JOURNAL OF THE
AMERICAN
SCIENTIFIC
AFFILIATION

Evangelical Perspectives on Science and the Christian Faith

In this issue . . .

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

VOLUME 38, NUMBER 4 DECEMBER 1986

MEMBER EPA EVANGELICAL PRESS ASSOCIATION

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THE JOURNAL OF THE AMERICAN SCIENTIFIC AFFILIATION (ISSN 003-0988) is published quarterly for $20 per year by the American Scientific Affiliation, 55 Market Street, Ipswich, Mass. 01938. Telephone (617) 356-5656. Second class postage paid at Ipswich, Mass. and at additional mailing offices. POSTMASTER: Send address changes to THE AMERICAN SCIENTIFIC AFFILIATION, P.O. Box J, Ipswich, MA 01938.

Putting Things in Perspective

"Complexity bewilders and discourages. Simplicity has a seductive beauty. (Un)fortunately, neither God, nor His universe are as simple as we are." These concluding words of Dave Wilcox's paper in this issue,"A Taxonomy of Creation," could sum up many of the controversies of our day. We search for simple answers in history, sociology, technology, biology, *et cetera;* but God, His universe, and all the creatures He has made—including us humans—are fantastically complex. Furthermore, our search for simplicity is often made with a lack of recognition of our creaturely finiteness to say nothing of our sinful condition which warps our judgment. In our pursuit of knowledge we Christians especially should be examples of godly humility and exhibit a real sense of awe for the world around us and its Creator. This issue of the Journal includes several papers that emphasize this awe and humility.

Russell Heddendorf, a sociologist and recent ASA president, reminds us of some of the social phenomena involved in the rise of modern science and its relations with theology as both strive to relate to the modern world. He stresses the need for a return to religious values which can act as "plausibility structures" for the scientist and society.

Russell Maatman, a chemistry professor, presents, in a paper of special interest to fellow college chemistry instructors, a perspective which emphasizes chemistry as a gift of God. The complexity and the diversity of chemical phenomena are to be admired, not only for their own sake, but as reflectors of the glory of their Creator. In addition, such chemical marvels are to be used responsibly; human beings are stewards of God's workmanship.

One of the rapidly developing areas of computer technology is that of artificial intelligence (AI). Dennis Feucht, a professor of electrical engineering, gives us a careful analysis of such developments in light of recent mind-brain research. At a time when many people, including some Christians, are suggesting that AI developments could be dehumanizing or even satanic, such a careful consideration as Dr. Feucht gives us is of great significance.

While there are important scientific and theological issues in the ongoing creation/evolution debates, much of the problem devolves from careless and unscholarly use of emotive words lacking clear definition. David Wilcox, a biologist and chairman of our Creation Commission, attempts to sort through some of these terminology difficulties in a way which at least makes it clear that a simple, dogmatic "creation *or* evolution" position is gross oversimplification.

Many observers of western society have described the numerous ways in which we have been losing our sense of community and the awesome results of such a loss. Jerry Bergman surveys, as a sociologist, the concept of community as it can be applied and misapplied in society and in the church. After examining the distorted application of community in the cults, Dr. Bergman reminds us of the importance to the church of a sense of oneness.

Analyzing the concept of community with particular concern for the disruptive tendencies within current evangelical Christianity, Donald MacKay, a British neuroscientist, warns us of the dangers of our separation from fellow evangelicals with whom we disagree. His plea for direct, prayerful confrontation—"as iron sharpens iron"—needs to be heeded at all levels of evangelicalism, including the science/theology interface.

WLB

Religion, Science, and the Problem of Modernity

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Two key elements in the early encounter of religion and science with modernity were the development of an "intramundane asceticism" in thinking and life style and the formation of a social system as well as a system of ideas. The ascetic quality provided the Puritan scientist with a calling to "a task set by God," but there also arose scientific societies which acted as community structures. Scientific societies lessened the tension between the sacred and the secular. However, secularization continued and modernization is now characterized by technologically stimulated growth and the replacement of calling by career. Science and religion are in need of new conceptions of reality which may be gained from a return to the merger of science and religion.

Modernity and Scientific Revolutions

The thesis of this paper focusses on the challenge of modernity and the responses of science and religion to that challenge. Since the argument for the religious origins of modern science has been effectively presented elsewhere,[1] our concern here is to describe briefly some of the main elements of this Christian response and how they might be applied in this modern age.

Where it occurs, modernization produces broad institutional changes which leave the definition of reality open to interpretations.[2] Many of the older forms of social support which gave plausibility to beliefs are then challenged by modernity. Consequently, modernity, especially as it is brought about by technological change, undermines religion and all those other institutions relying on a supporting network of values and beliefs.

In addition to challenging a traditional religious world view, modernization is also characterized by 1) the pluralization of society in which competing values and beliefs struggle for prominence, 2) the rationalization of society in which reality is apprehended and manipulated as atomistic units, 3) changes in human consciousness which, in its disenchantment, tends to externalize new realities enmeshed in modern technological changes, and 4) fundamental changes in science and its view of reality.

Describing scientific revolutions, Thomas Kuhn draws a parallel between political and scientific development.[3] In politics, crisis occurs when one set of political institutions is relinquished for another. For a time, society lacks direction from institutions, and persons are estranged from political life. Perceiving that political recourse fails, they commit themselves to proposals for the development of new institutional frameworks. Similarly, Kuhn argues, science evolves as an institution seeking new definitions of reality. Traditional paradigms are at issue as "normal" science is put on the defensive.

According to Kuhn, the critical element in a scientific revolution is a change in world view. Galileo's genius, for example, undoubtedly benefited from a medieval paradigm shift which analyzed motion in terms of the impetus theory.[4] Once a swinging stone

Paper presented at the 40th Annual Meeting of the American Scientific Affiliation jointly sponsored with the Research Scientists' Christian Fellowship with the theme "Christian Faith and Science in Society"—St. Catherine's College, Oxford, England, July 26-29, 1985.

was conceptualized as a pendulum, an important step was taken in the revolution of the science of motion. What was needed was a change of vision to allow something to be seen differently from the way it had been seen before.

It's important at this point to note that these shifts in world view are not necessarily individualistic or idiosyncratic. It's more likely that world views will be shaped in a systematic and pointed fashion by cultural changes. Such a major shift apparently occurred in the 17th century when vocational interests changed from the professions and arts to the development of science and medicine.[5] In addition, this shift extended to a change in attitude among learned men reflecting an increased importance of utilitarianism and realism. In all fields of endeavor, the practical and applied fields increased in social value.

The Puritan Ethos

What had occurred was a major change in world view resulting from the rise of Puritanism in the early part of the 17th century. Puritanism "built a new bridge between the transcendental and human action, thus supplying a motive force for the new science."[6] As a rising class in England, the Puritans turned to the new sciences and technology for the enhancement of their emerging power and for the stimulation of a program consistent with the development of new economic ventures. The major force behind these changes had been the religious motive of Puritanism, which had become a dominant factor in the cultural values of the day. For the Puritan scientist, "these worldly activities and scientific achievements manifest the Glory of God and enhance the Good of Man."[7]

It could be said that religious values were used by the Puritans to justify their involvement in the traditionally questionable practice of scientific research. Certainly religion at that time maintained the aura of acceptability necessary for invoking support of new and less acceptable behavior. But it is also true that religious values can act as reasons for actions as well as justifications. Robert Merton, sociologist of modern science, states: "It is also an acceptable hypothesis that ideologies seldom *give rise* to action and that both the ideology and action are rather the products of common sentiments and values upon which they in turn react. . . . *It is the dominating system of ideas which determines the choice between alternative modes of action which are equally compatible with the underlying sentiments* (original emphasis).[8]

This motivating system of ideas, referred to by Merton as the "Puritan ethos," consisted of three main beliefs.[9] First, the believer accepted "the glorification of God as the end and all of existence."[10] Although not a new notion, this principle was given new meaning by the Puritan who sought to channel this glorification into specific and diverse institutional directions. Second, "diligence in one's calling becomes a necessity."[11] Such diligence not only became a means of glorifying God but also contributed to the public welfare. Third, the choice of a calling should be limited to those which serve God and are beneficial for the public good.[12] Of these, the learned professions were deemed of highest value. The result of this blend of ideas was a unique merger of reason and faith, of the utilitarian principle with the doctrine of grace.

The Puritan ethos developed as the secularizing tendencies begun in the later Middle Ages carried over into the modern era. With his world view, the Puritan spanned both periods in his thinking and provided a critical bridge for the development of progress in the modern world. In one sense, Puritanism destroyed the old religious restrictions on scientific work. In another, it opened the way for a new religious discipline in conduct. The new world was to be conquered through the religious control of action. In science, this was to be done through the study of nature which allowed a fuller appreciation of God's works and led to praise of His power and goodness manifested in creation.

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Summarizing to this point, it is apparent that the scientific revolution in the 17th century was a stimulus for, as well as a consequence of, modernization in Western society. All of the old institutions and their religious supports were fragmented by social change. The political crisis engendered by the civil wars not only reduced scientific productivity but also led to the development of new discoveries in subsequent years. If a change in world view is necessary for such a revolution to take place, as Kuhn suggests, the evidence mustered by Merton supports the case for Puritanism as the logical motivating force. It is this shift to a religious world view, therefore, that is crucial for explaining the new scientific view of the natural world.

Puritanism and Modern Science

A basic thesis in the work of both Merton and Max Weber is that secularization, as a process in modern society, has its roots in religious motivation. In the case of the Puritans, there was a distinctly modern quality to their thought which gave them freedom in their scientific work. In this sense, the Puritan was "worldly" in his revolution against the Catholic church and its traditional Christian thought and practice. He shared the values of an emerging society and its modernity.[13] But the Puritan was also "non-worldly" in his resistance to the world's influence. As Merton puts it, "Compromise with the world was intolerable."[14] The world was to be subdued by the Christian's direct involvement in it. Over time, however, secularization won the day, especially as the new science successfully answered the questions it posed.

Hooykaas seems to share this opinion, that the Puritan sought to glorify God by bringing the physical world under man's control.[15] Science was to overcome the curse of original sin by restoring the Kingdom of Man and his dominion over nature. Thus, science was to be applied so as to remove the curse from labor. The Kingdom of Man was to supplement the Kingdom of God with reason submitting itself to divine Truth. Ultimately, this merger of man's work with God's revelation would lead to a "sublime knowledge" capable of leading man into the future. In Merton's words, the Puritan ethic "forms the essence of the spirit of modern science."[16]

This search for truth in nature was a critical element in the development of the new scientific paradigm. It also aided in the transition from the Christian to the modern, the sacred to the secular. Following Calvin's lead, the Puritan scientist recognized creation, not scripture, as the source of scientific truth.[17] Since the Bible was "a book for laymen," it was left to the specialist to study nature.[18] The result was a completely new way of looking at creation. It was to be seen as an economical structure requiring a new view of its elements such as atoms, molecules, cells, *et cetera*. According to Klaaren, this move away from a simplistic conception of the world led to the "sharp edge of modern knowledge [which] was its rule over nature, a utilitarian expression of knowledge as power."[19] God's work of creation was now sharply differentiated from that of redemption, Klaaren claims, and history was conceived as a manifestation of progressive divine creation. "Scientific [and other] discoveries were signs anticipating a new age."[20]

What should be stressed here is the apparent ambiguity in the tension between science and Puritanism in this period. The scientific movement clearly benefitted not only from the Puritan's religious commitment to his task, but also from the unique perspective on the world derived from that faith which sanctioned this behavior. It was this combination of the religious and the utilitarian which was necessary to be maintained. At the same time, the Puritan's success in science was inevitably tied to a possible failure of faith. Indeed, as nature was successfully subdued, a new scientific ethos gradually replaced the Puritan's original religious motive. The compromise with the world, originally considered to be intolerable, in the final analysis became inevitable.

Modernity and Inner Worldly Asceticism

If we are to understand how the Protestant ethos faltered, if not failed, two crucial elements should be singled out. One of these elements in the Puritan response to modernity has been referred to as intramundane asceticism and the other was characterized by its conception of science as a social system. Together they provided a fortunate synthesis of factors contributing to the rise of the scientific revolution. It was Max Weber, the progenitor of much of this discussion, who referred to inner-worldly asceticism as "the obligation to transform the world in accordance with (Puritan) ascetic ideals, in which case the ascetic will become a rational reformer or revolutionary on the basis of a theory of natural rights."[21] Talcott Parsons provides a helpful description of the inner-worldly ascetic as one who "seeks mastery over the worldly component of his individual personality and seeks in principle to extend this mastery to *all* aspects of the human condition."[22] For our purpose, it is important to note that Parsons likens this form of asceticism to the biblical admonition for the Christian. The Puritan "may seek salvation and yet avoid a radical break with the institutional order. He remains 'in the world but not of it.'"[23]

Another way of approaching the problem of inner-worldly asceticism is by noting Brentano's suggestion that it "is a rationalization toward an irrational mode of

life."[24] Rationalization, as used in this tradition, implies three things: "the intellectual clarification, specification and systematization of ideas, . . . normative control or sanction . . . [and] a conception of motivational commitment,"[25] All of these criteria were part of the Puritan scientist's effort to work out his faith in his science. But the ultimate objective of this effort was not to live a rational life style conformed to the world's purposes. The Puritan ethos clearly limited the options to those which would honor God and serve man.

Here we must insert the notion of calling or vocation as it was introduced by Weber in his original work. The inner-worldly ascetic understood that the vocation to which he was called was "a task set by God."[26] His work might be a rational means but the ultimate end would always be irrational by society's standards. In the extent to which this end was lost, the process of rationalization would lead to secular trends. In other words, an irrevocable tension had to be maintained by the inner-worldly ascetic who used new, and even worldly, means in his commitment to glorify God but not for any personal long range benefit.

It is intriguing to speculate as to whether this tension between the rational and the irrational was necessary for the scientific revolution to take place. Replying to some of the critics of the Weber-Merton thesis, Merton suggests that the Puritan ethos was not indispensable, although it did provide major support at that time and place.[27] But Klaaren suggests there was a distinctive quality to the modernity of this revolution which separated God's work of creation from that of redemption. Further, it gave rise to a religion of creation which could not be completely included in a theology of redemption. The result was a new conception of the world which could only be referred to as modernity. Unable to be explained in terms of traditional notions of reality, modernity had to be kept in a state of tension if it were to be sustained.[28]

But if we look at the Puritan ethos over a period of time, we find that it was largely lost, along with the necessary tension, to the encroaching secularization which Weber saw as endemic to the modernization of Western society. How was it that these deeply committed Christian scientists lost the vision that initially spurred them to revolutionize the science of their day? Two possible, but not very satisfying, answers suggest themselves. For the Christian, one readily turns to the depravity of man and explains the behavior in terms of his inherent sinfulness. The scientist, however, knowing his own weaknesses, is more inclined to share Merton's view that "scientists are human, after all."[29]

Modernity and Scientific Communities

Here we must turn to that other element which represented the Puritan response to the emergence of modernity—the idea of science as a social system. If we accept the basic thesis of the sociology of knowledge that there is a relationship between human thought and the social context in which it arises, then it must be recognized that science is a social system shaped by non-logical forces as well as a system of ideas.[30] Further, such systems act as plausibility structures to support those ideas against contradictory social pressure.[31] Since religious ideas are usually inconsistent with prevailing social thought, plausibility structures are especially important for the support of religious ideas. Without them, the Christian scientist is likely to lose his original commitment to the use of religious values in scientific work. In short, we must look at the scientific groups at the time if we are to explain some of the tendency toward secularization, as well as the original support of religious values found among the Puritan scientists.

Since few new presuppositions are presented to challenge the problems science chooses for itself, its revolutionary potential remains largely underdeveloped.

Merton argues that it was Puritan influence which helped to organize the Royal Society. Again, he claims that their religious values did much to encourage its development although they weren't necessary to it.[32] At a time when universities ignored science and clung to their traditional scholastic biases, learned societies, often meeting in private homes, provided the informal settings in which the integration of religion and science was encouraged. Butterfield claims that these scientific societies developed from the learned societies of the day and supported the voguishness of the new scientific inquiries. Not only did these societies bear the expense of many experiments, they also acted as panels for the criticism and verification of these experiments.[33] Klaaren even ventures to say that "experimentation was institutionalized in the Royal Society."[34]

But social systems are rarely stable. They vacillate with change and reflect the emerging trends as well as help to shape them. What usually occurs is a separation of motive and practice. Initially, practice agrees with motive and fulfills its expectations. But, over a period of

time, the values which had formed a prominent basis for action are displaced and replaced by more immediate and pragmatic means. The result is referred to by sociologists as the "displacement of ends."[35]

Kuhn points to this same problem in his discussion of "normal science as puzzle-solving."[36] Although a scientist's motives influence his or her choice of problems, they do not continue to direct behavior when actually working on the problem. Then the routine is shaped by the realization that something important is being done that demands maximum diligence and ability. "What then challenges him is the conviction that, if only he is skillful enough, *he will succeed in solving a problem that no one before has solved or solved as well*"[37] (emphasis supplied). In the case of the Puritans, much of the motivation to glorify God was displaced by the glorification of self.

There is an ambivalence within scientific communities that allows them to be at the forefront of change or to resist it. Kuhn claims a decision is made when a scientific community accepts a new paradigm and chooses the problems to be worked on. Gradually, the paradigm is taken for granted as the community limits the problems deemed appropriate for its members to work on. Problems considered important at an earlier time may be rejected as unworthy of the expertise developing in the new and specialized discipline. In fact, Kuhn claims, a scientific community may be insulated from problems that cannot be reduced to the puzzle form employed at that time.[38] Gradually, a revolutionary science becomes a normal science.

Much of the ambivalence of scientific communities is related to the equivocal attitude concerning the social role of the scientist who seeks approval in that community. Since approval is most likely to be gained when a scientist gains priority in some discovery, Merton has identified such competitive behavior among scientists as a powerful motivating force in modern science.[39] But ambivalence occurs in another form as the scientist recognizes the community's expectation that he will also play down his accomplishments. The result is a contradiction in behavior which Merton sums up as follows: "Whenever the biography or autobiography of a scientist announces that he had little or no concern with priority of discovery, there is a reasonably good chance that, not many pages later in the book, we shall find him deeply embroiled in one or another battle over priority."[40]

Apparently, the Puritans were not above such competitive efforts. Merton, for example, describes the contests waged by Newton for recognition of discoveries also claimed by Hooke and Leibniz.[41] What apparently resulted at this time for many of the Puritan scientists was a shift in the tension they felt. The original religiously motivated tension of being "in the world and not of it" gradually shifted to a tension in a community of peers whose approval was sought and belittled at the same time. Gradually, it was this community-supported motivation which dominated the thinking of scientists and replaced, for the most part, the religiously inspired world views.

Another way of looking at this trend is to say that the scientific societies were becoming professionalized as part of the modernization process. As evolving institutions in a modern society, the professions in the fields of science become part of the "movement to establish authority." The objective was to form "a community of the competent" by identifying "individuals who were competent, cultivat[ing] their competence, and confer[ring] authority upon them."[42] Consequently, the calling was replaced by the career as professions now defined the task which had been set by God.

Reviewing 17th century science as it was briefly sketched here, it seems safe to say that Puritanism provided an important spur for the modernity of the day. In addition to providing a religious alternative to the prevailing Catholic-dominated world view, it fragmented institutions and gave them new directions. To use Klaaren's phrase to describe the period, "history was tensed" as new definitions of reality merged with the old.[43] This tension between the religious and the secular found expression in the ambivalence experienced by Puritan scientists and their learned societies. But this original tension was lost with a return to normal science and its concern for mundane problem solving. The rise of professionalism provided new motives and values for the scientist, who, increasingly, was judged by peers rather than by God.

A Christian Response to Modern Science

Today, modernization continues to follow some of the patterns already described. Recent sociological studies have shown the reassertion of religious meanings in opposition to the nature of modernity.[44] As Klaaren describes early modernity, many of our old beliefs are taken for granted as new ideas of nature, methods and knowledge emerge.[45] In some areas of our society, deinstitutionalization has been severe as can be seen in the cases of the family and the church. It is this fact which suggests that new religious meanings remain subservient to the basic secularization of our age. They have failed to provide a world view to revolutionize and influence our institutions.

In one sense, no institution is more modern than science. Married to modern technology, science daily provides new realities for our consideration and contributes to the fragmentation of institutions. But in

another sense, it lacks the tension produced by a competing world view. New paradigms and revolutionary trends tend to come from within contemporary science itself and not from other institutions. Since few new presuppositions are presented to challenge the problems science chooses for itself, its revolutionary potential remains largely undeveloped.

Although our society lacks the kind of cultural tension characterizing the 17th century, revolutions are still possible. Remembering Merton's claim that the Puritan ethos is not indispensable, modern science might respond in a revolutionary way to some other cultural crisis. Still, inner-worldly asceticism seems to be a valid, if not necessary, position for the contemporary Christian scientist. This is not to say that modern asceticism should take the form expressed by the Puritans. In fact, it is quite probable that "a rationalization toward an irrational mode of life" today would require a very different life style from that of the Puritans. We simply don't have the kind of information to describe modern asceticism in any detail. Suffice it to say that the Christian would have to be *in* a field as a professional scientist while resisting its claims on his or her loyalty to be *of* that field.

Certainly it might be possible for each scientist to define asceticism for himself or herself. But if personal ambivalence is only individually defined, it is unlikely to continue. For this reason, scientific communities must also maintain ambivalence and operate as plausibility structures in support of Christian scientists who seek to be "in the world and not of it." Again, it is difficult to say precisely what is required except that God be glorified and professionalism avoided. Within these bounds, a community of Christian scientists can function to support a world view consistent with Christian objectives and scientific procedures.

And since there is no place more appropriate than Oxford, England for speaking of these things, let me simply state the obvious: Research Scientist's Christian Fellowship and the American Scientific Affiliation are heirs of the tradition which found so much stimulus here. It's intriguing for me to speculate on the meaning that tradition should have for us today. Is there a critical correspondence between certain conditions found in the 17th century and those we find today? Should we be in tension with our colleagues and professional associations, and, if so, how is such tension to be gained and maintained? How do we resist the dominance of scientific world views while still maintaining competence in our fields? To what extent can we apply our faith in creative ways in response to modernity? In short, how do we, as scientists, faithfully act as God's instruments to unfold the future as He would have us know it?

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[1]See, for example, Eugene M. Klaaren, *Religious Origins of Modern Science* (Grand Rapids, Mich.: William B. Eerdmans Publishing Co., 1977); R. Hooykaas, *Religion and the Rise of Modern Science* (Grand Rapids, Mich.: William B. Eerdmans Publishing Co., 1972); and Robert K. Merton, *Science, Technology and Society in Seventeenth Century England,* (New York: Harper & Row, 1970). Originally published in Osiris, IV, Part 2, Bruges (Belgium), 1938.

[2]The view of modernization adopted here is most closely associated with the work of Peter Berger. See, for example, his *The Homeless Mind* (New York: Doubleday, 1979), *Facing Up to Modernity* (New York: Basic Books, 1978), or *The Heretical Imperative* (New York: Doubleday, 1979).

[3]Thomas S. Kuhn, *The Structure of Scientific Revolutions*, 2nd ed. (Chicago: The University of Chicago Press, 1979), chapter 9.

[4]*Ibid.*, p. 119.

[5]Merton, *op. cit.*, chapter 2.

[6]*Ibid.*, p. 81.

[7]*Ibid.*, p. 85.

[8]*Ibid.*, p. 91.

[9]Merton derived his basic theory from the work of Max Weber and his notion of "the Protestant Ethic," which differs little from the Puritan Ethos.

[10]Merton, *op. cit.*, p. 60.

[11]*Ibid.*, p. 63.

[12]*Ibid.*, p. 65.

[13]Hooykaas quotes C. S. Lewis as saying the Puritans "were, of course, the very latest thing. Unless we can imagine the freshness, the audacity and (soon) the fashionableness of Calvinism, we shall get our whole picture wrong." *Op. cit.*, p. 139.

[14]Merton, *op. cit.*, p. 99.

[15]Hooykaas, *op. cit.*, pp. 140–141.

[16]Quoted in Bernard Barber, *Science and the Social Order*, rev. ed. (New York: Collier Books, 1962), p. 91.

[17]Hooykaas, *op. cit.*, pp. 117–118.

[18]*Ibid.*, p. 118. Hooykaas here quotes Weber.

[19]Klaaren, *op. cit.*, p. 189.

[20]*Ibid.*, pp. 190–191.

[21]Max Weber, *The Sociology of Religion* (London: Methuen & Co., 1965), p. 166.

[22]*Ibid.*, p. lii.

[23]*Ibid.*, p. li.

[24]Max Weber, *The Protestant Ethic and the Spirit of Capitalism* (London: George Allen & Unwin, Ltd., 1930), no. 9, pp. 193–194.

[25]Weber, *The Sociology Ethic . . .*, pp. xxxii–xxxiii.

[26]Weber, *The Protestant Ethic . . .*, p. 79. The German word for "calling" is "Beruf," the same word used by Luther in his translation of the Bible.

[27]*Op. cit.*, p. xviii.

[28]Klaaren, *op cit.*, pp. 190–191.

[29]Robert Merton, "Behavior Patterns of Scientists," *American Scholar*, vol. 38 (Spring, 1969), p. 197.

[30]See, for example, M. D. King, "Reason, Tradition, and the Progressiveness of Science," *History and Theory*, vol. X (1971), p. 3.

[31]The idea of plausibility structures is developed at a number of places in the work of Peter Berger. For a proper understanding of the concept used here, see Peter Berger, "A Sociological View of the Secularization of Theology," *Journal for the Scientific Study of Religion*, VI (1967), pp. 3–16.

[32]Merton, *Science, Technology and . . .*, p. 115.

[33]Herbert Butterfield, *The Origins of Modern Science* (New York, The Macmillan Company, 1961), pp. 74 and 95.

[34]Klaaren, *op. cit.*, pp. 118.

[35]For a brief discussion of this and related problems, see Robert K. Merton, *Sociological Ambivalence and Other Essays* (New York: The Free Press, 1976), p. 101 ff.

[36]Kuhn, *op. cit.*, chapter 4.

[37]*Ibid.*, p. 38.

[38]*Ibid.*, p. 37.

[39]Robert Merton, "Priorities in Scientific Discovery," *American Sociological Review* (December, 1957), pp. 635–659.

[40]Robert Merton, *The Sociology of Science* (Chicago: The University Press, 1973), p. 385.

[41]"Merton, Priorities . . .," p. 635 ff.

[42]Thomas L. Haskell, "Professionalization as Cultural Reform," *Humanities in Society* (Spring, 1978), pp. 103–104.

[43]Klaaren, *op. cit.*, p. 92.

