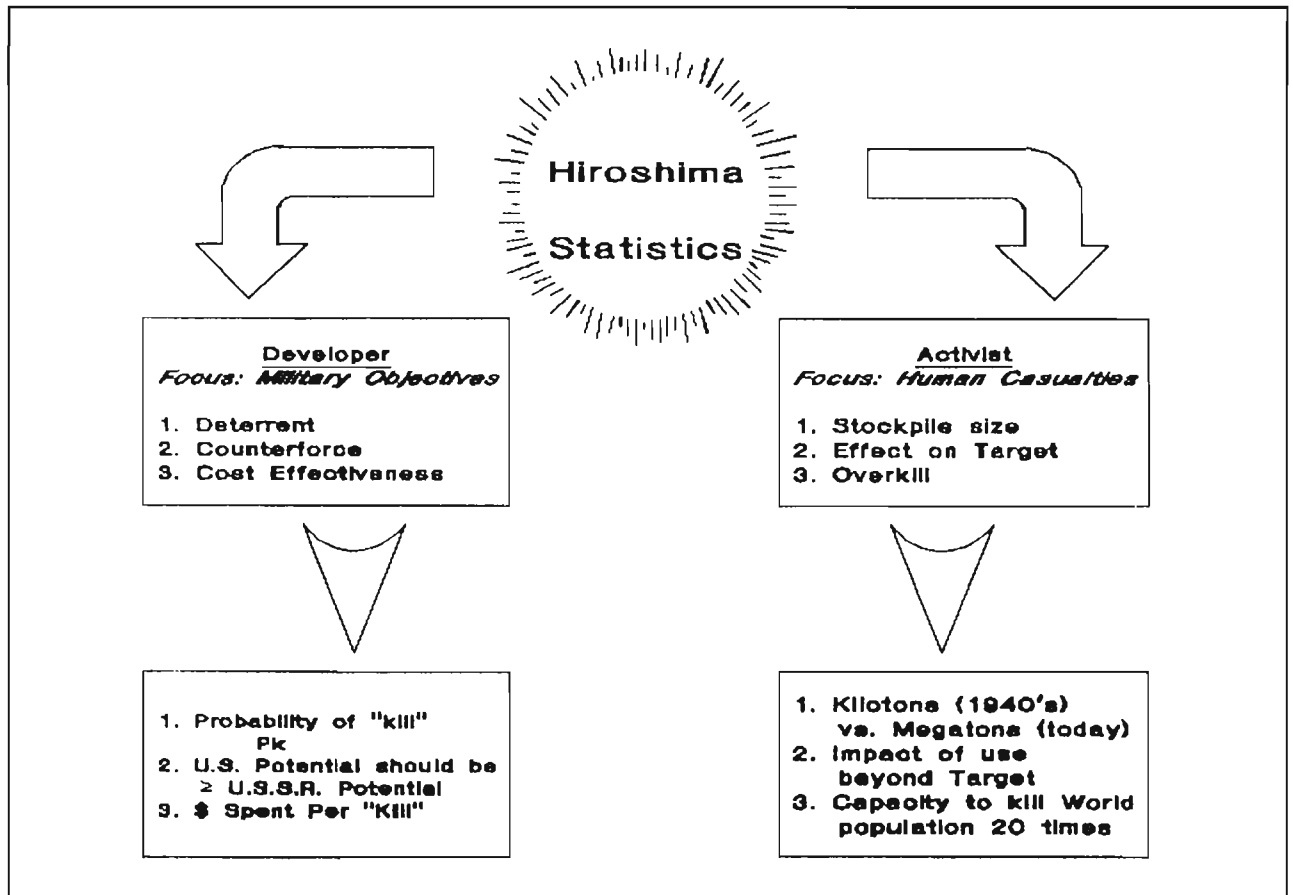

Figure 1. Different Uses of the Same Numbers

objective process functions regardless of the personal convictions of the developer.

The effectiveness of the U.S. nuclear weapon dropped on Hiroshima measured in terms of its destructive power forms the basis of much of the debate between technologists and activists. The activists and the developers use these numbers very differently. The number of casualties divided by the number of kilotons yields a measure of the effectiveness of the Hiroshima device and, since data is sparse, it is assumed that this measure is representative of all nuclear bursts. The world's stockpile today may have a total explosive yield of perhaps 50,000 megatons. If this tonnage is multiplied by the effectiveness of 4000 kills per kiloton, we must possess enough to kill two hundred billion people (the world population forty times).

The weapons developer will dismiss these arguments by noting that this effectiveness is meaningful only if everyone would conveniently line themselves up under the target area. In fact the world's susceptible population is dispersed over the globe in a non-uniform manner and, moreover, is not necessarily collected near military targets. The argument is analogous to stating that one human male carries enough sperm to impregnate every fertile female in the world.

Figure 1 illustrates this different use of the same numbers. Members of each community will interpret the numbers with a set of presuppositions, which may or may not have been examined critically. The weapons developer will emphasize military objectives, reasoning that "the strategy is deterrence; the targeting is counterforce; and nuclear weapons are cost-effective." He will produce numbers having to do with the probability of target damage or destruction, and that the U.S. potential for retaliation has to be as great as the Soviet threat, else we face an unacceptable risk. He also may mention the cost to "kill" a target; i.e., "more bang for the buck" in nuclear weapons. In contrast, the activist will focus on human and environmental effects of the weapon. We will examine such presuppositions in a later section.

Caricature of the Campus Activist (from the perspective of the weapons developer)

The developer is inclined to look upon the activist as academic, with much free time to dabble in philosophy, especially existential philosophy; he sees him as a "knee-jerk liberal" in his reaction to
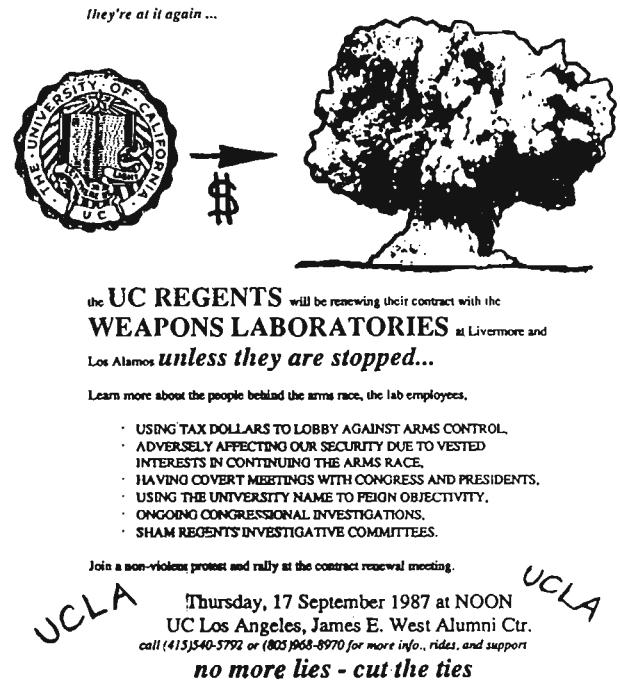
Figure 2. Anti-nuclear Literature from Campus

allegedly moral issues, like South Africa, Nicaragua, El Salvador, and "ecology." He is thought to come primarily from the arts and humanities, less from the sciences. Also, there are a number of perceptions that might be termed "group issues": use of charismatic speakers, irrational crowd-excitement, and under-informed listeners who are influenced by the countercultural media.

The poster shown in Figure 2 was circulated on the U.C.S.B. campus. The flyer says "No more Lies;
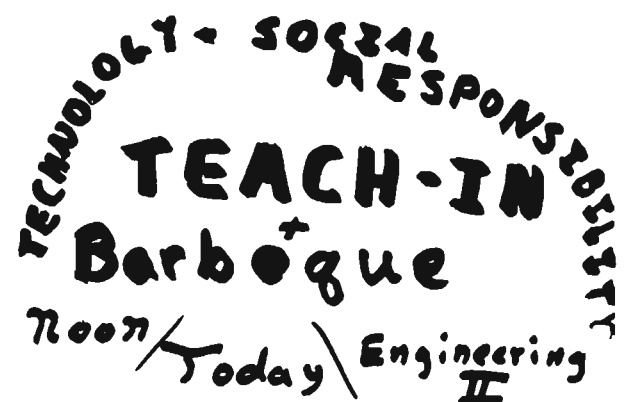
Figure 3: Career Guidance for Engineers

Cut the Ties. They're at it again. Learn more about the people behind the arms race, the lab employees..." This kind of literature is plentiful on campus, and off campus as well. Another example (Figure 3) was distributed at a U.C.S.B. "teach-in." This booklet, in which the idea of working in a weapons laboratory is called into question, was offered to incoming engineering students. The booklet was purporting to be objective, but its flavor was obviously slanted toward the negative conclusion. "Think about your career," the student was challenged. From the perspective of the developer, this was more an appeal to emotion than thought.

The developer tends to see the activist as naive in contrast to the "real world" of careers, making a living, avoiding poverty, and family responsibilities. Especially, the activist is perceived to be unaware of Soviet war preparations. There is also a belief that the students are looking to establish their identity, separate from their parents. They are thought to be attracted to experimental living and Bohemian lifestyles. But underneath it all, the activists are assumed to hold on to a belief that a better world can be constructed through some rather poorly conceived and inadequately developed human peace initiative, beginning with disarmament and "love." The rhetorical questions are often hurled: "Why aren't they at work?" or "Who is paying their bills while they are demonstrating?"

Role (and Orientation) of the Campus Activist

In this section we attempt to describe the role of the student campus activist, specifically in distinction to that of the developer. It is a socialized role as it is practiced on-campus, but without the economic reinforcement that the developer's role has in the nuclear weapons laboratory. Neither are students' grades likely to improve from classes missed in order to participate in a rally. Frequently, activists must be idealists, still considering where they are going in the future. Because of their strong sense of social consciousness, they identify with past conscientious objectors and activists of the sixties. It is important to observe that most activists feel they are without practical (or at least legal) means of realizing these social and moral goals.

Their role must be *active*, in the sense that considerable initiative is required—at least of the leaders. No procedures are in place, other than the ones which are socialized and commonly observed in the mass-media. The activist must go out of his or her way to initiate the action. This is opposed to going to one's job in the morning where objective roles are already in place. The activist has to possibly miss dinner or balance activism with studies in order to get involved. The procedures of involvement must be invented. The most effective procedures, as might a television advertisement for a new product, catch people by surprise. Mimicked procedures such as demonstrations and teach-ins are becoming less effective than in the recent past, partly due to saturation of the public consciousness.

The arguments employed by technologists in public debate are usually more quantitative than moral.

The role of the student campus activist is also subjective. It is plotted by the exchange of persuasive language rather than the exchange of information as "data." The information is cast in terms of qualitative units, to the degree that it can inspire "moral outrage" in the listeners. Some speakers are skilled at generating this kind of response to the nuclear statistics described above.

Recall that, using the same Hiroshima data in Figure 1, the activist concludes that we have the capacity to "kill the world" many times over. This is something of an absurdity, of course, because in the ideational domain of politics, where weapons function as deterrents, once should be enough. Activist persuasions are based on moral arguments and abstractions, in contrast to the more quantitative arguments of the developer. The activist largely doubts that the Soviet Union is the primary cause of the escalation; the U.S. is perceived as an integral—if not primary—partner in the arms race. He or she is faced with unresponsive policy-makers and a defense industry that has no interest in de-escalation. Thus, the activist believes that he or she is justified in doing his demonstrating here in the United States.

Activists will base their behavior upon a variety of mental paradigms. One is the opinion that nuclear weapons are a result of an oppressive system, namely, *"laissez-faire* capitalism," and that this oppression is equal to, if not greater than, that within the "state-capitalist" Soviet Union. Western oppression may be more due to economics than to totalitarian causes, but the end results are believed to produce just as much suffering. This is an important distinction. The activist will argue for moral symmetry

between the superpowers, whereas weapon designers tend (when pressed) to argue that the West is *relatively* more moral (or less immoral).

> ## *The developer tends to see the activist as naive in contrast to the "real world" of careers, making a living, avoiding poverty, and family responsibilities.*

Additionally, activists are suspicious of the information released through the mass-media, and of press releases by the government. They believe that the information is subject to management; that is, we as a population are "managed" by our government through information control. Therefore, activists will seek independent, allegedly more reliable sources of information. It is believed that rapid protest response, as in the April 1988 U.S. maneuvers in Honduras, is the most effective way to control foreign policy. The troops were deployed, and within three days there were nationwide campus demonstrations. Whatever the cause, the troops were withdrawn.

Caricature of the Developer
(as seen by the student campus activist)

In this section we offer a campus activist's view of the weapon developer. In general, the developer is perceived as "hawkish," even paramilitary. He or she is assumed to be fear-motivated, buying into the idea of Soviet expansionism as a threat to the West. Why does the developer still accept such a viewpoint, even though most activists are convinced that the threat ended years ago—if indeed there ever was a real threat? Largely it is thought to be due to propaganda—the "management" of information. This "information" protects U.S. interests, and, to borrow a slogan from a previous era, "makes the world safe for democracy." Largely, such slogans

are attributed to the developer, though they are produced by politicians. Further, the developer is seen as preserving his or her self-interests, trying to maintain job security and lifestyle.

Because of the insulation associated with his vocation, developers are seen as totally unresponsive to moral arguments. Further, developers seem to have a form of power which they are unwilling to submit to public debate or scrutiny. That is, they are perceived as having the power to influence policy in the arms race through personal input, but use this influence only to advance the arms race. A recent well-known example is Edward Teller, who is said to have sold the idea of a "Star-Wars" defensive shield to President Reagan in one private evening.[16] Also, sometimes the notion surfaces that the developer is merely a pawn in a system controlled by none (but sustained by the elite), privileged perhaps only to add or not add to the established political momentum, but unable to change its direction. Each side thinks that if the other only knew what it knows, the other side would change its position.

Venues of Change Available to the Developer

In this section we offer, from the perspective of the campus activist, some possible venues of change for the developer. As we stated in the introduction, it is agreed that both communities would prefer to move away from the "nuclear reign of terror," although activists are more likely than developers to believe that it can be induced by unilateral actions. The venues offered by the activist community take advantage of the developer's personal influence; that is, by using his or her "specialist-voice" to gain a hearing, he or she can speak to peers and access policy-makers.

Some lobby groups already exist to offer a forum for the technical professional to speak or work behind the scenes; e.g. Scientists and Engineers for Responsible Technology (SERT), or the Association

Table 1. History of Arms Control		
Date	Parties	Treaty Provisions
1100 BC	Israel and Philistines	Limited Use of Iron
201 BC	Rome-Carthage	No War Elephants
989/1150 AD	European Nations	Defined Non-Combatants (Peace & Truce of God)
1139 AD	Lateran Council	Prohibited Crossbow

for Responsible Dissent (ARDIS). There are associations of professionals who have united on the basis of common political views, such as Physicians for Social Responsibility, Union of Concerned Scientists, Computer Professionals for Social Responsibility, or Lawyer's Alliance for Nuclear Arms Control. Another avenue open to professionals is provided by the public policy advisory think-tanks, such as the pro-arms-control Natural Resources Defense Council. Many of these think-tanks are on university campuses. These organizations offer an opportunity for joint involvement between academicians and policy-makers, and they do have an influence on government policy. Developers could join and expand this "dialogue."

Acting individually, one could write to the newspaper editor or participate in forums, public and private. Topics on which the public is eager to hear an informed speaker include nuclear winter, just war, the moral use of nuclear weapons, and a

whole host of related subjects. A more radical course of action might include a work-strike or protest over involvement in nuclear development; the risk here is considerably greater because loss of employment can follow. From the perspective of the activist, commitment of this sort is vital if a civil protest is to be meaningful.

If a developer is not prepared for personal involvement he can simply donate to public-awareness groups. Bread for the World, which is only anti-war indirectly because of its theme of food instead of armaments for foreign aid, is a good example. He also can choose in advance how he will respond at a protest picket line. One serious option would be to return home and notify his employer of the obstruction. This response is similar to that asked of customers or other employees at a work-stoppage picket line. The difference, of course, is that the picketers usually come from elsewhere rather than from within the weapons plant. Per-

Table II. Arms Control Hypotheses

(1) *Bargaining From Strength*
Progress in arms control takes place only when:
  (a) The U.S. has the advantage.
  (b) Neither side has the advantage.
  (c) The Soviet Union has the advantage.

(2) *Genies in Bottles*
Meaningful constraints on any particular category of weapons can be achieved only if neither side:
  (a) Really wants the weapon.
  (b) Has tested the weapon.
  (c) Has invested heavily in the weapon.

(3) *Unilateral Restraint*
Unilateral restraint by the U.S.:
  (a) Induces reciprocal restraint by the USSR.
  (b) Induces counterproductive USSR action.
  (c) Increases likelihood of bilateral arms control agreements.
  (d) Decreases likelihood of bilateral arms control agreements.

(4) *Linkage*
The arms control process influences and is influenced by:
  (a) Soviet behavior in other policy areas.
  (b) American behavior in other policy areas.

(5) *Effect on Arms*
The arms control process and arms control agreements:
  (a) Redirect the arms competition in productive ways.
  (b) Codify existing defense plans.
  (c) Redirect the arms competition in counterproductive ways.

(6) *Uncertainties*
The arms control process and arms control agreements reduce uncertainties in estimates and projections of each other's forces.

(7) *Verification and Compliance*
  (a) The Soviets do not comply with the spirit or the letter of agreements.
  (b) The political requirements for verification and compliance are more demanding than security requirements.

(8) *Lulling*
The arms control process and arms control agreements:
  (a) Lull the U.S. into spending less than it should on defense.
  (b) Stimulate the U.S. to spend more than it should on defense.

(9) *Political Support*
  (a) Political support for an arms control agreement depends less on the provisions of the agreement than on other factors.
  (b) Congressional support for an arms control agreement depends upon the extent of Congressional participation in the process.
  (c) The public will support any negotiated arms control agreement.

(10) *Asymmetry*
The arms control process and arms control agreements serve the Soviet interest more than American interests.

haps this is one of the reasons that protest lines seldom, if ever, turn weapons lab employees away; they usually are impeded rather than deterred. On the other hand, public involvement is impossible to avoid because one's lifestyle reflects personal values—even in the simple examples of clothes and bumper stickers. At the very least, a disciplined and consistent reading program in the subject is essential for broad perspective and openness to change.

Venues of Change Available to the Student Campus Activist

The student can influence the arms race indirectly simply by choosing to work only for "socially responsible" organizations, as discussed in an article by Richard Bube.[17] In an earlier section, we described a booklet from the U.C.S.B. campus that attempted to influence engineering students away from arms development work. It would be safe to say that from the perspective of the developer, career choices in the humanities and arts tend to preclude one from insider participation in the technological aspects of national policy, and strongly correlate with anti-nuclear perspectives. On the other hand, a student can prepare himself academically for participation in one of the public policy think-tanks, or even choose a career with the government in the policy-making agencies. Most of the think-tanks will require advanced degrees, and probably some tenure in the arms control business.

Of course, the traditional organized protest demonstrations, marches, and blockades are available; but both authors (developer and activist) are questioning the efficacy of such activities, as alluded to previously. It is conceded, however, that public demonstrations do tend to bring instant media coverage, and therefore the publicity desired by the protestors. Such demonstrations contributed to bringing an end to the war in Viet Nam. Many of the venues of change suggested for the developer are also available to the student, and with less personal risk because he or she is less likely to be fired. Again, a disciplined and broad program of reading from both perspectives is essential.

Christian Perspectives

We now seek to bring biblical perspectives to bear on these issues. First let us deal with the traditional stereotype that is commonly applied and will continue to be applied, "Hawks" vs. "Doves." The Hawk believes, if the caricatures hold, that the primary cause of war is military weakness, tempting the militarily superior enemy to strike. The

worst problem to the Hawk is appeasement, with Munich as the classic example. The Dove, at the other extreme, holds that the primary cause of war is "saber-rattling;" the primary example is Pearl Harbor, where Japan allegedly saw the U.S. building up an invincible force, and the only option was to strike first in order to gain some kind of edge in the Pacific.[6]

The "Owl," on the other hand, "is a completely different kind of bird."[6] The Owl believes that there are many different paths to war, such as a complex set of political actions, or a problem that everybody wanted to back away from but could not or would not. The classic example is the circumstances leading to the outbreak of WWI. Escalation from conventional war to a nuclear war, rather than a sudden strategic strike, might fit within the Owl's concern.

Activists will base their behavior upon a variety of mental paradigms.

Each of these, Hawk, Dove, Owl, is a caricature, or stereotype, primarily applied to policy-makers. As Christians we have to remind ourselves that stereotypes are inadequate. We can't call each other commies, pinkos, war-mongers, or any other label and assume that we have honestly defined someone's views. We must avoid labels and treat people as individuals with worth and dignity, as Christ did. Jesus displayed all three of these characteristics at one time or another. Certainly, he seemed "hawkish" when he overturned the tables of the money-changers and drove them out of the temple with a whip,[18] and again when he said "I come not to bring peace but a sword. ... "[19] He appeared to be "dovish" by refusing to speak out in his own defense at his trial,[20] and the Sermon on the Mount is usually cited by Christian pacifists as a platform for their belief.[21] On the other hand, Jesus usually functioned as an "owl" in dealing with the lawyers, by responding to their questions with "neither-nor" answers.[22] In fact, he employed all three of these behavior types at some times and none of them at others. (Note: we must be cognizant of possible differences regarding applications. Some of Jesus' teachings clearly were addressed to individuals rather than states, whereas others have dual application.)

Let us re-focus on arms control. There is a long

history, dating back to biblical times, of attempts to limit the kinds of weapons that are legal. Table I gives some examples.

In this fallen world the effectiveness of an arms treaty depends upon whether we can verify compliance. Here is an area where a weapons developer can have a very direct input to policy. This is a crucial issue in today's arms control climate. Inability to verify compliance is likely to preclude ratification by the Senate. President Reagan's famous translation of a Russian proverb into "trust, but verify" reflects the approach to arms control of most of the advisors to the Reagan administration.[4,5] President Bush, in his Inaugural Address, expanded on this theme by stating that "great nations, like great men, must keep their word. When America says something, America means it, whether an agreement or a treaty or a vow made on marble steps."[23] President Bush may have been thinking of Matthew 5:33-37, where we are taught that our "yeas should be yeas and our nays should be nays." In other words, it should be enough for us to tell the Soviet Union, "Yes, we will abide by that treaty." But we are fallen; the need for verification illustrates the state of mankind. U.S. policy-makers tend to believe that the U.S. society is "open" and thus cannot cheat on an arms control treaty, because our action will be published in *Aviation Week* or debated in the newspapers.[7] By contrast, the Soviets are considered to be a "closed" society because the leaders are not accountable to the people. (In fact, the U.S. does insist upon more verification than the Soviets.)

Activists are suspicious of the information released through the mass-media, and of press releases by the government.

There are many approaches to arms control, depending upon what one believes about them. Conservatives in the U.S urge a cautious "wait and see" response to Gorbachev's *glasnost* and *peristroika* policies. A very helpful study was carried out in 1985-86 at Harvard University under the sponsorship of the U.S. Arms Control and Disarmament Agency; see Table II.[7] This study examined the beliefs held by an important participant or constituent in the arms control process and disbelieved by another. Some evidence can always be found to support one's beliefs. For example, if one is con-

vinced that bargaining from strength is the best basis for arms control, one is inclined to think that arms control progress takes place only when one side has the military advantage. The Harvard study identified ten questions relating to arms control, providing a helpful tool for understanding the debates.

Organized protest demonstrations, marches, and blockades are available; but both authors are questioning the efficacy of such activities.

Does unilateral restraint (Hypothesis #3) offer the best hope for stopping or reversing the nuclear arms race? For example, if the U.S. decided to cancel the S.D.I. program, would the Soviets offer a responding gesture? Hawks believe that the Soviets will take advantage of concessions by the U.S. The issue of asymmetry, whether military, economic, or geographic, poses another "assumption." Asymmetries certainly exist and might be "codified" by an arms control treaty. Asymmetries must be identified *a priori*, and quantified if possible, as part of arms control negotiations.

It is probable that arms control agreements succeed only when it is in the interest of both parties to maintain them. Scripture teaches that neither arms control nor nuclear deterrence will bring an end to world conflict. Conflict awaits regardless of what we do with arms control. The situation is analogous to squeezing a balloon. If we squeeze here, the balloon is likely to bulge out somewhere else. The U.S. Department of Defense has made "force modernization" an integral part of its approach to arms control. To some, this strategy is simply an excuse for continuing the arms race. Perhaps, however, efforts at arms control will postpone the final conflict prophesied in Scripture, thereby giving us more time to spread the Gospel. Alternatively, maybe the prophesied conflict will be rendered less damaging because of arms reduction. Perhaps the world will simply become a less dangerous place under the arms control agreements.

From the perspective of the Bible, peace is only available through righteousness. Various proposed "solutions" which do not recognize and address human sin will not be lasting solutions. Here we refer to personal as well as institutional sin. The topic of foreign policy based upon kingdom values

has been introduced by others.[13] Would anything differ if U.S. foreign policy were based upon pursuit of justice instead of economic self-interest? The Reagan administration maintained the belief that Western social and economic structures are not unjust, or at least are relatively more just; therefore, military solutions to defend them are appropriate. The *de facto* U.S. policy, in the opinion of the protesters, is to preserve and extend economic dominance. Economic growth, domestic or worldwide, is a fundamental capitalist thesis. Under this rubric capitalism may be called "expansionist."

Questioning authority can be biblically correct if it means that individuals are retaining responsibility for moral choices rather than defaulting all responsibility to authorities.

Christians, however, can and should involve themselves in government to bring about change, and Christians are called to be consciences of the state. Questioning authority can be biblically correct if it means that individuals are retaining responsibility for moral choices rather than defaulting all responsibility to authorities.[24,25] However, to the activist we say, before taking part in a civil disobedience-type protest, consider that God requires obedience to authority except under extreme circumstances. Disobedience must cause anguish; this can be a test. If there is no anguish, perhaps one's involvement is for some other reason than a biblical one. We ask the developer to consider that simply stating that "I don't make policy" does not accurately treat either his actual or potential influence. Each of the authors gained understanding about the other's peer group during the preparation of this paper. We suggest that dialogue of this sort, which seeks to identify underlying presuppositions, can provide a fruitful approach to defusing the hostilities between "establishment" and "anti-establishment" groups, and might even lead to some unification. ❖

NOTES

[1]Walter Slocombe, "The Countervailing Strategy," *International Security*, 5, 4:23 (Spring 1981).

[2]Lawrence Freedman, *The Evolution of Nuclear Strategy* (New York: St. Martins Press, 1983).

[3]Robert Scheer, *With Enough Shovels: Reagan, Bush, and Nuclear War* (New York: Random House, 1982).

[4]Strobe Talbott, *Deadly Gambits: The Reagan Administration and the Stalemate in Arms Control* (New York: Alfred A. Knopf, 1984).

[5]Strobe Talbott, *The Master of the Game: Paul Nitze and the Nuclear Peace* (New York: Alfred A. Knopf, 1988).

[6]Graham T. Allison, Albert Carnesale, Joseph S. Nye, Jr., *Hawks, Doves, and Owls: An Agenda for Avoiding Nuclear War* (New York: W.W. Norton & Company, 1985).

[7]Albert Carnesale and Richard Haass, eds., *Superpower Arms Control: Setting the Record Straight* (Cambridge, MA: Ballinger Publishing Company, 1987).

[8]Freeman Dyson, *Weapons and Hope* (New York: Harper and Row, 1984).

[9]Dan Caldwell, "Arms Control And Deterrence Strategies," *Deterrence In The 1980s: Crisis and Dilemma* (London: Croom Helm, 1985), pp. 183-202.

[10]Dan Caldwell, "Introduction to the Transaction Edition," *Arms Control and Disarmament Agreements* (New Brunswick: Transaction Books, 1984), pp. xi-xlix.

[11]Bernard T. Adeney, "Is Nuclear Deterrence Acceptable?," *Transformation*, 5, 1:1-8, 18-19 (Jan/Mar 1988).

[12]Dean C. Curry, "Beyond MAD: Affirming the Morality and Necessity of Nuclear Deterrence," *Transformation*, 5, 1:8-17.

[13]Joseph P. Martino, *A Fighting Chance: The Moral Use of Nuclear Weapons* (San Francisco: St. Ignatius Press, 1988).

[14]Kenneth A. Bertsch, Linda S. Shaw, *The Nuclear Weapons Industry* (Washington D.C.: Investor Responsibility Research Center, Inc. 1984).

[15]"Protesters Close Pentagon Entrance," *Pentagram*, Thursday, Oct. 20, 1988.

[16]Charles B. Stevens "The Controversial X-ray Laser," *21st Century*, January 1989, p. 44. See also "Lab Scientists Claim GAO Skewed Views," *Valley Times* (Livermore, CA) Friday, February 24, 1989, p. 1A.

[17]Richard H. Bube, "Crisis of Conscience for Christians in Science," *Perspectives on Science and Christian Faith*, 41, 1:11-19 (March 1989).

[18]John 2:12-17; Mark 11:15-18.

[19]Luke 12:49-53.

[20]Matthew 27:12; Mark 15:5.

[21]Matthew 5:3-13, 38-48.

[22]Luke 20:20-28; Mark 11:13-17; Matthew 22:13-22.

[23]President George Bush, Inaugural Address, January 20, 1989.

[24]M. Scott Peck, *People Of The Lie: The Hope for Healing Human Evil* (New York: Simon and Schuster, 1983).

[25]Charles S. Colson, *Kingdoms in Conflict* (William Morrow/Zondervan Publishing House, 1987).

Does Scripture Support Standardized Testing?

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A standardized test involves observations of an individual's behaviour made under specified conditions for the purpose of meaningfully comparing it with that of other people. Because of the very extensive use of these instruments, a storm of criticism has arisen and a great deal of misunderstanding surrounds them. While the critics have often been right, standardized tests do yield information which can facilitate good decision making. Provided we have a clear understanding of their limitations and we use them with a view toward service, standardized tests may indeed help to move us toward the goals of justice and equity.

Tucked away in the seventh chapter of the book of Judges, the Bible recounts a fascinating tale of personnel selection. Having received assurance through his "fleece test" that God intended to use him to deliver Israel, Gideon assembled an army of some 32,000 men to face the Midianite hordes. Unfortunately, God said that he had too large an army to do the job since the Israelites would be inclined to take the credit for victory. In the first stage of the selection process, one with considerable face validity, all those who admitted to being fearful were dismissed! As a result, only 10,000 remained. However, God evidently wanted a hand-picked group, since the results of the second stage of the process were even more dramatic. Gideon was instructed to bring the 10,000 would-be warriors to the water's edge. Those who passed this behavioural test by lapping water from cupped hands numbered a mere 300 men—the exact number God needed to effect a remarkable victory.

A few pages later in the same book (Judges 12) we find the less familiar record of a selection test with absolutely dichotomous outcomes—life or death. To determine the truth or falseness of an Ephraimite's denial of his tribal identity, Jephthah's men simply asked their suspect to say the word "Shibboleth" aloud. If he was unable to correctly pronounce the initial "sh" sound, he was judged to be lying; 42,000 unfortunate victims failed this decisive test on that occasion.

These two accounts illustrate the fact that procedures we would now categorize as "psychological testing" are not an invention of the current century. Nor are they unique in ancient times to the nation of Israel. Philip DuBois (1976) documents the extensive use of achievement testing in China over a period of 3,000 years. Though the content and some of the procedures involved were gradually modified, their basic purpose of selecting persons suitable for public office was retained. As early as 1115 B.C., candidates were required to demonstrate proficiency in the five essential areas of mathematics, music, archery, horsemanship, and writing. In a later era, moral qualities of integrity and piety were also taken into account, along with knowledge of law, finance, geography, agriculture, and military matters.

While psychological testing is clearly not a new phenomenon, its systematic and extensive application has been a prominent feature of only the present century. Unlike the significant though limited use of examinations by the ancient Chinese, in our culture there are tests for nearly every conceivable pur-

pose, and practically everyone's life is influenced in one way or another by these devices. It has been estimated that over 2,500 different psychological tests are currently in use in the United States, and that more than 200 million copies of these tests are marketed annually (Weiner & Stewart, 1984). The Scholastic Aptitude Test alone, faced as part of the admissions ritual by applicants to many North American colleges, is taken every year by more than 1.5 million hopeful high school graduates (Chance, 1988). Comprising some 200 multiple choice questions and taking three hours to complete, the SAT is designed to measure abilities in both mathematical and verbal areas. As a group, these students pay over $20 million for the privilege of enduring these three hours of sweat and toil.

It is evident that standardized psychological tests are a major component of twentieth-century North American culture. Despite persistent criticisms of tests and their creators, it is almost certain that they are here to stay. It therefore behooves us to be informed as to their nature and influence, and to thoughtfully evaluate the significant role they play in our lives.

The Nature of Standardized Tests

A good deal of confusion surrounds the development and use of psychological tests. While a definition will not solve the problem completely, it may provide a helpful starting point. A fairly typical one is given by Lee Cronbach (1984) in his widely used text *Essentials of Psychological Testing*: "A test is a systematic procedure for observing behaviour and describing it with the aid of numerical scales or fixed categories" (p. 26). Probably the key word in this statement is "systematic." We frequently observe and describe other people's behaviour, even using numbers to do it (e.g. "a 110% effort"), but seldom is the whole process an orderly one. Consequently, the results obtained are of fairly limited value.

Fundamentally, a test involves observing and recording a sample of someone's behaviour. The purpose of the observation is to determine the amount of a particular characteristic (extroversion, numerical skill, etc.) possessed by the individual. In order to make this kind of inference with any confidence, the observations need to be made in at least partially controlled or specified circumstances. For example, if records of how much talking different people do to others around them are sometimes taken in shopping malls, sometimes in staff lunch rooms, and sometimes at birthday parties, the results are not comparable and the observations tell us less about the individuals we are testing than about the situations they are made in. In order to achieve interpretable observations, test users typically examine the behaviour of different people in fairly similar settings.

This characteristic of making the observations in prescribed environments is what gives rise to the notion of "standardized testing." Many observations of behaviour are intended to infer something about the individual, but lack this quality of transferability. For example, the exam I give to my Introductory Psychology class is designed to help me determine how much of the discipline each of the students has understood and retained. However, the specifics of this exam reflect the textbook we use, the additional readings I assign, the tone of class discussions, and the special emphases I make in my lectures. Thus, it is not particularly suitable for someone else's Introductory Psychology class, nor even for my own class on another occasion. My exam lacks standardization, or the characteristic of being designed and administered so as to make results obtained at different times and in different places more meaningfully comparable. Without doubt, standardization is a matter of degree; some tests have nation-wide applicability, while others are of more limited local use. Tests created and used by teachers and professors for their students are not generally regarded as standardized tests.

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Rather, this term is reserved for those instruments that are developed, published, and made available for more widespread use. Though many of the same ingredients are needed to create good tests for classroom use, the focus of the present discussion is on standardized testing.

Procedures we would now categorize as "psychological testing" are not an invention of the current century. Nor are they unique in ancient times to the nation of Israel.

In addition to being standardized to different degrees, published tests also vary widely in the domain being assessed as well as in the quality of the instrument. The realm of testing is often divided into the cognitive and non-cognitive domains, reflecting evaluation of abilities and achievement in mental functioning on the one hand, as opposed to variations in personality traits, interests, attitudes, and beliefs on the other. The former are somewhat more clearly defined, and right or wrong responses can readily be specified. The ability areas are hence easier to measure meaningfully. The personality and interest domains involve characteristics that are inherently fuzzy and elusive, making their assessment particularly hazardous. Tests of these characteristics are generally of lower quality psychometrically than are measures of ability.

Beyond these two traditional realms of assessment lies the whole area of situational testing in which the context of evaluation is quite similar to what one encounters in daily life. Examples would be the practical portion of a driver's licence exam or a test given to police recruits in which we systematically record their ability to notice details during simulated job activities.

Published tests are generally evaluated on three major criteria. The first, standardization, reflects the extent to which the instrument can be meaningfully employed in a variety of times and places. This depends on the care with which the test has been constructed and the adequacy of the normative data available. Norms provide the basis for score interpretation. The second and third criteria, reliability and validity, require some further comment.

To the extent that the scores produced by a test

are accurate or consistent, we have a reliable measuring tool. A tape measure, for example, is a reliable measure of a person's height since multiple measurements of the same individual taken at various times and different places will yield results that are very nearly equivalent. Similarly, an IQ test which yields a score of 106 is relatively reliable if the same person earns 108 next week, but not very reliable if he/she scores 131 on a subsequent occasion. Although reliability reflects how much a person's score would vary across different testing occasions, it is usually determined by retesting a whole group of people and noting the extent to which the ordering within the group (best, second best, third best, etc.) is preserved. Further details of how reliability is estimated and what affects it are discussed in numerous books on testing (see for example *Essentials of Psychological Testing* by Cronbach). For our present purposes, it is to be emphasized that reliability is a criterion by which some tests look fairly good and others are seriously lacking.

The most crucial ingredient of a good test is validity. It can be simply defined as the extent to which a test measures what it claims to measure or achieves its stated purpose. For example, if a test is marketed as a tool for selecting used car salespeople and those who pass it sell three times as many cars under similar conditions as those scoring below a designated minimum grade, the test's claim to predictive validity is warranted. On the other hand, if an intelligence test purports to measure innate general reasoning ability, but more specifically reflects familiarity with middle class Western culture and experiences, it obviously lacks validity. The diversity of ways in which validity is assessed is beyond the scope of our present discussion, but always relates to the test's fulfillment of its stated purpose.

It has been estimated that over 2,500 different psychological tests are currently used in the United States, and that more than 200 million copies of these tests are marketed annually.

It should be emphasized then, that while tests typically attempt to ascertain the amount of some particular mental or psychological characteristic an individual possesses, the extent to which this objective is in fact reached varies widely from test to

test. No available test is perfectly reliable, and certainly none is completely valid. We must not lose sight of the fact that every test, no matter how prestigious, is a fallible measuring tool. It may provide us with useful information we would not otherwise have, but it neither magically nor perfectly reflects a person's inner qualities. It simply gives a basis for more meaningful inferences from behaviour than we would otherwise have.

Controversy Surrounding the Testing Enterprise

While there have always been critics who question the value of tests, in the past three decades a veritable tempest of controversy has arisen over their use. One of the earliest attacks entitled *The Tyranny of Testing* (Hoffman, 1962) was a lucid and engaging critique of objective testing in the cognitive domain. Hoffman was particularly unhappy with objective items such as multiple choice or true-false whose objectivity he regarded as illusory, residing only in the scoring process. He argued forcefully that these items ignore the quality of the reasoning behind an answer, thus seriously penalizing the more capable student. To support his position, he cited numerous examples of items (all drawn from well-known published tests) which could be interpreted in a variety of different ways. In Hoffman's view, objective tests have a useful but strictly limited place, testing relatively simple factual information well, but achieving greater difficulty largely through increased ambiguity and tapping higher cognitive functioning very slightly, if at all.

> *If an intelligence test purports to measure innate general reasoning ability, but more specifically reflects familiarity with middle class Western culture and experiences, it obviously lacks validity.*

Adopting a similar stance, Martin Gross (1962) published a telling indictment of personality testing in a fascinating volume entitled *The Brain Watchers*. The main target of his attack was the lucrative personnel selection industry in which a wide range of personality tests were being peddled as having almost magical powers to identify the best potential employees. He made the point that

frequently the selection process becomes a challenging game in which applicants must identify particular characteristics the tester is looking for, and respond accordingly. The claims made by test-users were elaborate, inflated, and largely unfounded, particularly since faking is known to be a very real phenomenon. The author's own conclusion, in the light of evidence that psychometricians were well aware of the tests' limitations, was not particularly complimentary: "The reticence of these scientist-psychologists has been ably mated to the huzzas and profitable hoopla of their brain-watching colleagues and the slothful ignorance of industry—into a formidable cult that operates only through the grace of many who should know considerably better" (Gross, 1962, p. 275).

> *In their zeal to point out the weaknesses of standardized tests, many critics have allowed strong emotion to take precedence over clear thinking.*

During the past twenty-five years, a variety of other critics have entered the fray and numerous recurring complaints have surfaced, accompanied by the responses of test supporters. Many of the concerns, such as those regarding unfairness to minority groups, false claims of identifying innate ability, and invasion of privacy, have their primary application in the area of intelligence testing. Lyman (1986) identified eight common complaints, noting elements of both fact and fancy in most of these. For example, it is evident that no test measures innate ability in its pure form, though the degree to which particular experiences will affect performance varies widely from test to test. Further, there is an element of cultural bias in most, perhaps all tests of ability, even if they carry the label "culture-fair." The critics have something important to say, and test-makers would do well to pay attention to them.

However, in their zeal to point out the weaknesses of standardized tests, many critics have allowed strong emotion to take precedence over clear thinking. As a result, their accusations have at times been badly overstated and quite indefensible. Rudman (1982) reviewed a number of commonly made criticisms of standardized testing and attempted to evaluate the data upon which they are based. Though his own commitment to testing undoubtedly biased his interpretations, he made a good point in challenging Hoffman's charge that tests

discourage creativity and penalize the better students. He responds: " … tests are treated anthropomorphically; they are given human qualities. They are assigned the ability to group children, determine their future, support children's goals, dampen creative urges, help children become dishonest, and even undermine the very foundations of education" (Rudman, 1982, p. 221). Rudman went on to argue that, in fact, tests do none of these things; rather, the teachers and administrators who make decisions are responsible if these consequences do occur. In other words, the problem is more in the interpretation and use of the test results than in the test itself. This is a significant point to which we shall later return.

> ## The problem is more in the interpretation and use of the test results than in the test itself.

Reflecting on the range of objections that have been raised concerning the use of standardized tests, what reasonable conclusions can be drawn? First, it should be pointed out that the critics have successfully and legitimately dampened the over-enthusiastic zeal of test producers who in their passion to create and market tests have often made extreme and ill-founded claims on behalf of their favourite instruments. One general and very positive impact of the critics, then, has been to force test publishers to be considerably more modest and realistic in how they present their product. This is clearly illustrated in the area of intelligence testing. Van Leeuwen (1982) made the case that it was evident to the early developers of IQ tests that these instruments were in fact culturally relative, but due to their interest in the eugenics movement, they chose to emphasize the innate nature of mental ability. Claims about the permanence and pervasiveness of intelligence were then made, but the evidence over the years has not supported these claims. In his review of recent conceptualizations of intelligence, McKean (1988) notes that the early view of mental ability as a unitary genetically determined trait is becoming progressively less popular. Current theorists emphasize both the diversity and the cultural variation in the concept of intelligence.

But many of the critics are not satisfied with scaled-down claims of what the tests can do. Some of them demand the total abolition of testing, at least of standardized, objective testing. Active debate on this matter continues to the present time and will certainly not be resolved in a few pages. However, one relevant point should be raised at this juncture. If tests are viewed (as I believe they should be) as sources of input for decision-making, then it is an undeniable fact that whether or not tests are used, decisions will still be made. Universities with limited space must accept some and reject other applicants. Employers must sift through the pile of applicants and decide which ones will be hired. Educational funds must be allotted to some and withheld from other children with special needs. Many of the attacks on testing reflect a naive assumption that if the tests are no longer used, then the plague of innappropriate decisions will be terminated. We need to ponder the question as to whether decisions made in the absence of the information provided by appropriate tests will be more equitable, or whether greater unfairness will in fact occur.

A Preliminary Christian Perspective

Having explored something of the nature and scope of standardized testing, and having briefly considered the evaluation made of it from various quarters, we now reflect on the implications which a Christian world view may have for this facet of psychology. What difference does a uniquely Christian perspective make when we examine standardized tests?

> ## One general and very positive impact of the critics, then, has been to force test publishers to be considerably more modest and realistic in how they present their product.

So far as I am able to discern, relatively little has been written in this regard; thus, we are venturing into uncharted territory. One helpful perspective has been provided by Van Leeuwen (1985) in her evaluation of the cognitive movement in which she addressed the concept of intelligence. She finds the whole notion to be heavily biased by a Western emphasis on formal operational thought and by measurement tools which are inherently culture bound. The fundamental concept of the fear of God (closely related in scripture with the idea of wisdom) is missing in our understanding of intelligence, which is therefore probably not very close to the core of what the image of God comprises (p. 174).

The Bible has little—either positive or negative—to say about people of low intelligence, but speaks frequently of the "fool" as one who is devoid of moral fibre. Thus, intelligence and wisdom do not seem to be closely related.

> *The Bible has little—either positive or negative—to say about people of low intelligence, but speaks frequently of the "fool" as one who is devoid of moral fibre.*

While these reflections are valuable, they are exclusive to intelligence, only one of dozens of traits which psychometricians seek to measure. If we were to remove from use all measures of intelligence, the numbers of available standardized tests would be only modestly reduced. What of the remaining hundreds of tests of mechanical ability, dominance, attitudes to authority, and so on? I propose to organize some thoughts in this regard in the form of responses to three fundamental questions:

- Is it appropriate to evaluate people?
- Is justice increased or reduced by standardized tests?
- In our use of tests, is our goal to serve or to be served?

Is Evaluation Appropriate?

While it would be possible to interpret Jesus' words in Matthew 7:1-2 as precluding our judging or evaluating one another, the thrust of this passage seems to be directed toward a censorious attitude often inherent in the critical assessments we make of others. Furthermore, the need for evaluation is affirmed in other passages. For example, in I Timothy 3 and Titus 1, criteria are laid down for the selection of elders and deacons. These passages do not specify how these criteria are to be implemented, though an intimate personal acquaintance with the candidate seems to be assumed. The situation, however, is somewhat parallel to a job selection in which tests are currently so often used. I see nothing in these passages to rule out the use of tests, provided they help us implement appropriate criteria more effectively.

If evaluation of other people is not only tolerated but actually in some cases authorized and required, then the merits of using tests to facilitate the process need to be considered. Personnel selection is only one of numerous situations in which these sorts of selections must be made, and while tests must not predetermine our selection criteria, they may, when properly applied, facilitate the application of these criteria. Nor, I believe, does the use of selection tests preclude a recognition of our need for divine wisdom in making such decisions. If God's intentions were revealed in times past through the equivalent of dice, then surely standardized tests can serve that function as well!

Is Justice Increased?

There is little disputing that a fundamental theme of scripture is equity and fairness, and that justice is close to the heart of God. Speaking of God in Deuteronomy 32:4, Moses declares: "All His ways are just." The Psalmist frequently appealed to God when he saw unfairness around him (e.g., Psalm 82:2), confirming his belief in God's justice. Furthermore, our essential human duty is described as the responsibility "to act justly, to love mercy and to walk humbly with your God" (Micah 6:8). Clearly, then, we cooperate with the purposes of God when our activities enhance the process of fairness in human relationships.

The question begging an answer is, "Do standardized tests contribute to the achievement of justice?" Obviously, when tests used for selection purposes are biased against people of certain races, social strata, or cultural background in ways that do not relate to successful performance of the task at hand, they are inappropriate. To discern whether or not this is occurring is of course difficult, but clearly the issue of test validity surfaces as a very critical one. Tests of moderate or low validity should be either dropped or used in such a way as to weight their influence in accordance with their limited validity, making way for consideration of other factors of greater potential value. Furthermore, the criteria in place for the determination of test validity need to be closely examined in the light of the goal of equity.

> *If God's intentions were revealed in times past through the equivalent of dice, then surely standardized tests can serve that function as well!*

Clearly, then, we cooperate with the purposes of God when our activities enhance the process of fairness in human relationships.

It is perhaps appropriate here to add a comment in support of standardized tests, a point often overlooked by zealous critics of testing. Given that people are prone to bias and often consciously prejudiced against specific subgroups, we need to consider the possibility that tests may in fact increase justice because they are constructed with deliberate intent to avoid elements of unfairness to minority groups. As Novick contends, "the proper use of well-constructed and validated tests provides a far better basis for making decisions about individuals and programs than would otherwise be available" (Novick, 1984, p. 15). While not all tests are well-constructed, and many are improperly used, it seems likely that judicious application of the better ones will lead to decisions that are more equitable than those based on the personal judgement of people who may have difficulty suspending their own values and views. In both the development and the selection of tests for all uses, the minimization of bias and the achievement of justice need to be given priority. When a test does not contribute to the realization of these goals, it should be eliminated.

Is Our Goal to Serve?

One of the recurring concerns articulated by critics of tests is that tests and their creators often wield too much power (Hoffman, 1982). They become masters rather than servants. There is no doubt that testing is a lucrative business, estimated to produce revenues of $60 million annually (Weiner & Stewart, 1984, p. 183). Its economic implications, for the companies involved, if not for society as a whole, are very substantial. Consequently, in their enthusiasm to market a successful product, test developers are inclined to paint an overly rosy picture of what their particular instrument is capable of doing. Likewise, test users whose motivation is one of efficiency and economic advantage are likely to employ tests in a self-serving way with little regard for the welfare of candidates or applicants involved.

It is in this context that I believe a crucial Christian distinction arises. The point which Farnsworth (1985) made with regard to the need for an orientation to service rather than to personal advantage

in the applied area of counselling has, I believe, equal if not greater relevance to the whole business of standardized testing. In all of our creating, selecting, and using of these instruments, the goal of organizational efficiency and economic gain needs to be balanced by a genuine concern for the welfare of the persons being tested. This will have at least two implications. First, considerable care will be taken in communicating both the results and the limitations of the testing process to clients so that they can gain useful self-understanding from their experience. These discussions will assist the test-taker to know how best to invest his/her unique abilities and characteristics, as well as to enable the organization to more effectively deploy its human resources. Secondly, the goal of economic advantage alone will be an insufficient basis for administering a test. We will establish as a minimum criterion for test adoption the requirement that some benefit accrue to the individual as well as to the organization.

Concluding Reflections

It is perhaps by now evident that this author does not see as a viable resolution to the problems surrounding the use of standardized tests the proposal that we simply abolish them. Such a suggestion is rooted in the naive assumption that these problems run no deeper than the test instruments themselves. A standardized test is a tool; relatively neutral in itself when appropriately constructed, but with potential for both use and abuse.

We need to consider the possibility that tests may in fact increase justice because they are constructed with deliberate intent to avoid elements of unfairness to minority groups.

Perhaps one of the reasons that tests have so often been misused is that in this context there is danger rather than safety in numbers. As has been aptly pointed out (Shelley & Cohen, 1986), when we attempt to describe human traits in terms of numbers, two problems tend to arise. First, quantification may usurp the original goal of accurate description and become an end in itself. Secondly, when results are reported in terms of numbers, a deceptive aura of precision surrounds them. This causes us to place more credence in the results than

may be warranted, and to forget more quickly that the test score is only an approximation of the individual's true score on that trait. We need to remind ourselves frequently of what tests can and cannot do.

This author does not see as a viable resolution to the problems surrounding the use of standardized tests the proposal that we simply abolish them.

Armed with this word of caution however, we must also avoid the other extreme of blaming tests unduly. Jenifer (1984), in making the distinction between the messenger (the test) and the message (the result obtained by a particular individual), wisely reminds us that we should not blame the messenger when the message is an unwelcome one, provided it is an accurate reflection of reality. This of course brings us right back to validity once again. Tests which have been demonstrated to fulfill their stated purpose can and should be used to the degree warranted by their validity, with appropriate interpretative caution.

The key to beneficial use of standardized tests is to be aware of both their capabilities and their limitations, thus avoiding overinterpretation of the results. In this regard, the conclusion stated by Ravitch (1984), though directed mainly to achievement testing, is well worth quoting:

> In sum, there can be no doubt that the tests have their uses as well as their misuses. The standardized test must always be seen as a measuring device, an assessment tool, never as an end in itself. The skills that it measures are important, but it does not measure every important skill. The information that it gives us about the state of a student's learning is never definitive but only tentative and subject to future change. Above all, we should not permit the standardized test to become the be-all and end-all of educational endeavour; we send our children to school not to do well on tests but to become educated people, knowledgeable about the past and the present and prepared to continue learning in the future. (Ravitch, 1984, p. 67)

If we keep this perspective in mind, we can appreciate standardized tests but not be awed by them. We can use them rather than misuse them, and they will serve us rather than oppress us. ♣

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Divine folly is wiser than human wisdom, and divine weakness stronger than human strength.

—from I Corinthians 1

Chiasmic Cosmology as the Context for Bioethics

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The development of biomedical technology has introduced new ethical questions and has sharpened some old ones. It is not obvious that old ways of formulating Christian ethics are adequate to deal with these questions. I first sketch two approaches: (1) "code ethics," and (2) "situation ethics," and point out some of their limitations. My main purpose is to consider bioethics in the context of chiasmic cosmology, which views the universe in terms of Luther's theology of the cross. This emphasizes the biblical understanding that God's work is characteristically done with the appearance of weakness, hidden under the form of its opposite.

Chiasmic cosmology is presented, and some of its general implications are drawn out. In this setting, I then look briefly at abortion, the use of life support systems, and genetic engineering as representative issues of bioethics.