[44]See, for example, James Davison Hunter, *American Evangelicalism: Conservative Religion and the Quandry of Modernity* (New Brunswick: Rutgers University Press, 1983).

[45]Klaaren, *op. cit.*, p. 86.

Chemistry, A Gift of God*

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This paper suggests one possible Christian approach to chemistry, intended for students in the first year of college chemistry. The basic idea in the proposed approach is that coherence in natural science is the consequence of the way God created and upholds creation. The concepts discussed, all of which presuppose the validity of this basic idea, are the following: (1) The human response to the existence of orderly chemical phenomena in creation attempts to be orderly. (2) Chemists have always assumed that chemical phenomena are unifiable and rest on first principles. Examples are given. (3) Chemical diversity arises through chemical bonding, also explained by using first principles. (4) The union of chemical phenomena has important consequences concerning beauty, progress, and care for creation.

College chemistry instructors usually attempt to teach as if chemistry were not related to any philosophical ideas. As a result, chemists tend to look upon chemistry, a basic natural science, as being the same for Christians and non-Christians. My purpose in the present paper is to suggest one possible Christian approach to chemistry. In my approach, I claim that chemistry can be the same for Christians and non-Christians when they consider the day-to-day work of chemists in a superficial way, but that chemistry is not the same for Christians and non-Christians when they consider the foundations of their science, the foundations which make chemistry possible.

My argument flows from the philosophical position I take. Here are the elements of that position which are directly related to my argument: 1) God created the universe and upholds it. 2) Every person has a duty to recognize the creating and upholding hand of God. 3) God is to be recognized in every aspect of life. 4) Each human act and attitude either recognizes or rejects God. Thus, there is no part of life which is ultimately neutral—neutral, that is, in the sense that it has no relation to God. Thus, no part of scientific investigation can be said to be neutral with respect to the creating and upholding hand of God. A scientific investigator either recognizes that he carries out his work in God's creation and is responsible to God for what he does, or he does not recognize these things; but there is no neutral stance. So much for my basic position.

Modern chemical conclusions rest on the idea that chemical phenomena constitute a coherent whole. This coherence lies in relating chemical phenomena to fundamental laws. Modern chemists think they know some of these laws, among which are the first principles of quantum mechanics. According to many Christian chemists, this coherence, resting as it does on fundamental laws, is the consequence of the way God created and upholds his creation. There is always the possibility of scientific error and incompleteness; after all, human descriptive law is not divine prescriptive law, the word of the Lord for creation. But the coherence found in creation seems quite consistent with the biblical teaching that God is faithful and his faithfulness can be seen in his creation. What modern chemists and other scientists see is that the various parts of creation fit

*Presented at the ASA-RSCF meeting in Oxford, England, July 26-29, 1985; based on a book by the author, Chemistry, a Gift of God, published by Dordt College Bookstore in 1985.

together. The fitting-together of the parts of creation is no less than the coherence expected of a faithful God who created and who is sovereign.

It is possible for Christians to understand that the power of God is responsible for the coherence in the phenomena of the natural sciences. But according to Romans 1:18–20, non-Christians suppress the knowledge of a unifying, coherent power. Even so, non-Christians act as if such a power exists when they assume the natural sciences to be orderly.

Order in Chemistry

First of all, chemists have—at least since the beginning of the modern period, around 1800—assumed that chemical phenomena are unifiable. The atomic theory, advanced early in the nineteenth century, was an attempt to unify and bring order into chemistry. Using the concept of an indivisible atom, certain problems could be solved. The atomic theory was therefore a paradigm in the Kuhnian sense.[1] That understanding, or model, of the atom was a "first level" understanding.

What Kuhn does not point out, but which nevertheless seems to be true, is that the Lord created us so that we can carry out scientific activity by means of the paradigmatic methodology of modern science. God has made it possible for us to carry out "normal science," defined by Kuhn to be scientific activity carried out under the "roof" of a reigning paradigm.[2] Classical mechanics discoveries, made by assuming the validity of Newton's laws of motion, which constituted the reigning paradigm, provide an example. The normal-science consequences of paradigm utilization can be (but, obviously, are not necessarily) a blessing.

Around 1900 physical scientists became convinced that the atom contains charged particles. The new paradigm made possible many more discoveries. But was it not good that the Lord made human beings so that they could take only one step at a time? The early nineteenth-century belief that the atom is indivisible was sufficient for the normal science carried out at that time. Eventually, a third-level understanding, the quantum-mechanical understanding, was needed. But once again, third-level knowledge, such as knowledge of the wave properties of matter, would not have fit into an earlier era. In retrospect, we can see that it is good that the Lord created chemistry so that chemists have only limited fundamental knowledge at various stages of the development of chemistry. Naturally, we must make the same conclusions concerning present knowledge; after all, we can never assume that we have "final science."[3]

Scientists who formulate physical laws assume that the phenomena of physical science, including chemistry, are orderly. They have discovered an ordered hierarchy of physical laws. Thus, it seems at first that the laws of thermodynamics are quite separate from the first principles of quantum mechanics. But one can show that the laws of thermodynamics, which are extremely important in chemical work, are actually summaries of other laws. The laws of thermodynamics provide many short-cuts in working out chemical problems; they do not, however, destroy the unity of chemistry.

Belief in the orderliness of chemistry is also the cause of other human responses to chemical phenomena. For example, chemists name compounds in an orderly way. Systematic names replaced trivial names because chemists realize that (a) it is possible to name large groups of compounds—perhaps, all compounds—using one set of nomenclature rules; (b) the use of systematic names facilitates chemical communication and therefore chemical research; and (c) the structure and properties of a compound can be communicated by use of a systematic name. Perhaps learning nomenclature rules will always be drudgery; but even beginning students can be taught that one takes a certain philosophical stance once it is assumed that (a) a set of nomenclature rules can be constructed and (b) a name can communicate structure and property.[4]

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The history of attempts to formulate a periodic classification of the elements illustrates the human belief that all chemical phenomena are orderly. Perhaps one could show that the premature "discovery" and naming of elements 43, 85, and 87—none of which occur in nature in amounts large enough to be detectable in the ores which supposedly contained them—indicates that belief in order can tempt investigators to accept poor experimental results. Thus, although belief in order can guide investigators, such belief may never be the reason for a diminished respect for investigation of that which the Lord created.

The attitude toward order held by the later deists provides an example of how modern chemists and physicists can have an incorrect understanding of the relation between the systems they study and God, that is, an incorrect understanding of the relation between the creature and the creator. Those deists, encouraged by the successes of Newtonian mechanics in predicting the positions of the planets, were children of the Enlightenment. For them, God created the world and then allowed it to operate like a machine; perhaps the universe could be compared to an unwinding clock. There is a parallel situation in physics and chemistry. Including Newtonian mechanics in kinetic-molecular theory, one can make many correct predictions concerning the behavior of gas molecules. For those who wanted to keep God out of scientific matters, their attitude toward the early kinetic-molecular theory provided a stepping-stone to the unbelief associated with modern theory. Beginning chemistry students can be shown what is wrong with the ideas some scientists have about the relation between the creature and the creator.

In both the Old and New Testaments the word for "know" carries with it the concept of "care for."

Diversity and Coherence in Chemistry

It would not be right to emphasize order but neglect diversity. After all, chemists as well as non-chemists become aware of a fantastic *variety* of chemical phenomena before they see order. In other words, a fascinating aspect of chemistry is its amazing diversity, observed not only in pure solids, liquids, and gases, but also in solutions and colloidal substances. Such diversity emerges from order by one means more than any other: bonding between atoms and/or molecules. God uses the many ways which atoms and molecules bond to produce the large number of different kinds of materials which exist. Thus, there are extremely weak bonds in non-ideal gases, as well as in some liquids and solutions; slightly stronger bonds, such as the hydrogen bond, in some liquids and crystals; still stronger bonds, such as ionic and covalent bonds in crystals and molecules; and a variety of other bonds, such as the metallic bond and three-center bonds. But they *all* rest on first principles; even the very weak bonds between gas molecules are now being explained quantum-mechanically. Diversity exists; but there is no chaos.

Because diversity is a fact, chemical phenomena which can be explained by atom-to-atom bonding are often not explained but treated as isolated phenomena. The situation was deplorable a few decades ago: most chemistry textbooks taught chemical phenomena in catalogue-like fashion. Students were required to memorize large numbers of facts which seemed to be unrelated. It seems to me that a Christian approach to chemistry must include an insistence that chemical phenomena are not actually isolated. In this way, a chemical approach will not contradict a conventional textbook as much as it would say to the student, "There is more. These phenomena are linked together; and there is an underlying reason for their being linked together." The problem is not that chemists and other scientists are unaware of the relations between scientific phenomena. Rather, the problem seems to lie in a lack of urgency in demonstrating the coherence among chemical phenomena. One factor (but only one factor) contributing to this attitude is the existence of a division between physics and chemistry: students tend to think, because they are usually not instructed otherwise, that anything which belongs to the discipline called "physics" does not belong to "chemistry." But physical-chemical reasoning which links atomic structure, atom-to-atom bonding, and practical application can be carried out for a large number of chemical phenomena. A few examples, all of which can be explained in detail to beginning chemistry students, are the following: the properties of ordinary glass; the lubrication properties of graphite; the osmosis phenomenon; the lowering of the freezing point of a liquid by a dissolved solute; the existence and properties of molten salts; the existence of semiconductivity, the transistor, and the computer chip; the action of soaps and other detergents; the driving forces in solution processes; and the unusual liquid range, dissolving power, and density-temperature relation of water.

The ideal way to explain chemical phenomena is to start with fundamental laws, including quantum mechanics. But a simpler and more practical approach is to use the following three-part working hypothesis: (a) Every bond is a consequence of electrical attraction

between electrons and nearby nuclei. (b) Chemical reactions are the breaking and/or forming of one or more bonds; the driving force is either the attraction of at least one electron of one atom for the nucleus of another atom, or the input of enough energy to break a bond. (c) The tendency of a system to go toward a state of greater disorder, according to the second law of thermodynamics, qualifies (b).

But the coherence found in creation seems quite consistent with the biblical teaching that God is faithful and his faithfulness can be seen in his creation.

Using this working hypothesis, one can describe almost all chemical reactions in terms of the movement of positive or negative species. That is, although acid-base systems (such as the Arrhenius, Bronsted-Lowry, and Lewis systems) are usually rather restricted, some chemists emphasize the positive-negative aspect of all acid-base systems. They come close to claiming that every reaction is either an acid-base reaction or the reverse of such a reaction. Even oxidation-reduction reactions are included; they are reactions in which there is negative species transfer—in this case, one or more electrons—and some oxidation numbers (arbitrarily defined) change.

Reaction rates can also be shown to be related to chemical first principles or, for the purpose of a first college course in chemistry, to the working hypothesis given above. Naturally, it is never necessary in a first course to tell students a very large fraction of what is known; but students can be shown that reactions, even the individual steps of a reaction mechanism, can be brought under the same logical roof. It is not difficult to use easy-to-understand fundamental ideas to show why some reaction steps are slow and others rapid, or to describe enzymes, which are amazing tailor-made catalysts whose existence is evidence of the handiwork of God.

A college course in general chemistry usually cannot be comprehensive enough to include much detail concerning nuclear chemistry. But it is important to show students that nuclear chemistry is not in principle different from extra-nuclear chemistry. There is no natural dividing line between the two. However, the simple working hypothesis given above cannot be used in nuclear chemistry. To take up anything beyond the most simple nuclear chemistry, one would need to introduce weak and strong nuclear forces. Discussion of such forces in a general chemistry course is not essential. What is essential is that students come to realize that physical science is unifiable and that nuclear chemistry is a part of physical science.

Three Additional Principles

No matter what part of chemistry is examined, certain additional principles require emphasis in a Christian approach. The following are three of those principles, all consequences of the unifiability of chemistry:

(1) Consider first the meaning of "beauty" as it is often used in relation to chemical phenomena. Usually its use—as in "a beautiful chemical law," "a beautifully elegant chemical synthesis," and "a beautiful crystal"—is for the purpose of indicating that something is aesthetically pleasing. ("Beauty" possesses other dimensions which are not taken up here.) What kinds of things are aesthetically pleasing? In fact, what *is* the aesthetic dimension of life? Calvin Seerveld states that

> (T)he "aesthetic" side of God-made and man-made things (is) . . . a matter of "allusiveness" or "nuancefulness."[5]

Thus, a painting may be beautiful—aesthetically pleasing—not because it is a faithful or photographic reproduction but because of its allusive or nuanceful character. One who looks at such a painting sees something which the artist intended to be seen, even though that "something" is not actually present in the painting.

No Christian approach to chemistry may ignore the responsibility God gives men and women as he allows their potential to increase as a result of the possession of greater chemical knowledge.

What of the beautiful chemical law, the beautifully elegant chemical synthesis, and the beautiful crystal? Is this kind of beauty allusive? I think it is. To the extent that human analyses of these parts of chemistry are correct, all three examples—the law, the synthesis, and the crystal—point to, *allude to,* the ordering hand of God. All three are allusive; their beauty resides in the

way each alludes to the creating and upholding hand of God. This, then, is the first of the three principles: ***Chemical facts, to the extent that they are correctly known, are beautiful because they allude to the creating and upholding hand of God.***

(2) A second consequence of the unifiability of chemistry relates to the way chemical investigation is carried out. Chemical investigation is easier than it would be if investigators did not understand that chemical phenomena are a part of a coherent whole. The practical consequences of this unity cannot be overestimated. Consider, for example, the large number of conceivable chemical reactions which need not be attempted (and therefore research resources are not wasted) because those reactions can be shown to be thermodynamically non-spontaneous. This is the second principle: ***The unifying laws of chemistry have made possible in only a few decades an immense amount of chemical progress.*** The divine command to subdue creation, implying as it does in modern times scientific activity, is being carried out. As Hooykaas has shown, the Reformers de-deified the world: the world is not the divine organism which the Greeks took it to be; rather, the world is creature, to be investigated and subdued.[6] God not only commanded this investigation of the world but he led human beings to perceive unifying principles in at least the physical aspect of creation. As a result, human knowledge has increased. This knowledge can be used.

As this knowledge increases, so does human potential increase; the same is true for non-scientific areas of life. Christians have an understandable tendency to see in this increased potential the occasion for even more sin than human beings have been guilty of in the past. But the increased human potential in chemistry, other sciences, and other areas of life has a dimension which is not sinful. The existence of greater human potential in so many areas continually shows human beings more of what "human" actually means. By allowing chemistry to progress, God might thereby give human beings, created in his image, a tiny glimpse of what it will mean to be human when sin has finally been taken away.

(3) No Christian approach to chemistry may ignore the responsibility God gives men and women as he allows their potential to increase as a result of the possession of greater chemical knowledge. In both the Old and New Testaments the word for "know" carries with it the concept for "care for." Knowing accompanied with caring held not only for a man who knew his wife; it also held in other situations. A man who *knew* his beast of burden had a duty to *care for* it. Knowing and caring were not two separate ideas; rather, either one implied the other. But knowing chemistry in the modern sense is possible because chemistry is unifiable. As a consequence, this is the third of the three principles which arise because of the coherence of chemical phenomena: ***Knowledge of God's creation today also carries with it the responsibility of caring for it.*** The immense body of chemical knowledge, which has accumulated because human beings realize creation is orderly, is also knowledge which human beings may not ignore. For example, chemists know the chemical details of the harm done to the environment because tetraethyl lead has been added to gasoline. The chemistry of the deleterious effects of lead can be easily explained in a first course in chemistry. Surely the point need not be belabored: chemical knowledge, so often associated with sin, is knowledge—according to God's commands—which is to be used to care for creation. Good stewards can do no less.

Thus, Christian chemists do know why chemistry and the rest of science is possible, that is, why physical phenomena hang together and are explainable. They can understand the meaning of beauty in chemistry, chemical progress, and human responsibility in chemical activity. Therefore, Christian chemists can understand how it is that chemistry is indeed related to philosophical ideas.

ACKNOWLEDGMENT

I deeply appreciate the helpful suggestions and analyses made by Professor Charles Adams.

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[2]Kuhn, pp. 10–42.

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The Mind-Brain Problem and Knowledge Representation in Artificial Intelligence

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The mind-brain problem is similar to problems in artificial intelligence (AI) since AI systems are analogous to the mind-brain. A mind-brain representation is presented which incorporates both monistic and dualistic aspects of mind-brain experience, with emphasis on the importance of distinguishing between ontological and epistemological categories. Alternative mind-brain representations are briefly discussed in view of AI notions of structure, behavior, causality, and function. Finally, the relevancy of the mind-brain problem to theology is briefly suggested in two ways.

Problem Definition

A problem of continuing interest in our civilization is the mind-body or *mind-brain* problem.[1-4] This problem can be viewed as one of finding the correct relationship between two aspects of our experience as human beings. We have two kinds of commonly shared self-awareness:

1. existential awareness through introspection of our conscious existence.
2. empirical awareness through observation of our physical existence.

The first kind of self-awareness is what Descartes referred to in his "cogito ergo sum"—"I think, therefore I am"—and is a *cognitive* kind of awareness. The second, in contrast, is a *perceptual* awareness; we learn early that the being we know ourselves to be by introspection is the same one that we physically sense as our body. Because these two kinds of knowing of ourselves are so different, it has been difficult historically to find a universally accepted relationship between them. A multi-dimensional spectrum of tentative solutions or positions has attempted to establish the relationship between these two kinds of self-knowledge, or else deny the reality of one of them. Some of these positions have theological overtones in that they lead to propositions on matters about which theologians concern themselves.

This problem has been thought through extensively in the past.[1-4] A fertile ground for new insights into the problem, however, is in the work being done in that branch of computer science called *artificial intelligence* (AI). Problems similar in nature to the mind-brain problem arise in AI, and developments there in the area of knowledge representation may provide a new perspective from which to view the problem.

This paper was prepared for presentation to the Vancouver, British Columbia section of the Canadian Scientific and Christian Affiliaton on October 18, 1985 at Trinity Western University, Langley, B.C.

AI and Knowledge Representation

One of the major activities in AI is *knowledge representation*, which is concerned with computational representation of knowledge. The interest here goes beyond the archiving of textual material; by representing knowledge in the right computational forms, automated reasoning or machine inference can be applied to it with results that are normally attributed to human experts. The principles of AI needed to do this have led to a technology known as *knowledge engineering*, which is a kind of applied epistemology.

The brain is analogous to the computer, as hardware, and the mind to the programming or software.

This study of knowledge from a computational viewpoint is similar in some ways to study of the relationship between mind and brain. Whatever "intelligence" AI systems demonstrate is manifested by a computer, which, like the brain, is a physical device. The brain is analogous to the computer, as hardware, and the mind to the programming or software. Thus, a problem analogous to the mind-brain problem is that of determining the relationship between hardware and software.

More significantly, the attempt to represent knowledge in a computationally compatible form is an attempt to express something of the essential nature of mind, since mind is the only instance we have of intelligence. Furthermore, these theories of mind are capable of "springing to life" in conjunction with a computer, giving us an unprecedented opportunity to examine the relationship between mental representations and physical mechanisms. Therefore, some major concepts of knowledge representation will be presented here, and in their context the mind-brain problem will be examined.

Knowledge Representation Concepts

A *representational theory* is that which produces a representation of some domain of knowledge. This theory is expressed in a given language. The particulars of the domain are often called "objects" and can be physical objects, concepts, relationships, or abstractions in general. Representations are abstractions of the objects they represent. Consequently, not all that is true of an object will be found in a representation of it. The more comprehensive a representational theory, the more complete the representation, and also, the more complex it is. A theory which abstracts from the object only those attributes of interest is optimal, but contains simplifying assumptions leading to multiple, possibly conflicting, interpretations of the actual objects. To resolve contradictions among interpretations and select the correct interpretation, other kinds of theories are needed.

Thus, four aspects of knowledge representation may be identified as follows:

1. objects (or a "domain") to be represented
2. a representational theory
3. a language in which to express the representational theory
4. a resulting representation.

An illustration of this is the work done on electronic circuit recognition by Johan de Kleer while at MIT.[5,6] His work involved capture of the kind of knowledge an electronics engineer has which allows him or her to determine what an electronic circuit does, given the schematic diagram (which shows the interconnection of the electronic components). The diagram itself represents the circuit, but knowledge of electronics is

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required to understand what it is for. This domain of electronic circuit recognition knowledge illustrates some aspects of knowledge representation commonly found in other domains as well, including that of mind-brain representation.

To pose the circuit recognition problem in more detail, we first are given in the schematic diagram a *structural* description of a circuit, which comprehensively describes what the circuit is. The goal is then to formalize that knowledge, allowing an engineer to determine the *functional* or *teleological* description from the structural one. Not uncommonly, intermediate levels of abstraction are needed to proceed from structure to function because the conceptual leap involved is too large. Although engineers have memorized from past experience many circuits for which they immediately know the function, yet if they are confronted by a novel circuit, some kind of rationalization must be employed to identify the function of the new circuit. An intermediate level of description is used—a *behavioral level*—in which the behavior of the circuit is deduced from its structure. A behavioral description of an object makes explicit what it **does**. This involves knowledge of the behavior of the individual components under different conditions. To relate behaviors among components, a theory of behavior is needed, or a *causal theory*. A causal theory defines logically necessary relationships between behaviors. Two properties of a causal theory are important here:

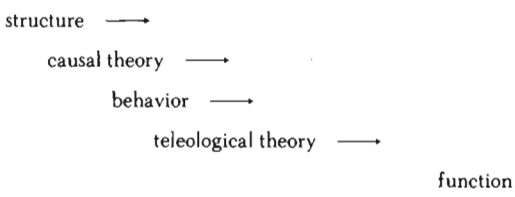
1. locality—the theory applies to behaviors on a local rather than global (or overall) level in the structure of the object.
2. directionality—the logic of cause and effect is unidirectional in that causes are logically necessary for their associated effects to occur.

These two properties of the causal theory used in circuit recognition (and elsewhere in physics) let us think in terms of the propagation or flow of causes through a circuit structure.

A functional description of the circuit can be derived from a causal one. This description tells what the circuit is **for**. Unlike causal theory, a theory of function, or *teleological theory,* has these two important properties:

1. globality—the theory applies to the overall function of a group of related components as a whole rather than to the components individually.
2. relationality—individual components are described in terms of how they contribute to the overall behavior of the circuit.

We then have a situation that can be graphically illustrated as this:



For circuit recognition, these aspects could be shown as:

Domain	*Representational Theory*	*Representational Language*	*Representation*
electronic circuit structure	causal theory	behavior	causal representation
causal representation	teleological theory	causes	functional representation

These multiple representations increase in abstraction from structure to behavior to function. Because of abstraction, the resulting representations are simple enough to be usable, but at the cost of being ambiguous due to a lack of detail about the circuits being represented. This means that more than one explanation of how the circuit behaves is possible. By simplifying the theory of how circuits work, some critical aspects may be lost. For example, de Kleer simplified the representation of circuit behavior by allowing only increases or decreases in voltages at circuit nodes. Engineers often reason about how circuits work this way: "If the voltage at node A increases, then the voltage at node B must decrease. This causes the voltage at node C to decrease also, and so forth." But sometimes, it is not enough to reason about circuit behavior in terms of qualitative changes. Feedback loops and other global circuit structures may lead to multiple causes with different amounts of contribution to the combined effect. Thus, multiple—and sometimes contradictory—behavioral descriptions result. To determine which description is correct requires another approach to the circuit which is not just a better causal theory. Circuit modeling programs produce a comprehensive analysis of a circuit's behavior based on the laws of electronics, and give a unique, consistent result. However, this analysis becomes unwieldy when applied to circuits beyond a limited complexity. To handle greater complexity, a simplifying abstraction like de Kleer's qualitative causal theory is necessary. Such is the case for engineers as well, since numerically exhaustive analyses of circuits are not feasible.

So it is that multiple representations, with the accompanying theories that produce them, form a hierarchy of conceptual abstractions derived from the actual circuits themselves. Each level of this hierarchy is "spaced" from the lower one by a "conceptual distance" manageable by the human mind, for it is AI researchers who determine where the levels of representation for a given domain should be.

In addition to this abstraction hierarchy, the descriptions themselves may be hierarchically organized to deal with their own complexity. For example, the structural representation of an electronic system can be broken into sub-assemblies, which consist of circuit boards, which in turn consist of components. This results in a three-level hierarchy of groupings needed to manage the structure conceptually. For it would be difficult indeed to think of hundreds of resistors, transistors, and other parts without grouping them into circuit boards and sub-assemblies and then thinking of the components in terms of these more abstract groupings. Similarly, the functional description is often related to the structure by grouping parts on schematic diagrams according to their functions. This results in a functional hierarchy with levels: system, sub-system, circuit, and component. Whereas the structural description regards a component as a physical part of certain dimensions, located spatially on a circuit board, the functional description describes it instead as having a behavior that contributes to the overall purpose of the circuit of which it is a part.

Descartes placed both mind and brain at the same conceptual level—the physical or material level—so that both are the same kind of object and could be represented by the same representational theory.

The Distinction between Ontology and Epistemology in Representations

Representations have dual contributing factors; both the representational theory, with its language, and the objects of the domain contribute to the representation. For example, a causal description of a circuit is the result of both the structural description of the circuit and of the causal theory used to produce the representation. For the mind-brain problem, the various solutions posed are different representations of the domain to be represented—the mind-brain. A significant question which arises in examining these various alternatives is Which aspects of a mind-brain representation are due to the mind-brain itself and which are due to the theory used to represent it? Those aspects of a representation that are due to the nature of the object itself are the *ontological* aspects, and those due to the representational theory are the *epistemological* aspects. For the circuit example, it is easy to see that the qualitative aspects of the behavioral description are due to the qualitative causal theory used to analyze it. And the particular chain of causal flow is due to the structure of the circuit itself. But for the mind-brain problem, it is not at all easy to see which of these two contributors account for particular aspects of a representation. For example, is the mind ontologically real or a result of the theory used to describe the mind-brain?

Furthermore, it is not clear at what levels of abstraction the mind and brain are to be found. Some representations place them at the same level. For example, Descartes placed both mind and brain at the same conceptual level—the physical or material level—so that both are the same kind of object and could be represented by the same representational theory in the same terms. This approach has not been too successful since the data we have to begin with about the mind is not normally described in material terms or categories. Descartes made an ontological distinction between mind and brain. When a distinction is made at the same level of representation, the resulting representation is *dualistic*. When no distinction is made, the representation is *monistic*. An example of a monistic mind-brain representation is identity theory (or central-state materialism). According to that theory, the mind **is** the brain. Whether the mind-brain is described in physical or mental terms, the descriptions are of the same object. In this approach, two different representations of the mind-brain, one physical and the other mental, result from applying two different representational theories to the same object, the mind-brain. To then consider the mind and brain as one and the same would imply that the theories used to represent them are also the same, but this is not the case. However, although the identity theory asserts one object, the mind-brain, and affirms both mental and physical descriptions, it mistakes the descriptions themselves as being ontological rather than the result of distinct representational theories. Ontological and epistemological contributions to the mental and physical representations have not been adequately distinguished.

Another representation, epiphenomenalism, asserts that the brain causes the mind. But what kind of causality is meant? From the circuit example, a causal description of the brain, a physical structure, would be in terms of physical behavior. Since epiphenomenalism

acknowledges existential experience of mind, a physical-to-mental causal theory is required, whereby mental effects are described in terms of physical causes. But this approach confuses the idea of causation with different levels of representation. Unless epiphenomenalists develop a whole new concept of causation (in which case it should be given a different name to avoid semantic confusion), the present theory will not suffice for mind-brain representation. If this approach were taken to AI systems, it would lead to talk such as "These logic circuits caused the program to branch to a different line of code." Although a description of program branching can be related to logic-circuit behavior, it requires another level of abstraction, namely, a functional level, with a teleological theory which relates physical behavior of the computer to its functional description, which is the program. (Donald M. MacKay has made this distinction in specifying that the relation between mental and physical events are correlates rather than translations.[7]) This is not to deny representation of mental behavior, but to emphasize that in order to relate it to the physical behavior of the brain another theory is required to bridge the conceptual gap—and this would be a teleological theory. In summary, the fault in the epiphenomenal representation is the assumption that mental and neural behaviors are related to a common representational theory. Neuroscience and cognitive psychology, however, are different theories and represent the mind-brain in different languages. To consider them causally related apart from teleological theory would be like trying to relate a street map of Vancouver with a politician from Vancouver. The two representations are both of Vancouver but are the result of distinct representational theories, which express the resulting representations in different languages, one geographical and the other political.

A Mind-Brain Representation

To do justice to what is understood from knowledge representation in AI, which provides an empirical base for testing representational theories, it is necessary to preserve both the monistic ontology of the mind-brain (as identity theory does), and yet preserve the necessary epistemological distinctions in the representational activity. What this suggests is the following kind of mind-brain representational scheme:

1. ***ontological monism***: brain and mind are the same structurally just as a computer and the program it is running are.

2. ***epistemological dualism***: mind and brain are different kinds of representations, resulting from different representational theories. Both are required to describe what the mind-brain is because both, being abstractions, are incomplete representations in themselves.

The first feature of this representational approach is to assume that the mind and brain both have as their objects of representation what, on the physical level of representation, is the same object, the mind-brain. That is, the mind and brain are not assumed to be distinct structures with their own independent existences any more than a computer and its program are structurally distinct. To ask where the program fits into the computer hardware must be answered in terms of energy states of parts of the hardware. It is the particular sequence of physical configurations that the computer takes that relates the hardware to the software. But do sequences of configurations of the same atoms have an existence in themselves? The approach taken here would deny such a separate existence.

Unless epiphenomenalists develop a whole new concept of causation, the present theory will not suffice for mind-brain representation.

Nevertheless, the program running on the computer is something to be reckoned with. It is a different representation of the computer's activity than an electronic one, but is not any less "real." It is as necessary to us in order to understand the computer as is the electronic description. Thus, the second feature of this approach is an affirmation of epistemological dualism—that both mental and physical representations of mind-brain are necessary. Again, the distinction has to do with representational theory and not with the ontology of the mind-brain.

An objection to this might be raised by the ontological dualist: If we make a distinction in our thinking between mind and brain, then, if that distinction is real, would it not also be true of the mind-brain itself? In a sense, the answer is yes. The distinction of epistemological dualism between mental and physical representations *does* correspond to a real distinction in the mind-brain itself. But it is not a physical distinction except in the sequence of states of magnetic dipoles, atomic orbital energies, *et cetera*. Returning to the computer analogy, different programs can run on the same hardware and the distinction between the two phenomena are differences in state. No account of the hardware would be adequate (or complete in any sense) without, in some way, taking state into account, yet the physical structure of the computer remains essentially the same. The only substantial difference due to differences in state is in the thermodynamic quantity, entropy, which increases with time. But is entropy, a measure of the disorder of energy, materially real? Or, is state real? It certainly cannot be ignored if we want to understand the computer in any but a superficial way.

The distinction of epistemological dualism between mental and physical representations does correspond to a real distinction in the mind-brain itself.

This issue of the reality of epistemological categories vis-à-vis ontological categories is, I believe, a root issue in the mind-brain problem. In terms of knowledge representation, the question is whether the contribution to a representation by the representational theory adds to the reality of the object as it is represented. Extreme objectivists (such as materialists or positivists) would completely deny the reality of the contribution to a representation by the representational theory, while extreme existentialists would experience it as the only contributor. The approach set forth here does not deny the realism of either ontological or epistemological contributions to a representation. (Perhaps this is why D. M. MacKay, who has a similar approach, calls it "Comprehensive Realism."[8-10])

The Mind-Brain and Theology

Whether the ontology of the mind-brain is monistic or dualistic is an issue that naturally lends itself to theological discussion since the church has long had a historic interest in ontology. In both the Bible and subsequent theological development, the mind-brain problem is not addressed. But the same underlying issues were dealt with at length in the Patristic period (A.D. 300–500) by the church fathers and are still present.[11-16]

The trinitarian and Christological controversies begun in the Patristic period are centrally concerned

with the ontology of God and Christ. They involve the problem of unity and diversity in God (one essence, three persons) and in Christ (one person, two natures). The orthodox doctrine of Christ and the Trinity contains both monistic and dualistic aspects; God (or Christ) is one in essence (*ousia*) but is three hypostases (or two natures). That is, what God appears to us to be must be accounted for in a multiplicity of terms. Even the use of the word *hypostasis* (found in Heb. 1:3) reflects the confusion over the distinction between ontological and epistemological categories among the church fathers. (See reference no. 15, pp. 83ff.) The mind-brain representation given here attempts to reflect theological orthodoxy with one essence of mind-brain and multiple representations (hypostases) of them, according to what they appear to us to be. When Basil the Great realized that *person* should be equated to hypostasis instead of ousia, orthodox ontology came together rapidly. Here, mind and brain are similarly related in that the distinction between ontological and epistemological representations reflects the distinction between ousia and hypostasis in orthodox Christology.

A second important aspect of biblical religion relevant to the mind-brain problem is the difference in ontological orientation between the concrete and wholistic Hebrew or biblical mind and the abstract and dualistic Neo-Platonist mind of the New Testament and Patristic era. Because Neoplatonism gave the church fathers philosophical categories or concepts with which to express Christian dogma, some of its concepts have remained an integral part of theological formulation. The interaction of the biblical "raw data" with a Platonic philosophical base has created a juxtaposition of ideas that are not easily harmonized. A prime example, close to the mind-brain problem, is the relationship of soul (or spirit) to body. Perhaps new ontological ideas, such as those being developed empirically in AI, will cast new light on the contrast between the Platonic belief in immortality of the soul and the biblical emphasis on resurrection of the body.

Conclusions

In conclusion, an approach to the mind-brain problem that combines ontological monism with epistemological dualism has been presented. It reflects central aspects of orthodox ontology while overcoming the faults inherent in identity theory and epiphenomenalism, and is consistent with what has been learned from the empirically oriented activity of knowledge representation in AI.

ACKNOWLEDGEMENTS

The refinement of this paper was aided by the useful critiques given by Dr. Loren Wilkenson of Regent College, Vancouver, B.C., and Dr. Judy Manley Toronchuck of Delta, B.C. at the CSCA meeting at which this paper was originally presented. Also, discussions with Dane Waterman and Dr. Michael J. Freiling were influential.

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"An angry man stirs up dissension,
and a hot-tempered one commits many sins.
A man's pride brings him low,
but a man of lowly spirit gains honor."

Proverbs 29:22,23

A Taxonomy of Creation

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The spectrum of possible viewpoints on origins is explored and reclassified on the basis of three levels of questions. First, what is the relationship of God to the natural world? Second, how might God act (or not act) to produce novelty and direction? Third, what is the pattern of appearance?

Few disagreements in modern thought are as confusing as the debate over the relationship of God to the creation of the natural world. Certainly real issues are at stake, but one gropes after them, confused by clouds of rhetorical smoke. The confusion could be much reduced by clearer definitions from both "sides." Both "evolutionists" and "creationists" do much categorical pigeon-holing and give multiple definitions to their banner words—evolution and creation. For example (Fig. 1), evolution has been defined as "fact" (observed change in gene frequency); as "mechanism" (neo-Darwinian natural selection); as "scenario" (the descent of species from common ancestors by transformation); as a "central paradigm" ("Nothing in Biology makes sense except in the light of evolution"—Dobzhansky, 1973), and as a materialistic "weltanschaung" ("The whole of reality *is* evolution, a single process of self-transformation."—Huxley, 1953). The meaning of the word "Creation" has been equally abused in exactly the same way (see Fig. 2). What seems to be needed for communication is some new way to classify viewpoints. The goal of this paper is the beginning of such a "taxonomy of creation."

The Relationship of God to the Natural World

The first principle of systematics is that some differences in structure are more important than others. Part of the fuel for the "origins" debate has been a lack of insight into which conceptual differences are central and distinctive, and which are secondary and peripheral. I suggest that in such a proposed classification the world-view is central. In relation to science, the most important conceptual distinctive in world-views is the relationship between the cosmos (matter) and Deity. I will discuss four distinct aspects of this relationship, and will distinguish a spectrum of five world-views, based on the presumed degree of autonomy of the natural order. This classification is summarized in Figures 3 and 4. The dominant world-view of our age among scientists is materialistic naturalism, which holds the universe to be completely autonomous in every aspect of its existence. On the other hand, both the ancient Hebrews and the early modern scientists (Robert Boyle, for instance) held a full theism, viewing the universe as completely dependent in every aspect (see Fig. 3) (Klaaren, 1977). The three "intermediate" views listed in Figure 4 hold the cosmos to be autonomous in some senses, dependent in others. Figure 4 is not intended to be an exhaustive classification, but is limited to viewpoints which consider a Deity (if existing) to be an eternal, omnipotent spirit other than the cosmos in essence (i.e., pantheistic views are not considered.)

The first two aspects of reality shown in Figure 4, origin and intervention, apply to the possibility of

transcendent divine activity, meaning divine activity which is "ex machina." God acts from outside the natural order, contra "natural law." These aspects are the origin of the system (cosmos, matter, etc.) and the openness of the existing system (cosmos) to outside intervention or intrusion. The second two aspects, existence and direction, apply to the possibility of immanent divine activity; i.e, God acting in concert with the natural order, through "natural law." These aspects therefore imply a certain relationship between "natural law" and God. They concern the continuing existence and behavior of matter and the possibility of directive activity taking place through (using) natural law. In the next few paragraphs, I will briefly explore the meaning of autonomy versus dependence for each aspect.

Few ultimate options exist for the origin of the cosmos. A truly autonomous origin (Fig. 4; origin) could only be thought to happen in one way: the material system must be in some sense cyclic. Either mass/energy is eternal (presumably oscillating), or energy is fed backward "past" time (the hyper-dimensional space-time continuum) to emerge at the "creation." Neither of these is a commonly held view at present. Most materialists are simply willing to live with mystery, accepting a universe generating itself *ex nihilo* via the laws of nature. The alternative viewpoint, dependent origins, posits that a sufficient cause for the initial creation of the system must be outside the system. The Christian view of God is especially satisfying because He has both the will to act and sufficient power. One implication of a dependent origin is that the laws governing the structure of the cosmos are expressions of His will.

Autonomy of the cosmos from outside intrusion, the second aspect (Fig. 4; intervention), is a statement that there can be no "singularities," points where physical events within the cosmos must be explained in terms of causes from outside the cosmos. The cosmos is either considered to be "all there is" or to be somehow closed to the reality without; or, alternately, the reality without is considered to be of such a nature that it would never "interfere" with lawful processes of the cosmos. If the cosmos is considered open to intrusive action, natural law is not denied, although there is a possibility of events which can not be explained completely from causes within the system. In that case, science could only describe the boundaries of the singularity, rather like a description of a black hole.

The third aspect of reality, existence (Fig. 4), represents a watershed in world-views. A cosmos autonomous in existence does not need a sustaining Deity in order to continue in existence. The law governing its continuance and operation exists directly in its elementary particles. Such a cosmos can live, though God be dead. Natural law itself is autonomous. There can be no doubt that the Biblical writers view "nature" as completely dependent upon the continuing will and action of God. In such a viewpoint natural law itself is the orderly expression of the presently active will of God, and is therefore exterior to the system, rather than being "on the particle." If God is dead, or if His "mind wanders," the universe is non-existent. Due to the positivistic heritage of the last century, we have an instinctive feeling that science is only possible if natural law is an intrinsic characteristic of the particle. However, Klaaren (1977) has argued cogently that it was the view that law was contingent to the will of God which led to the rise of modern science. Science simply requires law, not a particular sort of law.

The fourth aspect, direction (Fig. 4), looks even deeper into the concept of natural law, and may be even more foreign to the contemporary mindset. If law is considered to be a rigid framework which can not, or will not, permit directive action on the part of God, then the universe is autonomous. Even a sustaining law based on God's active will can be thought of being as completely deterministic and non-directive as the most materialistic of viewpoints. Must one hold such a view if the world is to be made safe for science? Despite the

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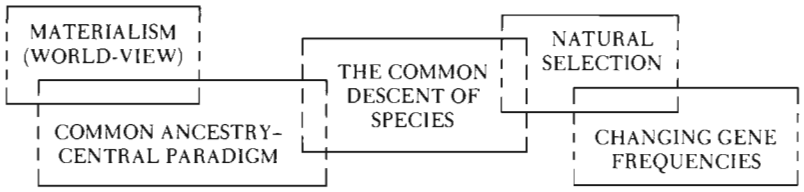

Figure 1. Evolution—How to not define a word precisely.

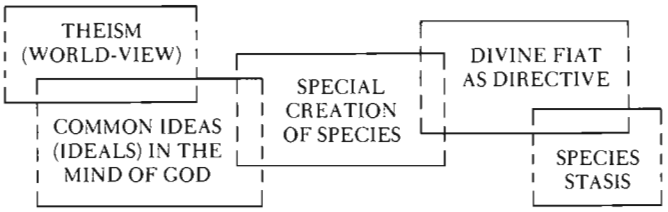

Figure 2. Creation—How to not define a word precisely.

fears of the twentieth century, modern science began with a world-view which considered the Providential direction of the events of nature fully acceptable. Nor was this direction seen as antagonistic to the concept of secondary causes, but, rather, supportive of them (Klaaren, 1977). This is the position spelled out in the Westminster Confession of Faith, for instance. A dependent universe, in this sense, is one in which God continuously directs all natural events, without tension, through natural law. I think it important to remember that this is no peripheral idea, but one central to the scriptural picture of Divine lordship. Surely we expect Him to act in this fashion if we pray requesting Him to meet specific needs.

How Might Novelty and Direction Be Produced?

Central to the debate concerning biological origins are the questions of the source of novelty and the source of direction. Such questions can form a second level of our "taxonomic hierarchy," as illustrated in Figure 5. Materialists, as well as deists and theists, differ on these questions. If true randomness is characteristic of the movement of atomic particles, such "stochastic" events may add novelty, and even provide direction. If the cosmos is truly deterministic, all events and structures were implicit in the nature of the origin, although many of these events may look random to our limited viewpoint. The most popular viewpoint is a hybrid one, considering novelty to be due to random events (mutation) and direction to be locally deterministic (natural selection).

Full deism may be divided into the same groups as materialism. If the cosmos is deterministic, then all the events were programmed at creation to unroll in time. Both novelty and direction would be fixed by the initial program. Direction is set by the characteristics of natural law, and novelty by the initial state of the cosmos. If the cosmos is stochastic, then God could program potentials, but could not know how the results would work out. Although significant novelty and direction would be implicit from the beginning, the stochastic openness would contribute to both in determining outcomes. One unique differentiation for biology within full deism would be the mode of species creation; from nothing, from abiotic matter, or from a (just) previously created species. In the first two cases, similarity would be due only to common ideas in God's mind. In the third, it would also indicate "common ancestry" (although not due to "natural" processes).

Intrusive deism may also be divided into deterministic and stochastic viewpoints. In the deterministic view, all events are still programmed for both novelty and direction. However, instead of all programming being done at the time of origin, it is also done at many small intrusive "mini-origins" as time passes. A stochastic view would tend to view intrusive events as not only creative and directive, but also as possibly corrective of "wrong" novelty input from stochastic processes (or perhaps, free will).

Legal deists will tend to look at the universe in almost exactly the same ways that the intrusive deists do. However, they will view intervention in a fundamen-

	TRANSCENDENCE (God acting from outside "natural law")		IMMANENCE (God acting through {inside} "natural law")	
	ORIGIN	INTERVENTION	EXISTENCE	DIRECTION
BIBLICAL (FULL) THEISM	Cosmos is dependent upon God for all aspects			
MATERIALISM	Cosmos is autonomous from God for all aspects			

Figure 3. Aspects of the Relationship of God to the Natural World

Origin: How did the cosmos come into being?—first origins
Intervention: Is the cosmos open to God's direct acts from outside?
Existence: Can the cosmos exist without God? Law in the particles?
Direction: Does God use natural law to direct events' outcome?

tally different fashion, since they differ in their concept of natural law. In intrusive intervention, God moves against the resistance of natural law which continues in force. The legal deist, however, will view intervention as local points where natural law is temporarily cancelled (or changed) in favor of some alternative divine action. Creation is, of course, that point when God first began to act in the fashion of natural law.

Full theists are significantly different in their viewpoint, since law itself is viewed as an avenue through which God works directively and continuously. Novelty could therefore arise by programming of the initial structures, by "guided" deterministic events, by "chosen" stochastic events, and by "outside" intervention (that which appeared to be an intrusive event). Theistic viewpoints might be distinguished on the basis of which of these mechanisms are emphasized. It would, however, be hard in a given instance to distinguish between God's various modes of operation, since all are God's hand in action. "Laws" are not seen as a description of what God has made, but rather of His present and free actions. His creative Word of command still actively reverberates from the structure of reality.

What Is the Pattern of Appearance?

Given the "phyla" of world-views (what is the relationship of God to the world?), and the "classes" of sources of novelty (How does God act upon the world?), I would suggest that the logical "orders" are the scenarios of the appearance of novelty (When did He do it?). The four most extreme possibilities for what the fossil record shows would be as follows: 1) all species appeared suddenly at about the same time, 2) all species appeared suddenly, but at different times, 3) all species appeared gradually at different times, and 4) all species appeared gradually about the same time. Intermediate views are possible, of course, as illustrated in Figure 6. One may hold any scenario of appearance with each of the world-views in Figure 4, although acceptable explanations for the observed phenoma would vary.

Space will not permit a complete description of all combinations, but, as a brief illustration, consider the possible explanations for the sudden appearance of a species. A materialist might explain it as due to random events which produced a successfully changed regulatory genome, or to deterministic events which reached

	TRANSCENDENCE (God acts from without "natural law")		IMMANENCE (God acts from within "natural law")	
	ORIGIN	INTERVENTION	EXISTENCE	DIRECTION
I. FULL THEISM	D	D	D	D
II. LEGAL DEISM	D	D	D	A
III. INTRUSIVE DEISM	D	D	A	A
IV. FULL DEISM	D	A	A	A
V. MATERIALISM	A	A	A	A

Figure 4. A Classification—Relationship of God to Natural World

A = Universe is autonomous from God in this aspect of its being.
D = Universe is dependent upon God for this aspect of its being.

TYPES OF SOURCES	DEPENDENT UPON GOD	AUTONOMOUS FROM GOD
DETERMINISTIC: due to environmental direction	Providental Selection (I)	Natural Selection (II, III, IV, V)
DETERMINISTIC: not due to environmental direction	Providental Creation (I, II)	Directionless Mutation (III, IV, V)
NON-DETERMINISTIC: causes outside of natural law	Intrusive Creation (I, II, III, IV)	Stochastic Mutation (III, IV, V)

Figure 5. Alternative Sources of Novelty and Direction

World views which might accept each source are indicated by Roman numerals—following Fig. 4.

I. Full Theism
II. Legal Deism
III. Intrusive Deism
IV. Full Deism
V. Materialism

a threshold somewhere (in environment or genome) and caused a sudden change in state. A full deist might agree, but point ont that the species was planned for in the initial state of the universe, or at least was a reasonable possibility. An intrusive deist might accept the above as possibilities, but also suggest that new programming might have taken place at that point in geological time. A legal deist would agree, but would emphasize that new programming could have been caused by a local change in the laws of nature which would allow species modification. The theist would probably admit that all the above are possible explanations, but would point out that in any case we are only distinguishing between the various overlapping modes of action which God might use.

Synthesis: Clarifying the Debate

In closing this discussion, I will try to apply the framework which has been developed to four of the positions which are most commonly distinguished in the origins debate (Pun, 1982). These positions (mentioned in Fig. 6) are usually entitled Recent (sometimes called Fiat or Special) Creation(ism), Progressive Creation(ism), Theistic Evolution(ism), and Atheistic Evolution(ism), and are often characterized as a series going from the best to the worst. There is, of course, a difference of opinion concerning which end is "best" and which end is "worst." You can sometimes tell a writer's orientation by the end to which he attaches "ism." In any case, it becomes evident that these terms do not represent single clear world-views, but heterogenous and contradictory assemblages.

Atheistic Evolution(ism), as usually defined, is merely materialism; i.e., the world-view that the universe is completely autonomous and therefore God is not necessary. In the minds of many, it is also identified exclusively with the continuous appearance scenario, stochastic novelty formation and deterministic direction; i.e., the Modern Synthesis as evolutionary mechanism. Such a confusion of categories gives the impression that the neutral mutation debate, the proposal of punctuated equilibrium, or "directed panspermia," represent covert attempts on the part of certain scientists to subvert or to compromise with a theistic position. This simply is not true. These theories of mechanism are alternate scenarios or explanations, equally derivative from a mechanistic world-view.

Recent Creation(ism), as usually described, is an assemblage of viewpoints which agree only on a specific scenario of the timing of creation (a single sudden appearance), along with a definite rejection of autonomy for the cosmos in origin. It is not a cohesive *world-view*, however, since supporters can be full, intrusive, or legal deists, or theists. Currently, their most popular view of the nature of "created kinds" admits that change is possible, but only within the limits of the genetic potentials built into the initial population. (The original "kinds" are not usually identified with species by modern "recent creationists," but most are reluctant to go beyond genera, or perhaps sub-families, in trying to identify them.) Since God's present providential activity in the biological world is not seen as directive and as having purpose, this particular concept of the limits to change is a fully

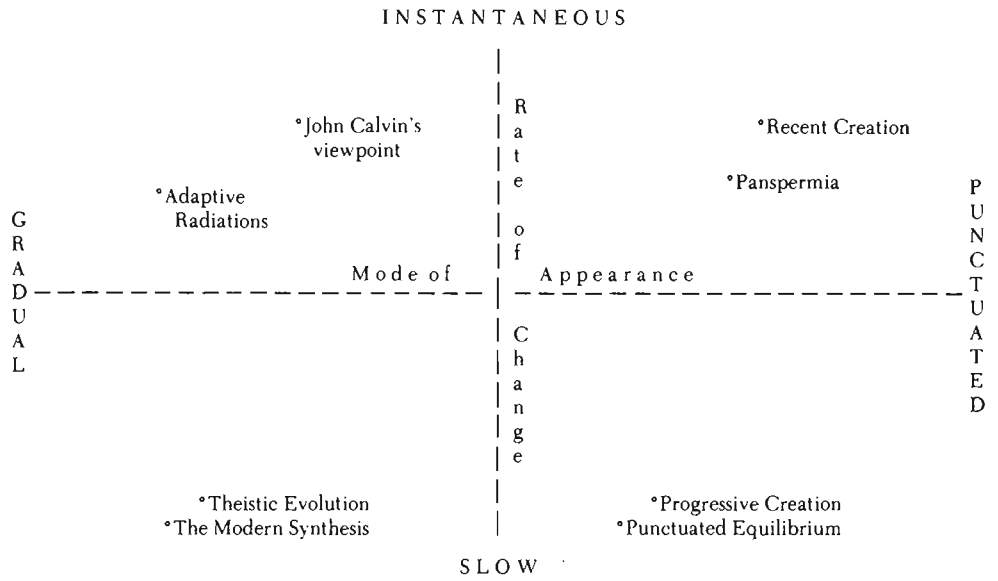

Figure 6. Variation in Scenarios of the Appearance of Novelty
°Suggested locations on the co-ordinate system for various viewpoints.

deistic and deterministic concept of the source of novelty, (although individuals who hold this view in biology are often "theistic" in other areas of thought.) A true theist can not accept the idea that any event in any realm can occur except due to the plan and present action of God. The physical source of the new "kind" might be thought to be new matter, abiotic material, or a previously created "kind." In any case, the creation process is held to be initiating, very rapid, non-reproducable and not due to the laws of nature. An older concept of species stasis (circa 1840) identified the limits of change with a "platonic ideal" species image in the mind of God, and was therefore more clearly theistic, since God was thought to be continuously acting (via natural law) to bring the (fugitive) species back to its designed ideal, or to recreate it if it became extinct.

Progressive creation(ism) also seems to represent a heterogenous set of world views which are agreed on the concept that species ("kinds") appear suddenly (special creation), but at considerable intervals, due to intrusive divine acts. Progressive creationists include both intrusive deists, legal deists and full theists. Variation in view exists regarding the source of novelty, with the most common view similar to that of the recent creationist. The "kind" is considered to be initially programmed with no later modification, a typical intrusive deistic viewpoint. As in recent creationism, the physical source of a new "kind" might be thought to be a new matter, abiotic material, or a previously created "kind," and the creation process is held to be interventional, very rapid, and non-reproducable.

A full deist could propose that such a pattern is due to an initially programmed punctuated equilibrium, or a theist, that it represents a divinely directed punctuated equilibrium. Such views would not be included in this viewpoint (as I understand its proponents, at least), despite species origins being both sudden and due to God, because they would still be due to natural law rather than to intrusive intervention. Such viewpoints would usually be cast into the next category.