Introduction

The development of science and technology almost automatically carries with it new ethical questions and challenges to some traditional ethical presuppositions. This is because such development creates new possibilities for human action. In the biological-medical area, such things as genetic engineering, organ transplants, or maintenance of bodily life for those who are brain-dead simply were not possible when traditional ethical systems were formulated, and it is not obvious *a priori* that those systems will be able to deal easily with the questions which new practices raise.

Perhaps traditional ethical concepts will be found adequate, but in a time of rapid change and new concepts it is wise to examine our foundations. The purpose of this paper is to look at the fundamental ideas which should undergird Christian ethics, especially with regard to bioethics.

I will look briefly at two broad approaches, "code ethics" and "situation ethics," and will note some of the difficulties they have in dealing with questions introduced by modern biology. As one solu-tion to the problem, I suggest adoption of a view of the universe which sees the Creator present first of all *as the crucified One*—chiasmic cosmology. With this approach, bioethics can also be kept closely in touch with other areas of the science-theology dialogue.

Approaches to Ethics

Of course the literature on ethics in general, and on Christian ethics in particular, is vast.[1] Here we will only look quickly at two other approaches before focusing on that associated explicitly with the theology of the cross.

The oldest and simplest approach refers ethical questions to an authoritative moral code, so that we may speak of *code ethics*. In the Judeo-Christian tradition the Ten Commandments would form the core of such a code. Any serious type of Christianity has seen the Ten Commandments as an important

part of divine revelation, though different parts of the Christian Church have often been in disagreement over the role of this code, from Paul and the Judaizers in Galatia to the present day.

Ethics based on the Ten Commandments can be simple and straightforward. "Thou shalt not kill"— no ifs, ands, or buts. We have an unambiguous apodictic law.

But application of the commandments is not always straightforward, as has long been recognized. What am I do to if I can save one person's life only by killing another? What if I can keep one commandment only if I violate another? "Thou shalt not kill" is not regarded in the Bible as an absolute prohibition against all taking of human life, for killing in war and self-defense is sometimes seen as legitimate.

What do the Ten Commandments tell us in the case of a pregnant woman with uterine cancer whose life can be saved only by the removal of the uterus, with consequent death of the fetus? If one believes that the fetus receives some protection from the Fifth Commandment[2] then there is no way to avoid violating this precept.

This is simply a modern version of an old ethical dilemma, and could be dealt with by various types of argument. But modern biology raises other issues to which it is hard to see even how to apply the moral code. It does not answer such questions as:

- When does the fetus become a person?
- When does death occur?
- Should we alter the genetic makeup of a human being?

And this is hardly surprising. Such things as genetic engineering were not even imagined by ancient Israel. Noting this fact involves no denigration of the authority of the Ten Commandments, but we do have to recognize that the ethical codes of the Bible do not give explicit answers to all the questions which face us.

Not all the laws in the Pentateuch are apodictic. There are many casuistic "If ... then ... " formulations, such as those found in Exodus 21-23. But while these refer to particular situations, they still apply a code to those situations. It is a much more radical departure from code ethics that has come to be called *situation ethics*.[3] With this approach there is no appeal to an authoritative code like the Ten Commandments. What is wrong in one situation—ending a human life, sexual intercourse, etc.— may be right in another. One must decide how to act in each concrete setting, guided by the need to show loving concern in that situation.

Certainly love is to be a fundamental element in Christian behavior. Jesus gave the "new commandment" to love one another (John 13:34), and St. Paul says that love of neighbor is the fulfillment of the law (Galatians 5:14). But who are all the people to whom love is to be shown? How is love to be put into practice? (Our concern for another person's welfare will, for example, be shown in different ways depending on whether or not we believe that there is any hope for life after death.) There must be something to guide the application of love in different situations. Without such guidance, situation ethics could degenerate into a disconnected series of arbitrary responses.

My purpose here is neither to try to eliminate the Ten Commandments as authoritative guides nor to deny that responsible behavior must to some extent be situational. We do want to look in a different way at the basic Christian understanding of God's relationship with the world in order to see how we are to relate to God and to the rest of the world. The picture of God as the divine lawgiver is neither the most general nor the most profound

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Christian image of the way in which God deals with the universe, and it does not give the clearest answers to some of our basic questions. If our questions are, "What does it mean to be human?" and "How are we to treat other human beings and the rest of creation?" then our answers must be informed by the Christian understanding of who the human *par excellence* is (*Ecce homo*), and by the way in which God deals with the creation.

Chiasmic Cosmology

How does God deal with the world? God's typical manner of working is *hidden* or *disguised*. God's good work is done under the form of its opposite. God Almighty says, "My strength is made perfect in weakness" (II Corinthians 12:9). This takes place throughout the biblical story, which comes to a head in the cross of Christ. The cross is the characteristic sign of God's work.[4]

I suggest adoption of a view of the universe which sees the Creator present first of all **as the crucified One**—*chiasmic cosmology.*

Only God's revelation is able to show us that God is active in this cruciform work, for sinners, cut off from God, assume that God Almighty must work in ways which *they* consider appropriate for omnipotence. Luther summarized this fundamental distinction by speaking of "the theology of the cross" and "the theology of glory."[5]

> That person does not deserve to be called a theologian who looks upon the invisible things of God as though they were clearly perceptible in those things which have actually happened. (Romans 1:20)
> He deserves to be called a theologian, however, who comprehends the visible and manifest things of God seen through suffering and the cross.
> A theologian of glory calls evil good and good evil. A theologian of the cross calls the thing what it actually is.

This fundamental insight which comes from the cross and resurrection of Christ is especially important for us today as our understanding and control of the universe continue to grow. It tells us how we are to discern God's presence in that universe which we explore, and thus provides a distinctive answer to the problem of natural theology. Using imagery from Plato and St. Justin Martyr, I have

called this approach, which sees God "placed crosswise in the universe," *chiasmic cosmology.*[6] And it is chiasmic cosmology which, I believe, should be the context for our considerations about bioethics.

Before examining some specific illustrations, I will spell out a few general implications of the theology of the cross. These will be helpful in our later discussion.

First, it should be emphasized that God *generally* acts in this crosslike way, and not only in the death of Jesus of Nazareth. That is the focus of God's work, to which all else is connected. Creation "in the beginning," biological evolution through natural selection, the Exodus, virginal conception, the justification of sinners, and the hope of resurrection all bear the mark of the cross. Romans 4 is especially relevant here.

This shows that God can and does bring good out of evil, life out of death, and joy out of suffering, because God is the One who creates *ex nihilo*. God's work is accomplished in spite of the lack of creaturely possibility.

God identifies with the weak and the helpless. This is quite literally the case in the Incarnation. The Son of God takes on existence as an embryo, as a refugee, as one who is persecuted. He is identified with sinners, suffers, and dies. In recounting the healing ministry of Jesus, the Gospel of Matthew interprets it as part of the fulfillment of the Suffering Servant prophecies of II Isaiah: "He took our infirmities and bore our diseases" (Matthew 8:17; cf. Isaiah 53:4). The healer is not described as one who stands outside the process of suffering, but as one who is effective through participation in it.

The oldest and simplest approach refers ethical questions to an authoritative moral code, so that we may speak of **code ethics.**

There is one more point which is important in decision making. God's justification of the ungodly is the same type of *creatio ex nihilo* which is seen in the cross and resurrection of Christ (cf. Romans 4:5 & 17). A theology of glory is likely to assume that a person's value depends upon that person acting according to certain ethical standards, so that status before God would depend upon behaving

virtuously. That is, of course, the basic idea of "works righteousness," standing in antithesis to the doctrine that one's status depends entirely on being forgiven by God and clothed with the "alien righteousness" which comes through Christ and is received by faith.

> *We do have to recognize that the ethical codes of the Bible do not give explicit answers to all the questions which face us.*

Before we make any moral decisions at all, we are accepted by God. When confronted with hard choices, it is necessary to pray and study for guidance to decide wisely. In the medical field such decisions cannot be taken lightly, for they are often literally life and death decisions. But Christians are free to finally go ahead and make decisions without having the assurance that they *are* right. They need not be paralyzed and rendered helpless by a need to be right. Christians can be confident that they are God's people whether they made the right decision in a given case or not. We are not justified by our correct choices, but by the death and resurrection of Christ.

Some Problems of Bioethics

Chiasmic cosmology does not provide a precise calculus for the solution of ethical problems, but we have just made the point that even to expect such a moral calculus would be to lapse into a theology of glory. In any given setting, the guidance of the moral law and the needs of the people involved must be taken into account. But if the situation is viewed in the light of the cross, we may be helped to see the will of God in ways that appeals to the Decalogue or to love might not reveal.

Abortion

We may begin with the question of abortion. This is not a new issue introduced by modern medicine,[7] but it is a major ethical problem today, and modern medicine has greatly expanded our understanding of the character of fetal life.[8] The Bible does not explicitly answer such old and basic questions as those concerning the time of "quickening." Thus, it has not been uniformly held in the Christian tradition that life begins at conception.

But we receive a fundamental insight from the classical doctrine of the Incarnation. Against all adoptionist ideas, this holds that there never was an independent human person in Jesus Christ. The personal centering of both his human and his divine nature is the person of the *Logos*. From the time that he was conceived, the One borne by Mary was the Son of God (Luke 1:26-45, Matthew 1:20-21).

Fetal life is certainly not full, complete human life. It is human life at its weakest and most helpless. And the Incarnation shows that the biblical God who is especially concerned for the poor, for the fatherless and the widow (Psalm 68:5), identifies precisely with human life in its weakest and most helpless state.

This means, at the very least, that we are to be concerned about the life and welfare of the unborn. It does not imply that the fetus has an absolute right to life which overrides concerns about the mother's health. But it does mean that a woman's right to control her body cannot be absolutized at the expense of the fetus.

Life-Support Systems

At the other end of life, concerns about the appropriate use of life-support systems, "death with dignity," "right to die," "quality of life claims," and euthanasia loom large. Medical technology has made it possible to maintain body functions in many cases long after there is any possibility of a return to conscious life. Voices are being raised in the medical community in favor of allowing, or even facilitating, death in some cases when life could be maintained.[9] What does the theology of the cross have to tell us about such concerns?

> *There must be something to guide the application of love in different situations. Without such guidance, situation ethics could degenerate into a disconnected series of arbitrary responses.*

As we might expect of a rather broadly defined theology, it will not always give precise "Yes" or "No" answers in specific cases. But it will suggest some boundaries for ethical practice.

In the light of the cross, suffering is not a pointless evil, even when we are unable to see any hope

for health or life. This is precisely the meaning of the resurrection of Christ—that the cross, which to ordinary understanding seems foolish, is the way in which God brings hope (I Corinthians 1:18-31, Romans 4:18). The cross is the instrument by which God defeats evil (Colossians 2:15). Suffering is therefore not something to be avoided at all costs. In some cases we are able to see the point in suffering, and we may then speak of discipline or of the building of character. Then there is some commonality between Christian and, for instance, stoic ethics. But the theology of the cross goes deeper. Even when we feel no hope and do not see how anything good could come from suffering, even when suffering is purely evil, God is able to bring forth good.

The cross is the characteristic sign of God's work.

Of course we are to try to minimize suffering. But any "quality of life" ethic which would end life when suffering and loss of dignity have become too great has failed to grasp the redemptive power of the cross.

That stands as a warning on one side. Our theology also insists that maintenance of physical life for as long as possible is not the highest good: Those who love their life lose it (John 12:25). Such attempts *may* become ways of denying that ultimate hope comes from the God who raises the dead, just as much as giving up on life because of suffering or apparent pointlessness may be a denial of hope.

This implies a relatively conservative and apparently "common sense" approach: To sustain life, but not take "extraordinary" measures when medicine can foresee no recovery. If there is a strengthening of public and professional opinion in favor of various degrees of euthanasia, such an approach may not remain common sense. It is therefore important that witness to the cross of Christ, which is anything but common sense (I Corinthians 1:18-31), be heard here.

Genetic Engineering

In areas of bioethics, which are still in a more speculative state, it will not be so easy to see implications of the theology of the cross. This is the case with human genetic engineering.[10] Again, our comments must be restricted to suggestions of some

fairly vague boundaries for deliberate genetic modification of human beings.

The identification of God with the weak and despised, "the form of a slave" (Philippians 2:7), reminds us, as we work to eliminate manifest genetic defects, that we must not be contemptuous of present-day people who have them. It would be a great advancement to be able to correct the problem of the extra chromosome which produces Down's syndrome, but it is wrong in the meantime to imply that those who have this condition should be looked down upon.[11] We must even be careful of words like "defect." To speak of people as "defective" suggests that they are to be regarded as products of a factory, or as merchandise.

When we speak of genetic modification of humans, we are considering alterations in the evolutionary trajectory of what is now the human race. How is this to be understood theologically?

Human evolution has already been radically redirected by the Incarnation, in which humanity is united with God. Of course this is something which transcends ordinary genetics, but it is not separate from genetics. All human beings are to some extent "infected" with the divine character of the Word. While human nature is not destroyed or swallowed up in this union, it is transformed. What it means to be fully human is not to be understood only in terms of a static concept of human nature, but must take into account the dynamic character of God's re-creative work in the Incarnation. And just as other techniques of science and technology may serve as instruments of God's action, so may genetic modification of the human gene pool.

The identification of God with the weak and despised, "the form of a slave" (Philippians 2:7), reminds us, as we work to eliminate manifest genetic defects, that we must not be contemptuous of present-day people who have them.

But the Bible already has something to say about the future of humanity's evolution. That future is what St. Paul calls the Body of Christ, the superpersonal organism of Christian believers who have Christ as their head (Romans 12:4-8, I Corinthians 12:12-31, Colossians 1:15-24, Ephesians 1:15-23).

J.A.T. Robinson connected Paul's concept with his experience on the Damascus road: When Christians are persecuted, Christ is persecuted (Acts 9:4).[12] It was one of the great achievements of Teilhard de Chardin to put this Pauline concept in an evolutionary setting with his argument that the Body of Christ is the next stage of human evolution.[13]

The direction of humanity's evolution, in this view, is not toward some type of individual superhuman, but toward the organic community of the Body of Christ. It will be appropriate to use our technology to correct genetic damage and perhaps even to work for positive genetic improvements—though we always have to ask, "Who decides what is an improvement?" and *Quis custodiet ipsos custodes*? But this activity can be seen as coherent with God's work—as a genuine activity of "co-creation"—only if it is in accord with God's will for creation.[14] And we have seen that that will of God is revealed most clearly in the cross and resurrection of Christ, leading to a renewed creation centered on the Body of Christ. There are certainly dangers associated with human genetic engineering, but it has the potential to be one instrument of the divine renewal of creation.

A Concluding Comment

We have seen here some examples of how chiasmic cosmology can deal with questions in bioethics. It is appropriate for Christians to have modest aims for their theologies, which at best provide models to express the richness of the Christian faith. It is not necessary that any given theological viewpoint provide a "theory of everything" (if we may borrow a term now popular in physics). It will be enough if a theology can provide a coherent and instructive way of understanding a significant part of our experience in connection with the Christian faith. It seems clear that the theology discussed here is able to do that. ✤

NOTES

[1] For a survey of sources see Waldo Beach and H. Richard Niebuhr (eds.), *Christian Ethics* (New York: Ronald Press, 1955). I would suggest also Dietrich Bonhoeffer, *Ethics* (New York: Macmillan, 1955).

[2] I follow the usual Lutheran numbering of the Commandments here.

[3] Joseph Fletcher, *Situation Ethics* (Philadelphia: Westminster, 1966), and *The Ethics of Genetic Control* (Garden City, NY: Doubleday Anchor, 1974).

[4] George L. Murphy, *The Trademark of God* (Wilton, CT: Morehouse-Barlow, 1986).

[5] Martin Luther, Theses 19, 20, and 21 for the Heidelberg Disputation in *Luther's Works*, vol. 31 (Philadelphia: Fortress, 1957), p. 40.

[6] George L. Murphy, "Chiasmic Cosmology: A Response to Fred Van Dyke," *Journal of the American Scientific Affiliation 38*, 1986, p. 124.

[7] The earliest explicit reference in Christian literature seems to be in *The Didache*. See *Early Christian Writings*, trans. Maxwell Staniforth. (Baltimore: Penguin, 1968), p. 228.

[8] Landrum Shettles and David Rorvik, *Rites of Life* (Grand Rapids: Zondervan, 1983).

[9] For a survey of current attitudes see, e.g., Sidney H. Wanzer et al., "The Physician's Responsibility toward Hopelessly Ill Patients," *The New England Journal of Medicine 320*, 1989, p. 844.

[10] See, e.g., Thomas A. Shannon, *What are They Saying about Genetic Engineering?* (New York: Paulist, 1985).

[11] Note, e.g., Fletcher's reference to babies with Down's syndrome as "pathetic creatures" in *The Ethics of Genetic Control*, p. 28.

[12] John A.T. Robinson, *The Body* (Philadelphia: Westminster, 1977), p. 58.

[13] Pierre Teilhard de Chardin, *Christianity and Evolution* (New York: Harcourt Brace Jovanovich, 1969).

[14] Ronald Cole-Turner, "Genetic Engineering: Our Role in Creation," in *The New Faith-Science Debate*, ed. John M. Mangum. (Minneapolis: Augsburg Fortress, and Geneva: WCC Publications, 1989), pp. 68-75.

May Your glory cover the heavens:
And the earth be full of Your praise.
May the earth be filled with the knowledge of the glory of the Lord:
As the waters cover the sea.

—from Habakkuk

American & Middle Eastern Scientists in Dialogue

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This paper holds that dialogue is an imperative for scientists interacting with their counterparts in a cross-cultural exchange. In interacting with those in the Middle East, dominated by Islamic thought and rich tradition, members of the American Scientific Affiliation in a tour of Cairo, Amman, and Instanbul, will be confronted by a world view and values that both differ and agree with views held by those in evangelical and orthodox Christianity. In an exchange on views to overcome such gross ills of famine, disease, illiteracy, female subservience, and rigid conservatism, we must first seek to understand the Middle Eastern culture and mentality that surfaces in their theoretical and methodological opinions. Since both world views subscribe to basic monotheism, we will understand and aid in programs of relief by establishing a common ground for action.

Paul entered the synagogue [in Ephesus] and spoke boldly there for three months, arguing persuasively about the kingdom of God. But some of them became obstinate; they refused to believe and publicly maligned the Way. So Paul left them. He took the disciples with him and had discussion daily in the lecture hall of Tyrannus. This went on for two years, so that all the Jews and Greeks who lived in the province of Asia heard the word of the Lord. (Acts 19:8-10 NIV)

In 1990 ASA members will be visiting with Middle Eastern scholars that include Muslims. Although we differ in basic theological assumptions, we can join in a common quest for answers to issues of justice, peace, famine, and disease by such interaction. Our goal will be to seek relief and solutions to human needs aggravated by the chaotic ravages of the Middle East's endemic disasters caused by both mankind and nature.

Incessant wars there have aggravated natural disasters, such as droughts, while hostilities stem in part from 19th and 20th century imperialism and colonialism from the West. Western invasion and exploitation began with Napoleon's invasion of Egypt at the beginning of the 19th century. We note also that Middle Easterners still remember the Crusades with Christians stereotyped as "bad guys" much as today's Western media cast the Arabs (loosely used to speak of all Middle Eastern people) into a "bad guys" image. We cannot give attention here to the Crusades, nor to other catastrophic invasions, such as by the Mongols with their incredible devastation. For example:

From 1218 to 1221 the Mongols chased Muhammad's army, laying waste to the great cities and much of the farmlands. ... The atrocities committed by the Mongol armies defy description: 700,000 inhabitants of Merv were massacred. ... The Mongol aim was to paralyze the Muslims with such fear that they would never dare to fight back. (Goldschmidt, 1979: 91-92)

Be that as it may, I think that the ASA should explore with Middle Eastern scholars all realistic proposals to alleviate tragic and gross physical and psychological needs among the population mosaic there (Coon, 1958). And although we in the ASA are not conventional "missionaries" with short-term appointments, we should see ourselves as genuine

ambassadors for Jesus Christ with our sciences as implements for fulfilling an ambassadorial role to serve others.

In my own field of anthropology, there is contention between those who seek to establish the discipline as pure science and those who seek to apply their research findings to aid those in distress and deprivation. That I favor the latter in applied anthropology within my evangelical Christian stance, will, I hope, be apparent from my involvement in our ASA overseas enterprise to Middle Eastern cities.

Regional Development in the Middle East

Lancaster's contemporary assessment (1989) concerns a vast area with different ideas about what became known as the Middle East during World War II. In this region between Africa, Asia, and Europe, diversity ranges from barren deserts to fertile pasture and arable lands. Development plans and efforts here have a long history with many fiascos.

In the 1960s the development emphasis was towards the large-scale integrated project, the irrigated agricultural schemes—complete with dams—initiated by multilateral agencies such as the World Bank. In the 1970s, development experts discovered "miracle" seeds, and suddenly it was the decade of the Green Revolution. The 1980s have been concerned with correcting some of the mistakes made by those early development pioneers.

Too many development projects were initiated without much thought for the people involved. The dams displaced villagers and then saddled them with water-borne diseases. The miracle wheats required large-scale inputs of often imported fertilizer—a drain on foreign exchange.

Only recently have development experts learned to plan projects with an eye to the wider, particularly environmental, consequences. Too frequently, the mad rush towards greater food production has been at the expense of the environment, but more recently the concept of sustainable development has increasingly been recognized.

Dialogue Guidelines

I agree with Eric Sharpe's views (1974) on dialogue as a guide for us ASA scientists in an exchange with those from the Middle East. Briefly, these include:

(1) *Discursive dialogue* (often labeled "debate" or "discussion") involves meeting, listening, and exchange on the level of mutually competent intellectual inquiry. As an intellectual activity, it can be profitable among equally equipped partners, since it presupposes the willingness to listen as well as to speak. I may add that Americans tend to want to speak and direct rather than to listen, and we in the ASA need to exercise restraint in such dialogue.

(2) *Human ("Buberian") dialogue* rests on commonly accepted existential foundations; it assumes the possibility for persons to meet purely and simply as human beings, irrespective of contrasting assumptions. The inference is that one can control inherent ethnocentrism and sectarianism. This is extremely difficult because assumptions usually reflect those of one's own culture and resist acceptance of others; thus, they are subjective rather than objective and tend to make dialogue more theoretical than practical. After all, is it not an ASA assumption that we don't have all answers but our continuing task is a quest for more and better answers?

(3) *Secular dialogue* stresses that where tasks are to be performed anywhere, believers of different

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creeds may share a program of joint action by minimizing different convictions. While still clouded with theory, this exchange does offer possibilities for those who are sincere. If we are not committed to aiding people in need, we had best skip this jaunt to the Middle East.

We in ASA do want our efforts to reach beyond relief of physical needs to offer spiritual views of our Christian faith.

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(4) *Spiritual dialogue* (called the "extra-human" by some anthropologists; e.g., Bharati, 1976) seems more at home with those trained in contemplative and monastic traditions. Its emphasis tends to rest upon prayer and meditation rather than upon debate and discussion. This difference between Western and Eastern colleagues comes into sharp focus when love is introduced as an imperative concept to aid Third World relief programs (Jennings, 1980).

The relative brevity of our ASA visit in various cultures and lack of fluency in the languages will limit this form of dialogue about abstract ideas such as love, mercy, regeneration, etc. Yet we in ASA do want our efforts to reach beyond the relief of physical needs to offer spiritual views of our Christian faith. To ponder the meeting of minds in Middle East/East Africa is indeed an opportunity to be models representing our universal Christ with His compassion clearly evident.

The Culture Concept in Cross-Culture Development

Our proposed ASA visit to East Africa and the Middle East anticipates different ways of life and different cultures. We need, therefore, to mention basic ideas about culture as used in the social sciences, especially as used in anthropology. Definitions of culture are bewildering (Kroeber & Kluckhohn, 1963). I accept Paul Hiebert's succinct idea: "Culture is the integrated system of learned patterns of behavior, ideas and products characteristic of a society" (1976:25). This view infers diverse cultures of mankind both historically and geographically, and is clearly inferred by Paul's analysis to the Areopagan scholars in Athens (Acts 17:24-26).

Our ASA Christianity in Western culture will reflect a biblical/theistic world view in dialogue with scientists from a different world view of Middle Eastern culture, though we share an ancient heritage, mostly that of the Old Testament. I think that Stott, a theologian rather than a professional anthropologist, envisions the culture concept as imperative for successful programs of improvement in the meeting of different cultural minds:

> "Gospel and Culture" is not a topic of purely academic interest. On the contrary, it is the burning practical concern of every missionary, every preacher, every Christian witness. [Are we not one of these categories?] It is literally impossible to evangelize in a cultural vacuum. Nobody can reduce the biblical Gospel to a few culture-free axioms which are universally intelligible. This is because the mind set of all human beings has been formed by the culture in which they have been brought up. Their presuppositions, their value systems, the ways they think, and the degree of their receptivity or resistance to new ideas, are all largely determined by their cultural inheritance and are filters through which they listen and evaluate. (Coote & Stott, 1980:vii)

Contemporary Middle Eastern Cultural Change

To be involved in Middle East development, we must reiterate that culture as a system conditions members in any society. Culture is dynamic and changes. These changes are accelerated when one culture with advanced technologies dominates a culture less advanced. Furthermore, change often introduces varying degrees of conflict about values and goals in the subservient or recipient society's members. To understand the cultural systems in the Middle East, we briefly suggest the basics of life and thought there, and then cite what I believe has posed major Middle Eastern problems in efforts to aid the victims of change. From this, we seek to propose empathetic and viable development programs toward realistic goals.

"Culture is the integrated system of learned patterns of behavior, ideas and products characteristic of a society."

First, Islam postulates a total, comprehensive way of life. Religion thus serves an organic function. It encompasses the Muslim's duties to God (worship, fasting, pilgrimage, almsgiving) and duties to one's fellows (family, commercial, and legal features). In brief, Islam is a religious system that pervades the total life of the faithful. Consequently, our American notions about separating the secular from the

spiritual—separation of church and state—is foreign to most Islamic thought.

We in the ASA need to see that Islam's modern history includes chaos as well as construction.

Second, the 20th century has seen Muslim countries faced with formidable sociocultural upheavals. Hence, we need to identify problems in the struggle for independence from colonialism: the birth and development of independent states with the pressures and strains of modernization; the conflicts between Arab nations and Israel (including Arab Palestinians in the occupied West Bank/Gaza); the national rifts in Lebanon, Cyprus, Yemen, Sudan, and Ethiopia; and the emergence of oil-producing states into a world economic bloc. We in the ASA need to see that Islam's modern history includes chaos as well as construction. And some of these changes have stemmed from well-intentioned Western programs to overcome desperate needs (Jennings, 1987).

From consequent regional stresses come various reactions with labels such as "Islamic resurgence," "militant Islam," or "Islamic revival." Further reactions include the Iranian revolution under Khomeini; the seizure of the Great Mosque at Mecca by Muslim extremists, followed later by the massacre of Iranian Shi'ite pilgrims by militant Sunnis at Mecca; the brutal carnage in crushing the Muslim Brotherhood members by Syria's Assad; the endless horrors in fragmented Lebanon; the eccentric adventurism of Libya's Qaddhafi; the assassination of Egypt's Sadat; the enormous bounty offered to kill author Rushdie for his *Satanic Verses* (causing international concern and strained diplomatic relations at the time of this writing), and other tragedies that make media headlines—all relevant in the discussions about development with Middle Eastern scholars.

In the middle of all this, my recent field observations there show increased public devotions by Muslims. Now there is more mosque attendance, a return to traditional dress by women, and greater observance of fasting during Ramadan, to mention the obvious. All these demonstrate that Islam is virile, and, unexpectedly to many scholars, is now a factor we must recognize in any plans offered for improvement in the Middle East.

Development, Change, and Cultural Authenticity

We in the ASA need to correct some deep-rooted myths about Islam—among them that it is a static, monolithic system with a traditional world view that is irrelevant for modern living; that to become modern is impossible unless the people adopt Western and secular ideas; and that religious and political institutions must necessarily be separate in modern systems of government.

Our effort here needs to examine changes as these may challenge Middle Eastern cultural authenticity. Will genuinely helpful aid programs attack the people's personality to leave them in states of anomie—aimlessness or meaninglessness in life? Can we help them to physical betterment without hurting them or causing mental pathologies with overtones of spiritual recalcitrance to appeals from our Christian faith? Will we be indifferent to harmful implications in representing Christian proposals?

In current discussions with Middle East intellectuals, a fear is sometimes expressed that too much change will eventually destroy the people's identity as Arabs, Iranians, Turks, or tribal groups. Advice is offered that the people should restrain the process of change in order to preserve their cultural authenticity. Clearly this response suggests the need of contextualized proposals by the innovators to prevent identity loss from improvement designs imported from a modern culture outside the region.

The cultural conservatism in resisting changes is what anthropologists call "the culture boundary maintaining mechanism," the means used to bar changes to venerable thinking and behavior in their way of life.

Every society attempts to preserve the status quo of its values and institutions when they are threatened by contact and potential weakening and destruction from an intruding society with its own cultural values and systems. The cultural conservatism in resisting changes is what anthropologists would call "the culture boundary maintaining

mechanisms," or the means used to bar changes to venerable thinking and behavior in their way of life. Thus, the Amish people in Pennsylvania, surrounded by both modern urbanism and advanced agriculture, resist this by means of "shun," which is complete ostracism for any member of their community who deviates from the customs long held by the Amish.

In considering the rigid restriction of Middle Eastern traditionalists, they are actually denying the acculturational process in their cultural history and authenticity. Their traditional culture maintenance mechanism is the stubborn and literal adherence to the Qur'an and the Hadith. They thus refute their own history and the innovations that brought them the glory of the Abbassid Period (750-1258 A.D.) with its adoption and assimilation of external ideas—the very process which generated their "cultural authenticity."

As I see it, an excessively protective attitude is a camouflage for attempts to reduce the pace of change, or even keep the entire region in the grip of traditionalism and hence under the hegemony of the present power systems both nationally and internationally.

The culture of any group is its collective experience through time and in place.

Admittedly, in this post-World War II period, there had been modernization in the Middle East. The amounts of change vary greatly from place to place, with most alterations occurring in the cities and least in the remote mountains and deserts. But to say that the Middle East has become modern in its structures and institutions, its ideologies, its science and arts, its values, attitudes, and behavior, and the lives of its individuals, is gross exaggeration. There remains considerable room for improvement before the people can begin to be modern and effective in the world community. The people, in my thinking, can continue to change with minimal fear for their cultural authenticity. In fact, they can and should change in order to become truer to themselves and their heritage.

Some questions need to be answered: What is Middle Eastern cultural authenticity on a most general level, or what is authenticity for the Arabs, the Turks, the Iranians, or others? Is it a quality

that is a permanent attribute of their collective personality or their "national" character? Are the Middle Eastern people endowed with a quintessential characteristic that distinguishes them from other peoples, such as the Chinese or the Indians? Is their culture so different from everybody else's in our modern world that it has to be treated differently?

Biblical absolutes as abstract truths remain constant, but their applications change to fit cultural circumstances.

To me, the problem surfaces when we view, for instance, the Muslim Arab culture as a monolithic entity, permanent and static in nature, given once and for all then preserved through succeeding generations. To be culturally authentic, the Arab, the Turk, or others must—according to this view—preserve this monolith and faithfully hand it down intact to posterity. Such a formulation obviously over-simplifies the problem, but the fact remains that we have here an unhistorical and, indeed, an erroneous view of culture.

By this I mean that the culture of any group is its collective experience through time and in place. As the group moves through time from generation to generation, it continually meets the new needs that challenge it. The response of the group shapes its experience of reality, which, in turn, adds to its culture. The group learns to acquire new cultural traits and discard others, so that its culture continues to develop in the service of group survival and satisfaction with enhancements. Culture is thus continuously changing and accommodating the group's institutions, beliefs, and values to its ever-rising needs, both material and ideological.

We as members of the ASA with our Christian stance, hold biblical absolutes such as love, mercy, forgiveness, and others (the Apostle Paul's "fruit of the Spirit," Galatians 5:22-23), that do vary in different cultural expressions according to time and circumstances. That is, the biblical absolutes as abstract truths remain constant, but their applications change to fit different cultural circumstances. Thus a traditional Chinese wife will demonstrate her love to her husband differently than a modern American wife to her husband; both could be obeying the Pauline injunction to the Ephesians about the husband-wife relationship as symbolic of the Christ-Church relationship of love.

SEARCH
Scientists Who Serve God

From Curiosity To Curating
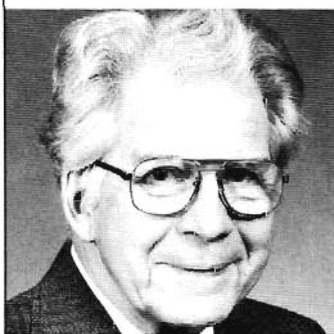
Edward Luther Kessel is a retired biologist, field entomologist, taxonomist, museum curator, educator, and editor. He was born in 1904 in Osborne, Kansas, but his curiosity about nature stems from childhood experiences in subtropical Africa as an MK—a "missionary kid."

Natural History Lessons in Zulu Land

Young Edward Kessel and his older brother John went with their Free Methodist parents to South Africa the day after Ed's fourth birthday. The two boys returned to the U.S. in 1916. During those eight years Ed learned to speak Zulu and many other things as well. He learned that cobra-like snakes called mambas, which invaded the Kessel home at times, could kill an ox with one bite. A huge python once crushed and devoured a full-grown goat along the same grassy path Ed had to walk to get to school.

Edward's parents were remarkable people who encouraged his interests in natural history. With his slingshot of "amatungulu" wood (Natal plum) he bagged birds in the station's mulberry orchard and frogs in a nearby swamp. His Zulu playmate Umsizi was his first biology teacher. Umsizi taught him how to dig out three-inch-long queen termites and cook them. With no western medicine available, Umsizi rid Ed's father of a tapeworm by having him eat pumpkin seed meats by the handful.

When Edward was seven, his brother (who later became a distinguished medical parasitologist) gave him some silkworm eggs and a reel to wind the silk from the cocoons. By the time he was ten, the young silkworm rancher won first prize in a Young People's Industrial Exhibition in South Africa. The prize was a book about a fictional professor, who became something of a model for Ed's future career as a teacher and entomologist.

A Distinguished Biological Career in America

After the two brothers returned from Africa during World War I, Edward finished high school in California. He graduated from UC Berkeley in 1925 after publishing his first entomological article (on "Silk Culture in California"). After studying for a year at the Church Divinity School of the Pacific, then located at Grace (Episcopal) Cathedral in San Francisco, he earned an M.S. at "Cal." He taught zoology at Marquette in Wisconsin for several years, then returned to teach biology at the U. of San Francisco and work part-time toward a Ph.D. in entomology at Berkeley, awarded in 1936.

In 1974 Professor Kessel retired from USF after 45 years of teaching and from his long editorship of USF's *Wasmann Journal of Biology*. For some 30 years he was also associated with the California Academy of Sciences, where he edited over 370 technical papers and served as Associate Curator of Insects.

Collecting Insects and Memories

Edward Kessel has been an acute observer and energetic collector. In appreciation of his work, Volume 4 of *Myia, A Publication on Entomology* of the California Academy of Sciences was dedicated to him in 1989 on the occasion of his 85th birthday. It reprinted a widely cited 1955 paper of his from *Systemic Zoology* and catalogued his 76 papers on insects and 21 on other biological topics. It also contained his 184-page *Autobiographical Anecdotes (I Was A Preacher's Kid)*. The photos in this issue of SEARCH are from that wonderful collection of Professor Kessel's memories.

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Adventures In The Animal Kingdom

TAXONOMISTS: AN "ENDANGERED SPECIES"?

Who will replace the "systematic biologists" of Edward Kessel's generation? The National Science Foundation is worried because fewer students are entering the field, and because not enough professors are available to train those who do. The growth of "molecular biology" seems to have pushed systematics out of the academic mainstream.

In all phyla, only about 1.4 million species have been described even superficially. To describe the estimated number of species that exist (perhaps 20 times that number) could take 25,000 professional lifetimes. In the world's universities and museums today only about 6,000 taxonomists are at work. The number of graduate students preparing to do systematics dropped from over 3,000 in 1978 to 1,154 in 1988. Many species may be driven to extinction (by destruction of tropical rain forests, for example) before they are even named.

Some molecular geneticists moving into entomology are now helping taxonomists classify insects by their DNA patterns. With so many insect species to work on, molecular entomology is more open to discovery than well-explored fields like yeast genetics. Entomology is shifting toward more basic biology, but "bug chasers" will still be needed to explore the diversity of the insect world.

Biology became a science only after the 18th-century Swedish botanist Carolus Linnaeus worked out a scheme for systematically classifying living things. Each level of his hierarchical scheme, from the most general (kingdom) to the most specific (species) is called a *taxon* (pl., *taxa*). Within the animal kingdom, for example, the phylum Arthropoda contains invertebrate animals with jointed legs; among the arthropods are "classes" of such creatures as insects, spiders, centipedes, and lobsters.

Chasing Flies and Fleas

Edward Kessel devoted most of his scientific studies to the class Insecta, and within it to the order Diptera ("two-winged" insects, such as mosquitoes and the common housefly). In 1945 he began donating his personal collection of Diptera to the California Academy of Sciences. He contributed 23,167 insect specimens, including 78 new species, 15 new genera, and two new subfamilies. All but one of the previously unclassified taxa were in the family Platypezidae ("flat-footed flies").

For his Ph.D., Kessel studied "The Embryology of Fleas." Of the several hundred known species, he chose to study one found on cats and another found on rats. He hunted rats at a city garbage dump (attracting a crowd of curious onlookers), then combed out their fleas and transferred the fleas to laboratory mice as substitute hosts.

Mice groom each other and relish fleas as tidbits, so unless kept in individual cages they quickly de-flea each other. With suitable contortions, a mouse can even capture and eat its own fleas, so a special collar was put on each host mouse to protect its flea colony. A pet cat named Dodo served as host for the cat-flea culture, producing thousands of eggs for Kessel's studies. Microscopic examination made sure that the cultures had not been invaded by "foreign" species.

Kessel's dissertation bulged with intimate details of embryonic fleahood. Published in the prestigious *Smithsonian Miscellaneous Collections* in 1939, it was the first paper on insect embryology to be illustrated exclusively by photomicrographs.

Collecting and Curating

For three years during World War II, with many workers gone from their jobs, Ed Kessel taught biology in the daytime and worked evenings as a shipfitter at Marinship in Sausalito, where his entomologist wife Berta also found work as a welder. Personnel shortages at the California Academy in Golden Gate Park led to another part-time job, helping to curate the millions of insect specimens in the Academy collection. The young entomologist was encouraged to carry on personal research projects. His principal interest became the "flat-footed flies."

In his office at the California Academy, about 1950.

Berta and Ed Kessel in front of their VW camper, about 1974.

After the world authority on Platypezidae died, Ed Kessel "adopted" them as his specialty. With travel grants from the National Science foundation, he and Berta searched out that group of flies in every state except Hawaii (where they are not known to occur) and in every Canadian province except Labrador. By the time he retired, they had logged over 375,000 miles in a VW camper, 125,000 more in a Condor motorhome rigged to serve as a mobile laboratory.

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When Edward Kessel was a PK ("preacher's kid") on a mission station in Africa, Sundays were for worship and reading the Bible or books pertaining to the Bible. His father, who held fundamentalist beliefs, considered scientific books suitable for Sunday reading because they taught his young son some of God's creation secrets. His young son agreed.

The Creator's Handiwork

Ed came to believe that "God had created the universe, our solar system, and all living things, including humankind," by natural processes. Many changes had taken place, were still taking place—all ordained by God. This is what some Christians call "theistic evolution."

For Ed, a pet baby monkey was "my first lesson in theistic evolution, showing how God created the human body." Firmly accepting God as Creator, Ed also accepted the idea that instead of being manufactured by hand, "we were designed, conceived, gestated, and born as creatures produced by God's most effective device for populating and replenishing the world." Throughout his life, Ed Kessel has studied that divine plan for creating new individuals.

The Kessel family soon after arriving in South Africa: John, the governess, their mother, Ed, and their father (clockwise from left).

Not all believers in the Bible understand its message of creation that way, nor would all accept some of Kessel's other interpretations of Scripture. As a boy he saw infections by the guinea worm *Dracunculus* (from the Greek *draco* for "dragon" or "snake"). The pain it caused was fiery enough, and it could grow to a length of four feet in the human body. The time-honored method of removal requires cutting through tissues to reach its head, lassoing the worm around the neck with a fine string, and carefully extracting it by winding it on a stick. Young Edward concluded from Numbers 21:6-9 that Moses not only taught the Israelites how to deal with those fiery serpents but used a visual aid as part of his instruction.

Theorizing and Theologizing

Scientists "play with theories" to help them think clearly, especially when they have few facts to go on. Christians untrained in science may feel uncomfortable "theorizing" about possible interpretations of biblical passages, but one can learn to consider various proposals without losing confidence in Scripture's authority.

In a 1983 article on "A Proposed Biological Interpretation of the Virgin Birth" Edward Kessel tried to picture "the basic natural process that God used to accomplish the physical aspects of the Incarnation," citing the relatively rare biological process of parthenogenesis as a "model." Some readers responded that it is irreverent even to think about such things.

The author argued that if something akin to Divine Parthenogenesis occurred, Jesus would have become a phenotypic male after being conceived by the Holy Spirit as a chromosomal female. The biology made sense, but some Christian readers—mostly men—questioned the theological implications. Some Christian women, however, said they found it easier to form a personal bond to a Christ who was not merely male. The idea seemed to fit in well with the statement in Galatians 3:28 that "there is neither male nor female; for you are all one in Christ Jesus."

To Edward Luther Kessel, emeritus professor of biology, "the Bible believer should be flexible enough to search for and defend the truth, whatever that turns out to be, and without regard for prevailing theological opinions."

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Seeing The Good

As a white child in South Africa 80 years ago, Ed Kessel was sometimes confused and disturbed by the racial discrimination he saw there. Even the Christian missionaries tended to treat black people much as the white farmers did, supporting the beginnings of apartheid. Because Ed made close Zulu friends, he discovered for himself that "true friendship is based on the quality of individuals and their value as persons, rather than on their color."

Knowing better than to misjudge people's character by their color did not exempt him from embarrassing misunderstandings. His first American experience on his return from Africa was an overnight train ride. The Pullman porter failed to respond to Ed's friendly attempt at conversation in Zulu. The twelve-year-old was shocked. He had never before met a black person who did not speak his own second language.

Edward L. Kessel in Lone Scout Uniform, Fair View, South Africa, 1915.

A Fatal Flaw?

Later, another kind of embarrassment influenced Ed's choice of careers. Although he differed from their rather narrow views on science and religion, he honored his parents and their desire that he consider a calling to the ministry. Realizing that other Christian groups might not force on him the same kind of choice between science and religion, he began studying theology at San Francisco's Episcopal divinity school. He was soon appointed student pastor of a mission church in West Berkeley. Episcopalians, he discovered, like Free Methodists, regarded home visitation as an important part of a pastor's life.

On his first home visit the hostess served tea to the young minister in the parlor. The young minister's problem was that he had been born with an essential tremor in his hands, making it impossible for him to hold a fancy English teacup without sloshing some out. His hostess politely refilled his cup to the brim with the boiling liquid, with which he again scalded his leg. He was soon too nervous to carry on a respectable conversation.

Realizing that an endless line of teacups lay ahead, Kessel decided that his tremor was leading him out of the ministry and into science. Ironically, by making it too difficult for him to pin insect specimens, the tremor eventually helped end the laboratory phase of his scientific career also.

Another Side of the Story

But this story has another side. For his Ph.D. work Ed had to remove the shells from tiny flea eggs under a dissecting microscope to expose the embryos. Convinced that his tremor would make it impossible to carry out his professor's wishes, he thought, "There goes my Ph.D." Friends with steady hands offered to help but even they couldn't perform the delicate manipulation without smashing the eggs. In desperation, Ed tried it himself. To his amazement he saw that his tremor "was gently vibrating the needle, cutting into the shell like a tiny, silent, smoothly running ultrasophisticated machine." As it turned out, Ed was the only one in the lab who could do the procedure—because of his "handicap."

Our Lord uses all sorts of abilities—and disabilities. He accepts people of all races, with all kinds of flaws, to transform into his own. Ed Kessel's father loved to quote Ephesians 4:24, urging Christians to "put on the new nature, created after the likeness of God in true righteousness and holiness." When God looks at a person, he sees us as we *can* be, in Christ.

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Most economic thought is subject to Islamic ethical norms of the Qur'an, the Hadith, and the Sharia.

Certain cultures may be more open to change than others, although the reasons for this are not always clear. But there is no culture that does not change unless it is a dead culture—i.e., an archaeologically reconstructed culture of an extinct group such as the Aztecs of Mexico or the Babylonians of Mesopotamia. Anthropologists justify their description of a culture that no longer exists in the form practiced earlier by the phrase, "ethnographic present," to caution the reader that conditions have changes, changes to be revealed in a diachronic examination—"through time"—of the dynamic reality of the group.

Furthermore, the unity of a living culture contains diversity, even with contradictory values tolerated as group cooperation versus competition. Some cultures allow more diversity within them than do others; there is probably no culture that exhibits total, uniform integration. This Middle Eastern diversity led anthropologist Carleton Coon to use "mosaic" to describe the maze of differences (1966).

Middle Eastern culture (with sub-cultures) has had a long and variegated history. Our present essay bypasses this to focus upon the present. One of the greatest impacts on Middle Eastern society in recent history has been its contact with the modern West. This cultural interaction has continued for nearly two centuries, with varying degrees of depth and intensity at different times and areas of the region.

During these two centuries, Western culture has experienced enormous change. Someone once wrote that George Washington would feel more at home in ancient Babylonia than were he to live in today's America. The Middle Eastern peoples have been exposed to various trends and changes during this time. The modern cultural encounter with the West is perceived by Middle Easterners to be more forceful and pervasive than others in their past, not only because the West is more powerful, but also because they view it from the position of their contemporary weakness following centuries of virtual stagnation and subordination.

The Middle Easterners have adopted many elements from modern Western culture, notably in the realm of technology (even Khomeini used audio cassettes to bring about the Iranian revolution!), but also in social organization and some ideology. Now there is increasing resistance to this acculturational impact. As the Middle Eastern countries moved towards political independence when colonialism declined, the preservation of cultural heritage and cultural authenticity intensified.

Tradition has loomed over most Middle Easterners as the rock of sure durability, safety to which they can cling amid the insecurity and instability of change (Jennings, 1987a). Only in tradition can many of them find their identity and their cultural authenticity. We in ASA must recognize this reversion; we will undoubtedly meet scholars who bear psychological scars, if not open wounds, who find themselves in a present state of flux. We must be discreet so that our suggestions for proposals in areas where some of them have been wounded by earlier schemes are as compatible with traditional cultural traits as possible.

Islam & Development in the Middle East

A common assumption in development theory is that modernization weakens religion and fosters secularism. The reality in some Muslim lands tends to contradict this (Jennings, 1984). While modernization has curtailed some traditional power and influence of the religious establishment ("ulama") among government and legal personnel, religion itself has not weakened appreciably. The Iranian revolution and the extreme restrictions in Turkey and Saudi Arabia on Christian missions make this clear. In Iran, Egypt, and Syria, the young educated Muslims are using their newly acquired knowledge and skills to develop Islamic responses to political and social problems, along with movements to implement change.

Religion remains a powerful force in these lands, and we need to be sensitive to clergy opposition to Westernization.

Islamic resurgence is not merely from mass alienation or rejection of modernization in Islam's resurgence and change in cultural ideology. In development proposals, we discover that Islam has become an instrument espoused both by incumbent government and opposition forces. Both respond to

the sociocultural exigencies of their countries and try to obtain legitimation and mass support for their program and policies. President Assad illustrates this in Syria, with an additional problem as an Alawite, a marginal sect of Islam, that finds him walking a fine line to avoid confrontation with the dominant Sunnis in Syria.

Religion as an integral part in economics prevails among Islamic peoples (Cummings, et al., 1980). Some scholars argue for Islam's compatibility with Eastern capitalism, including its relationship to current socioeconomic changes in the Middle East. Islam addresses itself, as I observe it, to many aspects of development including private ownership, taxation, interest, income distribution, and related matters (Jennings, 1987b).

Thus, most economic thought is subject to Islamic ethical norms of the Qur'an, the Hadith (Muhammad's interpretations), and the Sharia (Islamic judicial opinions). Economic traditions held by Muslims are their alternative to *laissez faire* capitalism and Marxist socialism. I hear this question in various forms: "If Western countries can evolve economic systems of a hybrid nature, might not Islamic countries do the same?"

The belief is that Islamic principles do not necessarily preclude development and rapid economic growth. On the contrary, the argument is that Islamic principles advocate factors generally regarded as essential to economic progress. Perhaps there exists something like the Protestant Work Ethic, even though some of my colleagues disavow this. Some of my Western colleagues even ascribe to Muslims a "pious poverty" that hampers improvement in the Middle East, but our affluent Western lifestyle is adopted to contradict such judgment.

Not all Westerners have gone to the Middle East to share altruism and spiritual concern.

The Iranian revolution is a dramatic case of Islamic thought about religion and development (Bayat, 1980). In historical perspective on fundamental Shi'ite beliefs and institutions, we can see a direct relationship to the Iranian revolution in 1979. Thus, in pre-Pahlavi Iran (before 1920), the relationship of Shi'ism to the state was marked by confusion and ambivalence. In flux, the Islamic clergy progressively institutionalized their religious authority, but

they failed to develop a cohesive group to overcome factional differences and so had little clout in governmental decisions.

Responsibility for poverty and misery is from both sides.

All this changes after the 1920s by secularizing reforms and anticlerical policies implemented by the heavy-handed policies of Reza Shah Pahlavi. His dynasty emphasized a pre-Islamic (Iranian) heritage to establish imperial identity with modern reforms in law and education. The reforms were based mostly on Western models through Durkheim's influence upon a Turkish sociologist, Gokalp (Peretz, 1978:157-158). Gokalp gained the interest of Ataturk who promoted laicism (secularism), and Resa Shah in Iran. Subsequent events show rejection of secularism by most Turks (though the Turkish constitution grants religious freedom), but not to the point of revolution as in Iran. Why so? And how does this relate to dialogue for development now?

For those of us in ASA who seek to help meet needs in the Middle East, the policies for modernization/development after World War II put the learned Muslim clergy on the defensive with the clergy's reaction as a distinct, socially defined, ideologically cohesive class of its own. This unity provided the force to oust the Shah; it also has potential for organized opposition to plans that we may offer in dialogue with Islamic scholars there. Religion remains a powerful force in these lands, and we need to be sensitive to clergy opposition to Westernization.

Again, ASA efforts to aid must note equal significance in lay Islamic theology, that is, among the professional classes who form the social infrastructure for nationalism and for adoption of innovations. Differences between clerical leaders and lay Islamic intellectuals must be recognized for a successful dialogue between the West and the Middle East. This necessitates credible exchange with lay scholars in proposals to benefit their people.

Middle East Education and Development

In my research, three issues for dialogue come to the fore: education, politics, and religion (Hudson, 1979). Of these three, politics and religion must be discreetly treated at all times. It goes without

saying that political and religious institutions cannot be avoided but both must be neutralized; these are volatile issues that can block fruitful exchange. Educational issues are less highly charged. To me, fundamental educational gaps cry for attention (Hudson, 1979). These discrepancies include:

(1) There is a need to *contextualize education.* Although Western models of education have achieved much in the past, they have often failed to interact positively with local communities. The people feel isolated or distant from schools, so they neither lend their support nor accept educators' advice.

There is, unfortunately, a deleterious effect in Western educational models. Students emulate teachers more in form than in meaning and function; consequent degrees of anomie plague many students. This aimlessness fosters student frustration and a desire to abandon the home community, preferably to emigrate to the West. Hence, educated persons with potential are lost to countries which could profit from such education.

(2) Education must view *human resources* as assets, not liabilities. To overcome this negative attitude which limits employment, education needs to emphasize dignity in work of any kind, including manual labor. All tasks then contribute to community well being. My first field study four decades ago in villages revealed this problem. Village youth, when sent to cities for education, refused to return to be models of manual work in the villages (Jennings, 1958:159).

(3) *Illiteracy* must be eliminated. This problem varies from country to country in the Middle East, but about 60 percent of the people cannot read or write. The wealthy oil states should confront this problem, for they can benefit immediately with skilled personnel, including trained, able leaders for the home communities in any nation.

(4) *Discrimination* against the *poor* and *women* must be banished if development is to produce enduring benefits for all Middle Easterners. Thus, my research data shows low worker productivity when compared with advanced lands. To hold women as second-class citizens is to bar half the population from their potential contribution. Their subordination perpetuates inferior values by maternal influence in children's personalities during the critical enculturational years.

(5) A *"teamwork" ethos* must become part of the Middle Eastern mentality. This problem is simply and bluntly the refusal to cooperate within levels in the socioeconomic system. People are more or less forced to join in community projects and comply grudgingly. This barrier to development correlates with deep suspicion towards superiors in all levels of work, from manual tasks to executive positions.