In any inadequate system of classification, some category must pick up items which do not fit anywhere. That is probably the most accurate definition of what people mean by Theistic Evolution(ism). Everyone has a somewhat different, often pejorative, definition, depending upon exactly how they define the other three categories. In general, all concede that "Theistic Evolutionists" accept both the existence of God, and "regular evolution." For some, that means a full deism with an otherwise autonomous cosmos evolving in a fully materialistic fashion. Others view it as "the God of the Gaps," a variant of intrusive deism in which materialistic evolution is occasionally helped along by divine intervention. Since these views concede autonomy of law to the material particle, they ought not to be called "theistic." Recent creationists often mean by the term anyone who believes in God (in any sense), yet questions the sudden appearance model, thereby including the progressive creationists, who reject evolution as completely as they do. Materialists may mean anyone who is "scientist first, religious second." Such a potpourri is not a position, but a conceptual trash can.

Is a theistic evolutionary scenario, in the real meaning of the words, possible? Not unless one first limits the meaning of "evolution" to a single concept, for instance, to the descent of one species from another by natural law. In this I follow distinctions and definitions used by Charles Hodge, the well known Princeton theologian of the last century, as he considered Darwin's theories (1874). Anyone who is a fully biblical theist must consider ordinary processes controlled by natural law to be as completely and deliberately the wonderful acts of God as any miracle, equally contingent upon His free and unhindered will. Miracles, after all, are given as signs, not as demonstrations of God's normal activities. What then might a "theistic evolution" look like? One example of a possible theistic scenario would be this: God designs and produces the cosmos, and all of life, by immediately and directly controlled gradual continuous change due to micro-creation (mutation) and providential direction (natural selection) using only natural law. (In parallel with two previous terms, such a view could be called "Continuous Creation" after the scenario of appearance which it advocates.) It could not be held by any of the three forms of deism because it depends upon God directing through natural events. Only a full theist could hold it. The true "scandal" of theism is not that it concedes too much to materialism, but that it refuses to concede so much as the spin of a single electron.

Conclusions

In conclusion, the tension between the materialistic naturalism of our day, and the theistic viewpoint of the scripture may be resolved in one of two fashions. Either one may choose a world-view half-way between the two, as illustrated in Figure 4; or one may consider "naturalism" as a special simplified sub-set of theism, just as Newtonian physics forms a special simplified sub-set of Einsteinian physics. Materialistic explanations are useful within the limits set by their simplifying assumptions. These simplifying assumptions are the a priori framework of twentieth century science. Theistic or deistic explanations therefore are not acceptable, which is fine as long as the materialistic model of explanation (episteme) is recognized *as a model.* The value of a model, a simplified representation of reality, is to allow a more complete exploration of how well the assumptions of the model match reality. The danger of any model is the tendency to identify the model with the reality which it represents.

In this paper, I have been proposing a classification of "scientific" views or models (interpretations of nature). Naturally one will choose corresponding scriptural models (interpretations of scripture) (Barnett and Phillips, 1985). Such models do not show one-for-one identity, however. Differing models of what scripture means may be held with the same scientific model, and people with identical scriptural interpretations may differ in their scientific models. In general, the Scriptures' proclamations about the nature of God are easier to understand than its occasional statements about the specific techniques He used at particular times.

I see two things as critical for this debate. First, the Scriptures are unalterably theistic, so we have no real options in world-view. For example, we must not adopt deistic positions to limit God's possible activities to our favorite scenario. Second, we need a humble spirit concerning the correctness of our conclusions—and exclusions. This paper has presented three levels of questions which serve to differentiate various positions on origins, giving as many as one hundred distinctly different positions which might be (and commonly are) held on this subject. It is not surprising that the debate has become rigid and polarized. Complexity bewilders and discourages. Simplicity has a seductive beauty. (Un)fortunately, neither God, nor His universe, are as simple as we are.

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The Sociology of Community

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A review of the sociological concept of community concluded that sociologists are expressing an increasing level of concern about its loss in contemporary western society. Loss of community is reflected in an increasing number of social problems, including a higher suicide and crime rate, more mental depression and related psychiatric disorders. The need for community is deeply rooted in both the Scriptures and early Christian history. A reclaiming of this phenomenon is at least part of the solution to many of the problems currently confronting Western civilization.

The history of early Christianity reveals that community was one of its major social traits. Likewise, research on contemporary churches that are now thriving finds that they tend to be principally those that offer meaningful community. The degree of community in the early church is illustrated by the second century Christian writer, Justin Martyr (Roberts and Donaldson, 1885 translation:186), who described a typical church service as follows:

> On . . . Sunday, all who live in cities or in the country gather together to one place, and the memoirs of the apostles, or the writings of the prophets are read . . . Then, . . . the president . . . exhorts . . . the imitation of these . . . [examples]. Then we all rise together and pray . . . and the president . . . offers prayers and thanksgivings . . . And they who are well-to-do, and willing, give what each thinks fit; what is collected is deposited with the president, who succors the orphans and widows and those who, through sickness or any other cause, are in want, and those who are in bonds, and the strangers sojourning among us, and in a word takes care of all who are in need.

The experience of community, recognized as imperative in the early church, needs to be re-evaluated in an attempt to capture its essence which has been diluted in Christian history. This essence includes primarily a focussed, active social responsibility, which was so vividly expressed in the young church that more is known about this aspect of the early church than many, if not most, others (Sider, 1977). Christianity's historical emphasis on social concern and responsibility has been adequately discussed by other writers, and need not be reviewed here. Our focus is specifically on the sociological concept of community.

Among the many New Testament passages which deal with this problem is Acts 4:32–37, 5:1–11. This account discusses an incident which highlights the religious seriousness of not responding to community needs:

> The whole group of believers was united, heart and soul; no one claimed for his own use anything that he had, as everything they owned was held in common . . . None of their members was ever in want . . . those who owned land or houses would sell them, and bring the money from them, to present it to the apostles; it was then distributed to any members who might be in need.
>
> There was a Levite . . . Joseph who . . . owned a piece of land and he sold it and brought the money, and presented it to the apostles.
>
> There was another man, however, called Ananias. He and his wife, Sapphira, agreed to sell a property; but with his wife's connivance he kept back part of the proceeds, and brought the rest and presented it to the apostles. "Ananias," Peter said, "How can Satan have so possessed you that you should lie to the Holy Spirit and keep back part of the money [earned] from [the sale of] the land? What put this scheme into your mind? It is not to men that you have lied, but to God." When he heard this Ananias fell down dead. This made a profound impression on everyone present. The younger men got up, wrapped the body in a sheet, carried it out and buried it.
>
> Later his wife came in, not knowing what had taken place. Peter challenged her. "Tell me, was this the price you sold the

> land for?" "Yes," she said, "that was the price." Peter then said, . . . "What made you do it? [Did] you hear those footsteps? They have just been to bury your husband . . . " When the young men came in they found she [also] was dead and they carried her out and buried her by the side of her husband. This made a profound impression on the whole Church and on all who heard it. (Jerusalem Bible)

This passage vividly shows that community concern was not a Christian option, but a requirement that was practiced by all of the faithful.

The Sociology of Community

The term *community* in the public's mind refers to a collectivity of people who live in a certain defined geographical area, usually a town, city, or a section of a city. As the concept of community developed in sociology, it came to refer more to the specific experience of a group expressing concern and various types of support for each of its members. In short, it is exhibiting those values which typify the stereotypic small, caring American city in contrast to the modern industrial megalopolis. Although Mitchell (1968:32) claims that in sociology "the term community is used in a general and deliberately vague way," the concept in fact often refers to *Gemeinschaft*. This term, coined by Toennies, was used

> . . . to denote social situations wherein those involved treat one another as ends rather than means (as in the ideal type mother-child relationship); implies the same type of relationships prevailing in the ideal type primary group; contrasts with Gesellschaft and sometimes with secondary group. (Hoult, 1969:142)

Community is essentially helping when needed, neighborly concern at all times and a genuine interest in each and every community member as well as the health of the group as a whole. It is other-directedness and a direct application of the "Do unto others as you would have them do unto you" Christian ethic. Its *ideal* is giving physically and psychologically of one's self in a total sense; its *real* is often clear, deliberate known efforts in this direction, and reasonable success. The implementation of community is always imperfect, yet is always set forth as an ideal. It is among the most worthy of goals, to be earnestly sought after by all. Few disagree with its importance, yet most fail to live up to its goals (Packard, 1972). Community can range from functional concern for one's neighbors to a total family involvement typical of a commune.

According to Nisbet (1969) the concept of community has proved to be of fundamental importance in understanding all organized human relationships beyond the family level. Community is a social environment in which volitional relationships between individuals are characterized by social cohesion to the degree that commitment to each other is viewed, not just as an obligation, but as a normal, natural, and endless series of reciprocations. This commitment involves not only concern, but also personal intimacy and an emotional depth which is continuous in time and of such power that it transcends almost all personal conflicts. Although it may be conditional upon adherence to certain group norms, they are usually specified and well known. Community in these groups supersedes to some degree the individual. The welfare of the group is often above that of each member, and that of each other member is above, or at least equal, to one's own concerns. Individualism is at the least discouraged, and instead active concern over the group's goals is fostered. This concern is often translated as other-directedness expressed toward other individuals instead of toward the group collective (Drummond, 1981).

One of the more extensive early discussions of community was by Toennies (1957). His major concern was the harmful effects of the impersonalization brought about by urbanization and industrialization. As persons moved into the cities in search of better paying jobs in factories, the changes that occurred in both their lives and the factory towns themselves were researched by sociologists. Their findings were of major concern to others, especially theologians, ministers, and humanitarians. The changes were primarily from a *sacred* to a *secular* orientation, from an *ascribed* to an *achieved*

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status, and from a *corporate* and *communal* orientation to a *rational-individualistic* one. Another shift was from *mechanical solidarity* (where associations were strengthened by commonality of problems due to similar work and play) to *organic solidarity* (where associations were held together out of dependence after specialization occurs).

A major response to the demise of community that usually followed modernization was an emphasis on deliberate *moral education*. Moral instruction and socialization into a set of norms which stressed the collective good, concern for others, and moral values, especially those which encouraged a responsibility to others, became a major focus (Gardner, 1978). Community is, by definition, generally highly responsive to human needs and it can be such without exploitation or dependency, a common charge that modern welfare systems face (Holloway, 1966). A unified, harmonious community can provide effective socialization because, for the most part, the values taught are consistent and reinforced by most individual members. This milieu provides the person with a strong sense of the validity of those values which he or she was socialized to accept. Within the impersonal city, a wide variety of divergent views almost always exist. This social environment serves to impede effective socialization of those norms which favor the group over the individual.

The research on depression has been especially helpful in understanding the importance of community. Durkheim was one of the early researchers to recognize the mental health importance of bonding, the need to establish connectedness to society or to a meaningful social group. Those who have secure emotional bonds to significant others are far less apt to suffer from most types of mental depression (Fabrega, 1975). This explains the difficulty typically experienced in living alone or in adjusting to the loss of a mate. Research on bereavement has found that one of the most important factors in coping with this difficult adjustment period is the ability and initiative others take in fulfilling the various roles that the lost person successfully filled (Schoenberg et al., 1975). Providing emotional support and doing things for the person grieving would figure at the top of the list. Overcoming various emotional problems, such as loneliness or even some types of mental depression requires, principally, the mending of breaks that may have occurred between the person and his or her significant others.

The need for human contact is such that individuals who live alone will commonly turn on the TV for background noise, or they may spend much time connecting with others by the phone. Interestingly, alienation caused by modern industrialization in society has been accompanied by inventions designed to reduce the loneliness that it incurred. On large family farms there rarely was a shortage of persons to talk to and be with. Modern, mobile society, on the other hand, has produced a shortage which has forced a reliance upon electronic connectedness to other humans.

Loss of community is reflected in an increasing number of social problems, including a higher suicide and crime rate, more mental depression and related psychiatric disorders.

The Other Benefits of Community

Community not only facilitates the satisfaction of emotional needs, but also purely physical ones. It is well known that a group of individuals, by cooperating and pooling their resources, can generally accomplish much more than can any one person separately. *United we stand, divided we fall,* is not only true in wars, but also in economics. An important factor of community, illustrated best by the many Amish and Bruderhof communes, is helping those physically in need. When a barn is destroyed by a lightning fire, when a couple marries, or when hardship befalls an area, the community helps out immensely. Young Amish couples often begin their families with a house, barn, land, *et cetera,* all debt-free (Hostetler, 1980). They are not burdened with the thirty-year mortgage or spiraling debts often incurred by non-Amish, which often require half or more of a lifetime to overcome. Their bank and insurance policies are other Amish. With no middlemen and a high degree of cooperation, most all will in time prosper.

Disaster research has found that the cooperation which a tragedy forces often causes those involved to realize that a resource exists that they were often far less conscious of during good times (Eurich, 1967). This resource is often far more valuable than that which is lost. Public service commercials often stress the need for communities to pitch in and solve problems ranging from crime to pollution to urban decay. As the community goes, so its individuals go, stressing the need each of us has for each other, and that the accomplishments of one person affect the achievements of all, often directly (Zablocki, 1971). Community is thus a crucial element in society, and ever present (although in some areas and some cultures it is far more obvious and more pervasive than in others).

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The influence of community can be directly studied in the developing African countries. Those tribes which have prospered most tend to be those that are more developed in terms of community. Long (1968) studied extensively religious organizations which stress community in contrast to both religious and non-religious organizations which lack this quality. He found the former were consistently more prosperous, socially successful, and materially affluent; other psychological and sociological benefits of community were obvious as well.

Therapy for Deprivation

Some social scientists try to attribute the growth of certain religions, especially those known as cults, to economic, social, or intellectual deprivation (Montague, 1977:135). In short, they concluded that persons lacking the benefits of community in their social world are attracted to groups that offer it. Intense involvement in religions that offer community appeals to these persons because they typically provide both an explanation for their plight and a source of gratification, namely community and its normal benefits. Often a necessary pre-condition for joining many organized social movements, whether religious or secular, is the situation of felt deprivation, or at least a void in one or several life areas (Kanter, 1972; Houriet, 1971).

Community can be *non-traditional,* such as a city "service" bureaucracy (e.g., a fire department in large cities) or *traditional,* such as that stemming from a set of religious values as displayed by the Amish, or the Doukhobors (Hostetler, 1980; Zablocki, 1980; Penton, 1985). It is the glue that holds a society together, the bolts, nuts and gears that enable the machine to travel forward, and the backdrop which rewards the efforts of its members seeking individual status. It is sometimes forgotten, and often not missed until it is needed, just as hunger reminds us several times a day of the need to eat. In the same way, awareness of one's need for community is not always obviously clear or apparent. Only in the long run does its importance become vivid. The resurgence of an interest in it by sociologists and political scientists reflects an awareness of the results of longitudinal research on this topic.

The achievements of block clubs and various community agencies illustrate both the rediscovery of the need for community and its continuing function. Periodically social scientists have endeavored to bring public attention to the human need for community. Vance Packard's popular work, *A Nation of Strangers* (1972) is one of many which illustrates well, via a popular presentation, the many important functions that community serves. In spite of its recognized importance, though, if community is not already a strong part of the local cultural tradition (as is often the case in large cities, although not nearly as much as in smaller, older American towns), we need to be periodically reminded of its value (Kogan, 1960; Bettelheim, 1960). It also requires a learned commitment both to others and the local community (Houriet, 1971).

The Need for Community

The thesis that individuals long for community and its benefits has been explored by many writers (Nisbet, 1969; Zablocki, 1971; Richter, 1971). The quest for community, while not necessarily articulated by most persons, is a need that research on the individual psyche has revealed to be a strong drive in normal persons (Nisbet, 1919; Wooldridge, 1902). Alienation can actually be defined as either the inability to find community, or not being able to assimilate it once it has been found, similar to not being able to properly digest food, as in bulimia. The quest for community is so strong, according to Nisbet (1969), that

> The single, most impressive fact of the 20th century in Western society is the . . . widespread quest for community—in whatever form, moral, social, political—[and the fact that] . . . too often the quest has been [sought] through channels of power and revolution which have [in the long run] proved destructive of human community.

A food analogy here would be seeking gastric satisfaction by eating poison. Endeavoring to satisfy a longing for community through religious sects which ultimately prove destructive to the person is another example (Manuel, 1965). Assuming that the quest for community is universal, many of the same motivations exist for joining groups as diverse as religious sects and political parties. And, according to Nisbet, some groups that offer quality community not uncommonly prove eventually destructive to the larger society itself.

For some persons, a major or primary attraction of their church is its provision of community. The existence and much of the success of not only the controversial contemporary cults, but of many religions, is due to their offering what in essence is a total psychological and sociological "belonging." A commune cult

is the most extreme example. Some religions, while not as restrictive as the "family" religious communes, are psychologically pervasive to the extent that they offer an invisible commune which is almost as real as that offered by the formal commune itself.

Religious groups tend to grow and prosper to the extent that they provide community (Bergman, 1985). Those that have grown most rapidly often have been found to offer it more so than most others, partially because of a sincere dedication to a set of values which encourage community, but also because these religious groups are structured in such a way that community is integrally designed into its norms, goals, and values (Wilson, 1961, 1966). They stress that it is not only a positive good to give unto others, but a necessity (Wilson, 1970). Indeed, some churches teach that not so doing could mean eternal destruction in that God demands that one give as much as feasible of one's self to both Him and others. Giving is not an option for them, but a requirement. Members are thus conscious of this need and, however imperfectly they fulfill it, generally a sincere effort is put forth to do so. Their lack in this area often results in guilt, social chastisement and even, in some cases, in ex-communication (Bear, 1974). Exercising their capacity to give often results in rewards, both those which normally emanate from helping, and those which are given by the formal religious structure to encourage such behavior in the future. Instruction and community via role-playing and didactic reading material also have long been used (Wooldridge, 1902).

Community and the Growth of Cults

Bergman (1985) found that a major reason for joining the religious groups popularly known today as "cults" stems from their offer of a high level of community. A survey of the major contemporary "cults," including the Unification Church, the Mormons, The Way, as well as older, more established "Christian deviations" such as the Christadelphians, the Cooneyites, the Jehovah's Witnesses and even the Amish and Hutterites, finds that they all manifest a high level of community. Research has found that this is either overtly or covertly one of their major attractions (Bergman, 1985). Much of the concern expressed in the media over the growth of cults and the reasons behind this contemporary development has neglected this important factor.

Involvement in most of the strict, cultic or fundamentalistic religious groups clearly involves a trade-off, and one of the bargaining items of these fellowships is, quite openly, community. Whether the trade is worth it depends upon the person; undoubtedly in many cases it is (Quebedeaux, 1982). This is the reason why many people are willing to give up a great deal in order to involve themselves in religious groups that require a high level of conformity to a rigid moral and belief code (Bergman, 1985). The fact that many of these sects have grown fairly rapidly, and that many are continuing to add members in the face of massive negative public press, illustrates the powerful attraction of community. Even when the involvement in the religious group proves destructive, it is still extremely difficult to sever one's relationship with it (Penton, 1985). By doing so one loses community as well as social contact with persons that one has come to accept as significant others.

At least some of the costs of membership are known to neophytes—the clear possibility of persecution is often discussed with many converts, as is the requirement to adhere to moral standards which may well involve much sacrifice. Some deindividualization often takes place. One is no longer primarily a store manager, but a person among equals, one of the brothers and sisters (Peters, 1965). Mutual criticism is an important part of insuring conformity. The available sanctions are ever present. They range from minor (not allowed to say audible prayers at the meetings), to major (such as total banishment called disfellowshiping). Thus sanctions as severe as not being allowed to speak to any other member in good standing, even including those in one's family unless absolutely necessary, always hang over members' heads (Franz, 1983). The rules often indicate that the exceptions to this banishment include very few cases or situations.

Community is a social environment in which volitional relationships between individuals are characterized by social cohesion to the degree that commitment to each other is viewed . . . as a normal, natural, and endless series of reciprocations.

Community Gone Awry

Involvement in many of the growing cults requires not only a high level of community, but a large investment of time, money, energy and emotional involvement in the organization. It also not uncommonly involves renunciation of many commitments to the outside world except those that are considered manifestly necessary (such as employment or buying

goods at the store). Involvement also typically involves giving up status differences (one is just a servant of the most high) and submitting to at least ritual involvement (attending meetings, baptism) as well as adopting a new identity.

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A most important result which many see as a danger of some types of groups that offer a high level of community, such as some exclusivistic religious sects or many utopian communes, is dysfunctional transcendence. One sees him- or herself no longer as simply a human, but as a servant of the most high God, doing His will with a level of insight into the working of the universe denied most of the wisest mortals, living or dead (Holloway, 1966; Manuel, 1966). One knows the divine plan and the reason for all events—and can sit back and watch the best and the brightest in the secular world groping, just as a scientist watches a rat run into a dead end in a maze. The scientist, able to discern the way out, omnisciently watches the rat's frustration. This world view gives one who accepts it a degree of power and self-confidence difficult to equal by involvement in most other institutions.

Extreme isolation from the outside community can produce an indigenous culture which, although influenced by the outside values, finds much of the origin of its standards and ideals within. Such a group disapproves of the incorporation of elements from the outside culture, and clearly and often communicates to its members that its intrinsic values are superior. They are, in time, seen as natural and those outside as abnormal norms. Such an orientation may be functional if the community's norms are constructive, but if not it may be harmful. The children of Ida Eisenhower, for example, were raised devout Jehovah's Witnesses, yet Witnesses today not uncommonly berate them because as adults they openly rejected some of the major Witness norms. They joined the military, ran for public office, and went to college (Cole, 1955). As one Witness said relative to former President Eisenhower (Bergman, 1985:73):

> What good has his success got him? He has rejected Jehovah God and has found his paradise on earth. But that is all that he will get; a few short years of adulation and, when he is dead, he will be cut off for everlasting. To think he was raised in the truth by Sister Eisenhower and yet rejected Jehovah's beloved promises for the world! I just cannot see how someone could do that. I really feel sorry for President Eisenhower, and certainly would not want to be in his shoes.

Community may be so strong that one may even give up a promising career because it may distract one from this more important work and produce excess wealth, fame, or worldly associations. The case of two Jehovah's Witnesses who gave up their careers when they converted was reported as follows (Douglas, 1969:51):

> The English soccer world has been rocked by the decison of two top players to leave the game for full-time service with Jehovah's Witnesses. Last month, heedless of pleas from the giant crowd that included many tearful girl fans, 23-year-old Peter Knowles played his last game for Wolverhampton. Two weeks later Bobby Tambling . . . an all-England forward, also decided to quit a lucrative career, be baptized, and give 150 hours a month as a "pioneer" with the sect. His pay would be $5.88 a month with $72 annual clothing allowance . . . London's . . . Watchtower . . . spokesman denied special efforts to convert famous sportsmen, but football officials are skeptical of the disclaimer. "If any player is approached by these people we would welcome a chat with him before he gets too involved," says Cliff Lloyd, secretary of the professional footballers association. Meanwhile managers are understandably jumpy; as someone has said, they never know when a player will enter their office with the announcement: "I would like to pray with the Jehovah's Witnesses next season."

Members of the exclusivistic religions not only believe that they know "who they are," but where they came from and where they are going. A continuous whole and a purpose is seen in almost every event that occurs (Penton, 1985). Those they view as negative are Satan's temptations, the positive are God's blessings. In contrast to the rootlessness of modern society, though, members of these sects have strong roots, even if they move elsewhere. The move is usually from a congregation in which they are intimately acquainted with the members to one in which they have yet to become so. And they are confident they soon will, and almost always soon do. The technological progress which may cause one to lose the natural human community is often not a concern of those in these cults and sects (Packard, 1972).

Some Conclusions

Examination of achievement of community among the extreme religions is instructive for society as a whole. The fact that they *have* achieved it portends that the more mainline denominations can likewise do so. America, in spite of billions expended to solve such problems as poverty, suffers from about the same percent in this condition today as twenty years ago. Poverty programs at best fail and, at worst, encourage

welfare dependence, proliferating the problems that they were intended to solve. The same is true of crime, divorce, family conflicts and most other social problems. Yet many religious groups have largely solved most of these problems. How they do this is an area which has obtained only limited focus. Religious cults, while they exhibit much to condemn, also have much to emulate. The goal is to sift the wheat from the chaff. Their many community elements are the wheat that attracts millions in spite of their obvious chaff.

Summary

Much publicity has been given to various religious cults which deviate significantly from the mainstream of American Protestant, Jewish, and Catholic religious traditions. A major concern is "brainwashing" as a conversion method and the various physically coercive, or psychologically unacceptable methods of retaining members in these various religious sects (Conway et al., 1979). A major clue to conversion and commitment to many of these religious "cults" is not brainwashing, but community. They advertise a highly supportive environment, and this is often provided. The primary drawback is that such community is often contingent upon conformity to a particular belief structure and set of moral ideals. Unfortunately, the latter requirement is often not stressed until after involvement.

Although other attractions are often present, a religion often tends to grow and thrive to the extent that it offers community, and it will often remain stagnant or decline to the degree that it does not offer it. This factor has been understressed in the sociological research on various religions.

One of the major appeals of most successful churches is community. This support includes emotional, financial and social help in finding employment, personal helping such as housecleaning parties, and other aid. Gemeinschaft was historically found in smaller communities which were based primarily upon intimate social relationships. They also tended to stress that Christians should live up to an ideal behavioral standard, one that was somewhat difficult for many persons to live up to, but nonetheless was an ideal which would facilitate upward, social mobility, and provide a solution to some of the major problems of life.

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The Health of the Evangelical Body

What Can We Learn from Recent History?

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1. Introduction

The primary aim of this article is *not* (directly at least) any of the following, though each of them might be a good objective under the same title:

(a) To identify the basic beliefs we share as evangelicals.

(b) To hammer out a common strategy for the defence of evangelical doctrine.

(c) To consider how to make our common viewpoint more persuasive, vis à vis either unbelievers or non-evangelicals.

(d) To pinpoint the main thrusts of current attacks on and opposition to our evangelical faith.

(e) To consider ways of alerting the next generation to the essentials of the faith that must be safeguarded.

What I have in mind is something different from all of these, though not unrelated. I would like to focus not on what we believe, say or do, but on what we *are* as a body of interdependent members, and the sorts of things that can go wrong *organically* with the corporate life of an evangelical body. We in recent times have seen more than one movement, launched with the brightest of evangelical hopes, turn sick and die out within a few generations. Why? What went wrong? Are there discernible common factors in such cases? What were the earliest symptoms that can be seen (with hindsight) to have been ominous in the light of later events? Can we discern the main factors that seem to favour the growth of spiritual disease? Were any identifiable health precautions neglected? Did the organic structure of the evangelical body suffer any vital damage by cleavage, or blockage of healthy mutual feedback, which facilitated the local spread of disease unnoticed and unchecked? Were there any identifiable vitamin deficiencies in the regular diet?