(6) *Population growth* is a serious problem; the birth rate is among the highest for the world's major cultural regions. Some states use manpower shortages to promote higher birthrates. The lack of many skilled personnel in the Middle East is aggravated by this issue. This can be overcome by education, not by increased population.

> *Put bluntly, Middle Eastern society has become schizophrenic with ambivalence toward modernity and traditionalism.*

As we might surmise, our Western idea to limit family size through planned parenthood is highly controversial in the Middle East, whether among Christians, Muslims, or Oriental Jews. But population growth rates decrease among those who are Westernized. (Note: the higher birthrate among Palestinian Arabs in the occupied West Bank/Gaza compounds Israel's problems if it annexes these areas; for Palestinians as citizens have larger families to portend a majority in Israel's future. Nor are these Palestinian Arabs all Muslims; some are educated Christians who also experience restrictions and participate in the "infadah," or uprising, at present.)

(7) The Middle East needs *institutional planning principles and techniques* at all levels. The inability to develop adequate scenarios has wrecked attempts to deal with major problems. Tactful dialogue is imperative, for Muslim fatalism emerges in reluctance to plan for an unknown future.

(8) Also with tact, we must not allow development plans to overtly confront Islamic views, yet *religious dogmatism should be lessened.* As a matter of fact, Islam can be interpreted to support general improvement for Muslims. In discussion, we may avoid ambushes if our views are on broad grids of theism and monotheism rather than a fine mesh that separates Christian groups (Watt, 1983).

(9) There are *felt needs* in the Muslim world that

are yet to be satisfactorily addressed. Although the unemployment rate in some Middle Eastern lands is high—slumping oil prices exacerbated unemployment and forced interregional expatriates back to oil-less homelands—thousands of skilled/professional jobs await filling. Development in the Middle East is not to produce a Western clone state. We are to listen carefully in order to identify *bona fide* hurts as they define them.

Surely we can see here Jesus' definition of "neighbor" in "the Good Samaritan" explanation. Personally, I look in vain here for evidence that the benefactor, a despised person to orthodox Jews, linked his aid to a theological demand. It may be fair, however, to infer a testimonial sequel by the Samaritan in his neighborliness.

(10) The *democratization of educational process* is imperative for good (i.e., functionally productive) education. "Democracy" and "freedom" have different meanings, even in the West; such concepts are indeed foreign to Middle Easterners. Categorical labels assigned to any people stem from educational insensitivity and are inexcusable in the ASA. Thus, references to the "Third World," "Undeveloped World," and the like have no place in our discussions as we exchange ideas about freedom and individual liberty.

Motivation for Development

I think that we must agree that many development theories are far from being value-free (Hudson, 1980). In anthropology, for example, I know theorists who have greater concern for testing their theories than for wrestling with the plight of societies they diagnose. We in the ASA do well to ponder the implications of this charge.

Do we allow our values and assumptions to hamper rather than help the needy in another culture? This danger has often given me pause. This hazard surfaces in some programs, but it can be minimized or neutralized. How so? If we condition our approach with the genuine altruism advocated by Pitirim Sorokin (1958, 1954). Doesn't it go without saying that we in ASA should adopt selfless means to aid those in need? Surely we can assume that our motivation is not for exploitation, self-enhancement, or personal gain.

We must admit, on the other hand, that our Christian theological grid most likely will be suspect to many Muslim scholars, especially when our views on aid are linked with human depravity and reconciliation with God uniquely through Jesus Christ.

Actually, some reputable Middle Eastern theorists do infer "sin" when addressing backwardness and deprivation among their people. While they blame Western exploitation, they admit the reality that suffering and deprivation are also found in their own leaders' closets.

The emancipation of women, for integration into total cultural life, will be restricted so long as traditional values and corresponding social roles persist.

We from the West must admit, too, that some charges against Western projects have justification—not all Westerners have gone to the Middle East to share altruism and spiritual concern. I agree with Patai (1971) who analyzes charges and countercharges about causes for Middle Eastern problems (Jennings, 1986:213f).

To Middle Easterners, the West's motivation for coming was domination, politically and economically. They say Western powers gained control in the Middle East by collaboration with regional rulers, who were either coerced or bribed into serving Western interests.

The Western countercharge is that without Western initiative Middle Eastern resources would have remained untapped. The West was invited by Middle East leaders to find and exploit natural resources, and to employ Western technology. Then, Western companies shared their profits with the legal owners, the governing classes in the countries. Unfortunately, the West argues, the rulers shared little of the benefits with the populace, but pocketed most returns. Hence, the rulers are responsible for the poverty and degradation that prevails among ninety percent of the people.

While this argument continues, we who seek to aid must emphasize areas of agreement. To me, responsibility for poverty and misery is from both sides. The ruling classes are guilty, for their actions and attitudes were instigated by foreign influence and inflamed by their own greed. But our Christian views demand empathetic dedication—our proposals are within the biblical ethos of caring and sharing.

Despite such commitment, we will meet Islamic conservatism that dominates their sociocultural sys-

tem. Put bluntly, Middle Eastern society has become schizophrenic with ambivalence toward modernity and traditionalism. Much social and corresponding psychological tension in life reflects a sharp polarization (Jennings, 1983:92; 1987a).

Modernity is found mostly in urbanized sectors; here it is culturally exclusive among upper social classes. Traditionalism is rooted in backward agricultural and artisan sectors; its strength is among the lower classes. For the most part, economy and most people remain bound to values and behavior patterns of long standing. These undergird conservatism and resist changes. Thus, the people are even adamant to appeals from revolutionary theory. They block progressives who attempt to implant socialism, especially in Marxist form, among the majority.

Women and Development

In any development program in the Middle East, a fundamental need is improved status/role for women. Change has come to upper-class women, and it varies from country to country, but women continue to be the most oppressed segment in the region. Overwhelmingly, whether Arab or non-Arab, traditional law and social practice support male dominance. This need is obfuscated by conflicting reports.

The emancipation of women, for integration into total cultural life, will be restricted so long as traditional values and corresponding social roles persist. Religious ideology is maintained not only for spiritual views, but also because it sanctions the established order of power. Thus, women's liberation in the Middle East is structurally bound. Any radical change in women's positions would signal, more than any single factor, the fracturing of the existing structure. In this respect, women constitute a revolutionary class in the Muslim Middle East.

Moreover, qualified women observers suggest that women's dress symbolizes their social position. Mernissi offers a neo-Freudian interpretation of the veil. She raises the question whether a desegregated society, where formerly secluded women could gain equal rights commercially, socially, and sexually, would be an authentic Muslim society (1975).

Anthropologist Elizabeth Fernea believes that Islamic dress is an eloquent expression of the female quest for honored status among Muslims (Fernea 1978, 1985). That is, the veil/modest dress is a complex symbol with multiple implications and different

impacts. When manipulated, it symbolizes a new meaningful Islamic approach to solve old and new problems; it can also be a reaction against modernization and secularization. Dialogues for development need alertness to this sensitive and emotionally-charged custom in the Middle East.

Democracy and Socialism

I join other scholars in examining two ideologies for dialogue between the West and the Middle East. We find that attraction to parliamentary democracy in the Middle East is overwhelmingly among middle-class intellectuals. They link democracy to modernity and constitutional government. But Muslims, Christians, and Jews of the Middle East tradition and mentality, even though intellectuals, do not understand what democracy means, neither in theory nor in practice.

These three major religious groups fail to see democracy as a recent historical phenomenon in the Western world; that when linked with a capitalistic mode of production, it is found in but a few industrial nations of the world. And Christianity, within the system, has influenced Western cultural ideologies historically. Most Middle Eastern scholars cannot foresee implications in its transplanting and growth in their own different cultural experience.

This disagreement on God-in-relation-to-man terms usually centers on human freedom and God's sovereignty.

Anthropologists caution that "form" in Western democracy is often accepted in "form" only; democracy becomes something quite different in "function" and "meaning" where Islam prevails. It requires more than adoption of democratic "form" to transplant the concept of "freedom" among those who do not comprehend it as it is understood within Western political thought (Linton, 1936:401f).

Socialism has never gained a large following in the Middle East. Surely terrorism and hostage-taking do not stem from socialism; these extreme illegalities stem from frustrations among people dispossessed of land and a way of life. Intransigence is spawned by impotence against policies and power which destroy cultural traditions based upon profound religious values and world views. This came into

sharp focus when Khomeini offered millions of dollars for the death of Rushdie.

Middle Eastern "socialists" in the "period of awakening" (the 19th century), were mostly utopians with a superficial knowledge of European social theory. At best, they were incipient reformers. They did, however, popularize ideas for socioeconomic change. We who seek to improve conditions can build on those faulty efforts, but always with concern for holistic welfare, allowing reasonable secularization for attaining desired improvements.

Watt's "Contribution to Dialogue"

The eminent Islamicist, W. Montgomery Watt, a British Anglican, offers relevant advice for dialogue between Western Christians and Middle Eastern scholars (1983). Significantly, the foreword to Watt's book is by His Excellency, Shaikh Ahmed Yamani, of Saudi Arabia, a Wahabi Muslim and Harvard graduate, who writes:

> I believe that the signs around us today auger well for the future of religion in the world. The resurgence of Islam in various parts of the world and the discontent that is often sensed in the Western world with the increasingly materialistic outlook of society in general indicate clearly, to my mind, the direction in which the Christian and Muslim worlds are heading. (Watt, 1983:x)

We share Yamani's comment about materialism. Pondering that world view, Watt envisions his task as, "The affirmation of religious truth against scientism." Such thought is also labeled "naturalism," "humanism," "naturalistic humanism," or "secularism" (Sire, 1976, provides a lucid review of these ideologies).

ASA members agree that science unlocks many doors to alleviate human problems and improve the lot of mankind. But in commitment to improve the Muslim world or elsewhere, we know that science in and of itself cannot answer ultimate concerns of "Why?" No mature scientist claims to possess all answers to absolute reality, although scientism infers it does.

Watt maintains that theism offers a common ground for dialogue between Christians and Muslims. However, agreement in theism does not remove the formidable chasm separating Christians and Muslims theologically, for Yamani asserts:

> In the great debate between Christians and Muslims, however, there are areas of fundamental principles where no amount of logical discourse can bring the two sides

nearer to each other and where therefore the existence of an impasse must be recognized. Issues like the Trinity, the Divinity of Christ and the Crucifixion are central to Christian beliefs, have no place in the Islamic faith, having been categorically refuted by the Qur'an, on the authenticity of which there is no discord among Muslims. The discussion in this book [by Watt] of the Crucifixion and the "salvation" it represents therefore will not be very convincing to the Muslim scholar and the attempt to find real parallels to it in Islam will have dubious prospects of success. (Watt, ix-x)

While we respect Yamani's views, we need not abandon hope for dialogue about development to alleviate desperate Middle Eastern needs. Though some impasse exists, certain basic theistic ideas allow cooperation to pursue routes of aid. Certainly shared views include removal of famine, disease, illiteracy, shelter, and discrimination. We can discuss amicably general cosmological ideas as means for cooperation and accomplishment. We can discuss that:

(1) Both Christian and Muslim accept God as Creator. The two faiths assume that special revelation provides information not derived from natural phenomena. Watt accepts theistic evolution after Teilhard de Chardin (1983), including metaphysical evolution in the noosphere. Few Muslim intellectuals seem influenced by such cosmological concepts, and many Christian scholars reject such views.

(2) Both the Bible and the Qur'an clearly express that God controls the events in history. Muslims, thus, wrestle with ideas about human ability to control/change, or how much God allows man to alter natural events or circumstances. In addressing development, skepticism may surface because Muslim leaders tend to question concepts about human improvements.

(3) Contemporary Christians view relations between God and mankind (since the Renaissance) with multiple philosophical outlooks. We can minimize these differences by emphasizing the relatively coherent view in the Qur'an and early Islamic interpretations with biblical parallels.

I agree with Watt that Islam sees mankind's relation to God as that of a "slave." Many modern Christians challenge such usage. Rather, these Christians employ such terms as "servant" and "creatureliness," to explain the relationship between God and human beings.

In exchange about relations, we will encounter objection to the use of terms like "sons" and "daughters" of God, since the Qur'an refutes the

thought that God has offspring. This objection holds also for the phrase "children of God" in the Bible. Muslims do speak of relation to God with the term of "khalife" (caliph); by this some are elevated from slave to stewardship status. I do not think that such status differences of man to God for discussions are insurmountable if tolerance exists in scholarly exchange.

At the deepest level, Christians and Muslims agree that humanity never completely loses its creatureliness or servile status.

This disagreement on God-in-relation-to-man terms usually centers on human freedom and God's sovereignty. To Watt, human freedom usually is no more than the lowest kind of freedom, that of the physical body. But we need not limit freedom to anatomical limitations or even to cultural conditions. (For the control of man by culture found in American life, see Jules Henry's *Culture Against Man*, 1963.) Restrictions thus caused by ignorance are lessened by gaining fuller and more accurate information in knowledge.

The inherent difficulty here is that we live encapsulated within our world view, including notions of freedom. Thus, in dialogue with Muslims for development—assuming friendship—we should become aware of distortions within our own cultural view of reality. Freedom as a necessary concept for improvement in the Middle East requires patience and discretion in the meeting of minds.

At the deepest level, Christians and Muslims agree that humanity never completely loses its creatureliness or servile status. This contradicts scientism, which claims that advances in scientific knowledge will eventually enable us to control future courses and events. Christians surely acknowledge this as fact: there can be no ultimate success in controls or change outside God's purposes and sovereignty.

We accept this, but on a human level man has the responsibility to change; however, success rate rests upon the knowledge to avoid ignominious failures as reported in history. The great British ground-nuts (peanuts) scheme in Africa after World War II was to solve many of the world's food problems; it came to nothing because some essential facts had been overlooked. Numerous studies have analyzed why failures occurred. Neihoff's (1966) case studies of development projects come to mind. He urges planners to anticipate various influences at play when seeking to correct adverse conditions, especially when projects are by Western innovators who hold different values and world views.

In my opinion, plans for improvement in Middle East development need two basic reminders as an infrastructure:

(1) The project advisor must be informed about change from a sociocultural point of view; he or she must know something about the principles of acculturation.

(2) In general, for introducing change here, one needs to involve local religious leaders, since they are a powerful leadership force.

In addition to Niehoff's notes above, we may add other anthropological titles which deal with preparation for development plans and personnel, including: Brislin (1981), Brislin and Pedersen (1976), Paul (1955), and Spicer (1952). Each of these are introductions to acculturation with implications attending those who plan to administer cross-cultural improvements.

Conclusion

Dialogue is imperative for significant contributions to improve welfare for Middle Easterners—or elsewhere—to be successful. No longer can Western people claim exclusive answers for relief among disadvantaged peoples. The former paternalism must be replaced by fraternalism—the sharing and discussion of improvement projects by both sides.

I have sought to provide helpful information for ASA involvement to meet Middle Eastern needs, in a major cultural realm dominated by the Islamic world view and values. I cited Sharpe's categories of dialogue earlier. Also helpful are Brewster's "three main levels," from the World Council of Churches, for dialogue with Muslims (1979). The three levels proceed from ecumenical reflection among Christians, to actual encounters with Muslims, and climax by actually living the dialogue. Most of us in the ASA cannot go beyond the first and second levels.

But we need not despair. A brief visit in the Middle East with development in mind may adjust our scientific lenses to explore opportunities and realize the third level. For many of us to work during

extended stays in the Middle East may seem impossible because of work, family, health, and other reasons. Nevertheless, this level may become possible by grants or other sources, so that our skills can alleviate the adverse conditions of so many in the Middle East—or elsewhere in the world. In scientific exchange with Middle Eastern scholars, we, as Christians, ought not ignore possibilities to bring our skills and knowledge into play for the benefit of those needing our involvement for improvement. ✤

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May God shield you on every steep,
May Christ keep you in every path,
May Spirit bathe you in every pass.

—from *The Celtic Vision*, Esther de Waal (ed.), Darton: 1988.

Communications

Automata and the Origin of Life: Once Again

I have appreciated the unusual amount of feedback from my article on Langton's self-reproducing automaton published in this journal.[1] Besides several letters to me personally, Mark Ludwig wrote a program which simulates the operation of the automaton on computers compatible with the IBM PC,[2] and John Byl has devised a significantly simpler automaton in response to my challenge.[3] As Byl's paper might be misunderstood to suggest that such a self-reproducing automaton could easily form in a universe the size and age of ours, I submit the following comments.

Briefly, Byl has designed a cellular automaton with simplified structure and transition rules which reproduces in only 25 time-steps. The initial configuration looks like this:

$$22$$
$$2632$$
$$2642$$
$$25$$

With an array of only 12 cells, with 36 special transition rules and 7 default rules, Byl uses my estimates for the probability of this automaton arising by chance in the known universe to get a timespan for formation of only 5×10^{-45} sec as against my value of 3×10^{139} years for the Langton automaton. This would seem to make the random production of a self-reproducing automaton quite likely somewhere in the history of our vast universe. While Byl has made an important step forward in the search for the simplest possible self-reproducing automaton, his conclusion regarding the ease of its formation does not follow. The fault, however, is mine rather than his for this impression.

Realizing that the Langton automaton was quite unlikely, I made a number of quite generous concessions in the probability calculation to simplify it and to avoid haggling. In the interests of realism (and at the risk of appearing stingy) I must take some of these back.

1. It was assumed that all relevant atoms in the universe were already in 276-link chains (or for the

Byl automaton, 55-link chains). This is certainly not the case. The actual number of 55-atom (or larger) molecules is surely much smaller. I am not sure how to calculate the actual proportion of 55-atom polymers, but perhaps a rough estimate can be made from a simple-minded application of the mass-action law.[4]

Assume a polymer P_n consisting of n atoms, formed by the reaction of a atoms of element X, b atoms of Y, c atoms of Z, and so on, such that

$$aX + bY + cZ + \ldots \rightarrow X_aY_bZ_c\ldots \text{ (i.e., } P_n)$$
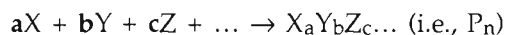
where $a + b + c + \ldots = n$.

Then the concentration of P_n is given by the formula

$$[P_n] = K \ [X]^a[Y]^b[Z]^c\ldots$$

Assume K to be of order unity. Since we are seeking some sort of organic molecule, perhaps 1/3 of the atoms in the polymer will be carbon, which makes up only some 320 parts per million of the earth's crust[5] and even less of the ocean.[6] Taking the concentration of the other elements to be of order unity:

$$[P_n] = O(320 \times 10^{-6})^{18}$$

$$[P_n] = O(10^{-63})$$

So 55-atom polymers will only make up an astronomically small fraction of the total atoms. We have assumed a site on earth (or an earth-like planet) for reasons cited in #3 below.

2. It was assumed that these chains were trading atoms in such a way as only to make *new* combinations. This will probably not make more than an order of magnitude difference in the result.

3. It was assumed that these traded atoms were moving at a speed appropriate for a temperature of 300° Kelvin (about 80° F). But few of the atoms in the universe are in such a temperature regime. Those in much colder regions will be moving

around far more slowly, so that fewer combinations will be formed. In any case, life would not survive in such areas even if it could form, and it is not likely there would be much transport from such regions to warmer regions, as the mass movement is nearly all in the opposite direction (outward from stars). On the other hand, those atoms in much hotter regions will have much faster atomic motions, but these very motions will disrupt any long-chain molecules.

It seems best to restrict our calculations to that fraction of matter in "life zones" around stars. Taking our solar system as an average,[7] this fraction amounts to the ratio:

$$f = M_{earth} / M_{sun} = 3 \times 10^{-6}$$

Thus, the fraction of atoms making such combinations is further reduced by a third of a million.

Here on earth, it is only the material near the surface that is in a temperature/pressure regime for life to function. This fraction of the total earth's mass is like a thin shell at the earth's surface (say 1 to 6 miles thick), which gives us a further reduction of 10^{-3} to 2×10^{-4}.

4. I believe I made an error in calculating the complexity of the Langton automaton which was carried over to the Byl model. The transition rules were represented as one digit per rule (the result), but in fact a label is necessary for each rule to identify it. In Byl's automaton, each of the seven default rules needs one digit (the current value of the cell) to distinguish among them. The non-default transition rules depend upon the current values of the four neighboring cells, which thus require a four-digit label for each. Adding in this complexity raises the number of combinations from Byl's value of 6 $\times 10^{42}$ (page 28 of his article) to 2×10^{173}. Without even taking back the concessions discussed in items 1-3, above, this gives a formation time of 3×10^{79} years again, and random formation appears to be out of the question.

Byl is undoubtedly right in suggesting that some of the complexity of the automaton will translate into physical characteristics of the component atoms for the molecule(s) involved in self-reproduction, and that these characteristics are already given rather than generated by a random process. However, the structure of the automaton and its transition rules do not exhaust its complexity, as no small amount of organization is supplied by the computer used to run the program. I would suggest that we let the computer's complexity stand

for the structure of the individual atoms, leaving both automaton structure and transition rules as the minimal complexity which random combination must supply to begin self-reproduction in a hypothetical universe without a designer.

I would appreciate correspondence from readers on possible improvements to this calculation, as I believe the determination of minimum complexity for any reasonable analogs to life is most desirable in thinking through the basic question of life's origin. ✤

NOTES

[1] Robert C. Newman, "Self-Reproducing Automata and the Origin of Life," *Perspectives on Science and Christian Faith*, 40:24-31 (1988).
[2] "A Program Evolves—By Design," *ASA/CSCA Newsletter*, 30(4):5-6 (Aug/Sept 1988).
[3] John Byl, "On Cellular Automata and the Origin of Life," *Perspectives on Science and Christian Faith*, 41:26-29 (1989); "Self-Reproduction in Small Cellular Automata," *Physica*, D 34:295-299 (1989).
[4] e.g., Donald H. Menzel, *Fundamental Formulas of Physics* (New York: Dover, 1960), 2:641.
[5] *Handbook of Chemistry and Physics* (55th ed.), F-188.
[6] *Ibid.*, F-190.
[7] This is still a generous concession. See Michael Hart, "Habitable Zones about Main Sequence Stars," *Icarus*, 37:351-357 (1979).

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There is in God—some say—
A deep but dazzling darkness, as men here
Say it is late and dusky, because they
See not all clear.
Oh for that night, where I in Him
Might live invisible and dim!

—Henry Vaughan, from "The Night"

Science and Something Else: Religious Aspects of the NAS Booklet, "Science and Creationism"

Two booklets similar in format intended to help teachers cope with the so-called creation-evolution controversy are now circulating widely. In this communication the authors of one of them, *Teaching Science in a Climate of Controversy: A View from the American Scientific Affiliation* (referred to here as "the ASA booklet"),[1] comment on its relation to the other, *Science and Creationism: A View from the National Academy of Sciences* (referred to here as "the NAS booklet").[2] We also comment on the NAS booklet's treatment of certain scientific and religious issues, which led us to attempt an alternative or complementary treatment in the ASA booklet.

This "tale of two booklets" begins when bills mandating "equal time" or "balanced treatment" for "scientific creationism" were introduced first in Iowa in 1977[3] and then in nearly a dozen other states.[4] Perceiving a threat to science education and to the future of science, the National Academy of Sciences brought the directors of a number of scholarly societies together in October 1981 at NAS headquarters in Washington, D.C., to discuss appropriate responses.[5] In July 1983 James D. Ebert, vice president of NAS and president of the Carnegie Institution of Washington, convened an NAS Workshop on Secondary School Science Textbooks to see what could be done to maintain "the scientific integrity of science textbooks."[6]

In 1984 an eleven-member NAS Committee on Science and Creationism, chaired by Ebert, produced a 28-page booklet for science teachers entitled *Science and Creationism: A View from the National Academy of Sciences*. The committee had been authorized by the NAS Governing Council, which subsequently reviewed its report. The Commission on Life Sciences of the National Research Council provided staff support. The booklet acknowledged support of the Mary Reynolds Babcock Foundation and others, which evidently financed an initial mailing to some 40,000 teachers in the United States.

In 1984 the Executive Council of the American Scientific Affiliation established a Committee for Integrity in Science Education. The committee's original intent was to help textbook publishers strengthen their presentations of science while avoiding statements that could be interpreted as anti-religious by the conservative Christian community. Publication of *Science and Creationism* by NAS stimulated the ASA committee instead to produce its own booklet for teachers, using the NAS booklet as a model. In October 1986, the 48-page *Teaching Science in a Climate of Controversy: A View from the American Scientific Affiliation* was published with the support of several foundations. Some 20,000 copies were mailed to high school biology teachers in southern and western states. In February 1987, with further foundation support, a slightly revised version was printed and another 20,000 were mailed to high school biology teachers in the northeastern and midwestern states. In June 1989 an extensively revised version of the ASA booklet brought the total number in print to over 100,000 copies.

In its 1986 Preface (by John E. Halver, member of both ASA and NAS), the ASA booklet referred to the earlier booklet, observing that "to some readers the NAS booklet seemed to overstate its case—particularly with regard to human evolution."[7] The two overstatements cited were (a) that "the 'missing links' that troubled Darwin and his followers are no longer missing," and (b) that "a succession of well-documented intermediate forms or species" leads from early primates to humans. The ASA booklet called the tone of *those two statements* "dogmatic rather than tentative" and said that they ignored "the current situation in anthropology."[8]

Without withdrawing its scientific criticism, the 1987 ASA booklet deleted the comment about the dogmatic tone of the two statements. Referring to their implication that the branching of hominids from other primates is well documented in the fossil record, the ASA booklet asserted that "the current situation in paleoanthropology is not that clear."[9]

Some critics who misread *Teaching Science in a Climate of Controversy* as a "creationist tract" also misread it as a general attack on the NAS booklet. For example, in a critique of the 1986 version, U.C. Berkeley paleontologist Kevin Padian charged that *Teaching Science* "labels the NAS book 'dogmatic'." "And what scientific authority is presented to challenge the NAS viewpoint?" he asked, using the

phrase *scientific authority* three times in a five-paragraph critique. Padian suggested that if ASA "did not mean to challenge the scientific authority or integrity of NAS" but intended to influence "hard-line creationists," it should have mailed its booklet to "fundamentalist preachers" instead of to science teachers.[10]

Far from attacking or rejecting *Science and Creationism*, however, the 1989 ASA booklet recommends it as an additional resource "available to help teachers deal with 'scientific creationism' in the classroom." The 1989 Preface of *Teaching Science* says of the NAS booklet: "It provided a broad summary of the evidence on which current scientific conclusions are based, but to some readers, its rejection of 'special creation' seemed to imply rejection of a divine Creator. Further, it ignored certain unsolved problems that should be an integral part of scientific education." The 1989 wording about the two questionable scientific statements is: "In fact such documentation is far from complete."[11]

The two contested sentences in the NAS booklet leave the impression that the problems of human evolution have essentially been solved. Overstatements about scientific accomplishments make it more difficult for teachers to convey the challenge of ongoing research. Such overstatements, especially when made by "scientific authorities," also tend to exaggerate the contribution of science to human understanding.