Above all—do any of these have dangerous parallels today? Why should not the same happen to us? Does recent history suggest any "dietetic" or "hygienic" precautions that we evangelicals—all of us—ought to be observing and urgently commending here and now? Can we in our situation recognize—across whatever differences in emphasis may divide us—remediable deficiencies in the *structure of our mutual dependence*: the ways in which and the extent to which we express our loving care and shared responsibility for one another, day by day or year by year? Are there any signs of incipient failure or neglect of communication, damaging to the body as a whole and frustrating to the life of the Spirit in it? Do different members of the body perhaps suffer from dietary deficiencies of opposite kinds, each equally damaging in its own way to health and usefulness?

I have scratched my head in vain for a single term to encompass the aim I have in mind. Diagnostic, epidemiological, hygienic, dietetic—it is all of these and more. Our central question is—what factors make for corporate health and resistance to disease in our evangelical body, and what factors expose it to disease and drag it

down? We need not expect to come up with exhaustive answers, still less with a foolproof prescription for health; but I believe it is timely for us to do what we can by God's grace, and the attempt should be good for us..

2. Unstable Equilibrium?

Perhaps I should 'come clean' as to what I had in mind in my introductory note. Consider then the Free Kirk of Scotland in 1843, resounding with the compassionate evangelical orthodoxy of Chalmers. Who would have predicted that by 1893 the same Kirk would be riddled with German liberalism? Look at the evangelical Student Volunteer Movement of last century. Could its founders have foreseen how it would be gradually transformed into the Student Christian Movement (SCM) that extruded InterVarsity Fellowship (IVF) into independent existence, and how it would latterly repudiate the very concept of Christian mission that gave rise to it? Or ask Dutch evangelicals what has happened to the Gereformeerde Kerk of the stalwart Abraham Kuyper.

Consider now the present day. Evangelicalism in some respects is once again thriving. Whereas not many decades ago the evangelical witness on university campuses was small, weak and despised, nowadays one of the biggest and liveliest of all British student societies is often the Christian Union (CU). Whereas once both the supply of and demand for evangelical literature was slight, our church bookstalls now bulge with attractive paperbacks from IVP, Banner of Truth and others, including the best of classical as well as contemporary authors. Whereas once it was thought almost a sign of unsoundness for an evangelical to take too serious an interest in human arts and culture, in our time we have had Francis Schaeffer and others to encourage the opposite view from an impeccably evangelical standpoint. Whereas once it was almost obligatory for an evangelical to be anti-evolutionist, now there are those who show perhaps too little critical discernment towards current scientific fashion. Whereas once the evangelical voice was seldom heard outside its own fold, now leading evangelicals are becoming increasingly influential, even courted, in "ecumenical" circles.

Opinions may differ as to which of these changes are good in themselves. My point at the moment is only that all of them tend to create an impression that evangelicalism is now in good shape, more popular, easier to belong to than some decades ago. Can this, I wonder, be a stable situation? Has such a phase of "respectability" ever before lasted healthily more than a decade or two? If not, why not?

I believe we are usually tempted to look for answers to these questions at too superficial a level. We note that people in the earlier situations began to overemphasize the social at the expense of the spiritual; to indulge in speculative critical theories that set Scripture at odds with Scripture; to soft-pedal or abandon the miraculous for fear of being unscientific; to re-write the doctrine of redemption to eliminate 'repugnant' elements; and in general to reject or devitalize the concept of biblical authority. These, we say, are some of the fatal mistakes we must avoid. And we are right.

But this, I fear, is to focus on symptoms rather than on the disease itself. The main question we need to ask, I believe, goes deeper. What was it about the evangelical body *as an organism* that made it *vulnerable* to these disorders? There are always germs around; but a healthy evangelical movement presumably develops "resistance" to them. What were the factors at the organic level that gave the germs such an easy time?

I would love to see a group of competent historians spend time on this question, trying to identify major organic weaknesses still relevant today. At some risk to our medical metaphor, the question can be split into three parts:

A. What factors make for reproductive infertility, whereby the second and later generations fail to "breed

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true"? Are there remedies?

B. What factors make for ill-health, leading to imbalanced and disordered corporate witness? Are there antidotes?

C. What factors make for disease-proneness? Are there precautions we can take?

The Christian view of God is especially satisfying because He has both the will to act and sufficient power.

Let me very tentatively mention one or two possible candidates under each heading just as a start to discussion. There must be many others.

A. *Failure to "Breed True"*

(1) The Protestant emphasis on individual responsibility and individual convictions is meant in theory to militate against popery. For one generation, this is fine. But in the second and later generations, does the emphasis on "thinking out one's own position" tend to breed leaders even more dogmatic in a self-satisfied "know-all" spirit than those leaders who merely echo, humbly and obediently, a catholic tradition? In the next generation, will their followers tend to equate evangelical faith with stagnant conformity?

(2) The individualistic protestant father (literal or metaphorical) who "has his own strong views" may fail to exhibit and inculcate adequately the virtue of *corrigibility*. Is there any evidence of this as a danger yesterday and today? If so, can we think of any structural compensation that could be built-in against it?

(3) Does the constant need for polemical writing tend selectively to favour types of leaders who are stronger in thinking and arguing than in *personal* piety and devotion to Christ? If so . . .

(4) The more intellectually respectable a position becomes, the less searching is the challenge that must be accepted on the intellectual front by potential adherents. Does this selectively favour the accession of half-believers? Are there other challenges that should be made more explicit in compensation? (Cf. Gideon's tactics, Jesus and the rich young ruler, etc.)

B. *Ill-Health*

(1) When and why does the desire to be in tune with our community overbalance into a trendiness that distorts biblical priorities?

(2) How can we inculcate courageously free but responsible thinking as opposed to foolhardy liberal speculation? Do we lay sufficient emphasis on intellectual integrity as a God-ward duty? Do we teach young people to distinguish sharply enough between the spirit of inquiry that invites God into the sphere of one's puzzlement, and the spirit of the serpent's question in Eden, which invites one to seek knowledge apart from God?

(3) Does even conservative apologetics sometimes get the emphasis on freedom in the wrong place? For example, I recently read an evangelical discussion of "seven possible *freedoms* which the Bible gives us as we consider the cosmos." One sees what is meant, of course; but if Scripture is God's revealed truth, and if there are some questions on which Scripture is silent or can be honestly read in several ways, isn't it odd (and perhaps revealing) to call the consequence "freedom," rather than just "ignorance?" Liberty is normally thought of as a boon to be desired; but who, in science or anywhere else, would prefer liberty to knowing what is *true*?

Are there any signs of incipient failure or neglect of communication, damaging to the body as a whole and frustrating to the life of the Spirit in it?

What lies behind this traditional evangelical usage may, I think, be a subtle but significant and deep confusion between freedom from interference by theologians (which makes sense) and "freedom" from explicit information in Scripture (which makes no sense). The more I look back on disputes in the past between science and religion, the more clearly I seem to see this confusion at the root of the trouble. It chimes in all too readily with the image the devil presents of Scripture as *curbing* the free spirit rather than illuminating its exploring path, of God's truth as a jealous *rival* of what the scientific explorer may discover, and of faith as an exercise that thrives on ignorance. Is there any evidence to support my diagnosis? If there is truth in it—even a teeny grain—what needs to be done?

C. Disease-Proneness

(1) Are there insufficient opportunities for purposeful dialogue between theologians and professionally qualified laymen? Does this explain, for example, the frequent past failures of evangelical leadership to reckon promptly and adequately with scientific and other secular developments? (I don't mean making pronouncements *ex cathedra*, but simply making a sensible Christian response as new developments occur).

(2) Conversely, when laymen—especially students—have problems, do they (know how to) find the theological help they need? Is there a need for still more evangelical literature giving critiques of anti-biblical presuppositions current in various disciplines and professions?

I hope to be forgiven if these brief and scrappy examples seem naive and misguided, and to learn better. For the remainder of this paper I would like to concentrate on one further suggestion that seems to me vital. Tracing back along the chain-mesh of causes of disease-proneness ("For want of a nail . . . "), I wonder whether one of the first may not be a neglect of the interpersonal relationships that should be natural between members of the evangelical body. In particular, well before the worst symptoms are florid, it seems possible that the relationship of *mutual dependence* between leading individuals may have broken down, so that the church body is no longer a body but becomes an agglomerate, the hand saying to the foot (by implication and practice) "I have no need of thee." Leaders and their cliques on opposite "sides" take to doing their own thing, fortifying themselves against the qualms of conscience by cherishing and propagating positive caricatures of themselves and negative ones of their opponents, and ceasing to *communicate*, in the full New Testament sense of the word (Acts 2:42; 1 Cor. 12). This is what John Stott (*Balanced Christianity*) deplores as "unnecessary polarisation." Spiritually disastrous though it is, this tendency has a powerful sociological function in promoting group cohesion and the authority of the group leader, so that it is generally self-reinforcing, and requires positive efforts in the opposite direction if it is to be avoided.

I may be wrong—I wish I were—but my reason for suggesting that it is time for us to put our heads together is a conviction that we today are reaching a point where the devil could easily manoeuvre us into this same dangerous condition. In a system having momentum and inertia, whether mechanical or social, the time to take corrective precautions would be *well ahead* of the time at which the actual position has become unacceptable. Most of the leaders across the evangelical spectrum, I believe, still love and respect one another as brethren in and through each of whom the spirit of Christ lives and works, whatever reservations each may have. All, I believe, are united in wishing to see the evangelical witness preserved against any decline from biblical standards, either into a lifeless orthodoxy or into woolly liberalism.

The question I want to raise is how we can each best serve one another in the joint task of keeping the whole body on track, in the best of disease-resistant health. I propose to call this the problem of *mutual corrigibility*.

My point . . . is . . . that evangelicalism is now in good shape, more popular, easier to belong to than some decades ago. . . . Has such a phase of "respectability" ever before lasted healthily more than a decade or two?

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3. "As iron sharpeneth iron . . . "

Most of us have a horror of becoming the sort of chap who lays down the law for everybody else and "thinks he is always right." We can look back on too many past occasions when we thought we were right, and were (as we now see it) proved wrong. In compensation, we may be tempted to adopt an opposite policy of "letting people find out their own mistakes," and prefacing any remarks we venture with a modest "I'm probably wrong, but . . . ." This may be an easy way of getting along with people; but as a way of meeting our mutual responsibilities it may be as big a let-down as its opposite tack.

The trouble here is that two issues easily get confused. We want to walk in Christlike humility, and fear the pride that feeds on putting other people right as a deadly disease. But as Christ's own example shows, the alternative he would commend is miles away from a mealy-mouthed policy of disclaiming any settled convictions when questions of truth are at stake. To be sure, when short of data we may have a duty to "keep mind open and mouth shut." But unconcern as to whether we are right in what we do believe or say is a sin against the God of truth, just as much as pride. Indeed, in some personalities it can be a manifestation of pride, designed to safeguard them aginst the hurtful experience of being proved wrong in argument.

As Christians, we should be able to take for granted in one another the *desire to be right* in what we believe and preach and write and live by. That such a desire could also issue from petty pride, and so be a dangerous symptom, cannot excuse us from nurturing it as the fruit of our love for the One who has given us such truth as we have to live by.

It can help to avoid trouble here if we bear in mind a distinction in elementary logic, illustrated by contrasting the two statements:

(a) He always thinks he is right.

(b) He thinks he is always right.

There may be some circles, Christian and otherwise, in which people are undeterred by knowing or thinking they are *wrong*, or only partly right, in what they are doing or saying. Once loyalty is tied to a political slogan, it is easy for the normal standards of accuracy and care to be swept aside as a hindrance to the cause, and all expressions of doubt or qualification, on whatever grounds, branded as dangerous betrayals. No matter how much truth there may be in objections raised, such people go ahead regardless, because they think the political or other interests of their group demand it. They would presumably repudiate both descriptions (a) and (b). But such carelessness over standards of integrity is unthinkable as a norm for someone who consciously faces and seeks only to serve the God of truth. I do not mean that he never fails; but at least his steadfast aim is never knowingly to do, think or write the wrong thing in the service of Him before whom "all things are naked and open." For him, (a) should ideally be true: as far as he can see, he thinks he is right. If not, he keeps his mouth shut. He had better; for this is no more than the definition of a conscientious man.

We need one another, not as a substitute for the Holy Spirit of God, but as the very channels through whom He has appointed that we shall receive much of His guidance and encouragement and correction.

Note now some contrasts with attitude (b):

(i) Whereas (b) is incorrigible, (a) can and should co-exist with an eager readiness to cross-check where possible, to attend not uncritically but carefully to both encouragement and criticism, and to be corrected thoroughly and speedily wherever necessary. The primary concern of (a) is to *be* right, not to *feel* right.

Does the constant need for polemical writing tend selectively to favour types of leaders who are stronger in thinking and arguing than in personal piety and devotion to Christ?

(ii) Whereas (b) tends to isolate a man from his fellows in the common cause, (a) should create an *active bond* between all who share it. They respect and trust each other because they know that none of them would wittingly lower what he believes to be God's standards of truth for the sake of peace, unity or anything else; but by the same token they express this respect and trust by actively *counting on one another's help* in the continual business of cross-checking. They are bound in a comradeship that should naturally rely upon one another for any helpful feedback they can give.

(iii) Whereas (b) tends to be authoritarian in a dictatorial sense, (a) is the spirit of "a man set *under* authority." Certainly this is no woolly liberalism; and it will be equally offensive to the egocentric strain of radicalism that emphasizes "doing one's own thing," but if the authority in question is that of God in Christ, as revealed in Scripture, then this is the spirit of true freedom.

I have underlined this distinction because I believe that the kind of unity possible in the spirit of (a) is the closest and healthiest that sinful and fallible evangelical believers can hope to enjoy on earth; and that it is one of the divinely-intended protections against some of Satan's most potent assaults on the corporate health of the evangelical body. This is surely a *sine qua non* of fellowship as the New Testament understands it: not the carping criticism of the mote-puller whose satisfaction is in putting other people right, but the comradely feedback of the team-mate whose joy is to serve you if he can, and to rely on receiving the like service from you as occasion arises. I think of soldiers in the front line, relying on each other to report any apparent weakness in one another's armour. I think of a team of doctors coping with an epidemic, each lovingly alert to any signs that a colleague may have caught the disease. Why, I wonder, is it so difficult for Christian teammates to be equally realistic and dedicated in their love

for one another? Are we so confused as to what Matthew 7:1–4 is really talking about? Do we not see the dangers and the self-contradictions in withholding useful feedback from people in danger whom we profess to love?

4. The Lack of a Recognized Role.

I do not believe we are so confused as to be blind to the dangers and self-contradictions of our silences—or worse, of our criticisms behind one another's backs. I believe we are paralysed, every one of us, by the lack of an appropriate mutually *recognized role*. There exists no standard form of *agreement* whereby fellow-Christians normally pledge themselves to express their mutual love by faithfully offering feedback in this (all-too-rare) spirit, and being equally grateful to receive it. Instead, "dealing faithfully" with a brother is too often a euphemism for tearing strips off him, in just the censorious spirit Christ condemned. One immediate objection might be that most of us feel quite ill-equipped to serve one another at all reliably in the role of team-mate. We do not know one another well enough, and could not possibly make proper allowances for one another's differing knowledge and circumstances. To this two short replies are possible. First, such considerations do not seem to deter some of us from engaging in *long*-range *public* criticism of the views and actions of our brethren! Secondly, it is no part of the compact between team-mates that all feedback, whether of encouragement or criticism, should be absorbed uncritically. On the contrary, since the only aim is to upbuild one another in truth, it would have to be mutually agreed that the main function of such feedback is only to *raise questions* that might otherwise remain unasked in the recipient's mind; and that the answers to these must always be sought by each of us on our knees before God in the light of His Word. If it were not so, which one of us could dare to offer any feedback at all to another from our limited and sin-dimmed personal perspective? But given this understanding, I cannot see why the exchange of feedback should not become a relaxed and natural token of real comradeship, even where the outcome leaves the parties agreeing to differ.

Are there insufficient opportunities for purposeful dialogue between theologians and professionally qualified laymen? Does this explain, . . . the frequent past failures of evangelical leadership to reckon promptly and adequately with scientific and other secular developments?

But unconcern as to whether we are right in what we do believe or say is a sin against the God of truth, just as much as pride.

A second objection, however, might be that some of us are already so aware of our limitations that we could easily be psychologically crushed by the pressure of candid criticism, even if offered in love. But let us ask —what is the alternative? Is it better to discover secondhand that a brother Christian has been sniping at you publicly in an address or in the pages of some magazine you seldom read, or to receive a letter from the same brother raising (but not demanding an anwer to) the same questions in a spirit of comradely affection, and inviting a similar service on your part if you ever have it to offer? Even in matters of sin, let alone mere differences of opinion, our Lord's command (Matt. 18:15) is to give priority to a personal approach before making public accusations. There is no doubt in my mind as to which would produce the lesser psychological strain. More important, our Lord leaves no doubt as to which would more nearly express Christian brotherly love.

Is it easier in practice to show real love to unbelievers than to fellow-members of Christ's body from whom we differ? I hate to ask this, because of all the implications that seem to follow if the answer is yes. But—is it? And if it is, *what does this mean*? Remember that we are not talking here about softness, but about tough, realistic love that considers the best interests of the other (and those around him) as far as we can see them, and acts accordingly. How many of us consistently show *this* kind of love towards those of our fellow-evangelicals whom we see in danger of "going off the rails" in the direction of narrow legalism, selfish pietism, shallow liberalism, gospel-socialism or whatever?

I know we have excuses. We have heard that **X** is crusty, obtuse and resentful of criticism. We may have tried **Y** once and been rebuffed. **Z** may for years have been attacking a garbled version of our own views to his followers without a whisper directly to us. For all we

know, others may see *us* as **X**, **Y** and **Z** all rolled into one. Is it not totally hopeless to try to break this vicious circle? It is, if our own heart's desire is not really for the right relationship. But if our eyes are once opened to the hideous self-contradiction of the alternative, and the health-giving naturalness of "submitting yourselves [for feedback] one to another in the fear of God" (Eph. 5:21), then there is nothing to stop us, for our part, from praying and practicing accordingly, *once we know that the other expects it of us.*

As Christians, we should be able to take for granted in one another the desire to be right *in what we believe and preach and write and live by.*

5. True Koinonia

Why am I hammering so much on this one point? For two main reasons. First, I believe that all ritual criteria of *koinonia* fade into insignificance beside this test: do you treat your brother as a front-line comrade? Maybe you eat bread with him and even share platforms with him—but what is that by comparison? Maybe you pray for him, after a fashion. But is it prayer in spirit (a) or spirit (b)? If it is (a), then how is it possible that you do not show the genuineness of your prayer by the natural actions and reactions of comradeship? Is it exclusively your brother's fault? Are you *sure*?

Secondly, as mentioned already, I suspect that what must have accelerated the fragmentation of earlier movements more than anything else was that people *stopped really listening* to one another in this comradely spirit. I am not referring to the later phase in which unbelief made itself so manifest that one group could reasonably doubt whether the others were indeed members of the same team. I am thinking of a quite early stage, uncomfortably similar in some respects to that of evangelicalism today, where presumably nobody denied that the others were pledged to the same Lord and had received His spirit, but polarisation had begun to set in so that opposing parties increasingly ignored one another except for public or formal exchanges at long range. Already at that point, if I am right, the rot had set in; and it had set in among undoubted *fellow-believers*, whose Sunday protestations committed them all—on the surface—to the bonds of loving concern for one another's health as members of the same body.

But what do you do, you may ask, with a group whose members seem to have begun to flirt with rationalistic liberalism or some other equally anti-biblical spirit of the age, and who dismiss with a smile your orthodox protestations as the nervous twitterings of an obscurantist? Here let me not pretend to know what our forebears should have done. Let me only suggest what I hope could happen today if this situation were to recur. Assuming that "we" means the heirs and would-be supporters of main-stream biblical evangelicalism, our first move, I believe, must be to institutionalise, however informally, a *pact of brotherhood* with all of those from whom we differ who are willing to participate. This would begin by frankly acknowledging the depth and seriousness of the issues that divide us for the time being, but also our common wish that God would open eyes on all sides to whatever is true, and whatever may be false, in what each affirms. It would testify to our recognition of one another as team-mates with *inescapable* obligations to one another arising out of our organic membership of Christ's body; and it would proceed to agree on simple, practical steps to be taken and faithfully followed up for the maintenance at all costs of open and recognized channels of mutual feedback, solemnly promised to one another in the spirit outlined above.

To be sure, there are hypocrites who will mouth the language of love while driving in daggers of hate. There are wolves in sheep's clothing who will receive all feedback with smiles and heed none of it. But if

If the authority in question is that of God in Christ, as revealed in Scripture, then this is the spirit of true freedom.

(perish the thought) we had such among evangelicals today, then at least to include them in the mutual feedback of comradeship could hardly do more harm than the absence of such a recognized institution may be doing right now to the integrity of the evangelical body. Of course it means learning—with pain and difficulty—how to be challenged by the Holy Spirit *through* what is said to us by others in whom He presumably dwells, as distinct from accepting uncritically all they say as *ipso facto* a message *from* Him. But again, do we not have to do this just as carefully whether their counsel is offered in the love and humility of comradeship or in the *hubris* of long-range pontification?

One might even be tempted to predict that sectors of the evangelical constituency might be somewhat abashed were a habitually defensive and critical stance toward other sectors to give way to a desire to interact in an honest but brotherly fashion.

6. Conclusion

To seek to preserve the unity of an existing body is not the same problem as to try to reunite separated brethren. It is, thank God, an easier task. We *are* one team. We can without reservation pray for and show our love for one another as such.

I have written this paper as a *cri de coeur* that I hope will find echoes in all our hearts. We need one another, not as a substitute for the Holy Spirit of God, but as the very channels through whom He has appointed that we shall receive much of His guidance and encouragement and correction. Fallible as we are, we cannot rely on dead reckoning. Like a car on a straight road we depend on a constant succession of small corrections if we are not to veer off the track. We have a recurring need to be asked the right questions. Some of these questions we can expect the world to ask us: are we compassionate enough, honest enough, diligent enough . . . ? Others we can expect nobody but fellow-believers to be in a position to ask. These are the 'prods' I am anxious to make so much a natural part of evangelical inter-dependence that (like the continual small movements of a car's steering wheel) they can be frequent and small enough to be almost unnoticed. (It is only in cases where the driver's negligence makes feedback too infrequent, or where the wheel is too stiff, that correction makes the car lurch violently from side to side of the track.) Such exchanges are possible only where each *knows* that the other expects them to occur.

I do my best to think and write in obedience to God's revelation in one particular area of apologetics. I *need* my brother who sees me as running dangerously close to heresy or incoherence to tell me when he has misgivings—not as a censor or pope, but as a comrade who fears for my health and that of those who read what I write. I need to weigh questions offered in this spirit, not as "attacks" but as helpful feedback to be evaluated as realistically as possible before God. If I find misunderstandings in what he describes as my position or its implications, I should point them out not just to defend myself but as part of my service to *him*, taking it for granted that he does not wish to cherish any false caricature of my position, because he too claims to serve the God of truth and will be glad to be corrected. Any idea of scoring points in a debate should be utterly abhorrent.

Is it impossible—is it not vital?—that the diverse leadership of the evangelical movement today, "left," "right" and "centre," should resolve corporately from henceforth to use this and only this as the basis and spirit of all future relationships? Don't let us pretend that it always has been or that it now is. All of us, I am sure, know glaring exceptions at first hand. One might even be tempted to predict that sectors of the evangelical constituency might be somewhat abashed were a habitually defensive and critical stance toward other sectors to give way to a desire to interact in an honest but brotherly fashion.

That is the measure of the seriousness of our condition. Have we already bred a generation of separate evangelical constituencies who have effectively *ceased* to see, love and pray for one another as team-mates in a common enterprise against world, flesh and devil? I do not know. I would love to think that if the right lead were given, the rank and file of every sector of evangelicalism would gladly and thankfully rise to the challenge to develop more constructive, more realistic, less God-dishonouring relationships, and that the editorial policy of every evangelical journal would insist on corresponding standards for published materials. If this is not the case, it means that some at least have become addicted to a poison fatal to our corporate (if not individual) health.

And then the battle would be already lost.

Postscript

I wrote this paper originally for an informal gathering of British evangelical leaders in London some years ago. Apart from minor editorial changes I have left most of it unaltered, believing that our need for action on these lines today is even more urgent.

Book Reviews

THE ANTHROPIC COSMOLOGICAL PRINCIPLE

by John D. Barrow and Frank J. Tipler. Oxford University Press, New York (1986). 706 pages. $29.95.

This wide-ranging and creative work seeks to provide a link between the phenomena of physical science and man's place in the universe. The authors who are practicing scientists in astrophysics, general relativity and gravitation physics, imaginatively mix an array of philosophical, quasi-theological and scientific ideas in addressing the question of why nature is the way it is. Their answer is that the universe is structured for human life. While the concept of the Anthropic Principle has developed within the last two decades the authors find that it falls in a tradition of thinking about providential design that has engaged many of the great figures in human thought. It must be understood, however, that the existence of man, not God, is the concern of this work.

This volume cuts so wide a swath that few readers will have the background to follow the details of all the arguments. Happily, the authors have arranged the material in a series of self-contained chapters which enables one to consider the idea of the Anthropic Principle in terms of subject matter with which he or she is most familiar. The arrangement is essentially chronological and becomes increasingly mathematical in later chapters. However, the major ideas of the book can be understood without recourse to the mathematics.

An introductory chapter outlines the structure of the book and provides a set of "Anthropic" definitions. Although the Anthropic Principle is a part of the astrophysical literature, its definition(s) has(ve) been traditionally set in vague terms in the hope that its significance may be more closely defined in the future. Barrow and Tipler counter this notion with 'precise' definitions of three anthropic principles:

1) Weak Anthropic Principle (WAP): "The observed values of all physical and cosmological quantities are not equally probable but they take on values restricted by the requirement that there exist sites where carbon-based life can evolve and by the requirement that the Universe be old enough for it to have already done so" (p. 16). The WAP is related to the self-reference arguments of mathematics (Godel's Incompleteness Theorem) and computer science (Turing's Halting Theorem) and reminds us to take into account the limitations of a measurement device when interpreting data.
2) Strong Anthropic Principle (SAP): "The universe must have those properties which allow life to develop within it at some stage in its history" (p.21).
3) Final Anthropic Principle (FAP): "Intelligent information-processing must come into existence in the Universe, and, once it comes into existence, it will never die out (p. 23)."

Broadly, the Anthropic approach seeks to link aspects of both the local and global structure of the Universe to those conditions necessary for the existence of 'living' observers. The connections are often elusive.

The second chapter argues that the modern Anthropic ideas are in the lineage of teleological discussions which have existed from ancient times. The authors superbly weave together a summary of the ebb and flow of classical Design arguments so important to the Greeks, the Schoolmen of the middle ages and the Virtuosi of the 17th centuries with various expressions of the modern Anthropic Principle. Teleological Design Arguments arise from a synthetic, holistic and global world view while the eutaxological approach comes out of the more narrow analytical perspective of modern physical science. The Eutaxological Design Argument is found to be analogous to the WAP. The Teleological Design Argument is analogous to FAP while the SAP has elements in common with both forms of Design Arguments. The authors note problems in classical teleology which stem from Darwin's work and modern epistemology. The eutaxological approach appears most productive in providing useful analogies for the development of modern Anthropic ideas.

Chapter 3 considers the place of teleological ideas in 20th century philosophy and science. An eclectic mix of evolutionary biology, chemistry, mechanics, and thermodynamics is conditioned by the perspective of the major modern figures in philosophy and theology. Successful applications of teleological reasoning and links with current Anthropic cosmological ideas are provided.

Chapter 4 seeks to find meaning from the observations of Dirac and Weyl of approximately similar dimensionless large numbers of the order of 10^{40} and 10^{80} arising from various combinations of atomic and cosmological quantities. Anthropic reasoning has been successfully applied to show that these 'large number coincidences' are necessary properties of an observable Universe and to explain why space possesses three dimensions. The anthropomorphic perspective considers these observations as 'inevitable' consequences of the existence of man.

The next chapters extend this approach. The structure and size of the objects of nature are seen as resulting from a limited number of possible equilibrium states arising from the attractive and repulsive forces of nature. Curiously, a size-mass plot of objects ranging in size from the proton to the universe exhibits an ordered distribution pattern rather than a scatter of points (p. 290). Another 'remarkable' observation is that the gross properties of all atoms and molecules are controlled by two dimensionless physical parameters—the fine structure constant and the electron to proton mass ratio.

Theories related to objects ranging from quarks and bosons to stars are pressed into service to explain these facts. Applications, ranging from escaping from grizzly bears and estimations of the number of heart beats for mammals, are mentioned. Grand Unified Gauge Theory is pressed into use to pull the various forces of nature (excluding gravity) into a single model. Chapter 6 provides a detailed summary of current theoretical and observational cosmology pointing to cosmological coincidences and initial conditions that support the WAP.

The role of man, the observer, is discussed in the Chapter on quantum mechanics. A 'Many Worlds' interpretation is found most appropriate for use with the Anthropic Principle. The authors provide a quantum cosmological model which allows Anthropic Principles to be tested.

Chemistry finds its place in a well structured chapter on the origin of living systems. The authors define a living organism as capable of self-reproduction and containing information which is preserved by natural selection.

An analogy between living systems and a hypothetical computer-based self-replicating machine is developed. An inordinately large amount of space is spent examining the unique physical and chemical properties of water (in the tradition of the *Bridgewater Treatises* of the 1830's), carbon, nitrogen and the other elements uniquely essential for life. Ten critical steps in the evolution of DNA-based life are considered. Emphasis is placed on the stringent surface conditions of climate and photochemistry necessary for life to arise. The authors employ the WAP to show that man is unique to the earth.

They find that the time it took for the evolution of *Homo sapiens* has used up almost all of the limited time in which a G2 star like the Sun can maintain its hydrogen nuclear fuel, resulting in a limited future for human life on Earth.

The final chapter addresses the future. Although life on Earth is doomed, intelligent (humanlike) machines may carry on human civilization. 'Physical eschatology' is a new branch of physics which explores the conditions necessary for the continuance of intelligent life beyond man—even after atoms no longer exist.

This is a work that should be in all college libraries and in the hands of anyone who would see the state of late 20th century cosmology and where it is heading. The well chosen selection of references at the close of each chapter offers the reader access to the major contributions and a chance to gain the background to better understand the discussion. This book would be an ideal base for a seminar series for majors in the physical sciences. Barrow and Tippler have made a 'classic' contribution to cosmology both in terms of their creative thinking and in their elaboration of the scope of the field. Readers of theistic bent will be challenged to consider the data and speculative interpretations in the light of their own convictions. Neidhardt has offered a 'religious' response to the issues posed by the Anthropic Principle (Journal ASA *36*, 1984, pp. 201–207).

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THE HUMILIATION OF THE WORD by Jacques Ellul. William B. Eerdmans, Grand Rapids, MI (1985). (Original French copyright 1981.) xvi + 285 pages. Paperback; $14.95.

I have read and struggled over several of Ellul's Books. He is always thought-provoking, usually driving us to repentance before God. This book is as difficult, both to understand and to apply, as any of his that I have read. It opens with these words: "Do not look here for some scholarly study on iconic expression or syntagmatics or metalanguage. I am not pretending to push forward scientific frontiers. Rather, I try to do here the same thing I do in all my books: face, alone, this world I live in, try to understand it, and confront it with another reality I live in, but which is utterly unverifiable."

Ellul describes two domains: a domain of reality that is seen in images, and a domain of truth that is talked about in words but that is "utterly unverifiable." He describes a problem that confronts us: images and reality have "humiliated" truth and the word. He claims (p. 34) that he is "not attempting to make a radical separation between image and word, reality and truth, but rather to recall the distinction between them and the place of each." Nothing visual can show us the glory of God: He can only be experienced through the Word. Yet the church has succumbed to the pattern of secular society in undervaluing the word and truth, and has been invaded by images. This point is presented from a historical and a contemporary perspective. The claim is that the church thus leaves itself with nothing to say.

There is a unity intended by God encompassing these two domains (reality and truth), but at the present time, because of the Fall, we humans cannot integrate them properly (p. 102). It is not that the word is superior, but simply that it must be recognized for its role with respect to the domain of truth (p. 230). Ellul anticipates an eschatological "great reconciliation" at the "time of the New Creation" (p. 253). In the meantime, we must value the word, recognizing the existence of the two spheres and the role of speech and writing.

In the preface, the translator, Joyce Main Hanks, points out that Ellul attacks "the imperialism of images and our idolatrous prostration before them." From the book itself, as well as from the translator's remarks, one can infer that Ellul's

motivation for writing this book lay in his antipathy toward much that has happened and is happening in popular culture and in intellectual circles concerning communication and the various aspects of theory (deprecatingly referred to under the rubric "technique," as one might expect from Ellul). I share that disgust, and I value this book as a goad to concerning ourselves with the *content* of communication, and as a reminder of what God has done and continues to do through his verbal revelation of himself.

But as Ellul, perhaps too single-mindedly, builds his case, he at times says things I cannot accept. For example, at one point he interprets Moses' breaking the tables of the Law as prompted by his recognition of the identity of this sculpture with the golden calf: "The breaking of the tables of the Law takes place so that the commandment can remain a living word, addressed to each individual without existing objectively anywhere" (p. 53). But God rewrites on other stones! Again, "Experience tends to show that a person who thinks by images becomes less and less capable of thinking by reasoning, and vice versa" (p. 214). There is no documentation for this claim; I think it's debatable. One man's experience—even a brilliant spiritual man's—hardly seems sufficient for such a conclusion.

Nonetheless, this is a book worth reading. It challenges and prods as Ellul always does. And one must join in the prayer of the final sentence: "During the space of time that separates us from this final sight, may the word resound for human freedom and God's truth."

Reviewed by Dr. David T. Barnard, Associate Professor of Computing and Information Science, Queen's University, Kingston, Canada.

CROSS-CURRENTS: Interactions between Science and Faith by Colin A. Russell. William B. Eerdmans, Grand Rapids, MI (1985). 272 pages. Paperback; $14.95.

Cross-Currents: Interactions between Science and Faith is a short history of science written, as described by author Colin A. Russell, "within a Christian perspective," but not "with Christian 'bias.'" The rise of modern science is the theme which runs through the book. This theme is described symbolically as a river starting as a small brook and developing into a large flowing stream. It is the view of the author that the river of science has been fed not only from the tributaries of scientific achievements, but also from other sources including religion, particularly the Christian religion. In asserting this, Russell denies the prevalent view of science and religion locked in mortal combat. Rather, he sees them as interacting with each other in various ways throughout history.

A short quote from the book will illustrate the author's viewpoint. He states the following in the chapter entitled "Science and History":

> A study of the history of science can be justified in many ways, but there is a reason which has a special appeal to those who take seriously biblical Christianity, whether as committed Christians or as its opponents. This is the simple fact that, for most of its history, modern science has been pursued in an ostensibly Christian culture, has acquired presuppositions that derive from biblical theology, and in matters of surprising detail has sometimes displayed the most remarkable conformity with the theological views of its practitioners.

After this introductory chapter the author traces various events in the history of science from early pre-modern science to the modern era of the nuclear age. Obviously, in a book of this size not every aspect of the history of science could be discussed. Rather, Russell explores some areas in which there has been a definite relationship between religion and the development of science.

The second chapter deals with the Greek origins of science and the influence of Greek philosophy upon the development of science in Europe. This discussion is also continued in other chapters, especially in regard to the influence of Greek thought on the development of theology.

The next chapter explores the events associated with Copernicus and Galileo and is one of the more interesting sections of the book. Russell discusses the far reaching effects of the heliocentric theory. He asserts that this new idea did not merely ruffle the ecclesiastical feathers of the day, but rather ushered in a totally new way of looking at the universe—something which shook Western civilization to its very roots.

The influence of Protestantism upon the growth of science is the subject of the next several chapters. The discussion centers around several religious nonconformists, including Dalton, Priestly, and others. Here the author discusses how the theological view of these scientists influences their view of nature and the pursuit of science.

A large part of the book is devoted to a discussion of the events surrounding the evolutionary theory of Charles Darwin. There is a considerable amount of information not usually found in a discussion of this type. "Temporary Flood Warning: A Geological Interlude" deals with "flood geology" and the controversies brought on by the new discoveries of the time. The next chaper, "Troubled Waters: The Evolution Controversy," contains a very interesting and for the most part objective discussion of the controversies arising from Darwin's theory. The author chose to dismiss the current "creation-evolution" debate with a few short sentences. Nevertheless, these two chapters are well worth reading by anyone interested in this subject.

Romanticism and scientific naturalism are the subjects of the next chapter. The subheadings, "The worship of nature" and "The worship of science," describe well the contents of this chapter. In summarizing this chapter Russell states in regard to this period of history, " . . . it [Romanticism and Naturalism] obscured the fact that the whole value and purpose of science depend, not on a divine nature, but on a divine creation and a divine mandate to study it."

The more recent events in the history of science are briefly discussed in the closing chapters. Subjects included in this section are the "new physics," pollution and the environment, and the nuclear dilemma. These are short chapters, but the

author raises some interesting questions concerning the interaction of Christianity and science in the years to come.

On the whole, I found this to be an interesting book, and one which provided me with some new insights and some new questions. I found the viewpoint of the author, that science and Christianity have been allies rather than enemies, to be refreshing. I feel that the book would be of interest to most readers of *JASA*.

Perhaps the one drawback of the book is the obvious lack of reference to persons and events in America. Even though most of the history of science is confined to England and Europe, there are several Americans that were involved in the events discussed in the book (e.g., Agassiz).

The last chapter is an epilogue dedicated to Michael Faraday. The author sees in this man the personification of the theme of the book. Such a tribute is fitting for one such as Faraday, a man who devoted his life to science, but who did so only after his life was first devoted to God.

Reviewed by Phillip Eichman, Harding University, Searcy, Arkansas.

ANTHROPOLOGY IN THEOLOGICAL PERSPECTIVE by Wolfhart Pannenberg. Westminster Press, Philadelphia (1985). 552 pages + indexes. Cloth; $38.95.

Wolfhart Pannenberg, Professor of Systematic Theology at the University of Munich since 1968, is widely regarded as perhaps the leading creative theologian in the Protestant world. He has long been engaged in the production of a comprehensive theological synthesis for the post–Brunner-Bultmann-Barth-Tillich-Niebuhr era. Pannenberg's previous work includes *The Apostle's Creed, The Idea of God and Human Freedom, Jesus-God and Man* (2nd ed.), *Theology and the Kingdom of God, Basic Questions in Theology* (2 vols.), *The Church, Christian Spirituality, Revelation as History, Ethics*, and *Human Nature, Election, and History*. Readers of this *Journal* probably know him best for *Faith and Reality*, and *Theology and the Philosophy of Science*, where he argues for a unitary way of knowledge and belief in which theological discourse is fully integrated with philosophic, scientific, and historical reasoning. Pannenberg has sought to locate biblical faith not only in its social but in its cosmological context, and thereby to rescue theology from its privileged but marginal position in the academy. He continues this project in his latest book—a major volume, copiously footnoted—which German reviewers have already hailed as the finest contribution to the field of theological anthropology to appear this century.

Pannenberg understands modern theology as being thoroughly "anthropological" in character, that is, rooted in certain conceptions of the human person. In probing the human sciences for their religious implications he keeps in mind the two basic anthropological themes of traditional dogmatic theology: the image of God in humanity, and human sin. The result is what Pannenberg calls a "fundamental-theological" anthropology which confronts powerfully and directly the charge of Christianity's atheist critics (Feuerbach, Marx, Nietzsche, Freud and their followers) that theology is "mere" anthropology, that is, a product of human imagination, neurotic illusion, or the expression of social and self-alienation.

The concentration on anthropology by theologians reflects the modern history of the philosophical idea of God, where "classic" natural theology steadily lost ground. "Not the natural world as such but human experience of the world and of the individual's existence in it repeatedly supplied the point of departure for discussing the reality of God," the author writes (p. 11). This attitude, apparent as early as Nicholas of Cusa in the fifteenth century, was adopted by Descartes, Leibniz, Kant, Fichte, Schelling, and Hegel. Philosophical anthropology, in the back-seat during the patristic and medieval periods, slowly supplanted theological readings of physical reality, and ended up behind the wheel in the driver's seat. Natural philosophers and philosophical theologians no longer ransacked the universe for empirical "evidence" demonstrating the existence of God as First Cause of the natural (and social) order. Rather, they increasingly argued "from the existence and experience of humans in order to show that God is inevitably presupposed in every act of human existence" (p. 12).

In Pannenberg's view, theologians can defend their God-talk, and informed believers their faith, only if they first respond to the atheist critiques of religion which are themselves anthropologically-based. Otherwise, discourse and convictions about God will remain subjective assertions, privately valid but without serious claim to universal validity.

Toward this apologetic end, Pannenberg seeks to lay theological claim to anthropology, at least to the human phenomena that anthropology and related disciplines describe. "Secular" scientific descriptions of the human world are accepted simply as provisional versions of objective reality—versions that need to be "expanded and deepened by showing that the anthropological datum itself contains a further and theologically relevant dimension" (p. 20).

What he is calling for, then, is a "critical appropriation" of anthropology by theology, with the hope that theology in turn can shed light on the empirical sciences of the human. This is possible, if the biblical God is indeed the Creator of all reality, human and natural; it is necessary, given the anthropological turn of philosophy and theology since the seventeenth century. Pannenberg does not argue from theistic presuppositions and ecclesiastical dogma in this study. Instead, he attends to those "phenomena of human existence as investigated in human biology, psychology, cultural anthropology, and sociology and examines the findings of these disciplines with an eye to implications that may be relevant to religion and theology" (p. 21).

Pannenberg locates the twin themes of human glory and human fallenness at the heart of theological anthropology:

> To speak of the image of God in human beings is to speak of their closeness to the divine reality, a closeness that also determines their position in the world of nature. To speak of sin, on the other hand, is to speak of the factual separation from God

> of human beings whose true destiny nonetheless is union with God; sin is therefore to be thematized as a contradiction of human beings with themselves, an interior conflict in the human person. (p. 20)

Obviously, Pannenberg leaves himself vulnerable to criticism from proponents of theology of nature, process theology, and liberation theology with definitions such as these. Many would maintain, for instance, that all reality, including the human, and including the reality covered by the term "sin," is constitutively social rather than individual.

In any case, Pannenberg, in surveying modern philosophical anthropologies beginning with Max Scheler, finds his initial clue in the word of J. G. Herder, for whom "image of God" served to describe the "unfinished humanity" of human beings. It is here that a problem emerges, and recurs in the findings of all the human sciences: humans achieve their destiny only through their openness to the world over the course of their life-histories. And yet it would seem that in order to accomplish their destiny, humans would already have to be what they are still to become. This paradox of human "world-openness" or "exocentricity" appears in the psychological data, for instance, where the self is only gradually formed in the web of social relations—and yet it is the self which from the start performs this developmental task. Thus, it is argued, psychology itself indicates the reality of a deeper dimension to human nature, a given wholeness upon which the unfinished openness is founded. Pannenberg connects this to the theological theme of "image of God" as human destiny.

Although human creatures are divine image-bearers, essentially open and whole, they exhibit signs of profound alienation or brokenness which the theological concept of sin addresses. The other side of human exocentricity is "centrality," and both are viewed as "anthropological constants" needed to fully explain the results of research on questions of ego and self, identity and non-identity, language acquisition, the nature of social institutions such as marriage, and so on. As in the case of analogues to "image of God" which he found earlier in the human sciences, Pannenberg unearths in each discipline he discusses phenomena of human "sin."

Thus, Pannenberg contends that within the unfinished historicity and brokenness of the human ("sin") there is a prior unity and wholeness ("image of God"). As explicated by Pannenberg, the human sciences themselves reveal this state of affairs as necessary to the formation of human individuals and culture. The paradoxical character of humanity is anticipated and expressed through myth and religious ritual and belief. Pannenberg's analyses further suggest the contemporary relevance of what Christians have traditionally referred to as "divine providence." At every level of the scientific study of the human—from the biological to the social and historical—Pannenberg finds data which *require* for their understanding that religious context of meaning which biblical faith has identified as "image of God," "sin," "providence," "spirit," and so on.

It is difficult to convey a sense of the richness of Pannenberg's discussions in a brief review, or to indicate all the ways in which his work might interest students of religion and science. However, for example, consider this statement which appears in the course of a critique of the explanatory principles of sociobiology: "Only a biological theory of evolution that accepted the perspective of the activity of the divine spirit in all living things could trace the evolution of life on into human cultural history without being compelled to pass a new threshold where humanity as such begins its development" (p. 161). This sort of statement is typical of Pannenberg when he gets irritated, as, for instance, when he examines claims for the theological provenance of our ecological irresponsibility:

> Only beginning in the eighteenth century did the commission given to human beings to represent God in their dominion over nature turn into a claim that they have unlimited power to dispose of nature. This happened . . . at the very time when modern humanity in its self-understanding was cutting its ties with the creator God of the Bible. It is therefore incorrect to charge Western Christianity as a whole with this distortion of the biblical commission of domination, this failure to recognize the role of human beings as fiduciaries. It was in fact only the emancipation of modern humanity from biblical revelation that turned the biblical commission of domination into a subjugation of nature to human beings on their own authority and for their own arbitrary use. (p. 78)

Pannenberg also offers treatments of the concepts of guilt and conscience (pp. 285–312), of play (pp. 321–339), of human language as a medium for divine Spirit (pp. 339–396), of human sexuality and social institutions (pp. 427–443), of political order, justice, the "Kingdom of God," and Augustine's teaching on peace (pp. 444–484), and of the "unavoidable" concept of spirit in anthropology (pp. 515–532). There is much more, and it all coheres nicely with his previous theological work.

Indeed, it is only the sheer comprehensiveness of *Anthropology in Theological Perspective* that causes me to sound a final note of reservation about Pannenberg's study. It is perhaps unfair to expect some engagement with James Gustafson's theocentric ethics and anthropology, and with James Nelson's and Stephen Sapp's separate attempts at theology of sexuality. One man, after all, cannot deal with everything in one book. And unfortunately, Bernard Ramm's recent theology of sin was published too late to have been considered by Pannenberg. However, as a Christian feminist, I am disappointed with the rather thin analysis of what our nineteenth-century forebears were wont to call the "woman question." Humanity in its feminine mode does not emerge in the early foundational stages of the book, but only much later, and briefly, in a discussion of marriage. Pannenberg, who has always examined ancient beliefs in fresh and critical ways, presents no criticism of the Pauline notion of the image of God as somehow especially present in males. Finally, Pannenberg seems unaware of the vast literature of feminist social history, social ethics, hermeneutics, political theology, and philosophical anthropology. One looks in vain for evidence that Pannenberg, in preparing his massive text, read anything by Dorothee Soelle, Rosemary Reuther, Letty Russell, Virginia Ramey Mollencott, Elizabeth Schussler Fiorenza, Penelope Washbourn, Carter Heyward, Beverly Harrison, *et alia*. It's an incredible omission, one that unfortunately skews the whole impressive discussion.

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TRIAL AND ERROR: The American Controversy over Creation and Evolution by Edward J. Larson. Oxford University Press, New York (1985). vi + 213 pages + index. Cloth; $17.95.

One might be tempted to question whether there is a need for another book on the creation/evolution controversy, but if that book is *Trial and Error* by Edward J. Larson, the answer is a definite YES! The book draws on Larson's legal training (J.D. from Harvard) and his knowledge of the history of science (Ph.D. from Wisconsin) to analyze the legal aspects of the controversy. In the process, he presents an illuminating picture of the dynamic forces at work within the anti-evolution movement, the pro-evolution establishment, the legal system, and the general public.

Usually the style flows well, ideas are expressed clearly, and flashes of humor draw the reader into the analysis. Larson maintains a balanced, sympathetic treatment of the various protagonists, even if this sometimes leads him to paint a somewhat flat, simplistic caricature of individuals. Moreover, he never loses sight of his purpose which is "to analyze the legal controversy both as a central manifestation of the popular response to evolutionary thought in America and as an episode in the use of law to redress the relationship of science and society."

Larson begins by setting the pre-1920's stage. He summarizes the general attitudes of American botanists and zoologists toward Darwinism, describes the way in which Darwinism was treated by high school textbooks, and recounts how changes in society, social values, and high school enrollment converged to create a climate of fear with respect to evolution and its perceived social implications. At the turn of the century, evolutionary theory was included in the major textbooks, with varying degrees of accommodation provided for theistic involvement or its application to man. By the early 1920's, with a tenfold increase in the number of high school students over the 1890 enrollment and a post-war, rapidly changing society, many fundamentalists became concerned that the teaching of evolution in the secondary schools was destroying the religious and moral fabric of society. The anti-evolution movement was thus born. Larson describes the legal arguments, the debates, and the demographics of voting patterns as he seeks to explain how and why the anti-evolution bills were proposed, enacted, and in some cases, defeated. By the end of the 1920's, most southern states had enacted such laws, and textbook companies responded by revising biology books to exclude evolution.

The laws were enforced largely by default—if the books did not contain evolutionary material, teachers did not teach it. But interestingly, only one anti-evolution bill was proposed after 1929, and, from a legal viewpoint, nothing further occurred until 1963. During that interval, and especially in the post-Sputnik era, the status of science in the eyes of the general public, and as a recipient of government support, changed considerably from its position at the time of the Scopes trial. Moreover, legal decisions regarding the first amendment in such areas as school prayer were changing the interpretation of the "establishment" clause. Larson clearly and methodically leads the reader through the various cases which set the stage for the *Epperson vs. Arkansas* case in 1965. He explains lucidly how the changes in perceived public support for science as defined and articulated by scientists, a well reasoned legal strategy, and a changed interpretation of the first amendment led to the decision that the teaching of evolution did not present a "public hazard" and that its prohibition was based on unconstitutional religious grounds. State legislatures and courts quickly set about to repeal the anti-evolution laws, and the last one was struck down in Mississippi in 1970.

The conflict which had begun by outlawing evolution then swung toward the opposite pole, with the judicial decisions after 1970 banning the teaching of creationism. Larson describes the various attempts, strategies, short-term victories, and subsequent defeats of the Creationist groups up through the Arkansas and Louisiana cases. In this section Larson continues to explain clearly and comprehensively the convergence of societal, legal, religious, scientific, and educational forces, which yielded the inevitable decision. Larson concludes that the existence of these conflicting forces precludes the possibility that the issue will fade away. A portion of the conclusion, reprinted on the book jacket, summarizes the issue well:

> The controversy over evolutionary teaching is as lively today as ever. More than a century of scientific research on the theory of evolution has not settled the matter for the general public. Americans remain deeply divided in their beliefs about the origin and development of the human species, and a significant number care strongly enough about those beliefs to dispute how to teach the subject in school. If the issue solely involved science, it could be addressed in that forum without reaching the wider public consciousness. But, for many people, belief in evolution has implications beyond science . . . Convictions on both sides of the controversy have been too strong to permit a compromise.

This book is an invaluable resource for anyone who wishes to see the complexity of the problem and its own evolution during this century. Specifically, scientists, theologians, educators, and lawyers can benefit from Larson's careful and insightful scholarship, but it is also valuable for anyone who wants to understand better the social and legal forces which have influenced the structure of the arguments and the direction of the controversy between creation and evolution.

Reviewed by Mrs. Sara Joan Miles, Biology Department, Wheaton College, Wheaton, IL 60187.

STUDIES IN CREATION: A General Introduction to the Creation/Evolution Debate by John W. Klotz. Concordia Publishing House, St. Louis (1985). 216 pages.

The name John W. Klotz will be familiar to anyone interested in the area of creation and evolution. He is the author of numerous writings, including *Genes, Genesis and Evolution* published in 1970. Although Klotz makes no mention of this, it seemed apparent to me as I read the book, that, if not a sequel, then certainly this is an extension of the earlier work.

The author approaches the subject in an objective and open manner which is often lacking in writings on this subject. When possible, Klotz allows for alternative viewpoints. He states, for example, in reference to the age of the earth, "Aside from Scriptural limitations, the creationist is free to postulate either a young or an old earth." Klotz handles other difficult areas in the same objective manner. In regard to certain fossils of early man, for instance, he feels it best to wait for further research before drawing any conclusions.

The content of the book is similar to others in the creation/evolution area. The first two chapters contain a brief introduction to science, the scientific method, the theory of evolution, and the controversy over the evolutionary theory. The next three chapters deal with creation and the biblical information on this subject. The author here provides an overview of possible interpretations of Scriptural teachings on the creation. These chapters are followed by a general summary of the evolutionary theory.

The final two chapters are entitled "Problems for the Creationist" and "Problems for the Evolutionist." Here Klotz discusses various problems related to these two viewpoints. For example, in the chapter on creationism he discusses topics such as fossils, geographic distribution, and continental drift. The final chapter contains numerous problems associated with evolutionary theory such as human evolution, taxonomic placement of humans, animal speech, fossils of humans, fossil frauds, and mutations.

I found this book to be interesting and informative. I was disappointed, however, in two aspects of the book. First, the author failed to draw conclusions from the discussion. Often I felt that the author had brought the readers to a point only to be left without any concluding remarks. Perhaps this was the intention of the author. It is possible that he meant for the readers to draw their own conclusions. Second, the book lacks any type of index, and is therefore not as useful as it might have been as a reference work. This does not, however, detract from the value of the work.