Although the National Academy of Sciences is the most prestigious scientific body in the country, its booklet for teachers was not about science alone but about "science and something else." Indeed, in June 1987 the U.S. Supreme Court declared the "something else" in the NAS booklet's title to pertain to religion rather than to science. Recognizing that the NAS booklet is about science *and* religion, it is legitimate to ask how its authors have handled religious questions. The following comments are directed at some religious aspects of the NAS booklet.

1. "Religion and science are separate and mutually exclusive realms of human thought whose presentation in the same context leads to misunderstanding of both scientific theory and religious belief."[12]

In the Preface (pp. 5-6), NAS president Frank Press quoted the above sentence from a 1981 resolution of the NAS Council. Many persons trained in both science and theology would disagree with the concept of separate "realms of thought." Even

those who accept the statement in theory generally find it difficult to apply in practice. It is worth noting, for example, that Press himself discussed both religion and science in the context of the same booklet, same preface, and same paragraph.

If "creationism" had been clearly defined in the Preface as a more limited religious concept than "creation," it would have been clearer that when Press used the term "creationists" he really meant "advocates of scientific creationism" or "participants in the creation science movement" rather than all people who believe in God as their Creator. All theists (including Christians, Jews, and Muslims) are creationists in that broad sense, but most theists would probably resent being identified with any movement that rejects well-established scientific conclusions.

A sentence beginning on the last line of p. 5 was probably intended to clarify the situation: "A great many religious leaders and scientists accept evolution on scientific grounds without relinquishing their belief in religious principles." That sentence would have provided more clarification if it had said: "A great many religious leaders and scientists see no conflict between the scientific theory of evolution and the religious doctrine of creation." As it stands, "without relinquishing their belief in religious principles" is too vague in a context in which *creation* is the specific religious principle under discussion.

Biological scientists legitimately object when weasel words like "biological change" or "development" are used in textbooks merely to avoid using the word *evolution*. It should be understood that the word *creation* is as well established and as honorable a word as *evolution*, even in our modern vocabulary. It stands in opposition not to biological evolution but to "evolutionary naturalism" or "evolution-*ism*." Some individuals are "evolutionists" not only in the scientific sense but also in a philosophical (even pseudo-religious) sense. Of such persons it might be said that they "accept evolution on philosophical grounds without relinquishing their confidence in the scientific method." (To substitute the word *religious* or *pseudo-religious* in place of *philosophical* would of course be a red flag to many scientists, as would substitution of a synonym like *faith* or *belief* for the word *confidence*.)

2. "The teachings of creationism as advocated by and exemplified in the writings of the leading proponents of 'creation science' include the following judgments: (1) the earth and universe are relatively young, perhaps only 6,000 to 10,000 years

old; (2) the present physical form of the earth can be explained by 'catastrophism,' including a worldwide flood; and (3) all living things (including humans) were created miraculously, essentially in the forms we now find them. These teachings may be recognized as having been derived from the accounts of origins in the first two chapters of Genesis in the Bible."[13]

"Creation-*ism*" is here adequately defined in the NAS booklet, but a problem arises from a close identification of "creation science" (including its concept of an earth only a few thousand years old) with the biblical account of creation. It seems indisputable that "creation science" is derived from a particular reading of the first two chapters of Genesis, and that many proponents of creationism are primarily concerned with defending their interpretation of Genesis. Yet any distinction among various biblical interpretations is obscured in a reference in the following paragraph to "the hypothesis of special creation." That sentence reads: "In the forms given in the first two chapters of Genesis, it is now an invalidated hypothesis."

Even "special creation" is definable in various ways, and although the term is often associated with an instantaneous "fiat" or narrowly literal interpretation of Genesis, it may also apply to broader views. Theists who take the Genesis account seriously (not a synonym for "literally") generally *do* think of creation as something special, just as scientists (theistic and otherwise) refer to the origin of the universe as something special (i.e., as a "singularity"). But Genesis is not a scientific textbook and does not present scientific hypotheses. It is a religious book concerned about *who* is doing the creating and *why*. We look to the scientific disciplines to explore the questions of *how* and *when*.

Perhaps we have here an example of what Frank Press meant about misunderstandings that arise from mixing science and religion in the same context. Scientific investigation has invalidated not the early chapters of Genesis but a pseudo-scientific interpretation imposed on them by advocates of "creation science." It is ironic if the authors of the NAS booklet have accepted a theological interpretation of Genesis provided by "creation scientists," the very people whom they consider untrustworthy in scientific interpretation.

Further, it is hard to imagine the scientists on the NAS committee having such a narrow or "literal" view of the Bible that they actually "see" a scientific hypothesis in Genesis. There may be

some theists among the eleven members of the committee that produced the NAS booklet, but of course the listing of their names and positions does not indicate their interest or competence in theology. Four of the eleven not identified as scientists seem to be lawyers rather than theologians.[14]

3. "Generations of able and often devout scientists before us have sought evidence for these teachings without success. Foremost among these was Charles Darwin, a member in good standing of the Church of England and an officer of his parish church at Down, in Kent, for many years."[15]

After mentioning "able and often devout scientists" who sought evidence of a young earth and catastrophic worldwide flood, the NAS booklet introduces Charles Darwin as "foremost among these." Darwin may well have been foremost in scientific ability but few Christians would regard him as having ended up foremost in religious devotion. It is perhaps unclear whether Darwin's journey away from religious faith took him all the way into atheism or merely into agnosticism, but it should have been clear that citing his church membership would raise a red flag to many Christians. According to Ernst Mayr, Darwin "abandoned Christianity" as part of "his conversion to evolutionism."[16]

In the current climate of controversy over public education, science needs the support of religiously motivated citizens as well as of those who have no interest in religion or who are antagonistic to religion. It is therefore important to demonstrate that many great contributors to science have also been believers in the Bible. Isaac Newton, cited on p. 10 as a mathematician and "natural philosopher," would have been a far better choice than Darwin for such a demonstration. Newton may have ended up as a rather unorthodox theist, but in the end he considered his theological explorations to be as important as his scientific writings.

4. "Scientists, like many others, are touched with awe at the order and complexity of nature. Religion provides one way for human beings to be comfortable with these marvels."[17]

Some atheistic scientists may consider the above statement in the Conclusion of the NAS booklet a sop to religiously motivated citizens to win their votes for increased support of research. Many religious persons, however, are likely to regard it as a subtle putdown of religion. The purpose of biblical religion is not to make us "comfortable" with the marvels of nature. The scriptures of the

major theistic religions supply an alternative way of looking at human personhood that includes personal and purposive elements excluded from a reductionistic scientific view.

The Bible depicts human beings not as products of blind chance but as individual persons created in God's image, without specifying in scientific language how that deliberate creation occurred, or how long it took. The sense of obligation engendered by identification with divine purpose is likely to make believers in the Bible decidedly *uncomfortable*—with our own moral status and with the status of our understanding of nature. Indeed, a biblical faith was a driving force behind the work of Copernicus, Kepler, Galileo, Newton, Pascal, Faraday, and other scientific pioneers, and that remains true of thousands of scientists today. It is not insignificant that modern science "evolved" under the influence of a Judeo-Christian view of nature as orderly, consistent, and inspiring to study. After all, seen as "the creation," nature revealed something of the mind of God. Even scientists who are not themselves theists build on the pioneering work of many scientists who were.   ✤

NOTES

[1] Committee for Integrity in Science Education, American Scientific Affiliation, *Teaching Science in a Climate of Controversy: A View from the American Scientific Affiliation*. Ipswich, MA: The American Scientific Affiliation, 1986; second printing, revised, 1987; third printing, revised, 1989. (Available from ASA, P.O. Box 668, Ipswich, MA 01938.)

[2] Committee on Science and Creationism, National Academy of Sciences, *Science and Creationism: A View from the National Academy of Sciences*. Washington, D.C.: National Academy Press, 1984. pp. 2-4. (Available from National Academy Press, 2101 Constitution Ave, N.W., Washington, DC 20418.)

[3] Stanley L. Weinberg, "Reactions to Creationism in Iowa," *Creation/Evolution*, Vol. 1, No. 2 (Fall 1980), pp. 1-8.

[4] "Update on Creation Bills and Resolutions," *Creation/Evolution*, Vol. 2, No. 1 (Winter 1981), inside back cover.

[5] "News Briefs: Committees of Correspondence," *Creation/Evolution*, Vol. 4, No. 2 (Spring 1983), pp. 38-41.

[6] Stuart W. Hughes, "Textbook Publishers Face Scientists and Educators," *Creation/Evolution*, Vol. 4, No. 2 (Spring 1983), pp. 33-34.

[7] Ref. 1, 1986 printing, p. 8.

[8] Ref. 1, 1986 printing, p. 42.

[9] Ref. 1, 1987 printing, p. 42.

[10] Kevin Padian, "And More," (letter), *The Science Teacher*, Vol. 54, No. 6 (Sept 1987), p. 64.

[11] Ref. 1, 1989 printing, pp. 8, 42, 45.

[12] Ref. 2, p. 6.

[13] Ref. 2, p. 7.

[14] Ref. 2, p. 3. The four are: Joseph H. Flom of Skadden, Arps, Slate, Meagher & Flom, New York, NY; Peter Barton Hutt of Covington & Burling, Washington, DC; David I. Shapiro of Dickstein, Shapiro & Morin, Washington, DC; and Laurence H. Tribe, Tyler Professor of Constitutional Law, Harvard Law School, Harvard University, Cambridge, MA.

[15] Ref. 2, p. 7.

[16] Ernst Mayr, *The Growth of Biological Thought*. Cambridge, MA: The Belknap Press of Harvard University Press, 1982. pp. 401, 402.

[17] Rev. 2, p. 26.

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*I know the ways of learning: both the head
And pipes that feed the press, and make it run;
What reason hath from nature borrowed,
Or of itself, like a good housewife, spun
In laws and policy; what the stars conspire;
What willing nature speaks, what forced by fire;
Both the old discoveries, and the newly found seas,
The stock and surplus, cause and history;
All these stand open, or I have the keys;
Yet I love thee.*

—George Herbert, from "The Pearl"

Penetrating the Word Maze

MEANING
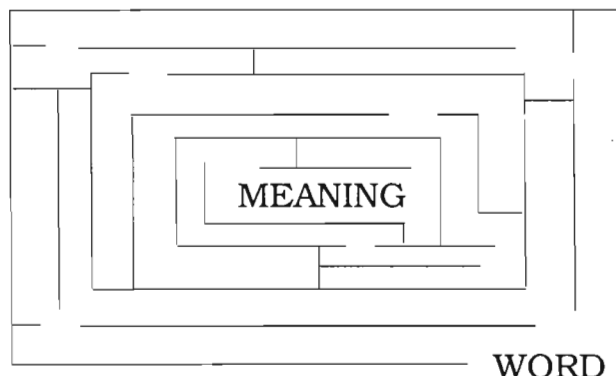
WORD

Taking a look at words we often use—and misuse. Please let us know whether these attempts at clarification are helpful to you.

Today's words are: "reason/faith."

The dictionary definitions: *reason: "a sufficient ground of explanation or of logical defense"; faith: "firm belief in something for which there is no proof; complete trust."* [Webster's Ninth New Collegiate Dictionary, Merriam-Webster, Springfield, MA (1987).]

*   *   *   *   *

The field on which science and Christian theology are discussed is strewn with dichotomies: false distinctions advanced as the basis for necessary choices. We encounter such dichotomies, for example, between determinism and chance, creation and evolution, and body and soul—as well as between God's sovereignty and human responsibility, faith and works, and love and law. But no dichotomy has held a larger portion of the field for a longer period of time than the one between faith and reason. All too often science is upheld as the perfect expression of reason, whereas theology is downgraded as an example of relative, subjective faith. We need to clearly understand what is meaningful about such a comparison, and what is totally false.

In human experience a reason-faith axis can be defined, extending from the purest kind of rational process characteristic of mathematical deduction at one end (**R**) to the purest kind of faith relationship (**F**) at the other.

R ------------x-----------------x----------- F
(science)   (theology)

Both science and Christian theology lie on this same axis; they are not at the same point on the axis, but they both partake of the same elements to some extent. Authentic Christian theology is a rational faith; authentic science is a faith-supported rational endeavor.

The dictionary definitions, reflecting common usage, might lead us to believe that science is based on objective facts, whereas theology is based only on personal feelings. These distinctions are useful to point to some differences between science and theology, but totally misleading if taken to indicate some kind of exclusive disjunction between them.

Pure objectivity in any human endeavor is a myth; no "fact" even in science ever provides its own interpretation. The entire scientific endeavor is based ultimately upon a faith commitment: faith that the universe is intelligible to human beings and that the thoughts of our minds can be relevant to the structure of that universe. A person who does not have faith in the possibilities of gaining

meaningful knowledge by doing science is unable to do science. The analogous question to "Can you prove the existence of God?" is "Can you prove the validity of a scientific approach?" Both must be chosen on faith before meaningful experience can follow.

If it is true that science is based on faith, it is no less true that theology is heavily involved with a rational assessment of evidence. The Christian position is based on historical data that cannot be ignored in developing an authentic Christian theology. One of the reasons that the Christian faith receives so much opposition is that it is not totally relativistic and subjective. It does not allow an individual the freedom to construct whatever kind of religious system he subjectively chooses.

If the essential aspect of science is a rational approach to questions, it is no less true that major breakthroughs in science often occur as the result of guesses, intuition, flashes of insight, or instances of serendipity, rather than some kind of mechanical logical progression.

Christian theology on its side upholds a rational faith, a phrase that should not be regarded as an oxymoron. A rational faith is one in which the available evidence of every sort is assessed, whether from the biblical revelation, historical events, or community or personal experience, and then on the basis of that assessment a choice is made and a faith commitment is formed.

There *is* a major difference between science and theology. The ideal of science is to be as objective and independent of one's subject as possible; the ideal of Christian faith is to commit oneself personally and wholly to Jesus Christ, trusting God's promise in Him, and being obedient to His words. The scientific approach is essentially reductionistic, focusing on the properties and interactions of the parts of a system; while the theological approach is essentially holistic, focusing on the properties and interactions of persons as whole beings.

But even here the differences are not as absolute as they may seem. The effect of the experimenter on the experiment has been highly documented since modern quantum mechanics, but it is a very common non-quantum occurrence when scientific research is attempted on persons. It has been increasingly realized that the answers one gets, even in science, may depend critically on what questions are asked.

Similarly the Christian's involvement in a holistic personal commitment does not remove the necessity of constantly seeking to know and to understand the revelation of God for today's situation. The Christian is constantly testing the elements of his experience in the light of the biblical revelation and attempting to draw objective judgements.

Since both science and theology are human activities, the role of community is important to both. To be a scientist is to be a member of a particular scientific community, with traditions, ethics, and practices representative of that community. To be a Christian is to be a member of a particular Christian community, with its traditions, ethics, and practices. Ultimate decisions on uncertain matters arise out of a consensus of the community in both cases.

To exhibit both faith and reason is an essential aspect of all authentic human activities. We should not erect walls between science and theology by appealing to false dichotomies between faith and reason.

Does it require more reason to have faith or more faith to be reasonable? ✤

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*If I see further than other men,
it is because I stand on the shoulders of giants.*

—Isaac Newton

Book Reviews

DIET FOR A NEW AMERICA by John Robbins. Walpole, NH: Stillpoint Publishing, 1987. 423 pages. Paperback; $12.95.

In the mid-1960s, John Robbins rejected his father's offer to take over the family business (Baskin-Robbins ice cream company), and majored in the history of political philosophy at the University of California at Berkeley. He later moved to a remote island where he grew his own food, practiced yoga and meditation intensively, lived in India with several "spiritual masters," and returned to California for a master's degree in Humanistic Psychology. John is an avid animal activist, a strict vegetarian (no eggs, milk, or animal products of any kind), and founder of the Rising Spirit Center, EarthSave Foundation, and Concerned Citizens of Planet Earth. In *Diet for a New America*, Robbins shares his feelings and beliefs.

Diet for a New America consists of 12 chapters; eight pages of black and white photos; four pages of recommended vegetarian, hunger, environmental, and animal rights books and organizations; and 36 pages of notes. Most notes are from popular literature of the 1960s and 1970s, some are from the 1950s; few are more recent than 1981. The first five chapters are highly anthropomorphic discussions of the use (and abuse) of animals for food. Chapters 6-10 focus on the health effects of our current diet and high protein consumption, especially animal proteins with the associated saturated fats. Chapter 11 condemns the use of agrichemicals, and chapter 12 concerns the global impact of producing animal products for food.

Robbins' main message is that changing to a strict vegetarian diet would help reduce world hunger, lessen environmental damage, improve our health, and reduce cruelty to animals raised on "factory farms." With no demand for meat and animal products, there would be less clearing of Amazonian rainforest to produce grassland for the beef export market, fewer pesticides and other chemicals in our food and environment, less atherosclerosis from eating too much saturated fat in our meat and dairy products, less osteoporosis from increased calcium loss caused by excess protein consumption, and no "factory farms" with laying hens or other animals inhumanely crammed into small pens and cages. Robbins also believes that something of the "sickness, misery, and terror" that these animals experience enters into us when we eat them; i.e., "we are ingesting nightmares for breakfast, dinner, and lunch."

Robbins' book is a polemic against "agribusiness oligopolies," their "obscenely inhumane system of food production," and our "protein obsession" fulfilled by eating meat and other animal products. Each of Robbins'

points has some validity; excesses and misuse should be stopped. But so much exaggeration, misleading half-truth, outdated information, and confusion of correlation with cause is likely to greatly lessen the book's credibility for scientifically literate readers. From my perspective as a nutrition instructor, plant ecologist with a "family" farm background, and two degrees in agriculture, I was disappointed to see such valid issues so clouded by such an emotional "Chicken Little" approach. And, as a fellow student at UC Berkeley (Ph.D. 1966), I also understand how such an extreme anti-establishment attitude can hinder objectivity and fairness.

This book will appeal to many animal rights activists, strict vegetarians, organic farmers, lay environmentalists, and persons interested in holistic health permeated with Eastern philosophy and religion. I do not recommend this book for ASA members, who have access to more accurate, objective, balanced, Christian literature available on diet, health, and environmental stewardship.

Reviewed by L. Duane Thurman, Professor of Biology, Oral Roberts University, Tulsa, OK 74171.

DOCTORS AND DISEASE IN THE ROMAN EMPIRE by Ralph Jackson. Norman, OK: University of Oklahoma Press, 1988. 207 pages, index. Hardcover; $27.50.

This is a fascinating book. It is extremely well written and authoritative. Author Ralph Jackson, a Fellow of the Society of Antiquaries, is a curator for the Department of Prehistoric and Romano-British Antiquities of the British Museum. His intimate familiarity with medical practice and related subjects, such as public hygiene in the classical world, is made manifest throughout the book.

Christians will find many valuable insights in this book about the character of daily life during the New Testament era. These insights will enrich their appreciation for some New Testament passages. Pastors and other speakers can use this book as a resource from which to draw many unusual but pertinent illustrations.

Jackson begins with a discussion of the origins of Roman medical practice and Greek and Egyptian influences upon it. He then explores public fitness, food, and hygiene. Training of physicians and the way they functioned is discussed in detail. It will surprise many that the patristic head of a family or clan often served more as the medical supervisor for it than did physicians, who were often viewed with suspicion. Women's diseases along with birth and contraception are given special treatment, as is the surgeon and medicine in the Roman army.

Jackson concludes with chapters on religious influences in medicine and the process of dying and death.

The impact of social class on health and well-being are evident in many parts of this book. For example, the author notes that living "three score years and ten" was not uncommon for people in the wealthy classes, but that the few cemeteries serving working-class communities rarely gave evidence of anyone who lived beyond fifty. The implicit challenge of this for Christians to do good for all men is still pertinent today in our world which contains so many poor whose life expectancy is similarly different from that of American middle-class Christians.

Although I have read extensively about the classical world, this book was full of surprises for me. It reminded me of how little I really know about that period. I suspect that many others might find it likewise for them. For example, I had not appreciated that the diet for the Roman army during the late Republic and early Empire appears to have been essentially vegetarian. Nor had I realized that latrines were often situated within kitchens—a fact which no doubt contributed to the frequency with which diarrhoea and dysentery are mentioned by ancient writers.

Simply put, this book is well worth reading.

Reviewed by D.K. Pace, The Johns Hopkins University Applied Physics Laboratory, Laurel, MD 20707.

SIGMUND FREUD'S CHRISTIAN UNCONSCIOUS by Paul C. Vitz. New York: Guilford Press, 1988. 287 pages. Hardcover.

Since its inception, the Church has been beguiled and bedeviled by a myriad of "isms" opposed to Christianity. Gnosticism, 20th-century secular humanism, and scientism are a few that come to mind. But no system of thought has caused more consternation for Christian belief than that which sprung from the fertile mind of Sigmund Freud.

Sigmund Freud (1856-1939), the founder of psychoanalysis, was born to Jewish parents in Freiberg, Moravia. We are mainly concerned here with Freud's thinking regarding religion in general and Christianity in particular.

He understood God, Satan, and the spirit world as personifications of man's projected unconscious fears and fantasies: "Freud believed that one's attitude toward God derives from one's childhood attitude towards one's father; that one's attitude toward the Deity is a displacement of one's stance toward the parent. In short, the heavenly Father is conceptualized as an exalted version of the earthly one" (*Baker Encyclopedia of Psychology*, p. 431).

Enter Paul Vitz, professor of psychology at New York

University. Vitz is no garden variety "Freud basher." He has a profound respect for Freud's contributions to our understanding of human behavior and man's emotional wants and needs. I quote from the preface of the book:

This book is an extended biographical essay on Sigmund Freud's little known, lifelong, deep involvement with religion, primarily Christianity and in particular Roman Catholicism. This topic should be of serious interest to at least two major groups of readers. First, there are those people, among whom I often count myself, who have interest in or more typically a fascination with Freud's life and thought. ...

There is no middle ground about Freud. Vitz points out that people either love him or hate him—which may indicate an unconscious acceptance of a key Freudian concept.

Vitz details how pervasive Freud's hostility to religion has been in our time. Personally, I feel much, if not most, of this difficulty would be resolved if one would distinguish between scientific statements and philosophical (and/or theological) ones.

Some presuppositions of science are: everything happens in time-space (natural), always traveling but never arriving (incomplete), and telling what the world may be like, not what it really is (relative). Theology and philosophy render opposite notions; not "what is," but "what ought to be."

"What I attempt to do here is to show how Freud's

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anti-religious beliefs and theories are to be understood as an expression of his own unconscious needs and traumatic childhood experiences." Vitz here attempts to use Freud's own interpretation against him.

Some of the topics discussed in this book include: Freud's Roman Catholic nanny and her importance for religion, his possible secret baptism, his rejection of his father, his use of cocaine, his dream interpretations, Freud and the Devil, and the Freud-Jung connection. A full plate indeed. On page 169, Vitz has a table, "Jesus as the Anti-Oedipus: A Summary of the Ways in which the Life of Jesus is the Negation of the Life of Freud's Oedipal Man," which by itself is worth the price of the volume. Christians, take heart.

The book's bibliography lists 274 separate titles, 37 pages of notes, and a 13-page index; not your average cursory treatment of a subject. Vitz first came to my attention through his book *Psychology as Religion*, (Eerdmans, 1977). Modern psychology began to take positions counter to and damaging for a Christian understanding of human personality. A few examples: (1) the glorification of the self (at cross purposes with the biblical encouragement to lose one's self); (2) the belief that "sin" is exclusively or primarily the consequence of outside forces on mankind (at odds with the Christian concept of man as sinner); and (3) the acceptance of secular humanism as the only basis for understanding human reality.

I will quote finally from the conclusion of the book under consideration:

> The reader may not agree with me that the weight of the psychological evidence now makes atheism a more probable symptom of neurosis than theism. However, at the very least, it should be clear that atheism certainly may often be an expression of a psychological pathology. ... In the future, as psychology moves (as I believe it will) toward a more honest approach to the question of the existence of God, I propose that at least two important spirits of Freud would wish such a new venture well: The spirit of his intellectual courage and the spirit of a three-year-old boy with his nanny.

Reviewed by Ralph MacKenzie, 5051 Park Rim Drive, San Diego, CA 92117.

COUNSELING FOR SUBSTANCE ABUSE AND ADDICTION by Stephen Van Cleave, Walter Byrd, and Kathy Revell. Volume 12 in the "Resources for Christian Counseling" series, Gary R. Collins, General Editor. Waco, TX: Word Books, 1987. 217 pages.

This book is a useful overview of addiction and how to respond to it. The three authors are medical specialists in the field of substance abuse who are Christians. Cleave is a specialist in internal medicine and emergency medicine with much experience in a variety of substance abuse programs. Byrd is a psychiatrist who serves as medical director of a hospital substance abuse program. Revell, a nurse, is a certified alcohol and drug abuse counselor. The combinations of their skills and extensive experience allow them to bring a depth of insight and balanced perspective to the book that is frequently lacking in books dealing with the subject of addiction or substance abuse.

This book takes a fairly comprehensive view of addiction, recognizing the similarity in its progress and treatment regardless of whether the addiction is to alcohol or to drugs. The authors discuss the variety of reasons that cause people to start using these substances and how progression to addiction occurs. They then discuss some of the counter-productive "helping" that is often given and explain why it doesn't help. The involvement of the family in the addiction process is given significant attention. The authors address the arduous task of helping addicts recover from their addiction and put their lives back together, with candid assessment of what works and what doesn't in inpatient, outpatient, and residential programs. They include an appendix which identifies a number of resources (books and both Christian and secular programs). There are a number of graphics in the book which may be very helpful for many as a way of organizing their thinking about the complexities of addiction and its treatment.

Although the book states that it is aimed at Christian counselors, it really seems targeted upon parents and church leaders rather than upon professionally trained counselors, since it is primarily a summary of generally available information that most Christian counselors should have covered in much greater depth during their formal training. I believe that the book will be valuable for many parents and church leaders since it can help them to develop strategies for coping with family members and those within their congregations who are substance abusers. Some counselors may also find it helpful, more as a resource to lend to some of their clients than for their own edification, although it can be a helpful focus.

Reviewed by D.K. Pace, Johns Hopkins University Applied Physics Laboratory, 7333 Better Hours Court, Columbia, MD 21045.

A LISTENING EAR: Reflections on Christian Caring by Paul Tournier. Minneapolis: Augsburg, 1986. 143 pages. Paperback.

Paul Tournier, a Swiss psychologist of renown, author of numerous books published in nineteen languages, died in 1986. One of his last books is a collection of interviews and lectures, originally titled *Live to Listen*. The book is probably the most personal among all books Tournier wrote. He gives us an account of many personal events that shaped his spiritual and professional journey and allowed him "to unite in a practical way the faith we receive from God and the science we are taught at the university" (p. 131).

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Noteworthily, Tournier both opens and closes his book with pointing to what became the leitmotif in his life: the power of silence. Silence, which Tournier identifies with meditation, "has the power to force you to dig deep inside yourself" (p. 14) to know God's will for your life, to "discover our real problems" (p. 133). It is the means to let God lead you in all areas of your life. That is what Tournier experienced himself in his personal growth, in relationship with his wife and his patients. He was able to see deeper and better his own and others' problems. His personal and professional life and his writings are a great testimony that becoming a listening ear can bring us—by the power of God—much further than we would ever dream of.

He accuses medicine, especially psychiatry, of impersonality, of treating patients as mere cases. Personal encounter or spiritual contact is vital here, but in order to achieve this stage the doctor needs to start by listening to God. In this way, he can see what hampers a genuine encounter with the patient and make real the third dimension of medicine: the dimension of relationship, of the I-Thou contact Martin Buber wrote about.

The finest chapter of the book is the one that discusses the enigma of suffering. This problem is central to Christianity, because it is "the only religion of the suffering God" (p. 87). Although on the ontological level suffering remains an enigma, on the practical level it is an integral part of the Christian life. It is to be accepted and also taken advantage of, but not only on the spiritual level: "the purpose of life is not the absence of suffering, but that the suffering should bear fruits. ... If one does not suffer, one does not live" (p. 92). Suffering opens doors to the meaning of life: Jesus, a suffering being. It also makes us more mature, more Christ-like. Do not we read that Jesus himself was made "perfect through sufferings" (Hebrews 2:10)?

Tournier gives many examples indicating that his discussion of the problems of suffering, meaning, listening to God, etc. is not only of purely theoretical importance. Being theologically insightful, the discussion can also be related to anybody's life (not only to the doctor's) and set into motion here and now—with God's help.

Reviewed by Adam Drozdek, Professor of Computer Science, Duquesne University, Pittsburgh, PA 15282.

ANGELS FEAR: Towards an Epistemology of the Sacred by Gregory Bateson and Mary Catherine Bateson. New York: MacMillan, 1987. 224 pages, glossary, notes, index. Hardcover; $18.95.

Angels Fear was written by the father/daughter team of Gregory Bateson and Mary Catherine Bateson. Gregory Bateson was trained as an anthropologist and did research in Bali and New Guinea before entering the field of research in psychiatry and schizophrenia. He took part

in the formulation of early cybernetics. His work has influenced the modern understanding of learning, the family, and ecological systems. He has written two other books, *Steps to an Ecology of Mind* and *Mind and Nature*. Mary Catherine Bateson is the daughter of Gregory Bateson and Margaret Mead. She is professor of anthropology at Amherst College and has done research in the Philippines and the Middle East. She has also authored two books, *Our Own Metaphor* and *With a Daughter's Eye*.

Actually, *Angels Fear* was written by Mary Bateson several years after her father's death. She used miscellaneous, incomplete, and unintegrated manuscripts he left, and wrote a collaboration that they had agreed to do before he died in 1980.

This book contains eighteen chapters, seven of which are "metalogues." The metalogues are devices she uses to "dialogue" in her thoughts with her deceased father. The book ends with a glossary, notes on chapter sources, and an index. The book also contains diagrams that chart some of Gregory Bateson's theories.

In Chapter One, Mary Bateson explains why this book was written. In the second part of the introduction, Gregory defines the task he set out to accomplish by beginning this book.

The next fifteen chapters are Gregory Bateson's attempt to explain individually and collectively our mental processes, learning, Carl Jung's theory on Creatura and Pleroma, the possible necessity of religion, and the sacred. Gregory makes use of a lot of parables, stories, and what he calls "models" to explain his thoughts and theories.

Gregory Bateson felt that one of the major problems with Western thought was dualism based in Descartes' separation of mind from matter, and spends much time explaining why Jung's epistemology is much healthier for our collective mind, and possibly for our individual mental health.

Gregory did not believe in the supernatural; however, he spent his last years in Esalen, California, and most of his friends there were involved in the New Age culture. He did not agree with their religion, but called it superstition and magic. Neither did he agree with the mechanists or materialists who try to explain everything by linear sequences of cause and effect, and view man as some type of machine. Instead, he hoped that mankind will someday find a middle ground: "Whether, if neither muddleheadedness nor hypocrisy is necessary to religion, there might be found in knowledge and in art the basis to support an affirmation of the sacred that would celebrate natural unity."

After finishing the book, I still did not feel that Gregory Bateson had explained what he meant by "the sacred." In Chapter 17, Mary Bateson discusses what she believes was her father's purpose: "Gregory wants us to 'believe in' the sacred, the integrated fabric of mental process that envelops all our lives—and the principal way he knows

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that has allowed men and women to approach this (but not necessarily the only way) has been through religious traditions, vast, interconnected metaphorical systems."

In *Angels Fear*, Ms. Bateson tried to put a cohesiveness to her father's unfinished manuscripts, but that was what it seemed to be as I read it—incomplete. Gregory was in remission from cancer and seemed to be searching for something—"the sacred," as he called it. I felt it was sad that "one of the most influential and original thinkers of the twentieth century," as the book jacket calls him, was not willing to be a free enough thinker to allow God the possibility to speak to him and touch his life.

While I read this book, I tried to decide what the audience might be for this book. I felt it was a bit pretentious, and geared to "intelligent" thinkers. I would caution anyone before they read this book. It is atheistic in viewpoint, and unless one was studying philosophy or humanistic forms of religion and has read Gregory's other works, I would not recommend this book.

Reviewed by Monell Weatherly, Route 1, Box 168-A, Itasca, TX 76055.

THE AGONY OF AFFLUENCE by William W. Wells. Grand Rapids: Zondervan, 1989. 128 pages, index. Paperback.

William W. Wells is well qualified to write about problems of the affluent Christian. He was raised in a conservative Christian home where poverty was no problem, he has taught philosophy and religion, he is affiliated with a major missions organization, he has earned advanced degrees in business, and he serves as a business and data-processing consultant.

Wells defines the "agony of affluence" as "living with personal prosperity, yet wanting to please God by making responsible and moral economic decisions in a world full of human need." The purpose of the book is to give Christians some guidelines for making these critical decisions.

One point he brings up frequently is that we live in an evil world. God created a perfect world for Adam, but after the fall of man, evil entered the picture. This explains why no system of government or economics results in an abundant life for everyone. There are the rich, the oppressors, the poor, and the oppressed. In the midst of this reality, Christians must look to Scripture to help them honor God while meeting personal needs and those of the less fortunate.

One may be tempted to blame the poor for laziness or for lacking motivation, but both Testaments make it clear that those who are fortunate enough to be prosperous are expected by God to help those who are poor. The question is how.

Several chapters deal with the economics of production and distribution. Wells provides a number of illustrations which show that wealth is created in capitalistic nations where the free enterprise systems sets prices and wages and provides the incentive for people to be productive. He also points out that tightly controlled socialistic nations such as North Korea and East Germany are far less prosperous than their capitalistic neighbors. He calls the two systems "market economies" and "command economies."

Wells also warns that beneficiaries of market economies often get so caught up in the business of making money that they no longer honor God, and they use whatever measures they can to take from others and fill their own coffers. Therefore, Wells writes, "pure laissez faire capitalism is not ... a serious option for an evangelical Christian." The system that he believes best serves everyone including the poor is "guided capitalism."

Wells never arrives at a simple formula for living the Christian life in an affluent society, but he seems to settle on a "theology of enough." This requires asking and answering many questions: What vocation would God have me pursue? What resources do I need to provide for myself and my family? How can I help my church, my society, and specifically the poor? He doesn't answer all of the questions, but he provides many interesting and provocative suggestions. *The Agony of Affluence* won't remove all of the agony, but it may help readers arrive at decisions which will enable them to live in peace with God and themselves as they share material blessings with others.

Reviewed by Ralph C. Kennedy, Professor Emeritus, John Brown University, Siloam Springs, AR 72761.

CONFESSIONS OF A TWENTIETH-CENTURY PILGRIM by Malcolm Muggeridge. San Francisco: Harper & Row, 1988. 150 pages. Hardcover; $14.95.

To say that Malcolm Muggeridge is simply a journalist is akin to saying that Mother Teresa—who played a vital role in Muggeridge's life—is simply a nun. A brilliant mind, combined with an uncompromising sort of honesty and plenty of hard edges, has for decades made Muggeridge a favorite not only of readers but also of television watchers.

This popularity is somewhat surprising because Muggeridge is among our most prominent and profound critics of modern bourgeois life. I can recall seeing part of a television documentary he did some twenty years ago which exposed, indeed emphasized in a most embarrassing way, the banalities and hypocrisies of American middle-class life. But not for Muggeridge the cant of assorted one-eyed leftists who see the flaws of Western societies while ignoring the brutalities of the various socialist utopias. Indeed, his first foreign assignment as

a journalist was in the Soviet Union, which he and his wife Kitty thought they might never leave, so expectant were they of its beneficent nature. The realities of Stalinism, especially the deliberate starvation of millions in the Ukraine, soon disabused him of his fantasies. While Walter Duranty of the *New York Times* and assorted fools from Britain, including the Webbs, George Bernard Shaw, Harold Laski, and clergymen like the Red Dean of Canterbury, Hewlett Johnson, were extolling the Messiah Stalin and his society of justice and peace, Muggeridge's dispatches informed the public of what was really happening. Naturally, he was obliged to leave the Soviet Union.

Muggeridge's sharply mordant wit and utter freedom from sentimentality didn't prepare the public well for the surprising news that he was a follower of Christ. He begins this book with an account of his reception, along with Kitty, into the Roman Catholic Church in 1982, when he was 79 years of age. But his journey of faith began long before that. When his two-volume autobiography, *Chronicles of Wasted Time*, came out in the early 1970s it provided not only a fascinating story of the life of a fascinating man, but also an exquisite illumination of the bulk of the middle half of the twentieth century. Yet it was a frustrating book for what it left out. Muggeridge let you know that his analysis was based on his perspective as a Christian, but for an autobiography it was strangely mute about when and how his faith began. You had the impression that it was rather late in life, but he never specifically said so.

Muggeridge's *Confessions* supply the missing information. As he says at the outset, he doesn't have a satisfactory answer for evangelicals who want to be given a time and place. He was always aware that this was God's world, in spite of the fact that he was reared in a family of atheist socialist utopians. By the time he became a science student at Cambridge he was part of a worshipping community, and his spiritual formation occupied a central place in the rest of his life. Still, Muggeridge is frank to speak of his many lapses.

Muggeridge reminds me of the great French Christian social critic Jacques Ellul. Both recognize the central place that Christian faith has played in Western civilization; both describe the collapse of that civilization through the rejection of the faith that gave it form; both provide some of the clearest insights into the nature of the enemies of Christian faith—proponents of what Muggeridge calls "the great liberal death wish." Less happily, both Ellul and Muggeridge evince a deep dualism in their thinking, the former perhaps due to his allegiance to the thought of both Marx and Barth. Muggeridge's arrival in the Roman port rather than the reformed may be best explained by his attraction to many aspects of dualism: his aversion to power, for example. A reformed thinker would want to ask how power might be responsibly used in God's kingdom; a dualist like Muggeridge can only point in horror to the alleged dichotomy between power and love, and reject the former entirely.

The dualism of Ellul and Muggeridge also bring them to virtually the same position with regard to scientific

endeavor. Since so many in modern society are ready to make a religion out of science and technology, these thinkers write them off entirely. "Twin monsters," Muggeridge calls them, "reaching into man's mind and inner consciousness to control and condition him. ... "

Notwithstanding these weaknesses, Muggeridge has a lot to teach us. His writing is a delight for those who derive aesthetic pleasure from a well-turned phrase or an original idea. Still, my counsel is: don't read this book by itself. Instead, first read the two volumes of his autobiography, *The Green Stick* and *The Infernal Grove*. And then read the *Confessions* to fill in the gaps.

Reviewed by Herbert Schlossberg, Fieldstead Institute, 5916 Oakland Ave., Minneapolis, MN 55417.

THE SEXUAL CHRISTIAN by Tim Stafford. Wheaton, IL: Scripture Press, 1989. 202 pages, index, bibliography. Hardcover; $10.95.

Author Tim Stafford, now a senior writer for *Christianity Today* magazine, draws from his 15-year experience of writing a response column for *Campus Life* magazine. His excellent book on Christian sexuality focuses on how mankind can be led back to Eden, back to the sexuality God intended.

The state of America's sexuality is explored through numerous quotes from secular proponents of the sexual revolution—one that revolves around an "ethic of intimacy." The ethic includes a high regard for sex, compatibility, value of the individual, and a lack of consequences. The weaknesses of the view are discussed as well as the strengths.

Not only does Stafford challenge the secular view of sex, but he also challenges the Christian view. "Christian thinking has been badly inadequate. Its negativism was unbiblical. ... Its acceptance of the double standard was immoral. Worst of all, it had nothing very positive to say. Eden had been forgotten." He describes Eden before and after Adam and Eve's estrangement from God. He also relates the example of God's marriage to Israel, a realistic model of living in a "hard" marriage.

Giving practical and biblical insight on living worthy of God, Stafford discusses unity, adultery, commitment, and homosexuality. His main point is that through celibacy or marriage one's life is to be devoted to God. Celibacy shows singleness of purpose; marriage, a sign of the kingdom. Both are legitimate, both are valued. Stafford's paths to return to Eden are equality between men and women, education, freedom, and privacy. His views into these areas are insightful.

The Sexual Christian has many strengths in its

presentation. The views of leaders of the sexual revolution are responsibly documented. Stafford presents objective views on issues, especially when interpreting scripture. The bibliography includes his assessments of several works cited. He not only presents the weaknesses of the modern sexual revolution, but he also gives clear direction for Christian sexual ethics.

This book is valuable for Christians who wish to strengthen "easy marriages," to encourage those in "hard marriages," and to help those struggling with singleness or homosexuality. Pastors and counselors will also gain insight to be shared with those they wish to help.

Reviewed by Joan Aycock, Editor, Outreach Publications, Siloam Springs, AR 72761.

INSIDE OUT by Larry Crabb. Colorado Springs: Nav-Press, 1988. 223 pages. Hardcover.

This is Larry Crabb's most profound book. It takes us below the surface of our problems to the root cause of all our pains and anguish—we live in a fallen world where everything is out of kilter. It leads us to seek to experience the fullness of our suffering and disappointments, without denying or covering anything up. It advocates admitting and repenting of the invisible and elusive sin of self-protection, which keeps us from loving as God desires us to.

Crabb says that modern Christianity has often preached a false Gospel which promises comfort and relief from pain and suffering in this life, an experience he believes is reserved for heaven. That causes Christians to pretend things are going well when they are not. That in turn leads to losing touch with one's feelings, resulting in a dry and passionless life of unsatisfying relationships. He advocates focussing on these feelings to see how bad our situation is—so bad that only God can help us, so bad that only heaven can bring relief. He believes this can lead to a new reality in life, a new appreciation for Christ, and a deep repentance which can produce lasting transformation.

The book is divided into four sections, designed to lead us, respectively, to look beneath the surface of our lives, to accept the fact that we are needy dependent people, to recognize our sinful patterns of self-protection, and to begin to be changed from the inside out. The development of these four sections is like a symphony: the theme stated in the introduction is presented over and over with different emphases and illustrations. The effect is not boredom with the repetition but a growing sense of hope. Crabb is presenting a message of deep and lasting change which the reader may have trouble believing. Crabb is like a cheerleader, repeating the encouraging message again and again.

Although he calls no names and mentions no movement, one can readily see that he is spelling out, in a deeper way than ever before, his disagreement with nouthetic counseling of the type advocated by Jay Adams. He says that obedience-centered counseling which does not deal with people's deep feelings will not produce vibrant Christianity or deep repentance.

There is a ring of authenticity to *Inside Out.* Crabb has bared his heart about his own pains, enough to reveal his own passion for change. He says, in the book, the ownership of feelings and deep repentance will enable us to touch the lives of others in a deeper way than we have ever experienced. This is made credible by the fact that this book moved the present reviewer in a more pronounced way than Crabb's other books have done. As a matter of fact, this book touched me and created hope for change as few books I've ever read.

Inside Out will be helpful for counselors. It will be useful for them to recommend to their counselees, since it is written in clear non-technical language. I recommend it for use in study groups (a study guide is available) or for personal growth. There is also an audio cassette available, with the same title.

One unfortunate feature of the book is that it does not use inclusive language. That will cause a negative reaction in those sensitized to this issue, but who might be helped by its contents. These same people will also question, and likely reject, the gender-specific roles and characteristics which Crabb mentions in developing his theme.

Reviewed by Joseph M. Martin, Missionary-in-Residence, Belhaven College, Jackson, MS 39202.

THE BEST OF TED ENGSTROM ON PERSONAL EXCELLENCE & LEADERSHIP compiled by Robert C. Larson. San Bernadino, CA: Here's Life Publishers, 1988. 333 pages, index. Hardcover.

How ought we to integrate the principles of Scripture with the practice of leadership and management? To this often asked question, editor Robert Larson brings a tested and venerated response, *The Best of Ted Engstrom on Personal Excellence and Leadership.* It is a classic work that will challenge and guide both the novice and the experienced Christian executive.

Among students of Christian management, the name of Ted Engstrom brings universal recognition and respect. He is a noted authority in the field, a prolific author, and a most able conference leader and teacher. Many executives in both religious and secular organizations would describe Ted Engstrom as a mentor to their personal and professional development.

Engstrom is a former president and chief executive officer (now president emeritus) of World Vision International. Prior to joining World Vision, Engstrom served as

president of Youth for Christ International and publisher of *Campus Life* magazine. He is the recipient of three honorary doctorate degrees. He is known for his time management seminars, conducted with colleague Ed Dayton, and for his numerous books, from which the present collection is drawn.

Robert C. Larson is a communications consultant and president of his own company. He is a graduate of Westmont College and Stanford University, and has collaborated with Engstrom on 11 books.

This book is organized into nine sections, each an excerpt from a different Engstrom title. There are a total of 31 chapters, which makes the book somewhat lengthy, but each chapter is a distinct and important topic, giving a sense of comprehensiveness to the entire work.

Larson begins with two chapters from Engstrom's most recent book, *Integrity*. The sections that follow deal with other helpful qualities and attributes of Christian leaders—"The Pursuit of Excellence," "Motivation to Last a Lifetime," "A Time for Commitment," "The Fine Art of Friendship," "Work, Goals, and Problem Solving" (from *For the Workaholic I Love*), "Managing Your Time," "Developing Your Leadership Style" (from *The Making of a Christian Leader*), and "The Gift of Administration" (from *Your Gift of Administration*).

Engstrom is known for his very readable, anecdotal style. In addition, he gives summary principles that are easy to remember and to apply. For example, to sufferers of the modern malady of burn-out, Engstrom gives this advice: read inspirational books; listen to motivational cassettes; recognize that you are always in the process of change; don't try too hard; don't wish for life to become easier; pray to become stronger; take a vacation; re-evaluate goals; practice, practice, practice.

The Best of Ted Engstrom could well serve as one of those inspirational books to read during a dry period in any Christian executive's career. It is a powerful distillation of Engstrom's many years of front-line experience, insight, and wisdom. The book should also be used as an introduction to the literature and approach in this field for a young manager or novice student. It is complete in itself, and yet will encourage the reader to go further in studying the model of Christian leadership and management which Engstrom advocates—and exemplifies.

Reviewed by John E. Brown, III, President, John Brown University, Siloam Springs, AR 72761.

THE CANON OF SCRIPTURE by F.F. Bruce. Downers Grove, IL: InterVarsity Press, 1988. 334 pages, bibliography, index. Hardcover; $19.95.

F.F. Bruce is such a renowned New Testament scholar that any new title of his raises expectations of sound scholarship and thoroughness. In his preface to this book, he writes about having taught courses on Text and Canon of Old and New Testaments at Manchester. After mentioning several outstanding works on these subjects by others, he justifies another volume by saying he needed "to get it out of his system," in addition to desiring to "communicate the present state of knowledge to a wider public" (p. 10).

After an introduction in which he discusses what a "canon" is (concluding that its basic meaning is a list of books accepted as a rule or standard), Bruce spends most of the rest of the book discussing the Old and New Testament canons. After drawing some conclusions he adds two appendices, one discussing the "Secret" Gospel of Mark, the other, primary sense and plenary sense of the Scriptures.

Bruce's approach is historical rather than dogmatic. He traces lists of Old and New Testament books through various periods of history. He draws few conclusions, but gives massive documentation for them. The numerous quotes he places in this volume make it a valuable reference book.

It is interesting to read Bruce's defense of including the Apocrypha in modern Bible translations, not as authoritative for doctrine, but as a secondary canon valuable for reading in the church. He laments that recent translations by conservatives have omitted these books, which have enjoyed recognition throughout church history, though not on an equal basis with the canonical books.

Bruce has interesting treatments of how the New Testament uses the Old Testament, and how the plenary sense is related to the primary sense. Many people are bothered with these questions, and not a few accuse the New Testament authors of misinterpreting the Old Testament. Bruce recognizes that often the New Testament writers quote these passages in ways which go beyond the intention of the authors. But they did this in keeping with a new paradigm that saw Jesus at the center of all Scripture. And they did not invent this paradigm; it was given to them by Jesus himself, in his use of the Old Testament (p. 55).

The overall impact of *The Canon of Scripture* is to confirm the authority of those books which have been traditionally received as inspired. As Bruce writes:

> By an act of faith the Christian reader today may identify the New Testament, as it has been received, with the entire 'tradition of Christ.' But confidence in such an act of faith will be strengthened if the same faith proves to have been exercised by Christians in other places and at other times. ... In the words of scripture the voice of the Spirit of God continues to be heard. Repeatedly, new spiritual movements have been launched by the rediscovery of the living power which resides in the canon of scripture—a living power which strengthens and liberates. (p. 283)

Reviewed by Joseph M. Martin, Missionary-in-Residence, Belhaven College, Jackson, MS 39202.

WAS JESUS WHO HE SAID HE WAS? by Michael Green. Ann Arbor, MI: Servant Books, 1989. 128 pages. Paperback.

This book has some of the qualities of a sermon, an apologia, a theodicy, and a textbook. As a sermon, it makes appeals to the will; as an apologia it argues for the truths of Christianity; as a theodicy, it vindicates God's plan; as a textbook, it offers scholarly evidence.

Michael Green, professor of Evangelism and New Testament at Regent College in Vancouver, has written many other books. This present book is highly recommended by such luminaries as Rebecca Pippert, Robert Coleman, and Billy Graham. It could be useful for several audiences. For lay Christians, it could strengthen their faith and motivate their wills. For non-Christians, it could provide a rational basis upon which to become a believer. For scholars, it could provide ready evidence for supporting Jesus' claims.

Green approaches his subject by assuming with C.S. Lewis that Jesus was either a madman or God. The evidence he puts forth argues that Jesus was indeed who he said he was. He was God in the flesh. The discussion is presented in four main parts: escapism, evidence, objections, and decision. Perhaps readers of this journal will find Green's monologue on objections to be the most relevant. Under this heading, Green discusses agnosticism, science, and Christianity. He has an interesting section on the parallels between science and Christianity. His discussion on the hostility between science and Christianity centers on creation and evolution.

In other chapters, Green discusses such questions as "Is Christianity a crutch?", "Is Christianity dull?", "Did Jesus rise from the dead?", and "How trustworthy is the New Testament?" The book is inexpensive, short, lucid, and interesting. It would make an appropriate gift to a seeker of truth or to someone who is weak in faith.

Reviewed by Richard Ruble, John Brown University, Siloam Springs, AR 72761.

DIVINE HEALING by Robert G. Witty. Nashville, TN: Broadman Press, 1989. 220 pages, endnotes. Paperback.

Witty poses several questions faced by Christians who are ill or are dealing with family illnesses. Then, he proceeds to search for answers. The result is a thorough and reasonably objective study of the subject. Most readers will appreciate the many biblical references and the summaries of various modern points of view on faith healing.

Many preachers say they believe that God can heal, but, Witty says that they don't answer the question, "What must I do to be healed?" He discusses four categories of teaching on divine healing: the inspirational, the inclusive, the exclusive, and the cautious. The first group says they believe God heals, but they don't go further. The second group says that the one in need of healing or his family and friends must have faith and pray, but these teachers also ask for letters, money, and other kinds of commitment. The exclusive group is very specific. One couple who claim special revelation, require followers to read their book, view their videotape, and follow other specific instructions. The cautious teachers agree that God can heal, but they see no basis for certain people calling themselves divine healers.

One teaching that Witty believes is unbiblical is the idea that disease was a part of God's judgment on Adam. To refute that belief, Witty says that disease is hardly mentioned in the Bible until God inflicts disease upon the Egyptians as a punishment. The only time Satan inflicts disease is when God allows him to give boils to Job. Witty observes that although God brings disease and illness on people, He also yearns to heal, because healing is part of His nature.

In Chapters 5-8, Witty compares instances of healing in the Old Testament with those in the New Testament. Among his observations is that Jesus healed sickness and forgave sins on the basis of the power given to Him. Witty also notes three characteristics of His healing ministry: "no-contest authority," "no failures," and "no incurable conditions." None of these, he emphasizes apply to any modern faith healer.

Witty agrees with those who say that one of Jesus' purposes in healing was to prove His divinity. But he adds that the healings also revealed the true nature of God and disclosed "attitudes, acts, and attributes of Deity to which man must respond for salvation."

In his discussion of the atonement, Witty notes several benefits which are provided for the whole man, and states that God has planned a "progression in bestowing the benefits of the atonement upon his children." Some benefits are immediate, others are gradual, and still others are ultimate. All that God has promised is complete fulfillment, and that is ultimate, not immediate.

In Chapter 12, "The Bible and Health Procedures and Means," Witty expresses the idea that one who follows the Bible's instructions for daily living will avoid many of life's problems. But for the problems that do exist, both testaments contain favorable references to medications and physicians.

In Chapter 13, "Biblical Restorative Provisions," Witty says that Christians can accept spiritual imperfections and physical sicknesses as a part of life when they realize that "salvation is not simply an instantaneous work but a continuing process leading to an ultimate goal." Part of that process, he indicates, involves biblical guidelines for healing. In Chapters 14-16, he discusses gifts of healing, the anointing with oil by the elders, and the prayer of the believer.