On the whole, this book is an important contribution to the creation/evolution discussion. Klotz's analysis of human evolution alone is well worth reading by anyone interested in this subject.

Reviewed by Phillip Etchman, Department of Biology, Harding University, Searcy, Arkansas.

CREATION AND EVOLUTION: The Facts and Fallacies by Alan Hayward. SPCK Triangle Books, London, England (1985). 232 pages. Paperback; n.p.g.

Hayward is concerned over the discredit being brought to the theological concept of creation by those who insist on a recent creation, a young earth, and in particular, flood geology—views which he sees as completely untenable. He is equally unhappy with theistic evolution. In this book he tries to steer a middle course and presents a theory of ancient creation. His approach is to interpret the days of creation of Genesis 1 as "days of divine fiat." He views the days of creation in Genesis 1, not as the days on which God did the actual work of creation, but as the days in which God issued his creative comands. The actual processes which fulfilled those commands then took great and varying periods of time which from our perspective are seen as millions of years.

The book has three sections. The first section is a critique of evolution (descent with modification) and in particular of natural selection as a mechanism of evolution. The second section presents the evidence for a very old earth, and the succession of fossils of increasing complexity and variety in the geological strata. The third section focuses on the Bible and the pros and cons of various Christian views of creation.

The critique of both theistic-evolution and recent-creation theories (in particular those of "flood geology") are appropriate and well presented. The weaknesses in each view are exposed. However, Hayward does much less well at presenting a positive alternative. In a book comprised of 232 pages and thirteen chapters, only one chapter (17 pages) is devoted to an attempt to present the author's "Days of Divine Fiat" theory. The balance of the book is devoted largely to a critique of the other theories of origins. Consequently, this book shares a shortcoming with many others of its sort in its implication that weaknesses in other theories constitute evidence for the particular theory which the author wishes to propound.

In particular, although Hayward acknowledges the existence of creative processes, he makes no attempt to indicate what sort of processes brought living organisms into existence, subsequent to the divine fiats. Since he allows for creation over great time spans, presumably some process was involved which fulfilled the divine fiat. It strikes me that his interpretation of Genesis 1 as days of divine fiat would fit well with a subsequent working out of those commands through a gradual process of change such as descent with modification. However, Hayward rejects such a view, but provides no alternative.

This thought-provoking book is clearly written in a smooth and non-technical style which makes reading easy. Extensive notes and references direct the reader to sources and deal with some technical details. The best feature of the book is its detailed critique of young-earth theories and flood geology. Its worst feature is the very weak and conflicting presentation of an ancient-creation theory. It provides an interesting contribution to the debate regarding origins, but certainly no convincing answers.

Reviewed by Steven R. Scadding, Department of Zoology, University of Guelph, Guelph, Ontario, Canada.

A CASE FOR CREATION by Wayne Frair and Percival Davis. Moody Press (1983). 155 pages. Paperback; $6.95.

Most books don't last long enough to be published in three editions. This one has. Obviously, it must have something to recommend it. On page 10, the authors state that their intention was to write the book for the informed layman, or the person who is going to be a scientist. They admit that they are biologists, and haven't attempted to be geological or radiometric experts in the book. They also state that

> It is our firm conviction that Scripture must be allowed to speak to man and that man must not presume to dictate to Scripture. We are not attempting to interpret (or misinterpret) the Bible so that it speaks the language of the twentieth-century geologist or zoologist. That approach might impress naive Christians, but it would not be accepted outside the church. In the long run it would defeat its own purpose by leaving the enemy in uncontested possession of the battlefield. (p. 10)

I do not have the first edition available. The second, published in 1972, is only about two-thirds the length of the present volume. A twenty page chapter, "Occurrence of Organisms and Life," has been replaced by three chapters, totalling 62 pages, in the present edition. There are no footnotes in either edition, in accord with the stated audience, but there are suggested readings, which have been completely revised since the second edition. I might add that these readings include many which clearly do not agree with the positions of the authors, but which have been included for the readers benefit. The book itself consists of nine chapters, described in the remainder of this review.

The chapter "Evolution and Science" sets forth the views of Frair and Davis on the nature of science and covers the history of scientific views of origins. It is generally clear and fair-minded; and, on some topics, such as prediction, retrodiction and science, as good a treatment as I have read. I expected to find some mention of the sociological influences on the development of science, or on the concept of scientific revolutions, but did not. The following statement is noteworthy:

> What of creationism? Is it "scientific," or can it be made so? Strictly speaking, the answer is no. Despite the insistence by proponents that evolution is firmly established as scientific, its dependence on retrodiction greatly weakens that claim. By criticizing evolution as unscientific, however, one does not thereby establish creationism as scientific—*and this should not bother us*! Science is a practical tool for approximating truth. Though there is probably no influence more pervasive in our society than science, and though it has produced a revolution in human thought unprecedented in history, science is not infallible. Truth, in fact, takes precedence over science. Let creationists frankly acknowledge that their commitment to creation depends at least as much on faith as on science. The evolutionists are no better off. We can and should exceed them in honesty. (p. 21, emphasis in original)

Frair and Davis have followed their own advice—a major strength of the book is the author's own intellectual honesty. The reader will not have to look beyond the pages of their book to learn about some of the main attacks on the position of the authors.

The chapters "Reasons for Similarities" and "Comparative Arguments" consider the comparative arguments for relationship by descent. No such argument, whether based on skeletal structure or enzyme similarity, convinces the authors, and they state their reasons. In some cases, it appears that their reasons lack strength. For example, on page 38, they write, "If one classifies organisms on the basis of evolutionary relationships that are presupposed, how can the classification be used as evidence that the evolutionary relationships are true? The reasoning is circular." That may be so, but it doesn't seem to me to be actually what is going on in many cases. Relationships are inferred by one type of evidence, for example, skeletal, and then it is predicted that biochemical similarity will also exist between these organisms, and that is found. I don't consider that form of verification to be circular.

"The History of the Earth and Its Organisms" is the longest chapter in the book, but is probably considerably too short. It considers fossils, geology, and radioactive dating. The authors spend two pages on fossils and give a full-page illustration of Archaeopteryx but, unfortunately, there is not a single item on this creature in the references. With repect to radioactivity, there are only three short paragraphs about isotopes other than C_{14}, and no reference to, for example, the works of Davis Young.

In "The Nature of Life and its Origins," the authors, for some reason, spend over seven pages on basic cell biology. The treatment is good, but it seems that the knowledge of cell division, DNA structure and function, and the like, could have been assumed, and these pages spent on more pertinent matters. Other topics in the chapter include spontaneous generation and the origin of true cells. Once more, I am not comfortable with Frair and Davis's assignment of circular reasoning to others: "Organisms with similar base sequences are held to be related because the sequences are similar (another example of circular reasoning)" (p. 91). In the first place, it is not clear to me why that is circular reasoning. In the second place, in the previous paragraph, Frair and Davis have pointed out that a satisfactory phylogenetic tree cannot be constructed by using the amount of haploid DNA, which sounds like a similar argument.

The chapter "Genetics and Evolution" is a mere six pages. Here the authors ask whether or not pesticide resistance can truly be considered evolution. They also question the generalization of explanations given by population genetics for such events to explain the supposed origin of the phylogenetic tree.

The following two chapters, "The Origin of Behavior" and "The Study of Mankind" will not be remarked on. The final chapter, "The Bible and Creation," is, however, worth some remarks. Frair and Davis spell out their views on the authority of the Bible, and the conclusions which they derive from their view of this authority, as follows:

> God is creator.
>
> There was order in creation, as evidenced by the sequence of days.
>
> Man was the climax of creation.
>
> The process of creation was completed during a short period of time.

Frair and Davis note that this last conclusion is the "most controversial, even among creationists," and indicate the reasons for their belief. Also in this chapter, the authors consider the nature of "kind," concluding that it does not necessarily have any modern equivalent, or that, if there is one, it may be considerably larger than a species.

There is an epilogue entitled "Creationism's Unfinished Business." In it, the reader learns that one of the authors was a student of the great Theodosius Dobzhansky. He/she also learns that Frair and Davis believe that there are several definite needs of creationism, to wit:

1. An uncompromising, but civil spirit
2. More scholars
3. Clear-cut biblical foundations
4. Research, in a number of specified areas
5. Determination

Only the future will show us the course of the many present theories of origins. If the future could be determined by Frair and Davis, it would contain a theory of origins requiring special supernatural creation, and certainly one that is completely consonant with Scripture. But this future theory would be backed solidly by scientific evidence, and would be the consensus not because other theories had been ignored, or not throughly examined. Certainly this is not a perfect book. Nonetheless, it is generally well written, in a spirit that is all too rare in scientific, or any, circles—namely a spirit that allows one to consider the major facts of opposing theories.

Reviewed by Martin LaBar, Central Wesleyan College, Central SC 29630.

SOCIAL PROBLEMS: CHRISTIAN PERSPECTIVES by Charles P. DeSanto and Margaret M. Poloma, (eds). Hunter Textbooks, Winston-Salem, NC (1985). 310 pages. Paperback; n.p.g.

When I first encountered this book thoughts such as "Oh no! Not another ideological tome from the New Religious Right masquerading as science!" went through my mind. Happily, that turned out to be a serious error of prejudgment, for the book is definitely of another order.

This text is designed to be a social problems textbook for college use. It consists of twenty-one articles written by sociologists and related professionals who are Christians from about fifteen denominational orientations. At least four are ordained ministers, and two are ordained elders. The approaches are all necessarily somewhat different, and many of these differences are pointed out in the editors' introduction to each article. The references at the end of the articles total more than eighteen full pages and show a wide range of resources.

The articles are generally very well written with sound sociological and biblical understanding. There is no problem with "shifting gears" in each new article, since the introductions make the theoretical orientation of each author clear.

There are many pointed challenges to the idolatry of secularism and to the fact that American Christians (with few exceptions) have fallen prey to the ways of this world and have not been transformed through the renewing of their minds in Christ. On the more positive side, it seems that those few exceptions have tended to be people who have led the way toward a more Christ-like understanding of our society.

There are two weaknesses in the book that stand out to me, although they are not glaring and possibly could be used to promote critical thinking on the part of students using the book. These are (1) a lack of historical background in some of the articles and (2) occasional poor use of Scripture. The former claim seems self-explanatory, but the latter needs some clarification. The book contains many statements such as "Christians believe . . . " and "John (or another biblical writer) said . . . " with no reference provided. For the most part this style presents no problem, but occasionally some of us—probably because of different denominational orientations—will not view some assertions as common knowledge.

I have only taught social problems once, but that experience would lead me to recommend the book as a parallel text. The articles tend to be short with a range of 12 to 24 pages, having a mean of 15 with only two over 17. The size would not put an undue burden on students, and the alternative approaches should add much to class discussions.

My hope is that the editors-authors will feel the need to produce another edition with whatever improvements they see fit and make a very good text even better!

Reviewed by Larry Riedinger, MRE, Southern Baptist Theological Seminary; and graduate teaching assistant (sociology), University of Louisville.

FROM SCIENCE TO AN ADEQUATE MYTHOLOGY by Kevin J. Sharpe. Interface Press, Auckland, New Zealand (1984). 105 pages + notes (19 pp.) + references (10 pp.) + index. Paperback; n.p.g.

The author of this little book is a chaplain to the University of Auckland, and holds a doctorate in mathematics and a masters in theology. He describes himself as belonging to a "dying church," one of the "more liberal churches." His goal in this book is commendable, being an argument for the need for integration between science and Christian theology. Indeed, many evangelical Christians in such organizations as the American Scientific Affiliation in the United States and The Research Scientist Christian Fellowship in England regularly urge the same effort. The author, unfortunately, appears largely unaware of such activity, and is caught instead between the inflexibility of Fundamentalism on the one hand and an impotent Liberalism on the other.

Sharpe's use of the term "mythology" serves many of the same functions as the terms "worldview" or "ideology." He

sees humanity's general need for a source of adequate values, and argues that science, conservative Christianity and liberal Christianity are all inadequate for the task. Finally, he proposes his own model of an integration of science and Christianity to achieve the desired ends: "We need a mythology adequate for our society, and that must be founded on the integration of secular-scientific knowledge and that of the Christian religion in which neither is subordinated to the other" (p. 13).

For instance, he claims that science is based on the belief that "every event has a cause," and thus ignores all of modern physics with its probabilistic foundation. He assumes without real questioning that it is the authentic purpose of Genesis to provide a mechanistic explanation for the workings of the world. He wanders off into views redolent of the subjectivism of Eastern mysticism when he makes statements such as the following: "The miracles of Jesus probably did happen because they had the possibility of happening in that mythology—enough faith (and being God!) means you can do anything, even move mountains." In addition, this reviewer found Sharpe's arguments to be more laborious than necessary, in that he piles quotations from different authorities on top of one another for pages, often leaving the reader wondering what Sharpe's own opinion really is.

Sharpe finds conservative Christianity wanting in supplying the framework for an adequate "mythology," because it is totally separated from our secular life, and therefore cannot influence it. "For most moderns any 'reference to a transcendent Creator . . . [is] a dispensable relic of an outmoded past.'" Traditional religion is incapable of relating our religious life to our secular life. "How can you apply Christian morality in our modern cut-throat, competitive business world, for instance?" Or "One cannot hold truly to a strict conservative Christian theology and be also a modern and secular person, because science decrees what is true in this secular world." By focusing almost exclusively on the extremes of Fundamentalism, and neglecting the common goal of a large fraction of Christian evangelicals to make faith and life an integrated whole, Sharpe is able to draw his conclusion that "conservative Christianity is not able to make one's necessary secular life a vital and coherent part of total religious being."

He is, if anything, even quicker to dispense with the liberal Christian option, devoting only three pages to this subject. Here he appears somewhat confused, however, as exemplified by such remarks as "Biblical fundamentalism is to some extent correct; the stories [in Genesis 1–3] are meant to be taken literally. . . . It is wrong for a liberal to claim that the Genesis creation accounts were meant religiously and not factually." He calls for a "new" kind of liberal Christianity that is "firm and strong in its theology without the gaps and confusion of its predecessor."

Finally Sharpe turns to his own proposed solution: an integration of the scientific and Christian mythologies. What he wants is a "single understanding which, when looked at from the point of view of the nature of the physical world, gives more or less our present science, and when looked at from the point of view of persons gives more or less the Christian religion." To achieve this he proposes a "ladder model," with each of the scientific and theological systems being one of the vertical poles and the rungs being those things they share in common. As I mentioned above, such an approach is being taken today by many Christians who desire to uphold authentic science and authentic biblical theology; it is neither necessary to compromise one or the other, nor to invent some new way of integration. He appears to feel that the "complementarity" approach, in which science and theology are considered to provide insights into the same reality from different perspectives and for different purposes, is inadequate; and that true integration must demand that new theological insights arise out of science, and that new scientific insights arise out of theology. His own proposed elements of theology call for an acknowledgment that *this* world is ultimate, a definition of God as the cause of each event, an acknowledgment of the great gap between ourselves and reality, and an acceptance of ethical norms from the Christian tradition.

What Sharpe calls for *is* important: we *must* strive for an integration of authentic scientific understanding and authentic Christian biblical understanding. We cannot relate to the real world that God has made and sustains without understanding as much as we can about the nature of that real world. Nor can we expect a major change in the orientation of human nature without the activity of divine grace. Sharpe's call for integration is timely and essential; his discussion of it is unfortunately ambiguous and usually uninformed by a genuine understanding of the evangelical vision.

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

BEYOND THE CURSE by Aida Besancon Spencer. Thomas Nelson Publishers, Nashville (1985). 223 pages. Hardcover; $10.95.

Spencer is an evangelical Christian whose reading of Paul's letters opens the doors to women's full participation in the life of the Church. Her interpretation gives new insights into the sacred text, not by special pleading, but by reading the sacred authors with the assumption that when Paul affirmed no distinction between male and female, he really meant it. It is only remarkable because Paul is so universally read in a quite different way.

That may be why this reviewer felt Spencer's Paul was forced. For example, I Timothy 2:11–12 is taken to mean that

women *must* learn, incidentally in silence. Any teacher knows that silence may mean conviction or respect, but it may also mean boredom or resentment. Rabbi Akiba did identify silence as a "fence around wisdom," but never as a significant attribute for his students, who would have been exclusively male. Paul himself only made it relevant for females.

Spencer interprets Paul's use of the generic "people" in II Timothy 2:2 to be an indication of his unwillingness to exclude women from the teaching mission of the community. In fact, the Greek text is correctly translated, not generically, but to refer specifically to males. Even if the Greek supported Spencer's argument, no one could assert with finality that a sex-neutral term was intended to be inclusive of women. She assumes knowledge on the basis of conjecture.

But male exegetes have done as much. If the author's argument is not compelling, it is certainly suggestive. Intriguing as it is to imagine the Christian missionary Paul to be a feminist in fidelity to the Messiah Jesus, the case probably cannot be made. Spencer's efforts, even though flawed, are well worth the reading.

Her basic assumption that men and women together have a mission in the Christian community is one many others share. Her husband's "Practical Male Afterword" shows how well one couple lives out what she teaches so cogently.

This book makes an admirable case for what Jesus and Paul would certainly teach in the ninth decade of the twentieth century. Readers must decide whether the case is as strong for what they actually taught in the first century.

Reviewed by William J. Sullivan, S.T.D., Department of Religious Studies, St. John Fisher College.

THE CHURCH AND WOMEN IN THE THIRD WORLD by John C. B. Webster and Ellen Low Webster (eds.). The Westminster Press, Philadelphia, PA (1985). 167 pages. Paperback; n.p.g.

This book is a collection of eight articles on the title subject. The articles were requested by the editors and were to be empirically oriented and focused on one to three of the following themes: "Christian images of women, the role of women in the church, and the impact that the church has had on the status of women in general." There is also a helpful introduction, an annotated bibliography of empirically based studies (only one written prior to 1970) of eight pages organized geographically, and a list of the nine contributors with background information on each person.

The articles are scholarly without being pedantic and cover a wide range of issues and interests of the contributors. They should be of help to anyone interested in women in church and society regardless of academic background. The notes for the articles fill fifteen pages and include many useful explanatory comments, as would be expected in sound scholarly work.

The following list of article titles will show the scope of the book and should assist *JASA* readers in finding information of specific interest to them.

1. Images of Chinese Women
2. Assumptions about the Indian Woman underlying Protestant Church Policies
3. Sor Juana Inés de la Cruz: The First Woman Theologian in the Americas
4. Coming of Age in a Latin Church
5. Catholic Women in India
6. Cultural Ambivalence and Ceremonial Leadership: The Role of Women in Africa's New Religions
7. Third World Women and Men: Effects of Cultural Change on Interpretation of Scripture
8. Women in Philippine Basic Christian Communities

This is a fine piece of work, and I recommend it highly to anyone interested in expanding the range of information s/he brings to the debates of women in American churches.

Reviewed by Larry Riedinger, MRE, Southern Baptist Theological Seminary, Louisville, KY; and graduate teaching assistant (sociology) at the University of Louisville.

A HITCHHIKER'S GUIDE TO MISSIONS by Ada Lum, InterVarsity Press, Downers Grove, IL (1984). 143 pages. $4.95.

The author of this book has had a variety of missionary experiences in many countries in her capacity as a staff member with the International Federation of Evangelical Students. In this book for prospective missionaries, she discusses what a missionary is, and many of the experiences—"good" and "bad"—that one can expect to encounter.

Six biblical images depicting a witness, an evangelist, a herald, a pioneer, ambassador, and a servant are used to explain the commitment required of missionaries. The concrete examples of Jesus and Paul are given. Ada Lum relates the difficulties of dealing with cultural and other barriers as well as the interpersonal problems that may arise between mission team members. A separate chapter deals with women in mission, and here the author's experience is sensitively presented. Recognizing when the work in a given area is done, requiring the missionary to move on, is the subject of the last chapter.

This book is full of pragmatic advice and is solidly biblical. I recommend it highly, especially to Christian students. Those

of us who have already made major career decisions can also benefit from reading this book, since we should all be aware of missions problems and opportunities around the world and in our own lives.

Reviewed by Dr. David T. Barnard, Director of Computing Services, Associate Professor of Computing and Information Science, Queens University, Kingston, Ontario, Canada.

ANGELS, APES AND MEN by Stanley L. Jaki. Sherwood Sugden & Co. (1983). 128 pages. Paperback; $6.30 (Canadian).

It is unusual for a reviewer to have both read and heard the same message. This book is based on three lectures given at the Institute for Christian Studies, Toronto, in 1981. The title of the lectures was *From Angels, Through Apes, To Man.* The book title is a shortened and more apt version of this title.

With respect to the first lecture, "Fallen Angels," I admired Jaki's detailed knowledge of the philosophers he discusses. He appears to have read everything these thinkers ever wrote or uttered, and uses this knowledge with great effect. This is apparent in the book's footnotes, which also make clear, by citing Jaki's earlier books, that this book is the fruit of earlier labors. Nonetheless the book throws light on a subject not fully explored in previous works. As the flyer announcing the lectures put it:

> Among all aspects of human activity, the cultivation of science has commanded special attention for some time. Yet the connection between a scientist's idea of man and the viability of his formulation of scientific method has been largely neglected. Professor . . . Jaki . . . probes into that connection from Descartes through Darwin to Godel, and into the bearing on it of Christian anthropology.

Yet lecture one deals mainly with philosophers—not scientists. The explanation lies in Jaki's interest in the claim of these thinkers to have competent knowledge of "modern" science, a claim which he finds to be false (cf. pp. 22, 24, 35–39 and fn. 75). Indeed, he argues that Descartes' belief

> that cognition is *intuitive*, its origin is *innate*, [and] its operation is *independent of things* (p. 16)

led to epistemological error by virtue of its view of reason as unfallen.

From this intitial error, Jaki traces the failure of Cartesian philosophy through the course of its successors: empiricism (Locke, Hume) and idealism (Kant, Hegel). One result of all three philosophical systems was a general failure to understand scientific method and the proper consequences of Newton's achievements; another was the tendency to replace God with man. Jaki's second lecture, "Glorified Ape," was the most brilliant, witty, satirical and deeply informed critique of Darwinian materialistic philosophy I have ever heard—or read! Jaki starts by describing Rousseau as

> this man, almost entirely ignorant of and furiously hostile to the sciences, who set for the science of man a new course. He did so by fastening European thought to a new outlook on man. Man was henceforth autonomous, subject only to the voice of his sentiments and longings. (p. 50)

Sentiments and longings were natural and what nature gave was morally good. Moreover, in Rousseau's philosophy man differs only by degree from other animals. Man

> . . . was a glorified ape who instinctively turned to the vistas of his simian ancestors. To view his mental faculties . . . as evidence of something imperishable, and in a sense supernatural because given to him in a special creation, soon became an effrontry to scientific thought. (p. 50)

Thus the door was opened for Darwin's illegitimate grafting of this materialistic ideology (with suitable modifications) onto evolutionary theory.

The third lecture, "Unconquerable Man," contained a scientific revelation which still reverberates in my mind. Jaki recalled Tolman's 1934 work relating thermodynamics to an oscillating universe. What Tolman demonstrated was startling: an oscillating universe would run down because each succeeding oscillation has less energy available than the last oscillation. The conclusion: a created rather than an eternal universe.

Chapter three shows that if Descartes' anthropology erred by elevating man's mind, and Rousseau's erred by reducing man to his material body, then the correct anthropology would be a non-Cartesian dualism. This dualism's implications for science would be that, by cancelling out both the rationalism, empiricism and idealism of the "fallen angel" and the Darwinian materialism of the "glorified ape," it would thereby allow science to flourish. For science requires a mind capable of conquering the universe by thought and a body susceptible to experimentation. Man—being both—was able to develop this insight. This insight is confirmed by the fact that man comprehends matter whereas matter comprehends nothing.

Reviewed by Ted M. Beverley, Master of Divinity student, 131 Kingswood Rd., Toronto, Ontario M4E 3N4.

NO CONDEMNATION: Rethinking Guilt Motivation in Counseling, Preaching and Parenting by S. Bruce Narramore. Zondervan Publishing House, Grand Rapids, MI (1984). 320 pages.

Since Sigmund Freud focused the psychological spotlight on guilt nearly a century ago, theologians have been nervous about the intrusion into what they perceive as theological territory. Most contributors to the subject paint a dismal picture of the effects of guilt for Christians and non-Christians. *No Condemnation* presents a welcome contrast. This scholarly work, welding together the best of psychological and theological insights, provides many sound answers to

knotty problems that have plagued thinkers in the field for decades. The title, obviously, comes from the immensely reassuring words of Paul in Romans 8:1: There is therefore now no condemnation to them which are in Christ Jesus.

The book is an excellent source for counselors, pastors, therapists, physicians and others who deal with persons beset by guilt or feelings of guilt. Its scope includes guilt theory and biblical references to guilt, along with many helpful, insightful and practical comments to parents and ministers.

Bruce Narramore, Ph.D., is Professor of Psychology at Rosemead Graduate School of Professional Psychology in California. Author of more than a dozen books and numerous articles, Dr. Narramore has emerged as a major contributor to the integration of psychology and theology.

While the subject of guilt has been widely discussed in the literature, evangelical scholars have not explored this important topic in depth. The noteworthy exceptions are *Guilt and Grace*, by Paul Tournier; *Freedom from Guilt*, by Bruce Narramore, and *Guilt and Freedom*, by Narramore and William Counts.

The author approaches the topic of guilt from almost every conceivable angle. In such a brief review, only a few of the more important areas covered can be listed, which include guilt and self-esteem; the views of Freud, Fromm and Mowrer, referred to as the naturalization, humanization and glorification, respectively, of conscience; the biblical view on guilt and conscience; guilt and constructive sorrow; and inadequate therapeutic models, two of which are lowering the conscience's ideals and raising levels of behavior.

The final chapter, entitled "Psychotherapy, Guilt, and Grace," skillfully and succinctly brings together many major concepts of the book, building on the theoretical foundation that objective guilt is real, deserved and rooted in human pride, while *guilt feelings* are not from God. Patients, through psychotherapy, are to move beyond simple confession of sins to true repentance for god-playing and self-atoning behavior to gain true release from the tyranny of guilt. Christ's atonement, coupled with our appropriation of God's forgiveness, brings regeneration and a change of nature whereby we become new creatures (II Cor. 5:17). Godly sorrow for sin dispels our guilt feelings and our inadequate self-image.

The impetus for the book arose from what seemed to Narramore to be an irreconcilable conflict between psychology and theology. His early Christian training emphasized the idea that most if not all guilt feelings come from God, while his psychological training and experience indicated that the preponderance of guilt feelings are unhealthy and counterproductive.