In Chapter 17, "Personal Epilogue Concerning

Healing," Witty gives us his bottom line conclusion in the following four points: healing comprises one of mankind's greatest needs; the Bible contains definite teachings about the cause and the healing of sickness and disease; the church has a God-given responsibility to study and decide what the Bible teaches on the subject; and, the church has a responsibility to teach and practice what it believes the Bible teaches about sickness, disease, and healing.

Witty has given the reader a rather extensive and sensible examination of a difficult subject. Those interested in a biblical approach to healing should find *Divine Healing* very helpful.

Reviewed by Ralph Kennedy, John Brown University, Siloam Springs, AR 72761.

MANNERS AND CUSTOMS IN THE BIBLE by V.H. Matthews. Peabody, MA: Hendrickson Publishers, 1988. 283 pages. Hardcover.

Readers of the Bible are often confronted with passages which they don't understand. Sometimes this lack of comprehension is due to inadequate knowledge about biblical manners and customs. For instance, why did Abraham pretend that his wife was his sister? Why did Lot send his daughters out to the men of Sodom rather than the "strangers" in his house? What effect did the Exile have on Israel? The material in this book deals with these kinds of questions.

This book is not arranged like an encyclopedia or Bible dictionary. Rather, its five chapters are based on time: patriarchal period; exodus-settlement period; monarchy periods; exile and return periods; intertestamental and New Testament period. About 75% of the material is related to the Old Testament period, with the remainder related to the intertestamental and New Testament periods. The book includes a bibliography, four indices, 58 photographs, and 15 line-drawings.

A few caveats are appropriate: Pompey conquered Jerusalem in 63 B.C., not 63 A.D. as indicated on page 165; the black and white photographs are of varying quality because some were obviously taken by amateurs; the white space nearly equals the text on each page, which makes for easy reading and a longer book.

This book is not intended for professionals but would be appropriate for neophytes, Sunday School teachers, lay leaders, and college students. The author of this book is an associate professor at Southwest Missouri State University where he teaches Bible-related courses.

Reviewed by Richard Ruble, John Brown University, Siloam Springs, AR 72761.

THE EVOLUTION OF SEX by George Stevens and Robert Bellig (eds.). Nobel Conference (23rd: 1987: Gustavus Adolphus College). San Francisco: Harper & Row, 1988. 202 pages. Hardcover; $19.95.

HOMOSEXUALITY: The Test Case for Christian Sexual Ethics by James P. Hanigan. New York: Paulist Press, 1988. 103 pages. Paperback; $9.95.

Sexuality has always been a universal human interest. Recently, however, what appeared to have become a moral consensus concerning the expression of our sexuality has been called into question at several important points, giving rise to renewed discussion and debate. These two volumes, although quite different from each other, nevertheless both fit within that debate and indicate the breadth of interest in the subject of sexuality.

The Evolution of Sex is itself an indication of the broad range of fields of study involved in the question of sexuality. Although the title might lead the reader to anticipate a history of the development of sexual practices among humans, the subject matter of the book is far broader, extending to the rise of sex, understood in the wider sense, within life forms in general. The issue explored is how biological evolution gave rise to "all those processes whereby genetic material from different ancestors is brought together in a single descendent," to cite the definition by John Maynard Smith (p. 3). The book consists of essays presented at the 23rd Nobel Conference at Gustavus Adolphus College held in St. Peter, Minnesota, in 1987. Contributing to this volume are experts in the fields of biology, zoology, anthropology, and theology, carefully drawn together and introduced by the book's editors. Although the work lacks an index, the various illustrations and the lengthy glossary are valuable additions.

All seven articles make for interesting reading, not only for the specialist, but also for the general audience. Of these, several essays may be of greater interest for persons more keenly interested in the interface between science and the Christian faith. For example, zoologist William Donald Hamilton offers a welcome, if perhaps unexpected, expression of concern that the old purpose of sex for human reproduction not become overshadowed by technology (pp. 88-90). Likewise Sarah Blaffer Hardy, brings a refreshing modesty to the scientific enterprise, when she admits that although the primatologist may offer background information, the construction of ethical guidelines for human sexual behavior lies outside the scope of her discipline. The most significant article, however, may be that by theologian Philip Hefner, who seeks to provide a theological understanding of the purpose of the evolution of sex. On the premise that sexual recombination facilitates evolutionary progress, Hefner offers the fascinating thesis that "sex is part of God's ongoing work of bringing the new into existence while being faithful to the concrete histories of the creation" (p. 151).

Whereas *The Evolution of Sex* provides a broad view of the phenomenon of sexuality, *Homosexuality* focuses on one specific ethical problem. The book itself was born

out of a sense of conflict between the concrete reality of homosexual human beings and an abstraction called homosexuality; that is, a conflict between what at times seems the most loving route to follow and what a person may believe to be the demands of Christian morality.

The book's basic thesis, as the title indicates, is that homosexuality has emerged as the issue on which any viable Christian sexual ethic will stand or fall; a thesis which gives the work importance beyond the specific issue it addresses. Thus, what theology says about homosexual behavior has decisive significance for its view of human sexuality in its entirety. This thesis is outlined in the opening chapter of the book. The biblical and theological basis for the traditional rejection of homosexualty and a critical assessment of contemporary alternatives occupy Hanigan's efforts in chapters two and three. The author presents his own position in the fourth, which is followed by three additional chapters dealing with chastity as a virtue, the relationship between human freedom and sin, and the limits of human knowledge of the divine will.

Hanigan, who is associate professor of moral theology at Duquesne University (Pittsburg), admits that he is "plowing very little new ground." Instead, he finds that his position is in accord with traditional Roman Catholic teaching. His treatment does offer something fresh, he believes, in his treatment of the way we are to understand our sexual relationships in relation to Christian faith. This contribution is indeed important, for Hanigan succeeds in placing sex within the broader context of ritual acts in general, and employs this understanding as a basis for raising the question concerning the propriety of homosexual behavior. For this reason, his careful approach constitutes one of the most helpful recent treatments of the issue.

Reviewed by Stanley J. Grenz, North American Baptist Seminary, Sioux Falls, SD 57105.

THE WHOLE TRUTH ABOUT AIDS by Patrick Dixon. Nashville, TN: Nelson, 1989. 253 pages, index, appendices, bibliography. Paperback.

When I heard about this book, my first reaction was one of disbelief. How could one book tell us the *"whole truth"* about AIDS, a disease that involves molecular microbiology, immunology, complicated health care, morals, ethics, politics, and religion? However, when I started reading I was impressed with the sensitive, knowledgeable, and well-written manner in which the subject was handled. By the time I finished the book there was no question but that this is the best book I have read on this delicate and important subject.

The author is a British medical doctor who has lived in Africa and the United States, including San Francisco. Much of his medical experience has been with hospices

and terminal care teams, so he is well qualified to write on a fatal disease of worldwide importance. As indicated at the end of the book he "is currently director of AIDS Care Education and Training which is a church-based organization providing a nationwide network of practical volunteer help to people with AIDS at home." With this background he writes on AIDS in a frank but compassionate manner. After reading this book I have a better understanding of the pervasive effects and challenge of this disease to health care, sexual behavior, politics, and the church.

In twelve carefully written chapters he gives a summary of the worldwide extent of the nature of the disease, and an honest but non-sensationalist account of the methods of transmission (both the likely and the unlikely). One chapter gives realistic answers to questions Dixon has been asked by the diverse people with whom he has been in contact through his practice and his lectures. Two chapters deal with some of the moral and theological dimensions of the problem from his perspective as a medical doctor and as a lay reader in his church. He wisely emphasizes the need to consider that homosexuals and drug addicts are reaping the natural results of their lifestyles; AIDS should not be callously dismissed as the punishment of a wrathful God. In the ninth chapter he has an excellent discussion of death and dying with a challenging reminder that, "Since 1945 we have been living in an escapist, death-denying society ... These days most people assume they will live to a ripe old age. Any discussion of sickness and death is considered morbid. And now comes AIDS." In the last three chapters he gives detailed suggestions on what can and should be done by the government, by the church, and by responsible and qualified individuals.

The main text of the book is followed by over 75 pages of appendices and notes. Here Dixon considers subjects such as the location of health care for AIDS patients (hospice, hospital, or home); burnout of AIDS workers; advice to travelers; a checklist of countries that presently have AIDS testing requirements for non-residents; a directory of AIDS organizations, by states, in the United States; suggestions for further reading at the popular level; and 16 pages of carefully selected references from the voluminous worldwide scientific literature. Finally, he has a glossary of terms that include both simple definitions of technical terms and translation of some of the slang from both the gay and drug cultures.

For the person who is not a medical biologist, *The Whole Truth About AIDS* gives a simple but accurate description of the disease, its transmission, and its effects. For the "average citizen" it provides a basis for evaluating the impact of AIDS on the health-care systems in the United States, Europe, and Africa. For the Christian he emphasizes the role of the church, the need to care for the sinner even when we hate the sin, the need for compassion and concern, and the sometimes healing role of corporate prayer.

I would enthusiastically recommend this book to anyone looking for an honest, non-sensationalist evalua-

tion of the AIDS epidemic. Such potential readers should include all ASA members, since AIDS calls for an integration of the biology of a disease, the challenge of a technology to prevent and to cure, and the need to apply Christian compassion to sick and sinful segments of our society. Furthermore, I would recommend this book for every church library and to every clergyman.

Reviewed by Wilbur L. Bullock, Professor Emeritus, Zoology, University of New Hampshire, Durham, NH 03824.

SEVEN CLUES TO THE ORIGIN OF LIFE: A Scientific Detective Story by A.G. Cairns-Smith. New York: Cambridge University Press, 1985. Paperback; $8.95.

Cairns-Smith is the originator of one of the most novel theories of the spontaneous origin of life: the first organisms were self-replicating crystals of clay-like material. The present volume is a popularization of his book *Genetic Takeover.* He did not merely simplify the book to make it accessible to the layperson, but restructured it to convey to the lay reader that scientific research is really very much like detective work. He infiltrates the book with a great number of Sherlock Holmes quotes. Furthermore, he uses many metaphors and illustrations, so his discussion of basic biology (such as transcription and translation) is interesting and useful for teachers. The author has the ability to draw information together from many fields (his seven clues are "from biology," "from biochemistry," "from the building trade," "from the nature of ropes," "from the history of technology," "from chemistry," and "from geology"). A clever man, he realizes like his hero Holmes that common sense can be misleading.

He begins by showing that the standard scenario for chemical evolution is hopelessly impossible. He says that, like phlogiston theory, it looks good from a distance but fails to explain the details. Given the whole ocean and enough time ... but, concludes Cairns-Smith, there was neither enough time nor enough world for the standard scenario of chemical evolution.

He then leads up to his own theory, that the first organisms (clay crystals) made use of organic chemicals to help them survive and replicate, and eventually the organic chemicals completely replaced the clay crystals. His theory remains unconvincing, however. I have identified six weak points in his arguments:

1. He still has not explained how such a "genetic takeover" could actually have happened.

2. He describes the very restricted conditions that might have allowed the origin of replicating clay crystals, for instance the slight supersaturation of the dissolved minerals. But it is unlikely that such conditions would have remained uninterrupted long enough to allow the crystals to proliferate.

3. He also has an unrecognized problem with scaling. Crystals are stable only on a scale larger than the size of a cell.

4. Even clay organisms would need internal compartmentation, and would thus have been at least as complex and as unlikely to originate by chance events as modern bacteria.

5. He suggests that clay organisms might have invented photosynthesis because they could use the sugar to help them stick together better. Surely such a complex process as even the simplest known version of photosynthesis would not have been necessary just to make sticky clay.

6. Finally, the clay genes would have, claims Cairns-Smith, contained their information in two or three dimensions. DNA, however, conveys information in a linear fashion. He does not explain how two-dimensional information can be transposed into one dimension.

This book is an enjoyable introduction to the tantalizing complexities of life and of the scientific process, written by a brilliant thinker. But it only serves to emphasize that, at least at the present time, evolutionary theories of the origin of life are in hopeless confusion.

Reviewed by Stanley Rice, The King's College, Briarcliff Manor, NY 10510.

THEORIES OF THE EARTH AND UNIVERSE: A History of Dogma in the Earth Sciences by S.W. Carey. Stanford, CA: Stanford University Press, 1988. 413 pages. Hardcover; $45.00.

Theories of the Earth and Universe by S.W. Carey is a monograph written for the science-educated. This may appear at first to have significant appeal only to those interested in things geological or astrophysical. However, there is a more fundamental aspect of the book that can be illustrative for all who deal in the realm of controversial ideas. The subtitle, A *History of Dogma in the Earth Sciences*, is actually misleading (except for the word "dogma"). There is a briefly developed chronology of historical concepts (chapters 1-6), but this serves mainly to support the author's arguments (chapters 11-13, 18-22). Carey is a long-time campaigner against the prevailing megatheory or paradigm in geology—plate tectonics. He is probably the most determined advocate of the alternative theory of an expanding earth. ASA members and other Christians can find many parallels between Carey's efforts and those of "creation science" proponents in their attempts to overthrow the theory of evolution along with many geological principles.

It would be a great disservice to portray the author in the same light as most of the young-earth advocates. For over sixty years Carey has shown himself to be an outstanding and highly influential scholar. Few would label him a quack or his ideas as irrational rantings. Carey's background should at least cause readers to honestly assess his case. And indeed like notable others, including the Meyerhoffs and Soviet academician Beloussov, Carey does pose some puzzling anomalies that beg theoretical explanation. In challenges, such as missing Archean crust, missing ophiolites and flysch, imperfect ocean-trench morphology, and the existence of Tethys and Iapetus oceans are likely not troubling to the most orthodox plate tectonicians. Other phenomena, particularly the various difficulties in reconstructing earlier plate geometries, remain enigmatic. Carey's descriptions, without mentioning contradictory evidence, make all compatible with global expansion.

The biggest difference between the two opposing concepts is the facility of subduction zones in plate tectonics to recycle the lithosphere in a near steady-volume relationship. The lack of subduction leaves only upward and outward expansion available to new rocks produced at spreading centers (mostly oceanic rift zones). Few geologists would consider the arguments against the existence of subduction as very complete or persuasive.

Carey's style of argumentation is often polemical, and it incorporates some lines of (il)logic also employed by the Institute of Creation Research and the like-minded. We are urged that those strongly convinced by plate tectonics (like evolution) have been dogma-blinded slaves to the establishment, and that if certain features or processes are not well explained by plate tectonics (or evolution) then the respective theories are thereby falsified. It also follows that if earth expansion (or creation science) better explains the selected phenomena, then the desired alternative is the logical replacement paradigm.

The book's last two chapters reach out to a consideration of the universe. Carey prefers to reject an *ex nihilo* origin and the Big Bang in favor of a "null universe" hypothesis. This concept, in brief, specifies an eternal and continuous addition of energy and mass in equal, canceling ("null") increments. Thus, the universe as well as the earth can expand as long as the energy-mass balance is maintained. I am but a mere geologist and the complexities of this philosophy are beyond my limited comprehension.

Perhaps because of the preceding observation, chapter 7, "Numeracy in Geology," is a personal favorite of mine. In a few pages Carey desanctifies the mystique of mathematical elegance and precision. Geology is often derided as less than truly scientific. This is because of the traditionally descriptive nature of its studies relative to the quantitative rigor of physics, chemistry, etc. However, through the centuries scientists have been prone to discovering precise numerical relationships that later prove dead wrong, often due to faulty presuppositions. This is of course to be expected, and therefore it must be realized that precision is no substitute for being correct.

Theories of the Earth and Universe may be Carey's last slap at the smug establishment. Unfortunately, the book

is flawed by combative rhetoric, some dated and one-sided arguments, and a sore lack of in-text references. In spite of its short-comings, I appreciate the collected wealth of information and insight. There may be disagreement with the author's opinions, but his case should inspire an attitude of humble skepticism about our own dogma.

Reviewed by Jeffrey K. Greenberg, Department of Geology, Wheaton College, Wheaton, IL 60187-5593.

TOWARD A NEW PHILOSOPHY OF BIOLOGY: Observations of an Evolutionist by Ernst Mayr. Cambridge, MA: Harvard University Press, 1988. 564 pages, index. Hardcover; $35.00.

Harvard University's Alexander Agassiz Professor of Zoology, Emeritus, Ernst Mayr is a prolific author whose immense knowledge has contributed greatly to biological sciences. His twenty-eight recent essays collected in this volume range beyond philosophy of biology, unless that is interpreted as a total world view. Topics are grouped into nine sections, each with a brief introduction: Philosophy, Natural Selection, Adaptation, Darwin, Diversity, Species, Speciation, Macroevolution, and Historical Perspective. A short paper in the first portion argues against the probability of discovering extraterrestrial intelligence. Another speculates about origins of human ethics.

The subtitle is more appropriate than this reviewer anticipated. Unlike many scientists who apply Darwinian principles in research fields, Mayr treats Darwinism as a creed—evolutionary humanism, excluding theistic religion. He suggests that Western culture must jettison its Judeo-Christian values in order to adapt and survive natural selection pressures. Teleology is anathema to him; one essay deals with the various, contradictory meanings, and how the concept should be replaced by recognition of merely opportunistic processes. Mayr exaggerates Darwin's revolutionary role, assuming that early nineteenth century natural theologians were opposed to acknowledging fossil successions and other changes. (Actually, the Rev. Dr. William Buckland approached theistic evolutionary perspectives by 1836.) Brief citations of Buckland are included, although his name never shows up in the index. Science historian John C. Grcene is singled out for harsh rebuttal, apparently because he misread contemporary applications from Darwinian ideas, counting Darwinism as obsolete. Mayr attributes any such errors to Greene's religious bias as a Christian.

Anti-Christian statements occupy very few pages. More often, the author argues against rivals closer to his own perspectives, vindicating his earlier works and citing some cases wherein he had been misinterpreted. He provides profound insights into evolutionary theories, evidence, and historical context, from Darwin's generation to the present. Mayr's macroevolution papers are especially sig-

nificant, together with his closing chapter on this century's evolutionary synthesis and subsequent developments.

Numerous essays overlap, making repetition a problem. Polysyllabic, technical vocabulary renders the book almost impenetrable to those, including the reviewer, who are not specialists in the same field. Severe editing and simplification would yield a more helpful study, half the length if not less, than the rambling anthology which took months to read.

Reviewed by John R. Armstrong, Honorary Assistant in Deacon's Orders, St. Philip the Evangelist Anglican Church, 629 - 49th Avenue S.W., Calgary, Alberta, Canada, T2S 1G6.

TARGET EARTH: The Necessity of Diversity in a Holistic Perspective on World Mission by Frank Kaleb Jansen (ed.). Pasadena, CA: Global Mapping International, 1989. 175 pages. Paperback; $23.95.

This book is intended to provide accurate information on many of the world's problem areas and mission fields. It attempts to present a complete perspective and raise vital issues on world missions. Measuring nine by twelve inches, it is filled with colorful maps, graphs, tables, charts, and pictures. The five sections of the book are entitled Mankind, The Basic Human Needs, Threats, Credo, and Stories of Hope. Articles written by 43 different authors give an overview of 159 topics. Data found in this book comes from *Britannica World Data.*

Lots of the data is very interesting. For instance, one in seven people in the world is a Christian. Every day Christianity increases by 78,000 believers and more than 200 churches. It is projected that by the year 2000 one in three persons will profess Christianity. All of this data is designed to inform, to inspire, to involve. The reader will be impressed with the book's success in achieving these goals. *Target Earth* is a book which should be read by all who take the Great Commission seriously. And that should include all Christians.

Jansen, the book's editor, is a native Norwegian businessman, elder in his church, and founder of *Bible for All.* He has taken part in missionary endeavors to the Far East, Poland, and Russia. He has used the proceeds from his commercial success to fund his missionary activities.

Reviewed by Richard Ruble, John Brown University, Siloam Springs, AR 72761.

WHAT ARE THEY SAYING ABOUT GOD AND EVIL?
by Barry L. Whitney. Mahwah, NJ: Paulist Press, 1989.
135 pages. Paperback; $5.95.

According to Whitney, the problem of God and evil has experienced a resurgence recently. (The problem of God and evil is why an all-powerful and all-loving God allows so much evil and misery in the world.) In this book, he examines the traditionalist and contemporary views of the problem. Whitney believes that to cope with suffering a believer must make some sense of God's relationship to evil. To assist the reader in better understanding, Whitney presents nine chapters with endnotes and a selected annotated bibliography.

Whitney believes that the presence of evil and suffering in the world is the greatest threat to the Christian belief of an all-powerful and all-loving God. Moral evil, says Whitney, can only be explained as the consequence of the misuse and abuse of human freedom. The question of natural evil is more difficult to answer. Traditionalists interpret natural evil as a test of faith or the result of divine punishment. Evidently natural laws make natural evils unfortunate but necessary. The aesthetic theory argues that evil parts may comprise a good whole. Animal suffering is a neglected area of study. Whitney thinks that this problem has no final solution. "Perhaps faith in God is all we have, despite the evil and misery in the world," he concludes.

Whitney is a professor at the University of Windsor. He has previously written many articles and reviews and a book entitled *Evil and the Process God*. This book is a succinct, lucid, and interesting summary of the problem of evil.

Reviewed by Richard Ruble, John Brown University, Siloam Springs, AR 72761.

Letters

Response to Armand Nicholi's "How Does the World View of the Scientist & Clinician Influence Their Work?"

This letter concerns an article published in *PS&CF*, vol. 41, December, 1989, by Armand M. Nicholi, Jr., M.D., titled "How does the world view of the scientist and the clinician influence their work?"

I found very disturbing Armand Nicholi's thesis on the role of Christianity in clinical psychology and psychiatry. It is in somewhat the same vein as Mary Stewart Van Leeuwen's thesis (*PS&CF*, vol. 40:4), that Christianity needs to participate actively in psychotherapy. But in this case Nicholi concludes by saying: "Seeing the patient as an object created in the image of God automatically influences the tone and attitude of the physician toward his or her patient" (p. 220). He associates "kindness and compassion" with the Christian therapist, the inference being that a non-Christian (secular, humanistic) therapist will be at best indifferent and at worst cruel, inhumane, and uncaring in treating a patient. This kind of Christian chauvinism is insulting to those whose differing world views include the same human behavioral guidelines in clinical practice. (The guidelines appear on p. 218.) Nicholi implies that Christianity is unique in generating compassion and sympathy. Surely Christianity has no market corner on these feelings of respect and concern for other human beings, nor is Christianity free of many negative attitudes that are part of the same religion, namely guilt for sin and divine retribution in the form of eternal damnation and hellfire.

Despite your disclaimer that papers in *PS&CF* do not reflect any official position of the ASA, the journal editor and peer reviewers (if there were any) should bow their heads in shame for allowing this unconscionable display of Christian bigotry. They should apologize to the millions of nontheistic and also caring, kind, loving, self-sacrificing, and compassionate individuals living and long gone—among them devoted parents, teachers, volunteer social workers, nurses, and physicians—whose world view includes respect for and adherence to those admirable qualities of character the author has so egregiously limited to avowed Christians.

Arthur N. Strahler
[Ph.D., Columbia University (Geology), and
formerly Professor, Columbia Graduate Faculty
of Pure Science]

Is Man a Vandal?

Only in this generation has it become abundantly clear that mankind has over-abused the earth to such an extent and with such ferocity that nature is "striking back" in many deadly ways.

Pollution problems in many small countries and in a score of larger cities are actually *unbearable*. In the demand for more goods and services, scores of belching smoke-stacks arise each year, not only causing acid rain and the greenhouse effect but also respiratory problems which are difficult to deal with.

Myriads of unknown and possibly valuable plants are cut down, not only in the tropics but in temperate regions, such as is going on in the Pacific Northwest. Renewable resources like trees can furnish man with income forever if properly managed, not to forget the valuable oxygen that they give off and the carbon dioxide that they absorb during their cycles.

Beautiful and piteously naive creatures are being exterminated at an alarming rate, or driven from their natural habitats in which they have evolved for millions of years in some cases.

The careless use of freons, pesticides, herbicides and fertilizers have created enormous problems, some of which will be costly and difficult to correct.

One reason for the near-catastrophic state of the world is that mankind has forgotten or ignored the fact that the habitable part of the globe is less than one-fourth of its surface area; man continues to trespass into the deserts and into the wetlands. He also largely ignores the fact that there is a term "carrying capacity" and that just so many people can crowd into a given space. More than this number creates deep problems.

More importantly, when will we learn that the world is *basically* a NATURAL world—a world consisting of soil, water, air and living organisms—and is governed by many well-known *laws* or *principles*? If we thwart the principles, we must be prepared to pay a heavy price. There *are* other worlds such as the business world, the art world, the world of sports and other entertainment but these other worlds, *important though they be*, must be managed in such a way so as not to counteract the principles which hold the natural world together. It is the opinion of such great minds as those of Drs. Borlaug, Raven, Hardin, Ehrlich, Borgstrom and many others that any further increase in the human population would create an *intolerable* demand for more goods and services, and this demand would certainly cause an *increased degradation* of our environment. Birth rates and death rates *must* be balanced. Indeed, if the earth is to be habitable forever it would be *better* if family size was limited to one child per family in view of the large number of young people now pronouncing their marriage vows.

Irving W. Knobloch, Ph.D.
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Editor's Note:
We welcome *any* and *all* correspondence regarding the contents of our journal, as stated on the inside front cover of this publicaiton. No membership requirements are necessary for consideration of the publication of either articles, book reviews, or letters in this journal, subject to the discretions of the journal editor and the editorial board.

The American Scientific Affiliation

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

Canadian Scientific & Christian Affiliation

A closely affiliated organization, the Canadian Scientific and Christian Affiliation, was formed in 1973 with a distinctively Canadian orientation. The CSCA and the ASA share publications (*Perspectives on Science & Christian Faith* and the *ASA/CSCA Newsletter*). The CSCA subscribes to the same statement of faith as the ASA, and has the same general structure; however, it has its own governing body with a separate annual meeting in Canada.

LOCAL SECTIONS

of the ASA and the CSCA have been organized to hold meetings and provide an interchange of ideas at the regional level. Membership application forms, publications, and other information may be obtained by writing to: American Scientific Affiliation, P.O. Box 668, Ipswich, MA 01938, USA or Canadian Scientific & Christian Affiliation, P.O. Box 386, Fergus, ONT N1M 3E2, CANADA.

Central California	Chicago-Wheaton	Delaware Valley	Eastern Tennessee	Guelph, ONT
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South Central	So. California	Southwest	Toronto, ONT	Vancouver, BC
Virginia-Kentucky	D.C.-Baltimore	Western Michigan	Western New York	

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

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