Searchers for new truth will not find this book easy reading, but will be rewarded by a scholarly treatment that wrestles with many of the deeper and also controversial issues that have traditionally surrounded the study of guilt.

Harold W. Darling, Professor of Psychology, Spring Arbor College, Spring Arbor, Michigan.

THE RESTITUTION OF MAN: C. S. Lewis and the Case against Scientism by Michael D. Aeschliman, William B. Eerdmans, Grand Rapids, MI (1983). 94 pages.

The title presumably reflects that of the book by C. S. Lewis, *The Abolition of Man*, in which Lewis argues that man as anything more than a complex animal has been abolished by the philosophy of scientific materialism. Aeschliman points out how man has been abolished, and seeks the restitution of man to his proper place.

There have been two major streams of thought in Western philosophy in the past few centuries. One is based on a "common sense dualism," and asserts the primacy of metaphysicial knowledge. It distinguishes between mind and matter, God and the world, and means and ends; and attests to the reality of both. It provides a place for ethics, aesthetics, and other intangible aspects of reality. The other stream of thought, scientific materialism, claims that physical reality is the primary and only reality. Since it is a philosophical extrapolation from science, it is often called scientism. It claims to be based solely on observable facts, and rejects the reality of all other forms of knowledge not directly observable with our senses.

Aeschliman's purpose is to defend common sense dualism and to show how C. S. Lewis, in much of his writing, was devoted to a defense of this position and to an attack on scientism.

The book begins with a historical analysis of these two philosophical streams under the heading "scientism versus sapientia." It then goes on to review the current status of this debate, and the consequences of the dominance of the scientific materialism for our culture today. Aeschliman agrees with Lewis that the case is not simply that the consequences of scientific materialism are bad, but that the philosophy itself is internally false and inconsistent.

Since this book deals with the historical development of ideas in considerable detail, it will not appeal to everyone. However, I have found it helpful in clarifying my own thinking on these issues, and believe that it will certainly be very useful for anyone interested in the debate between "common sense dualism" and scientism.

Reviewed by Steven R. Scadding, Department of Zoology, University of Guelph, Guelph, Ontario, Canada N1G2W1.

THE FAMILY TIE by Allen Finley and Lorry Lutz. Thomas Nelson (1983). 192 pages.

"The purpose of this book is to examine the biblical principles and practical applications of sharing resources in the church around the world," say the authors. "The family referred to in the title is the worldwide church of Jesus Christ. The biblical base is built on passages which talk of sharing resources with those in need. But the authors do not focus on

relief as much as on mutual mission. The world is to be reached, and the responsibility falls on all God's people. For this to be done well, the world church must cooperate on a deeper level than has ever been done. All available assets must be pooled and mobilized.

The authors contend that this process of sharing has been hindered by faulty missiology and by false thinking. The emphasis on self-support of church movements has led people to withhold funds from needy projects, fearful of creating dependence. Distrust of those who work differently has led to reluctance to give to organizations in other cultures or countries.

The Family Tie attempts to give a new perspective on international partnerships. It draws on the considerable experience of the Christian Nationals Evangelism Commission, which grew out of a movement in 1943 to aid national workers in China. Finley has been president of Christian Nationals since 1961. Lutz edits their magazine so they write as insiders on the issues they address. That gives the book its strength—brief case studies and documentation of positive results appear throughout the book. On the other hand, it does raise questions about the objectivity of the treatment, since the authors have a stake in the reader's conclusions.

One can read *The Family Tie* and see only one group's rationale for their work. But it is far more than that. It is a significant appeal to North American Christians to rejoice in the ties God has given them with His family throughout the world, and to have their lives and outreach enriched by those ties. The authors have clarified some of the issues for this reviewer, and given encouragement to become more involved in "The Family" 's ministry.

Reviewed by Joseph M. Martin, Professor of Missions, Edward Lane Bible Institute, Patrocinio, M.G., Brazil, S.A.

A TALE OF THE TWO CHURCHES: Can Protestants and Catholics Get Together? by George Carey. InterVarsity Press, Downers Grove (1985). 166 pages. Paperback; $5.95.

Carey makes it clear from the beginning that his purpose is not to whitewash true theological differences or to encourage Protestant Christians to become Catholic or vice versa. Rather, his purpose is to present the strengths and weaknesses of both positions as he sees them, in the hope of furthering the true unity of all believers.

Commencing with Vatican II, Carey moves backwards in history to the Reformation and then forward to the present day. He devotes a full chapter each to 1) the aspects of the faith shared by both, 2) those especially meaningful to Catholics, and 3) those especially meaningful to Protestants. He then outlines the criteria for the perfect church and, after showing that no earthly church is perfect, concludes with a plea for Christians to be more accepting of other Christians while at the same time being actively committed to a corporate body of believers that holds the faith as set forth in the ancient creed of the church.

This book is "must" reading for any evangelical Protestant who is trying to understand the meaning of the Reformation for today.

Reviewed by Elizabeth M. Hairfield, Associate Professor of Chemistry, Mary Baldwin College, Staunton, VA.

Books Received and Available for Review

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

Ackerman, P. D., *It's A Young World After All* (Exciting Evidence for Recent Creation), Baker

Barlow, G. (ed.), *Vintage Muggeridge: Religion and Society*, Eerdmans

Brown, R. M., *Saying Yes and Saying No: On Rendering to God and Caesar*, Westminster

Bruce, F. F., *Jesus: Lord and Savior*, InterVarsity Press

Faulstich, E. W., *History, Harmony and the Hebrew Kings*, Chronology Books

Frey, B. L., Ingram, W. E., McWherter, T. E. and Romanowski, W. D., *At Work and Play* (Biblical Insight to Daily Obedience), Paideia Press

Gallup, G., Jr. and O'Connell, G., *Who Do Americans Say That I Am* (What Christians Can Learn from Opinion Polls), Westminster

Hall, D. G., *Imaging God* (Dominion as Stewardship), Eerdmans

Harris, R. L., Quek, S. H., and Vannoy, J. R. (eds.) *Interpretation and History* (Essays in Honor of Allan A. MacRae), Christian Life

Hulme, W. E., *Vintage Years* (Growing Older with Meaning and Hope), Westminster

Leatt, J., Kneifel, T. and Nurnberger, K., *Contending Ideologies in South Africa*, Eerdmans

Mills, W. E., *Speaking in Tongues* (A Guide to Research in Glossolalia), Eerdmans

Murphy, G. L., The Trademark of God (A Christian Course in Creation, Evolution and Salvation), Morehouse-Barlow

Neuhaus, R. J., *Dispensation: The Future of South Africa as South Africans See It*, Eerdmans

Neuhaus, R. J. (ed.), *Virtue—Public and Private*, Eerdmans

Raines, J. C. and Day-Lower, D. C., *Modern Work and Human Meaning*, Westminster

Ratzsch, D., *Philosophy of Science* (The Natural Sciences in Christian Perspective), IVP

Schaeffer, Franky, (editor), *Is Capitalism Christian?*, Crossway

Sumrall, L., *Supernatural Principalities and Powers*, Nelson

Talley, J., *Reconcilable Differences* (Mending Broken Relationships), Nelson

Taylor, R., *Single and Whole*, IVP

Torrance, T. F., *The Christian Frame of Mind*, Handsel Press

Wenham, J. W., *The Enigma of Evil* (Can We Believe in the Goodness of God?), Zondervan

White, J., *Excellence in Leadership*, IVP

Wilson, C. and McKeon, D., *The Language Gap*, Zondervan

Wilson, E. D., *Sexual Sanity* (Breaking Free from Uncontrolled Habits)., IVP

Wulf, D., *Find Yourself, Give Yourself* (How Godly Self-Respect Can Set You Free to Serve), NavPress

Young, J. J. (ed.), *Divorce Ministry and the Marriage Tribunal*, Paulist

LEARNING TO WALK ALONE by Ingrid Trobisch. Servant Books, Ann Arbor, MI (1985). 113 pages.

On June 2, 1952, Ingrid and Walter Trobisch were married to each other. On October 13, 1979, Walter died of a heart attack, making Ingrid a widow. This book is Ingrid's reflection on her years of marriage to Walter, his sudden death, and her adjustment to widowhood.

The book, although cloth-bound, is short. I read it in just over one hour. The writing is straightforward and simple, adorned only with quotations from letters, books and friends. It is a moving account of one person's adjustment to the death of a loved one, a symbol of the myriad kinds of losses experienced by every human being.

Ingrid and Walter Trobisch are famous for their work in Christian family counseling. This work was carried on through their conferences, books and personal counseling. An umbrella organization, Family Life Mission, was formed to advance their work and continues to this day.

The turning point in their ministry came with the publication of Walter's first book, *I Loved a Girl*. This book was widely read and produced an avalanche of reader's letters. Walter observed that "first I wrote *I Loved A Girl*, and then it wrote my life."

Ingrid includes in her book some nostalgia, some biography, some sentimentality, and some introspection. It is all interwoven with joy, hope and love. This book is the testimony of a Christian pilgrim who has learned that even in the valley of the shadow of death, she need fear no evil.

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

SPEAK UP! CHRISTIAN ASSERTIVENESS by R. K. Sanders and H. N. Malony. Westminister Press, Philadelphia (1985). 118 pages. Paper

The authors point out that this book is needed because many Christians do not know how to be assertive. They know how to be aggressive which results in guilt. And they know how to be passive which results in depression. But they do not know how to tread the thin line between these two extremes and get what they want. This book intends to show them how.

Sanders and Malony write that it is unscriptural for Christians to become cream-puffs who serve as doormats and pushovers. This Caspar Milquetoast approach to interpersonal relationships is self-effacing and self-defeating. Equally unscriptural is the aggressive powder-keg approach to life which fails to achieve important goals and also hurts others in the process.

Rather than adopt either of these strategies, Christians need to teach themselves to be assertive and courteous, too. To that end, this book presents some exercises designed to help readers become more assertive in just one month. The book contains some model dialogue and behavior which should make its concepts easier to understand and apply.

There have been many books written on assertion. Because of their secular approach, probably most of them have not reached the Christian reading public. This book appeals specifically to Christians to become more assertive in conflict, in church and in everyday life. I hope it has a wide circulation.

The authors are both psychologists and ministers. R. K. Sanders is executive director of the Samaritan Counseling Center and a faculty member at Stephen F. Austin University. H. N. Malony is a professor at Fuller Theological Seminary.

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

IF YOU'RE OVER THE HILL YOU OUGHTA' BE GOIN' FASTER by Carl Malz. Grand Rapids, Michigan: Zondervan Publishing House (1984). 98 pages. Paperback.

Subtitled "How to Get the Best Out of the Rest of Your Life," this book is written for people over forty years of age. Its insights, however, can be beneficial to all who want to improve life. It deals with such topics as loneliness, sickness, dying, sex, money, wills and health. Carl Malz, its author, is presently an associate evangelist with Lowell Lundstrom Ministries. In this capacity he travels widely and participates in Living-to-Win Seminars and city-wide crusades. Malz, 62, is past president of Southern Asia Bible College, founder of the Middle East School of Theology, and past vice-president of the International Correspondence Institute.

"Many have allowed their world to shrink until it is only a path on the carpet between the bedroom and the kitchen," writes Lowell Lundstrom, in the foreword. Malz argues that this does not have to happen and tells how to avoid it. At 264 pounds, barely able to run the length of a football field, he realized in his early forties that he was slowing down. He started a fitness program and it worked. On his sixtieth birthday he ran over twenty miles. Malz believes that growing old can be a rich time in life. The secret to making it so, he believes, is to counterattack and resist the myths of old age. If life is not faced with determination, it can walk over you. "Youth is shaped by energy; age is shaped by discipline," Malz believes.

Two areas where shaping up is essential are body and mind. To do this Malz emphasizes the necessity of exercise, proper diet, and a positive mental attitude. He recounts the story of a pastor who died at 53 from neglecting these prerequisites. Statistics grab the attention: 81 percent of Americans say they do not eat well; American men rank 13th in world health; the average American drinks 40 gallons of

soft drinks yearly; there are over 3000 food additives and the average person ingests eight pounds of them a year. Malz emphasizes a healthy diet as being part of God's will to which many Christians have been slow to respond. Since the Christian's body is a temple of the Holy Spirit, it should be kept in the best repair possible. Increasingly the evidence points to a diet low in salt, sugar and fats, combined with a vigorous exercise program, as the best way to do this.

This book, with less than a hundred pages, can be read in one sitting by a fast reader. Or, with only ten chapters, it could be read in bits and pieces and finished easily in a week. Either way, it is light and interesting reading and will be worth your time. It contains lots of interesting anecdotes and statistics. While the book is more motivational and inspirational than informational, it does provide listings for additional resources.

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

A LIFE STYLED BY GOD by Pamela E. Snyder. Zondervan Publishing House (1985). 122 pages. Paper.

This book is directed at a very large minority of the U. S. population: the more than thirty percent who are overweight. Dieting, claims the author, is not the solution to being overweight. Snyder believes that diet is a dirty word which means hard work followed by failure.

The purpose of this book is to help people lose weight through a change in lifestyle. The book's goal is not to offer another diet but to enable the reader to draw on God's help. This is done through a 12-lesson group Bible study in which other Christians provide fellowship and support. Behavioral-change techniques based on learning theory are also used in this approach.

Subtitled "A Woman's Workshop on Spiritual Discipline for Weight Control," this is a thin book which seeks to go beyond giving advice. It invites the reader to become a participant by doing the exercises which are the major part of the book. Activities in the exercises include diary keeping, self-evaluation, homework, group discussion and prayer. Use of the Bible is an integral part of the exercises.

Topics addressed in this volume include eating habits, savoring food, overeating, eating cues, stress, destructive thought patterns, and biblical resources. The author is qualified to deal with these issues. She is educated in human nutrition and dietetics, a registered dietitian, and an employee of a health promotion company.

There is no indication as to the success rate of this program. Statistics indicate that the majority of overweight people are unsuccessful in permanent weight reduction. This may be because they go on a diet instead of seeking to make permanent changes in the way they live. This book emphasizes gradual weight loss based on a changed attitude toward the variables that control eating. Ultimately a good deal of discipline is required. But there seems to be no other way. This book is helpful in identifying the variables in weight control and how they can be used to advantage.

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

YOU CAN CLIMB HIGHER by George Sweeting. Thomas Nelson Publishers (1985). 192 pages. $10.95.

The publisher of this book advertises it as "a kind of synthesis of the best thinking on Christian excellence from all ages." The book's purpose is to help believers overcome problems which keep them from effective Christian service. Sweeting believes that every problem is a chance to display supernatural power and that every handicap can be used as a stepping stone to climb higher.

To help Christians determine how well they are doing, the author presents nine marks of Christian excellence: faith, character, action, single-mindedness, love, suffering, prayer, wisdom, and staying power.

He illustrates these by aphorisms which are sprinkled throughout the book in large type. A maxim which sums up the message of the book comes from John W. Gardner, who himself has written a classic on the topic of excellence: "Whoever I am or whatever I am doing, some kind of excellence is within my reach."

Each chapter contains examples of individuals who have embraced the principles of excellence and ultimately achieved success. Individuals set forth as models include D. L. Moody, Charles Haddon Spurgeon, and William Carey. The author also gives glimpses into his own personal struggle in his quest to achieve excellence.

Sweeting writes in an interesting, engaging way. His many years of preaching, teaching, and writing have made him a successful communicator. He knows he will not reach the audience if they are not listening. To assure that they are, Sweeting peppers this book with pithy quotes, illuminating illustrations, and appropriate scriptures. The end result is an informative, inspirational and motivating book. It is worthy reading for all who aim at excellence. That should include every Christian.

George Sweeting is the author of seven books, editor-in-chief of *Moody Monthly*, president of Moody Institute, speaker on the radio program, *Moody Presents*, and a popular public speaker.

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

Letters

More on Four C's for the Christian

I was indeed gratified by the letters of Edith Hoffman Konopka and Wilbur Bullock in the Letters section (*JASA* June 1986), indicating their concern with the issue set forth in "Four C's for the Christian." They are quite right in seeing the issue of "success" as far wider reading than simply the environment provided by a corporation. I was undoubtedly focussing on a problem best known to me through the activities of our graduates in the physical sciences and engineering, with the involvement of many in Silicon Valley.

Perhaps it is possible to keep the original title, "Four C's for the Christian," and simply realize that the fourth *C* stands for "Career" and all of its temptations. It is a problem that is becoming increasingly challenging for young Christians starting out on career paths, and I hope to treat the subject somewhat more fully in the near future.

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'Theistic Evolution'—A Confusion of Terms?

Because of some rather unhappy experiences in the past, the title of Fred Van Dyke's article, "Theological Problems of Theistic Evolution," in the March 1986 issue of *JASA*, was of interest to me. As a believer who makes use of evolutionary explanations for biological phenomena, I have been asked (accused?) on more than one occasion whether or not I was a theistic evolutionist. I dislike that label very much and find theistic evolution to have a number of serious flaws. My objections are, however, somewhat different from those presented by Dr. Van Dyke.

The problem may be partially semantic, but the term "theistic evolution" connotes much more than the mere combination of one's theology (a belief in God) and one's science (acceptance of evolution as a valid theory). Van Dyke dwells on the implications which he believes such a combination has for one's view of God and scripture. I have some additional concerns about theistic evolution which I would like to share with the readers of JASA.

First of all, there is the view expressed in LeComte du Nouy's famous book, *Human Destiny*. In this book, du Nouy makes an elaborate argument which may be summarized very briefly as follows:

1. Evolution by chance alone is so improbable as to be impossible.
2. Evolution has, in fact, occurred.
3. Since evolution has occurred, in spite of its improbability, some supernatural power has been responsible for it.

Du Nouy argues, therefore, that evolution, rather than being at variance with belief in God, actually becomes evidence in support of belief in God. Since I associate this rather disingenuous logic with theistic evolution, I dislike being labelled as a theistic evolutionist.

There is a second line of thought I associate with theistic evolution which makes it unpalatable. The Roman Catholic theologian/paleontologist Teilhard de Chardin championed the idea that evolution was God's method for achieving a specific purpose—the formation of mankind. As a *theological statement*, I have no quarrel with de Chardin's thesis. Scripture is clear in its view that humans are the crowning achievement of God's creative work. What bothers me about de Chardin's view of man's place in nature is that it is presented as a *scientific conclusion*. There is no basis whatever, in terms of objective scientific arguments, for concluding that *Homo sapiens* is the goal toward which evolution has been striving. A somewhat absurd view, but possibly having equal scientific validity, would be the allegation that man evolved in order to provide a host for tapeworms!

As an advocate of complementarity, a point of view frequently expressed in the pages of *JASA*, I find the attempt to fuse a theological conviction with a scientific theory creates more problems than it solves. I am a theist, but if evolution is valid as an objective, scientific conclusion, then my understanding of its features (gene equilibria in populations, fossils, natural selection, comparative anatomy and biochemistry, etc.) should be no different from that of some other biologist who is not a theist.

I am a theist—I believe in God and in Jesus Christ as His revelation to humankind. I am an evolutionist—I find many biological phenomena which are not explainable except by the theory of evolution. But please, don't call me a "theistic evolutionist!"

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A Psychologist's Perspective on Juvenile Delinquency

I read the March 1986 issue of the *JASA* with considerable interest, especially the article by Jerry Bergman, "A brief history of the failure of American corrections." I am a developmental psychologist specializing in research on adolescent development. I do not regard myself as a specialist in juvenile delinquency, but I lecture on that topic in adolescent development courses. From the perspective and bias of my discipline, I notice that psychological theories about the causes of juvenile delinquency are quite different from Bergman's primarily sociological perspective. It seems that there is not much communication and interaction between adolescent psychologists and sociologists concerning the origin of criminal behavior.

Most social theories are single-factor theories implying that criminal behavior has a single cause. It is, however, possible that we are dealing with an over-determined phenomenon: that is, adolescent delinquency may be the outcome of half a dozen major variables (body type, temperamental disposition, parent-child relationships, adolescent peer groups, social control in the neighborhood, etc.), some of which may be necessary and/or sufficient conditions for delinquency. The elimination of any single predisposing variable would not appreciably reduce the delinquency rate. The disconfirming evidence cited by Bergman should be interpreted in this context.

Bergman argues that hereditary factors predisposing to crime have been discredited. He is right in the view that there are no criminal genes. Behavior genetics is one of the most rapidly expanding fields in developmental psychology. Recent evidence for the hereditability of temperamental traits in humans (activity level, persistence, intensity of emotional reactions, threshold of emotional arousal, response to new experiences, etc.) have given the issue a new twist. Most adolescent delinquents are of the so-called "difficult" temperamental constellation, characterized by high restlessness, low threshold of emotional arousal, high intensity of emotional responses, negative reactions to new experiences, irregular body rhythms, etc. A certain temperament may be a necessary (but not a sufficient) condition for becoming an adolescent delinquent. Moreover, longitudinal studies, where primary-school children were followed up until adolescence, suggest that future delinquents have quite different social and personality developments than do future nondelinquents. (J. J. Conger and A. C. Petersen's *Adolescence and Youth: Psychological Development in a Changing World*, [3rd edition, Harper, 1984, pp. 622–627] gives a brief overview of the outcomes of such studies.) In addition, the parent-child relationship (a factor not discussed by Bergman) seems to be a significant factor contributing to the development of juvenile delinquency.

The above brief comments do suggest that it is difficult to see the whole picture of this socially important topic. Recently *Christianity Today* (April 4, 1986, pp. 52–54) published a long book review of J. Q. Wilson and R. J. Herrnstein's *Crime and Human Nature* (Simon and Schuster, 1985). I expect that this review will have a considerable impact on the outlook on crime for many Christian readers. The book reflects much current psychological thinking about the origin of crime.

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Science and Theology—Immiscible?

I have been interested in the exchange of theological arguments related to the creation/evolution discussion in the March and June 1986 issues of the *Journal ASA* between Van Dyke and Murphy. I would like to call attention to a curious dilemma that may not be sufficiently clearly realized:

Thesis: *The careful construction of theological arguments against a scientific theory is likely to be self-defeating.*

Corollary 1: *A scientific theory that is suspected of being faulty should be challenged primarily by the pursuit of authentic science.*

Corollary 2: *A philosophical or ideological position, supposedly based on a particular scientific theory, should be challenged primarily by the pursuit of authentic philosophy or theology, rather than by an attack on the scientific theory.*

The thesis is based on the paradoxical realization that the more complete, more convincing, and more effective theological arguments against a scientific theory are perceived to be, the more danger they hold for the future of that particular theology if the scientific theory is demonstrated to be adequate beyond reasonable doubt. If the theological arguments against a scientific theory are weak or ambiguous, the success of the scientific theory does no real damage to the theological perspective involved. But if the theological arguments against a scientific theory are perceived to be absolutely unanswerable, then the success of the scientific theory leaves the theological perspective totally unprotected. Since we can never be certain whether a particular scientific theory will ultimately be demonstrated acceptable beyond a reasonable doubt, it is always a dangerous pursuit to construct intricate and apparently convincing theological arguments as to why the theory cannot be accepted. It is far better to deal with possible faults in the theory by the pursuit of authentic science. Similarly if the scientific theory is being extrapolated by people to derive philosophical or ideological conclusions, it is far better to deal with the inauthenticity of such an extrapolation, than it is to attack the scientific theory itself.

The Galileo experience is, of course, a principal precedent for seeing these principles in action. Galileo's scientific hypotheses caused as much upheaval as they did because the apparent theological arguments against their validity were so "self-evident." One didn't have to be an intellectual to "know" that the Bible teaches that "the earth is the center of the universe." The establishment of the scientific view caused considerable temporary distress in Christian circles. If, instead of constructing theological arguments as to why Galileo could not possibly be correct, his antagonists had done some authentic science, they would have been spared the effort and would have done ultimately much less damage to the Christian cause. Likewise, people concerned about the nihilistic consequences of our realization that the earth is only a tiny speck in the interior of a vast and almost incomprehensibly large universe, should be confronted, not with an attack on Galilean astronomy, but with an attack on whether the nihilistic conclusions are a necessary result of the scientific findings.

I add only the *caveat* that I am talking here about *tactics* and *risk minimization*. Please do not read the Corollaries above as implying that theology *cannot* have something to say to science, or that science *cannot* have something to say to philosophy or ideology. In fact, it is evident that western science itself has sprung from largely Judaeo-Christian roots, and that our understanding of biblical interpretation and revelation has been enriched by Galileo's telescope and Darwin's finches.

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Moore—A "Crisp, Clear Approach"

Congratulations on the publication of T. M. Moore's outstanding paper "Model for a Christian Approach to Scientific Endeavor" (June 1986, pp. 103–109). Moore's crisp, clear approach to the relationships between the theological sciences, natural sciences, and human sciences provides a rational framework for future discussions of this general area. His simple circle drawings are, in my opinion, particularly insightful. More generally, Moore's paper is a welcome relief from the muddle-mindedness and lack of respect for the authority of Scripture that usually accompanies such polemics on the science/Christianity interface.

Henry F. Schaefer III
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University of California, Berkeley

Value of Limitations in Science

In "Impact of the Rediscovery of Genetics on the Concept of Variation in Darwinian Theory" in the December 1985 *JASA*, Lothers discusses some of the difficulties which Mendelian genetics caused for the Darwinian approach to evolution in the early part of this century. He suggests that the earlier lack of awareness of these problems may have made easier the acceptance of Darwin's theory in the nineteenth century.

There is an historical parallel which may help to illuminate the significance of that possibility. Kepler's discovery of his three laws of planetary motion was an important step toward the development of a law of gravitation. Fortunately, the observations which Kepler had were sufficiently precise to enable him to formulate these laws. But they were not precise enough to show the "inequalities"—the deviations from strict Keplerian motion—which were later shown to be due to the mutual gravitational perturbations among the planets. It is fortunate that their precision was so limited. If Kepler had had to take into account the inequalities, it would have been practically impossible for him to arrive at any simple rules for the orbits, and the development of Newton's law of gravitation would have been much more difficult. Sometimes it is better not to know too much at the start, lest the task of constructing an adequate theory to describe the phenomena seem too formidable.

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INDEX, Volumes 36–38, 1984–1986

The locations of Indices for previous Volumes are listed on the inside back cover. Numbers in each entry refer to volume, issue, page and year. The letter is the initial of the month of the issue (March, June, September or December).

Articles

Communications

Review Essays

Book Reviews

The name of the reviewer is given at the end of the reference in italics.

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

Statement of faith: (1) *The Holy Scriptures are the inspired Word of God, the only unerring guide of faith and conduct.* (2) *Jesus Christ is the Son of God and through His Atonement is the one and only Mediator between God and man.* (3) *God is the Creator of the physical universe. Certain laws are discernible in the manner in which God upholds the universe. The scientific approach is capable of giving reliable information about the natural world.*

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